

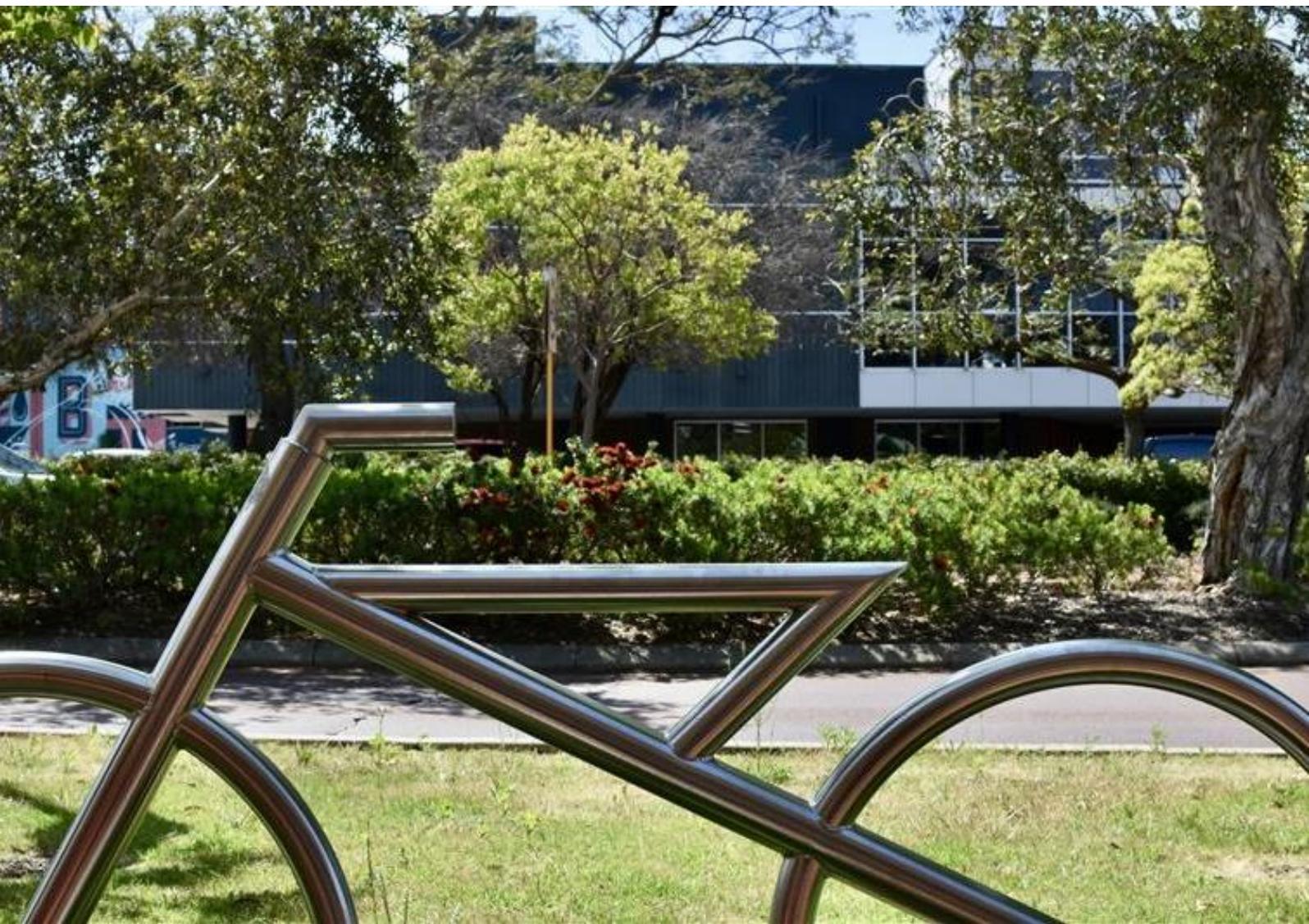


Transport Impact Assessment and Parking Management Strategy

Bassendean Precinct Structure Plan

27 June 2025

➔ **The Power of Commitment**



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Executive summary

The following is a summary of the Transport Impact Assessment (TIA), and Parking Management Strategy prepared to support the Bassendean Precinct Structure Plan. It includes a brief description of the proposed Precinct Structure Plan, the key transport issues, potential transport impacts and mitigations, together with any proposed modifications to the surrounding transport networks.

Proposed Bassendean Precinct Structure Plan

The Bassendean Precinct is designated as a 'District Centre' under State Planning Policy 4.2 - Activity Centres (SPP4.2). The Precinct Structure Plan is to apply to development within the:

- Bassendean Town Centre
- Success Hill Frame

The Precinct Structure Plan will guide the future development of the Precinct as it is a key location within the Town of Bassendean (the Town) for urban growth.

For this TIA and Parking Management Strategy, development of approximately 21,964 m² of additional non-residential floorspace, together with 1,691 additional dwellings within the Precinct has been assumed. These total yields are consistent with the Town's endorsed Local Planning Strategy and economic forecasting for the Precinct.

Future development will be subject to market demand and would likely occur in stages over a lengthy development horizon. This horizon could extend over multiple decades. For the purposes of this TIA and Parking Management Strategy, assessment of impacts is made out to 2050.

Key transport issues and impacts

Land use change

- There are approximately 557 dwellings within the Precinct at present and 22,636 m² of commercial space. Most of this space is located along Old Perth Road and at Hawaiian's Bassendean shopping centre. Forecast growth is expected to be considerable in this context, placing adding pressure on the transport network.
- The majority of growth in non-residential floorspace is expected to be in 'Non-shop' land use. Non-shop land use typically involves higher transport demand for employees, and less transport demand for customers, compared to 'Shop' uses. This presents an opportunity to design future movement networks for the benefit of longer-stay employees.
- The increase in population and non-residential floorspace is forecast to generate an additional 1,910 vehicle movements during the AM peak. While this is spread across all traffic links within the Precinct (and includes movements both in and out) this is deemed high impact under the Western Australian Planning Commission (WAPC) Transport Impact Assessment Guidelines (TIA Guidelines).

Road network

- The Guildford Road and Collier Road intersection will become heavily congested in the future and be a major contributor to congestion. Crash volumes at this intersection warrant review of traffic safety and consideration of grade separation of infrastructure.

- Vehicle movements from Guildford Road onto Old Perth Road are limited and expected to remain that way into the future. This presents opportunity to reevaluate the intersection to promote a better public realm outcome and improved accessibility to Bassendean station.
- Vehicle access out of Thompson Road to Guildford Road is heavily constrained in both the AM and PM peaks. This will be compounded by growth in the Success Hill Frame area.

Pedestrian and cycle network

- The design of Old Perth Road supports pedestrian movement, but areas of activity and interest along and adjacent to Old Perth Road are fragmented. This discourages walking and cycling to the Precinct overall.
- Pedestrian and cycling access over Guildford Road and to the north of the Perth-Midland railway is heavily limited and uninviting. It is generally more, or just as, convenient to travel by car from the area to the north of the Precinct.
- Without a significant shift of trips to active transport (and/or public transport), the network surrounding the site will be congested at peak times, even with modifications.

Parking

- There are over 500 publicly available off-site bays in the Precinct. These bays are typically occupied at rates less than 50% of capacity during weekday periods. There are many customer bays available on key commercial sites in addition to these public bays.
- The current supply of off-site public parking is sufficient and expected to accommodate demand well into the future. Only under a situation where significant non-shop (office, professional services, etc) land use growth occurs would additional public parking be necessary. As there is considerable off-site parking capacity in the Precinct, there is unlikely to be a need to consider parking caps or cash-in-lieu provisions.

Public transport

- The Precinct is well served by public transport. Significant increases in public transport services or infrastructure should not be expected in the future.
- Access to Success Hill station is limited given its relatively isolated location, absence of desirable pedestrian and cycling connections (except for a principal shared path on the northern side of the railway), limited passenger facilities and absence of dedicated parking and/or kiss-and-ride facilities.

Future movement network direction

Road network

- Modify Old Perth Road between Wilson Street and Guildford Road to provide one-way access that improves functionality of parking, more space for landscaping and outdoor activity.
- Modified access at Thompson Road, most likely in the form of a roundabout will be required to support movement in and out of the Success Hill area.
- Additional access at Earlsferry Court could supplement this in the short-term but would be limited to left-in-left out movements. Long-term, a roundabout or signals at the North/Earlsferry/Guildford junction could resolve movement constraints.
- Guildford Road and Collier Road will become heavily congested. Level-crossing removal will improve traffic performance at the intersection and presents the opportunity to improve cycling safety along the parallel principal shared path.

- The intersection at Guildford Road and West Road/Lord Street will become congested in the future. Improving signals phasing at this intersection will manage increased movement in the short-term.

Pedestrian and cycle network

- Significant improvements to the public realm could be achieved through new development that results in:
 - Improved connection between Bassendean station and Old Perth Road, including the potential to make the portion of Old Perth Road between Wilson Street and Guildford Road one-way to vehicle traffic.
 - Increased tree canopy and weather protection along Old Perth Road.
 - Provision of pedestrian priority and reduced intersection geometry along Old Perth Road.
 - Increased connection between Old Perth Road and BIC Reserve, and West Road and Bassendean Oval and Surrey Street via a series of pedestrian green links.
 - Improved connection between Whitfield Street and West Road, and Success Hill station.
 - Connection between Whitfield Street (north of Guildford Road) and the existing railway underpass at Wilson Street/Second Avenue.
 - Future mid-block links between Bassendean Oval and BIC Reserve.

Parking

- Repurpose parking spaces to other uses, or to facilitate other forms of transport. Public realm concepts for Old Perth Road repurpose parking and road space for activation, alfresco and landscaping.

Public transport

- Together with access enhancements across Guildford Road, advocate for improved public transport facilities at both Bassendean and Success Hill stations.
- Advocate to repurpose the southern end of Bassendean station carpark for development.

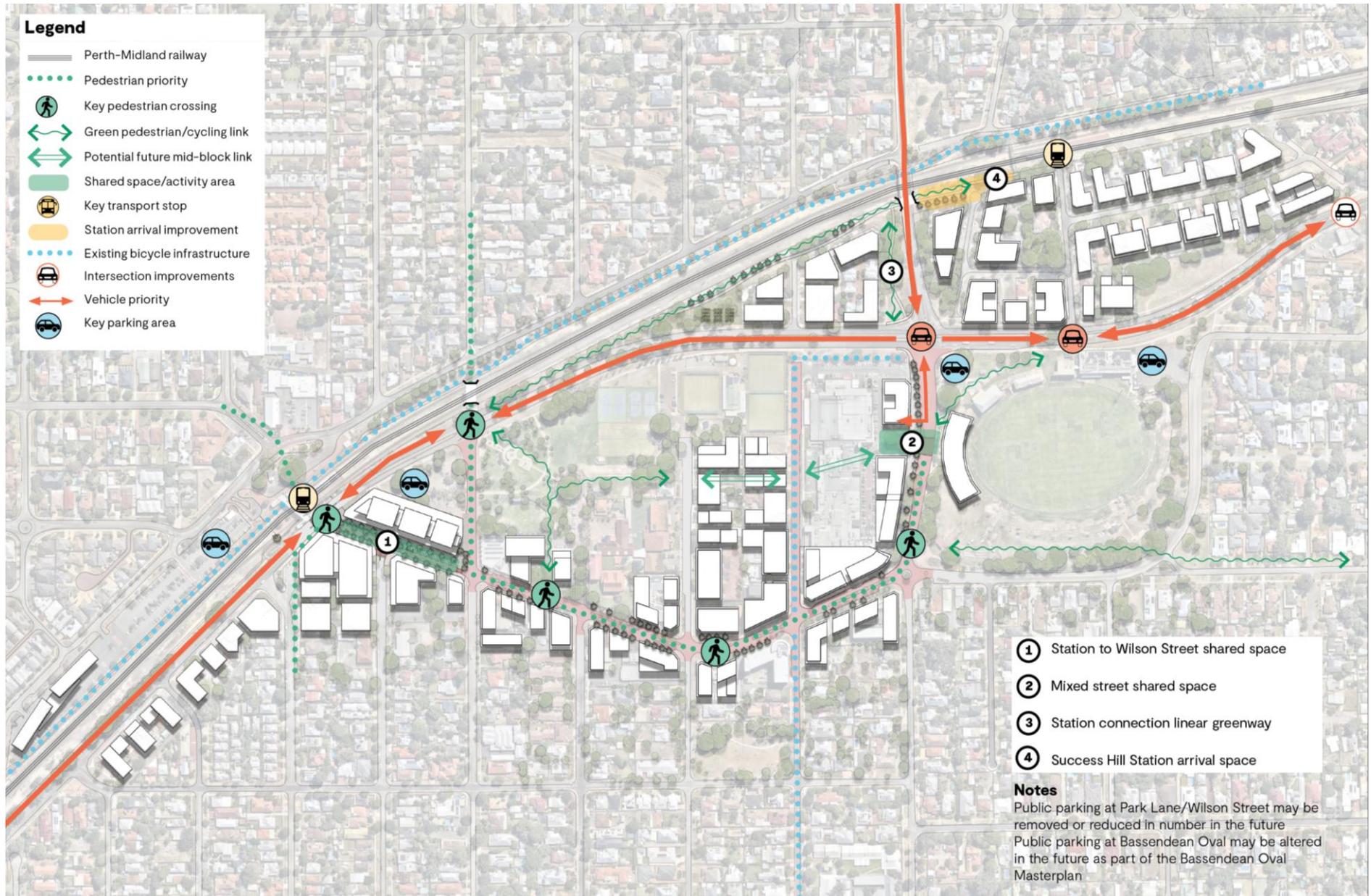


Figure 1 Bassendean Precinct Structure Plan – Movement Plan

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1. Introduction

1.1 Background

The Town of Bassendean (the Town) engaged GHD to prepare a Precinct Structure Plan for the Bassendean Town Centre and Success Hill Frame (the Precinct) consistent with the Western Australian Planning Commission (WAPC) State Planning Policy (SPP) 4.2 – Activity Centres, SPP 7.2 Precinct Design (SPP7.2), and the Western Australia Planning Manual Guidance for Structure Plans (WA Planning Manual).

The Bassendean Precinct Structure Plan has been prepared to address the vision, planning principles, objectives and community priorities expressed in the Town's Local Planning Strategy (the Strategy).

The Strategy was endorsed in 2020 and enshrines key land use planning and development priorities of the Town's community.

To support and inform the development of the Precinct Structure Plan, GHD has prepared this Transport Impact Assessment (TIA). It provides an assessment on the current and future transport network and discusses the impact of future development within the Precinct.

1.2 Purpose of this assessment

The purpose of this TIA is to identify and assess information relating to the transport impacts that future development within the Precinct is likely to have on the surrounding transport network. The report considers:

- Analysis of existing transport conditions including traffic volumes and crash statistics.
- Evaluation of pedestrians and cyclists, including pathways, crossings, and bike infrastructure.
- Estimation of future traffic volumes based on the proposed Precinct Structure Plan and other planned developments in the area.
- Assessment of the key intersections in terms of level of service and capacity to accommodate future traffic.
- Challenges and opportunities for the transport network.

1.3 Objectives

The objectives of this report are to:

- Assess the proposed internal transport networks with respect to accessibility, circulation and safety for vehicles, public transport, pedestrians and cyclists.
- Assess transport integration between the Precinct and the surrounding land areas.
- Determine the impacts of the traffic generated by the Precinct on the surrounding land uses.
- Determine the impacts of the traffic generated by the Precinct on the surrounding transport networks.
- Recommend measures for managing traffic flow within the precinct and on the surrounding network.
- Review challenges and opportunities facing the transport network.

1.4 Scope and limitations

This report has been prepared in accordance with the WAPC Transport Impact Assessment Guidelines Volume 2: Planning Schemes, Structure Plans and Activity Centre Plans.

The extent of the area considered for the assessment of the impacts is set out in section 2.

1.5 Assumptions

This report is based on the following assumptions:

- The provided traffic data is reflective of the current situation. Traffic volumes and turning counts at some locations were not available and have been assumed based upon historical rates of growth and other nearby comparable intersections.
- Traffic distribution is estimated based on publicly available desktop information and data provided by the Town.
- Traffic growth rates have been estimated and agreed with the Town where data is not available.

2. Precinct overview

2.1 Location

This Precinct Structure Plan applies to all the land depicted as being within the precinct boundary, shown in Figure 2, on the adjacent Precinct Area Plan. The Precinct Structure Plan is to apply to development within the:

- Bassendean Town Centre
- Success Hill Frame

The combination of the Bassendean Town Centre and the Success Hill Frame is referred to as the 'Precinct'.

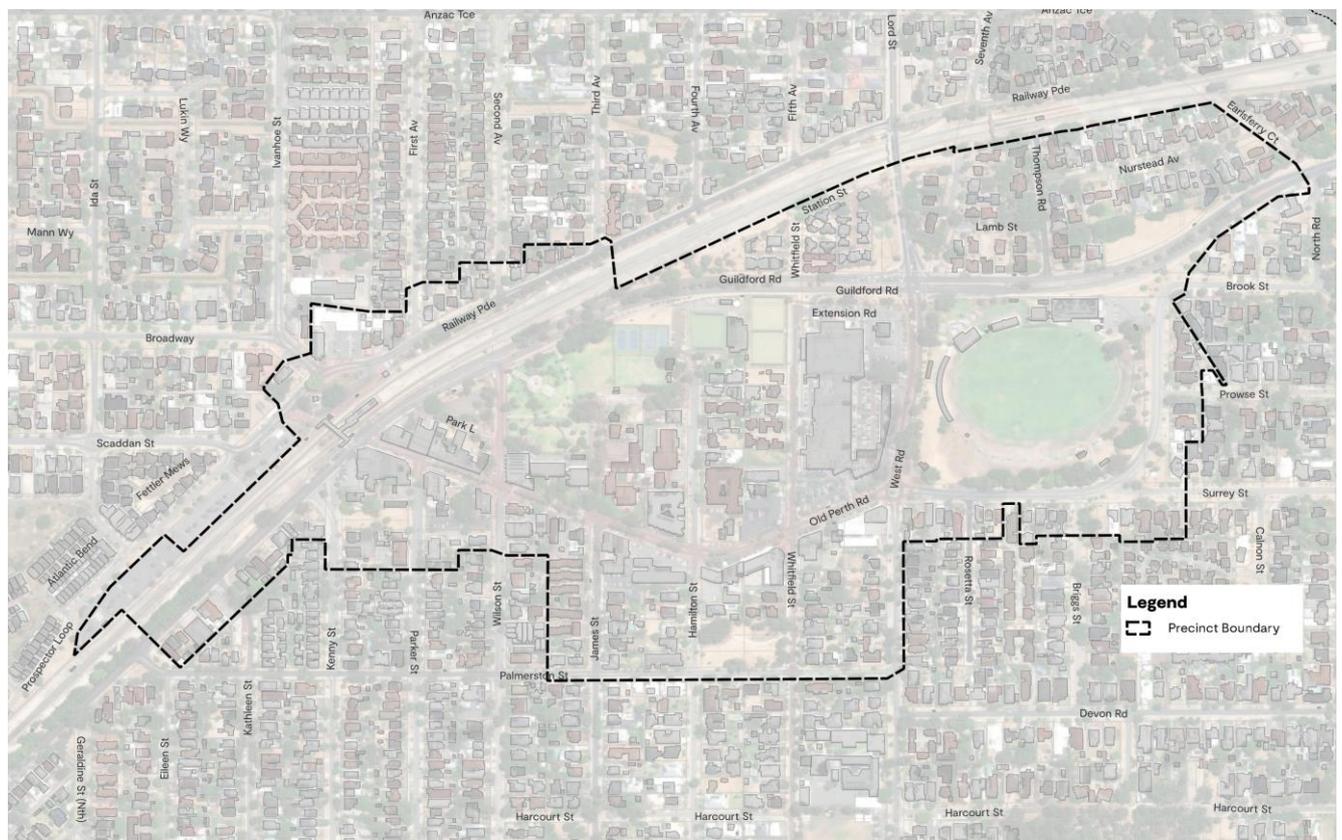


Figure 2 Precinct boundary

The Precinct is positioned in Perth's eastern suburbs, forming part of a series of connected centres along the Perth-Midland railway line, as shown in Figure 3. Connected to major centres like Maylands, Bayswater and Midland, the Bassendean Precinct plays an important role in connecting residents of Bassendean, Ashfield and Success Hill to wider transport networks, areas of employment and activity and natural amenity.

The Precinct is well located to enable current and future residents to leverage employment opportunities at major employment hubs like Ashfield, Bayswater, Midland and Morley. The Swan River significantly curtails the Precinct's catchment to the south and to a lesser extent to the east, dividing the Bassendean Precinct from otherwise nearby locations such as Redcliffe/Perth Airport, Hazelmere, Guildford and the lower Swan Valley.

Despite these limits, the Precinct's location approximately 10 km from the Perth CBD positions Bassendean well to leverage the opportunities from a growing population, growing employment and activity.

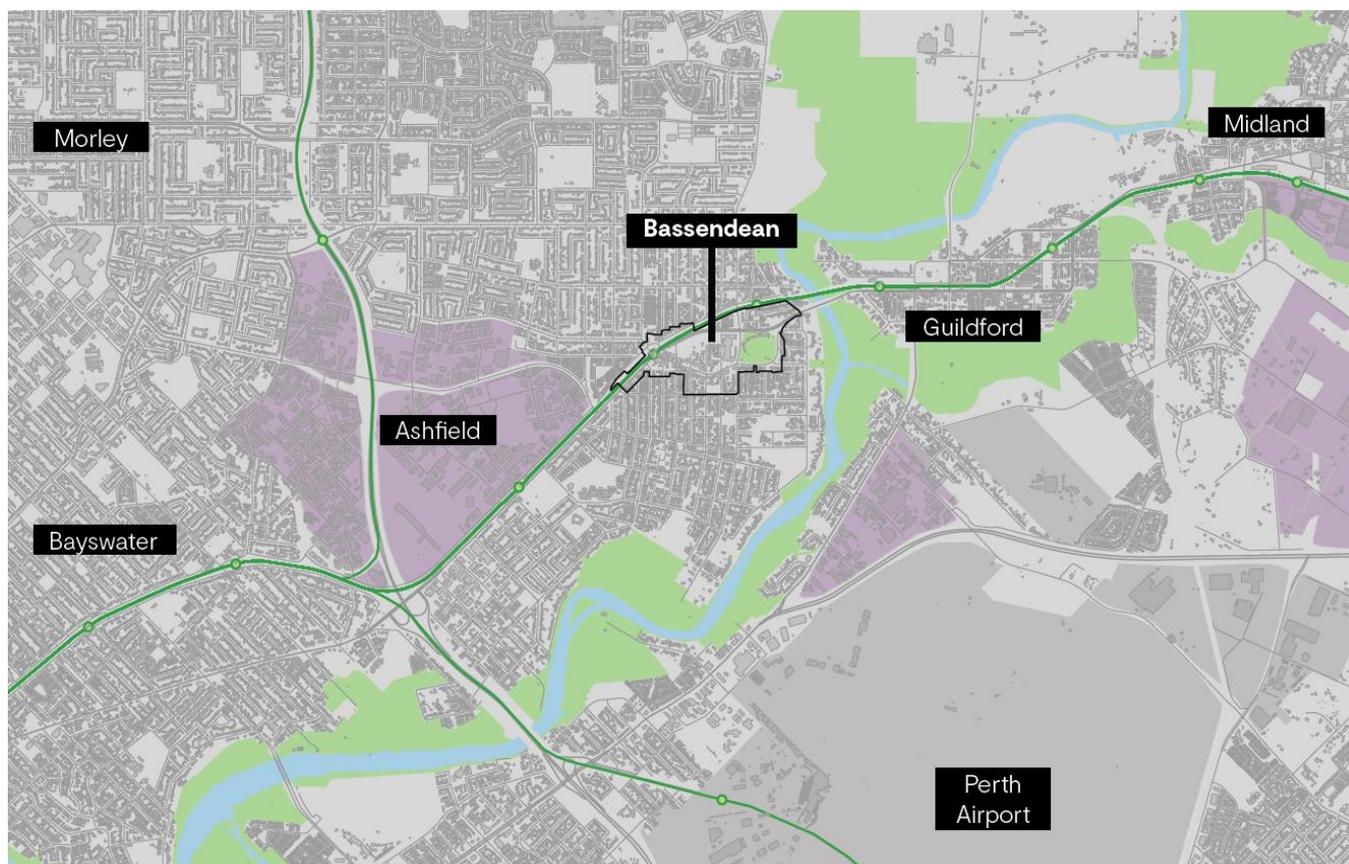


Figure 3 Precinct regional context

2.2 Growth and staging

2.2.1 Residential growth

There are approximately 557 dwellings within the Precinct. As outlined in Table 1, the Precinct Structure Plan is estimated to provide for dwelling growth of at least 1,368 additional dwellings by 2050; consistent with the Town's Local Planning Strategy. Dwelling growth and types within land zoned District Centre is expected to be in the form of mixed-use, mid-rise developments, with ground floor dwellings occurring on streets other than Old Perth Road. In the Success Hill Frame, growth is expected to be almost entirely residential, with a mix of mid-rise apartments, townhouses and villas to provide dwelling growth.

It is noted that the growth assumptions that have informed traffic modelling for this TIA exceed the expected residential growth described in this section. The Precinct Structure Plan includes provisions that enable additional height and building scale (and consequently more dwellings) above those stated in the table below. The level of growth permitted by the additional height provisions is broadly aligned with the mid-range growth target expressed in the Town's Local Planning Strategy.

Table 1 Dwelling growth estimates

Land use types	Additional dwellings (10 years)	Additional dwellings (ultimate)
R40, R60	94	154
R80+ (including R-AC codes)	699	1,214
TOTAL	793	1,368

2.2.2 Non-residential growth

Projections indicate that the Precinct could support approximately 18,000 m² of Shop/Retail floorspace by 2050. This represents an increase of approximately 6,000 m² over the coming decades. A further 15,000 m² of non-shop commercial floorspace is forecast, representing a considerable increase in demand in professional service industry. Projected floorspace need across Shop/Retail and Non-Shop categories is summarised in Table 2.

Table 2 Commercial floorspace need projection (m²)

Category	2024 (approx.)	2029	2034	2039	2044	~2050
Shop/retail	11,980	13,134	14,068	15,189	16,398	17,984
Non-shop	10,656	16,992	23,133	24,130	25,205	26,616

Given the extent of land tenure fragmentation within the Precinct, development is expected to occur on an ad-hoc basis. The Precinct Structure Plan includes provisions that:

- Incentivise development on opportunity sites, encouraging new development at these locations early and as a priority for the Precinct overall.
- Built-form provisions that recognise development will occur slowly over several decades and transition.

2.3 Strategic context

2.3.1 Perth & Peel @ 3.5 million and Central Sub-Regional Planning Framework

The Perth and Peel @ 3.5 million suite of strategic land use and infrastructure plans, including four Sub-regional Planning Frameworks (north-west, north-east, central and south metropolitan Peel), seek to guide the future growth of the Perth and Peel regions as a compact, consolidated and connected city that can accommodate a population of 3.5 million by 2050.

The Central Sub-regional Planning Framework provides high level guidance for the growth of the Central sub-region of the Perth metropolitan area, and forms part of the 'Perth and Peel @ 3.5 million' suite of strategic land use and infrastructure plans. The framework provides high-level guidance regarding where new homes and jobs will be located, how to make best use of existing and proposed infrastructure and how best to protect the natural environment to allow sustainable growth within the central sub-region.

2.3.2 Town of Bassendean Local Planning Strategy

The Town's Local Planning Strategy was endorsed in February 2023. The Strategy sets out the long-term planning direction for land use and development within the Town; principle of which is planning for the Precinct.

Consistent with the principles of urban consolidation, the Strategy identifies six planning areas for land use intensification. For the Bassendean Precinct, this includes accommodating between 1,209 and 2,175 additional dwellings by the middle of the century. The Strategy includes a mid-range growth target of over 1,600 dwellings. This mid-range target has informed traffic modelling assumptions for this TIA.

The Strategy includes actions to prepare a Precinct Structure Plan for the precinct, based primarily on the findings and community aspirations expressed through the Town Centre Masterplan.

2.3.3 Town Centre Masterplan

In 2021, the Town endorsed the Bassendean Town Centre Masterplan following extensive community and external stakeholder engagement. The Masterplan provides a high-level vision for the Precinct and is intended to be implemented through preparation of this Precinct Structure Plan. Objectives identified in the Masterplan relevant to transport and movement outcomes for the Precinct are as follows:

- Improved pedestrian mobility and accessibility;
- Transit-oriented development and locating high density development in proximity to train stations;
and
- Appropriate management of parking supply and demand.

Figure 4 shows the access and movement network contained within the Town Centre Masterplan.

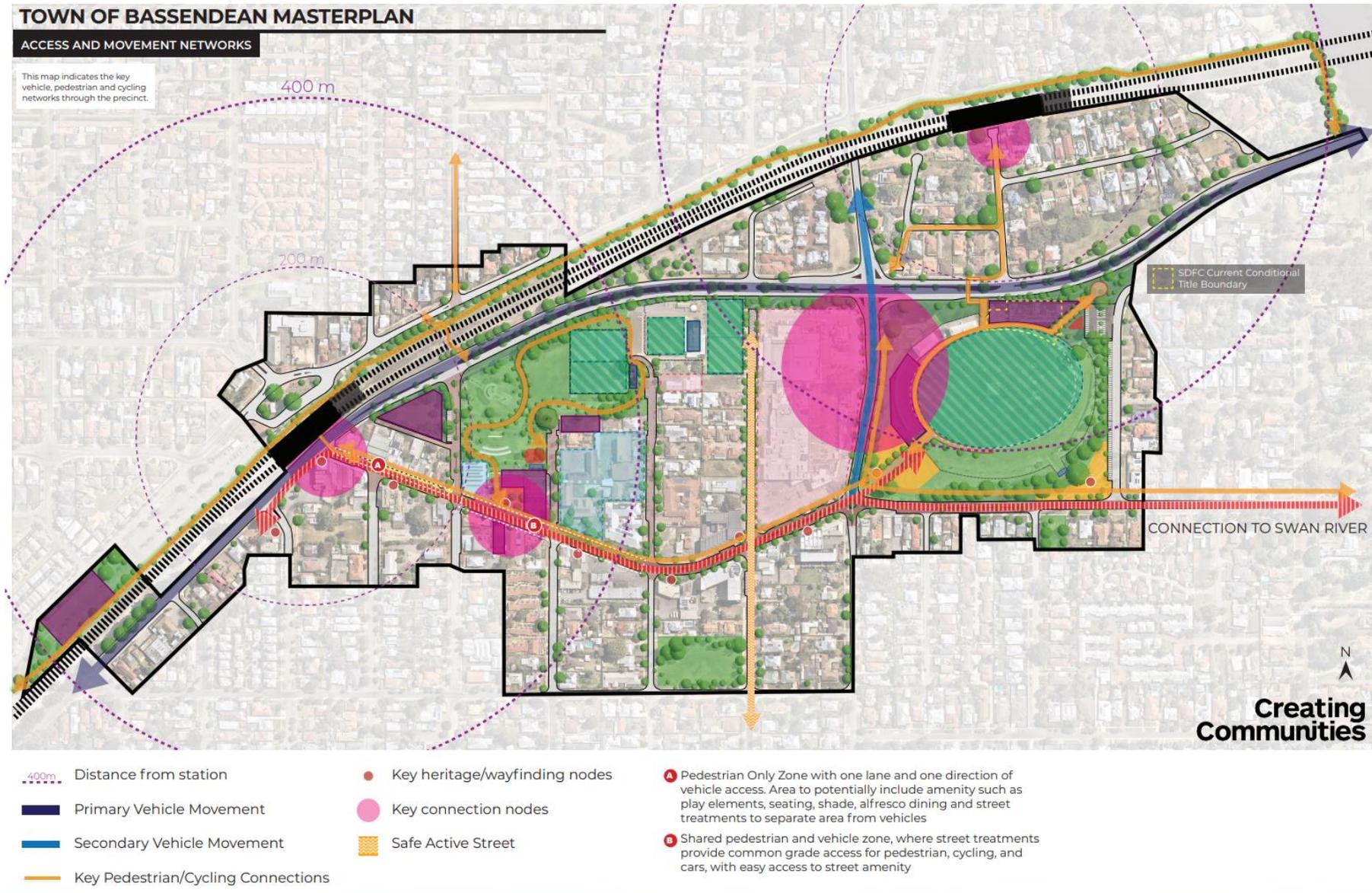


Figure 4 Town Centre Masterplan (Access and Movement Networks)

2.3.4 Integrated Transport Strategy

The Town's Local Integrated Transport Strategy adopted in late 2019, provides a strategic framework for improving the Town's transport network and infrastructure. The strategy identifies the following (relevant) proposals that support an improved movement network:

- PT1 – Improve pedestrian and cyclist access to Success Hill train station.
- PT2 – Plan for extended platforms at Bassendean train station and potential active transport link aligned with Park Lane.
- PT3 – Advocate for sinking of the Midland line to facilitate at-grade connectivity and new development opportunities in the vicinity of Bassendean station.
- AT2 – Advocate/support redesign of Ashfield and Success Hill pedestrian bridges to achieve DDA compliance.
- AT4 – Assess the opportunity to improve the current design of the Wilson Street subway as a key north-south access for pedestrians and cyclists of all ages and abilities.
- RN2 – Advocate for an alternative treatment for the Guildford Road corridor (West Road to Swan River) to one which:
 - Balances local access needs (both in the Town and adjoining Guildford centre) and amenity, transit-oriented development, multimodal safety and comfort, and strategic network objectives.
 - Achieves reasonable signal phasing at the intersection of Guildford Road/West Road associated with the Lord Street/West Road bridge widening and anticipated intersection upgrade.
 - Retains key local street links under suitable traffic management (in particular Guildford Road/North Road/Earlsferry Court).
- RN5 – Advocate for traffic signal and boom gate synchronisation at Collier Road/Guildford Road.
- RN10 – Create a pedestrian friendly town centre and community centres through implementing self-explaining streets design and management principles to encourage slowing of vehicular traffic.
- LD2 – Investigate mixed-use redevelopment of the Bassendean park-and-ride site contingent on agreement with the Public Transport Authority regarding possible reduction in park-and-ride demand associated with the Morley-Ellenbrook line.

2.3.5 Local Planning Policy 8 – Car parking and end of trip facilities

The Town's Local Planning Policy 8 – Car parking and end-of-trip facilities (LPP8) sets out the access and parking provisions for non-residential development (including commercial and mixed-use developments). The parking requirements for residential development are contained within State Planning Policy 7.3 - Residential Design Codes (SPP7.3).

SPP7.3 makes provision for resident and visitor parking within new developments. Demand for future off-site parking from new residential developments is expected to be reduced as a result.

For the majority of non-residential floorspace growth, on-site parking will be provided consistent with the Town's LPP8.

2.3.6 Town of Bassendean Bike Plan (2012)

The Bassendean Bike Plan (2012) sets out the long-term vision for improvement to the bike network in the Town and its integration with networks beyond its boundary. Some key projects from the plan have been delivered, including the Whitfield Street 'bike greenway', some elements of the Old Perth

Road/Surrey Street 'greenway' and construction of the principal shared path along the Perth-Midland railway.

2.4 Current travel patterns

Like most of metropolitan Perth, travel patterns in Bassendean are dominated by car movements. Journey to work census data from 2021, shown in Table 3, demonstrates a high rate of private vehicle use, which can be considered a proxy for understanding other patterns of movement.

Table 3 Journey to work (2021) (Source: ABS)

Type	Percentage of working population
Private vehicle	78%
Public transport (all types)	9%
Walking and cycling	1%
Worked from home	12%

2.5 Road network

2.5.1 Road hierarchy and characteristics

The road hierarchy within and surrounding the Precinct has been obtained from the Main Roads WA Road Information Mapping System and is shown in Figure 5. Notable roads are described in Table 4.

Table 4 Precinct road characteristics

Road	Road hierarchy classification	Lanes	Width	Speed Limit	Public Transport Route	Street parking
Collier Road	Distributor A	4, two-way, two lanes each direction, undivided	7.55 m northbound, 7.44 m southbound (dual carriageway)	60 km/h	Bus route 47	No
Guildford Road	Primary Distributor	4, two-way, two lanes each direction, undivided	6.03 m eastbound and 6.51 m westbound (dual carriageway)	60 km/h	N/A	No
Palmerston Street	Local Distributor	2, two-way, one lane each direction, undivided	6.71 m (single carriageway)	50 km/h	N/A	No
Old Perth Road	Local Distributor	2, two-way, one lane each direction, undivided	4.1 m eastbound and 5.12 m westbound (single carriageway)	50 km/h	Bus route 45	Yes
West Road	Local Distributor	4, two-way, two lanes each direction, undivided	7.15 m (single carriageway)	50 km/h	Bus route 45	Yes
North Road	Access Road	2, two-way, one lane each direction, undivided	7.41 m (single carriageway)	50 km/h	Bus route 45	No
Thompson Road	Access Road	2, two-way, one lane each direction, undivided	7.24 m (single carriageway)	50 km/h	N/A	No

2.5.2 Activity centre and vehicle access points

Regional movements through the Precinct arrive almost exclusively via Guildford Road, Collier Road and Lord Street. Vehicle movements that seek to terminate within or nearby to the Precinct typically access other parts of the Precinct via:

- West Road (south of Guildford Road), Old Perth Road, either via the intersection with Guildford Road, or via Palmerston Street (Local distributor) or Wilson Street. The Perth-Midland railway heavily restricts vehicle arrivals to the Precinct; limiting access to Lord Street/West Road and Collier Road. In the case of the Success Hill Frame, Thompson Road and Whitfield Street (north of Guildford Road).
- Localised movements, particularly to the south of the Precinct, are via several local roads, while access to/from the east is provided primarily by Surrey Street.

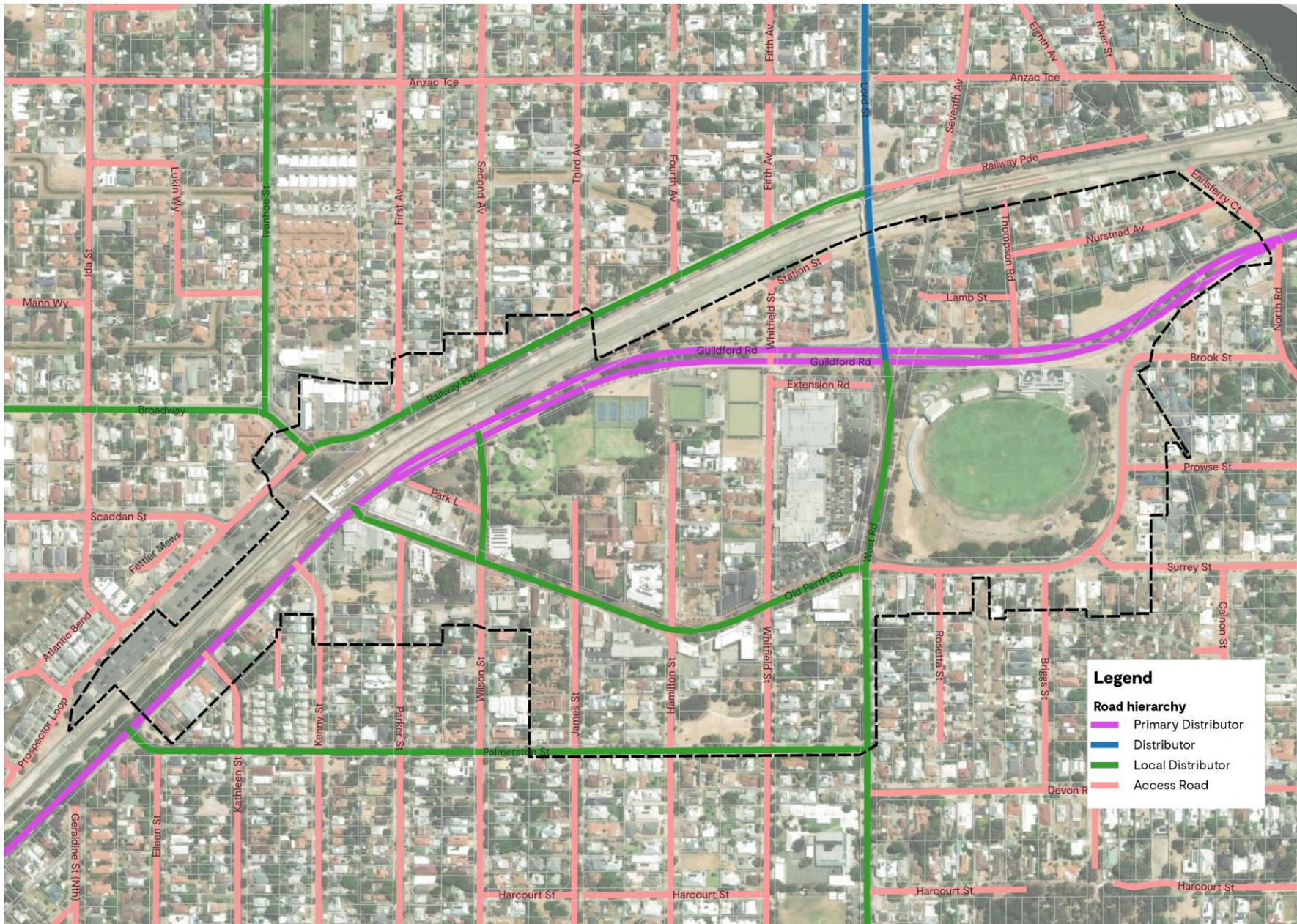


Figure 5 Main Roads WA road hierarchy

2.5.3 Traffic movements

ROM24 data was available for certain intersections for the years 2021, 2031, 2036, and 2041, and was retrieved in the form of Link Volume Plots (LVPs). This data was used to calculate traffic growth rate factors.

The Annual Average Growth Rate (AAGR) between 2021 and 2041 was selected to forecast traffic for the design year of 2050. Future traffic volumes for 2050 were extrapolated using the 2024 traffic survey as the baseline, with the AAGR derived from the ROM24 models. For roads lacking ROM24 data, a growth rate agreed upon by the Town was used.

Table 5 Precinct traffic data

No	Intersection	Road	Direction	Traffic Volume (Existing – 2024) VPH		Growth Factor	Future – 2050 VPH	
				AM	PM		AM	PM
1	Guildford Rd & Collier Rd	Guildford Rd	EB	414	737	1.021%	539	960
		Guildford Rd	WB	811	618	1.166%	1096	835
		Collier Rd	NB	356	717	1.094%	472	951
		Collier Rd	SB	533	717	1.094%	707	951
2	Guildford Rd & North Rd	Guildford Rd	EB	1138	1091	1.526%	1687	1617
		Guildford Rd	WB	995	1143	1.642%	1520	1746
		North Rd	NB	24	30	1.000%	31	39
		North Rd	SB	65	140	1.000%	84	181
3	Guildford Rd & Old Perth Rd	Guildford Rd	EB	581	1096	1.358%	825	1556
		Guildford Rd	WB	888	702	1.166%	1200	949
		Old Perth Rd	NB	109	137	1.000%	141	177
		Old Perth Rd	SB	8	5	1.000%	10	6
4	Guildford Rd & Palmerston St	Guildford Rd	EB	583	1105	1.021%	759	1439
		Guildford Rd	WB	960	825	1.166%	1298	1115
		Palmerston St	NB	109	76	1.000%	141	98
		Palmerston St	SB	98	110	1.000%	127	142
5	Guildford Rd & Thompson St	Guildford Rd	EB	1154	1131	1.526%	1711	1677
		Guildford Rd	WB	1060	1221	1.642%	1619	1865
		Thompson St	NB	12	21	1.000%	16	27
		Thompson St	SB	21	13	1.000%	27	17
6	Guildford Rd & West Rd & Lord St	Guildford Rd	EB	1154	1079	1.526%	1711	1600
		Guildford Rd	WB	1089	719	1.507%	1607	1061
		Lord St	SB	1045	707	1.172%	1415	957
		West Rd	NB	385	560	1.172%	521	758

In addition to vehicle movements generated by the Precinct, traffic resulting from school drop off and pickups is considerable and is an important local movement consideration.

2.5.4 Heavy vehicles

A review of the Main Roads WA Heavy Vehicle Services Network Map indicates neither Old Perth Road nor West Road are rated for RAV movements. The purpose and demand for use of the local network by these large vehicles should be investigated to determine whether smaller vehicles can be used.

For example, the West Road/Old Perth Road roundabout, shown in Figure 6, is regularly damaged by heavy vehicles as they navigate it, indicating poor geometry for larger vehicles. A check of the swept path of a 25 m vehicle around this roundabout could be performed, however the requirement/purpose to accommodate these vehicles on this route in the future should be confirmed.



Figure 6 Damage to kerbing – West Road-Old Perth Road roundabout

2.5.5 Access to Success Hill Frame

Access to the eastern portion of the Success Hill Frame is a concern for the community due to its single entry and exit point of Thompson Road (shown in Figure 7). The western portion also has a single entry and exit at Whitfield Street (north).

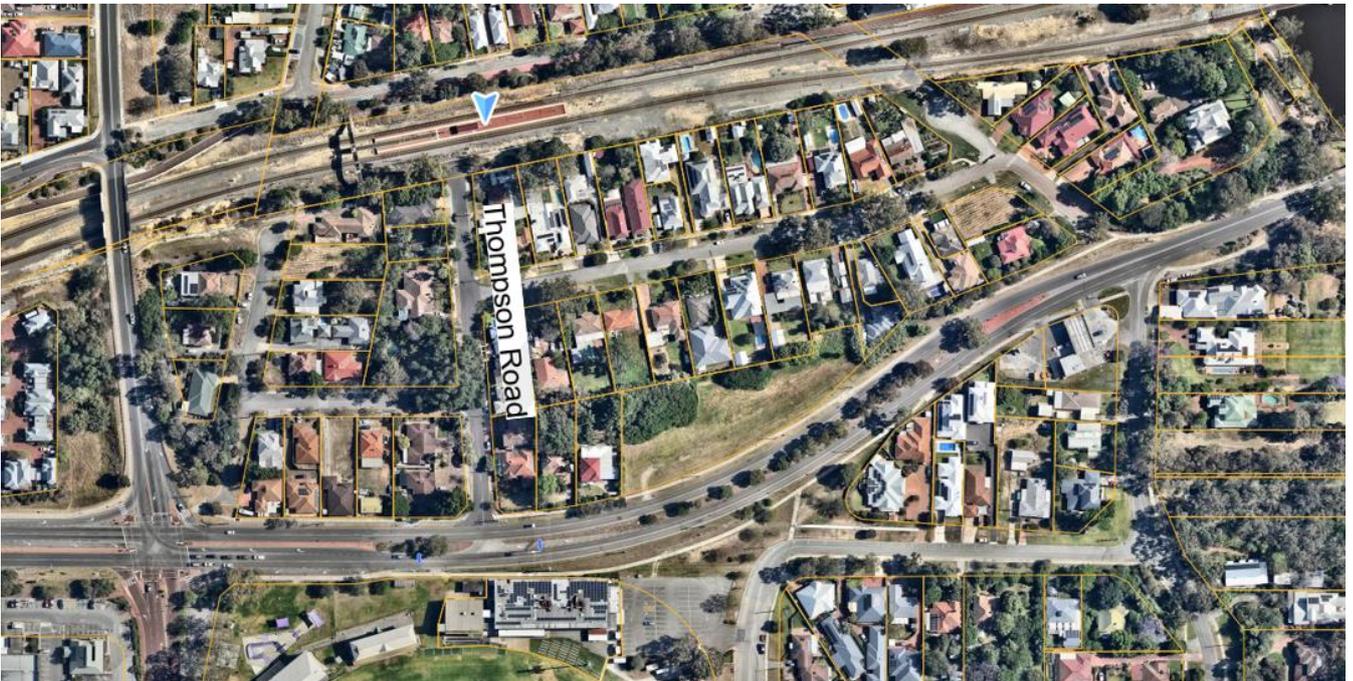


Figure 7 Thompson Road (Source: Nearmap)

2.5.6 Crash analysis

Main Roads WA CrashMap was used to analyse crash patterns, crash history, types and details of crashes at mid-blocks and intersections within and surrounding the Precinct. The data collected covers a five-year period between 1 January 2020 to 31 December 2024. A crash summary for each of the roads included in section 2.5.1, along with their corresponding crash locations, is given in the following tables and figures.

Guildford Road and Collier Road intersection

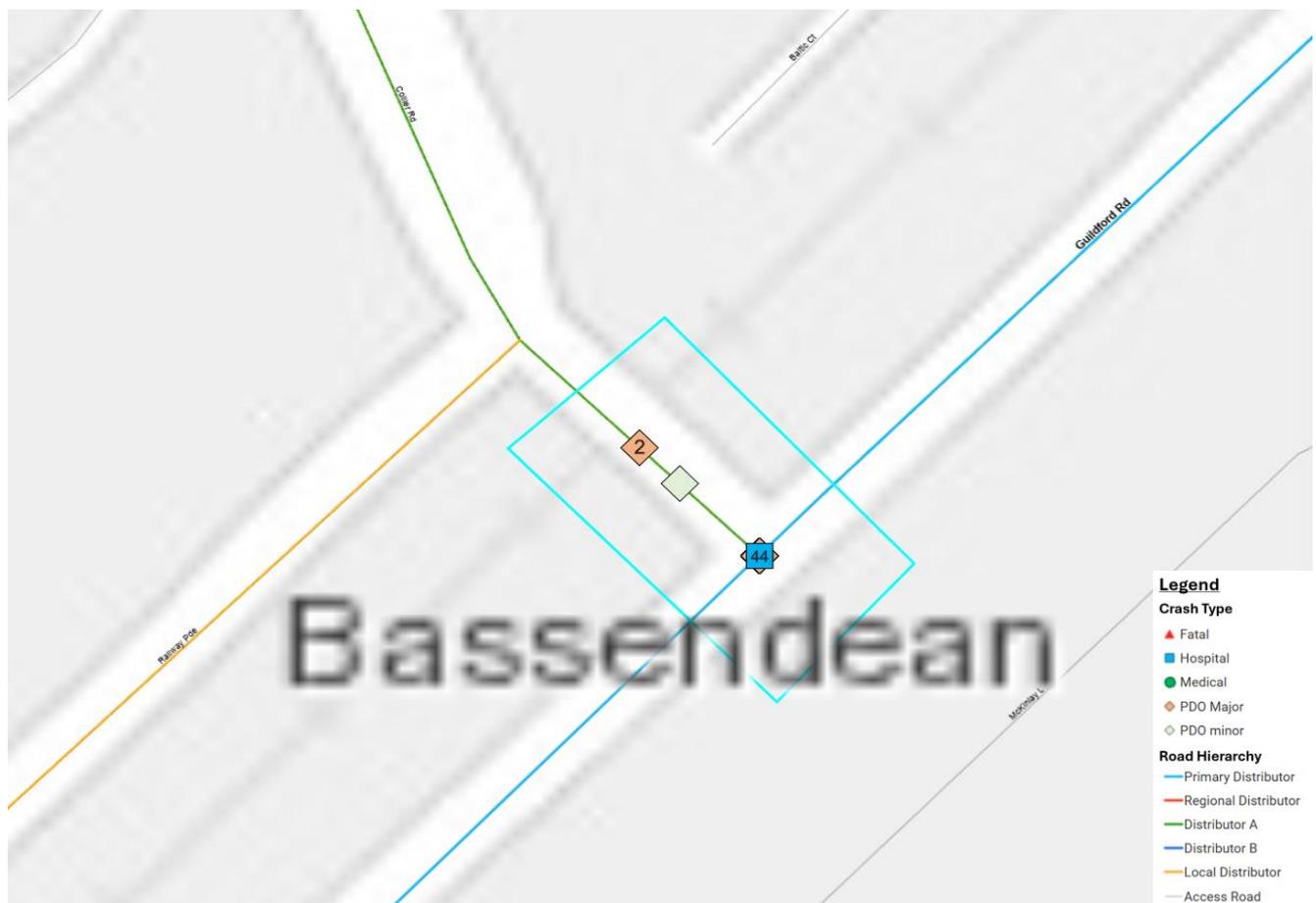


Figure 8 Crash locations at Guildford Road and Collier Road intersection (Source: MRWA)

Table 6 Reported crashes for Collier Road and Guildford Road intersection (2020 – 2024)

Particular	Description
Total crashes	47
Severity	2 Hospital, 6 Medical, 27 property damage only (PDO) Major, 12 PDO Minor
Nature	2 Hit Object, 1 Hit Pedestrian, 2 Unknown, 23 Rear End, 2 Right Angle, 7 Right Turn Through, 10 Sideswipe Same Direction
Light	5 Dark – Street Lights On, 4 Dawn/Dusk, 27 Daylight, 11 Other/unknown
Conditions	40 Dry, 7 Wet

Palmerston Street

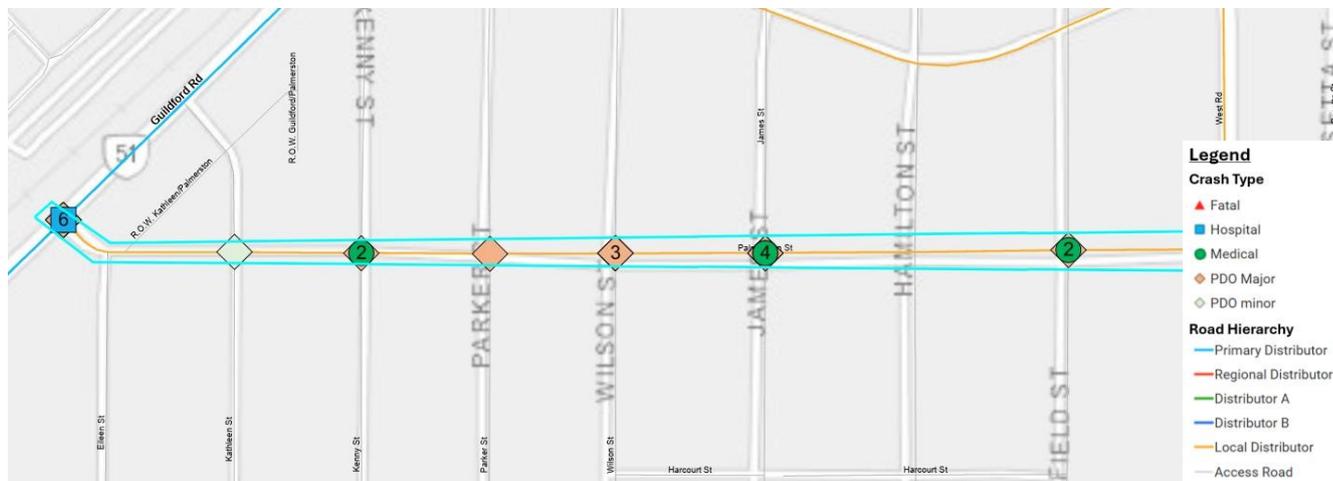


Figure 9 Crash locations on Palmerston Street (Source: MRWA)

Table 7 Reported crashes for Palmerston Street (2020 – 2024)

Particular	Description
Total crashes	19
Severity	1 Hospital, 5 Medical, 10 PDO Major, 3 PDO Minor
Nature	2 Rear End, 13 Right Angle, 3 Right Turn Through, 1 Sideswipe Same Direction
Light	1 Dark – Street Lights On, 2 Dawn/Dusk, 15 Daylight, 1 Other/Unknown
Conditions	14 Dry, 1 Other, 4 Wet

Old Perth Road

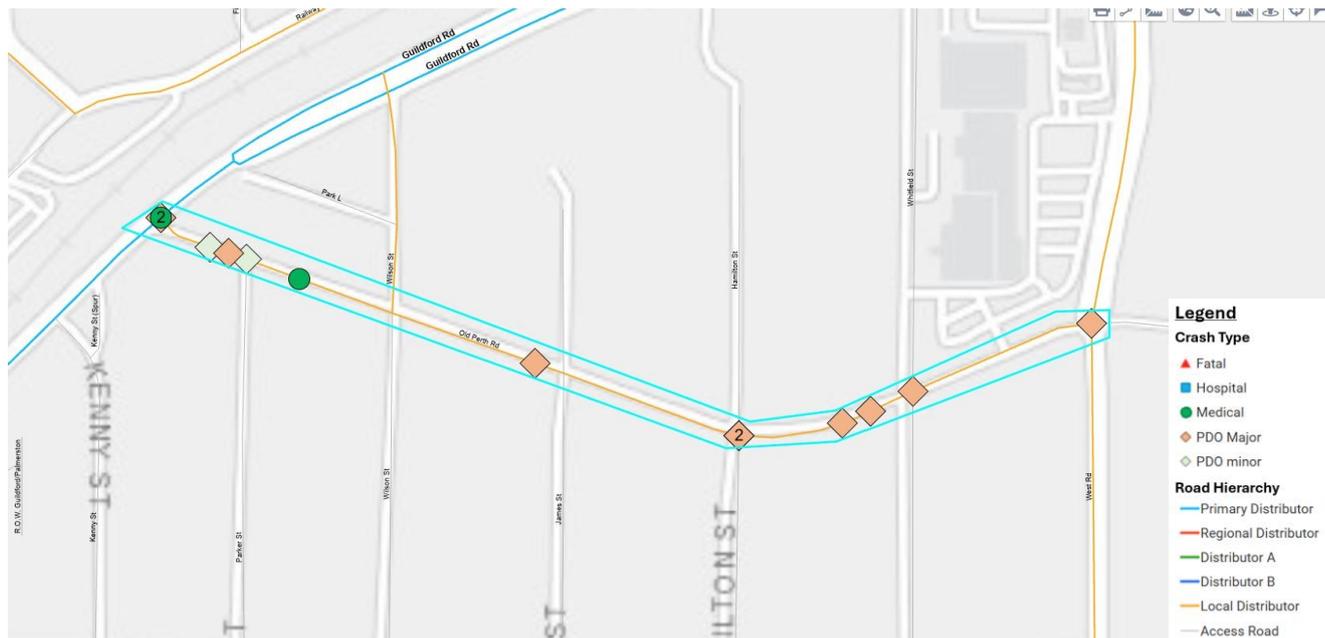


Figure 10 Crash locations on Old Perth Road (Source: MRWA)

Table 8 Reported crashes for Old Perth Road (2020 – 2024)

Particular	Description
Total crashes	13
Severity	2 Medical, 9 PDO Major, 2 PDO Minor
Nature	2 Hit Object, 4 Unknown, 3 Rear End, 2 Right Angle, 2 Sideswipe Same Direction
Light	2 Dark – Street Lights On, 7 Daylight, 4 Other/Unknown
Conditions	10 Dry, 2 Other, 1 Wet

West Road



Figure 11 Crash locations on West Road (Source: MRWA)

Table 9 Reported crashes for West Road (2020 – 2024)

Particular	Description
Total Crashes	59
Severity	5 Medical, 39 PDO Major, 15 PDO Minor
Nature	2 Hit Object, 31 Rear End, 11 Right Angle, 6 Right Turn Thru, 9 Sideswipe Same Direction
Light	8 Dark – Street Lights On, 2 Dawn/Dusk, 45 Daylight, 4 Other/Unknown
Conditions	44 Dry, 15 Wet

Thompson Road

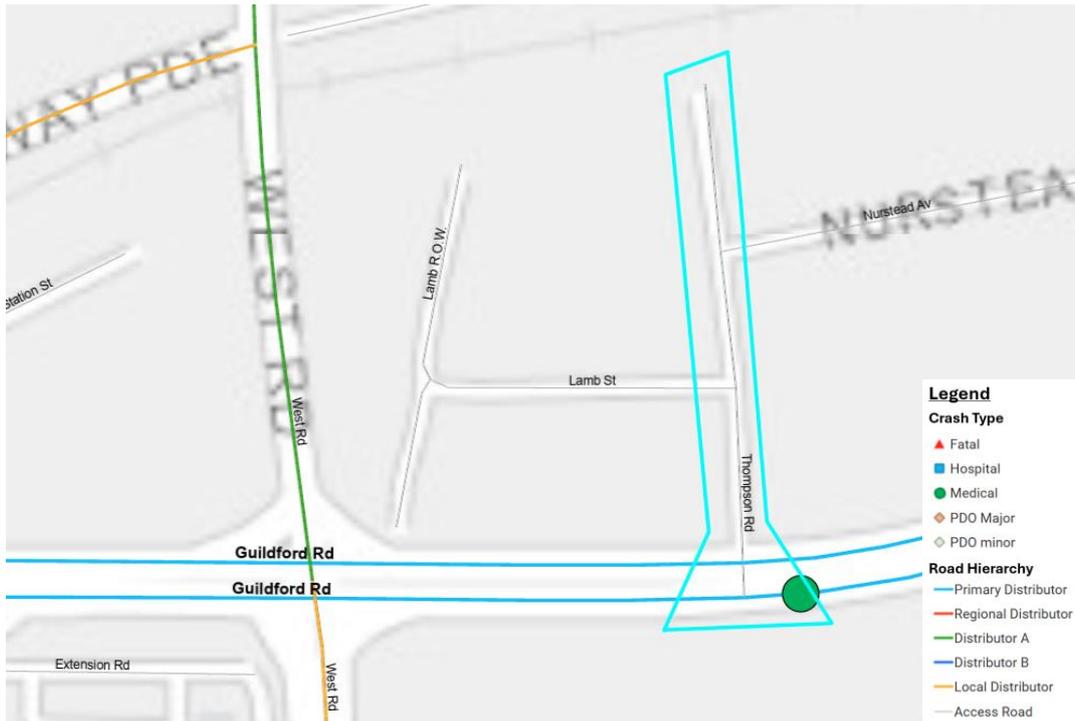


Figure 12 Crash locations on Thompson Road

Table 10 Reported crashes for Thompson Road (2020 – 2024)

Particular	
Total Crashes	1
Severity	1 Medical
Nature	1 Sideswipe Same Direction
Light	1 Daylight
Conditions	1 Dry

Guildford Road

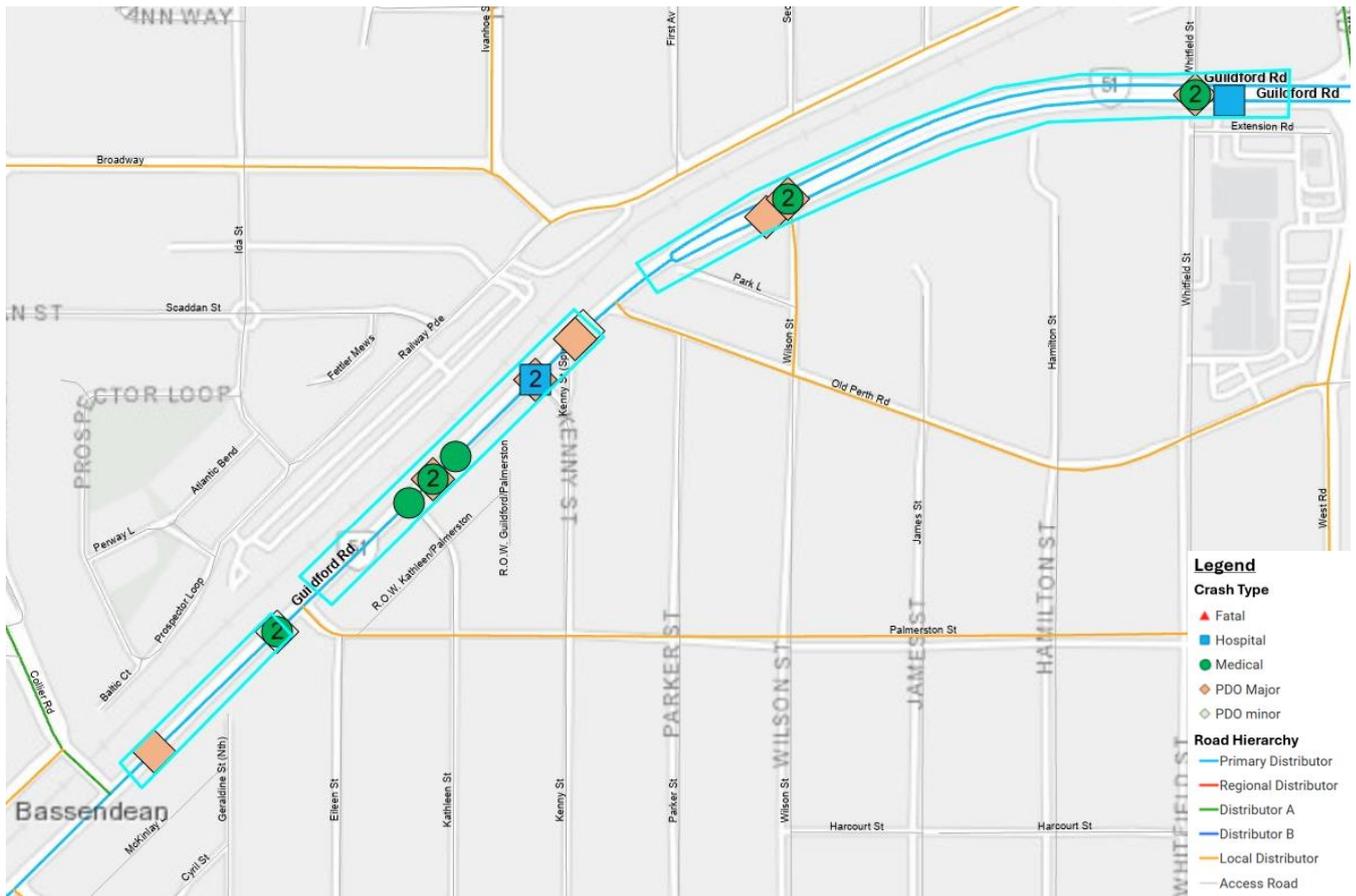


Figure 13 Crash locations on Guildford Road (Source: MRWA)

Table 11 Reported crashes for Guildford Road (2019 – 2023)

Particular	Description
Total crashes	17
Severity	2 Hospital, 6 Medical, 7 PDO Major, 2 PDO Minor
Nature	2 Hit Pedestrian, 8 Rear End, 2 Right Angle, 1 Right Turn Thru, 4 Sideswipe Same Direction
Light	1 Dark – Street Lights Off, 2 Dark – Street Lights On, 12 Daylight, Other/unknown 2
Conditions	15 Dry, 2 Wet

2.5.7 Summary of crash analysis

The rate of crashes at intersections within the Precinct, whilst high, are somewhat typical for the volumes of movement along each connector. The incident rate at Collier Road/Guildford Road is somewhat higher than typical and is a representation of the congested nature of the intersection and limited space between road, rail and cycling infrastructure.

2.6 Active transport

2.6.1 Pedestrian access

Old Perth Road and West Road

Pedestrian pathways within the Town Centre Core Precinct are well-maintained, promoting safe and convenient access for pedestrians, which is illustrated in Figure 14. The Town Centre itself is aimed at being pedestrian-friendly, with wide footpaths, street lighting, and clear signage. The recent Town Centre Masterplan aims to further enhance this connectivity by proposing the creation of a pedestrian-only zone on a portion of Old Perth Road, which will include amenities such as seating, shade, and alfresco dining.

Whilst pedestrian movement within the Town Centre area is generally good, connection to surrounding locations provides challenges.

Accessing Success Hill station from the Town Centre via Whitfield Street and West Road is difficult due to a lack of continuous pedestrian footpaths, large road intersections and high volume of traffic which fragment and interrupt pedestrian movement.



Figure 14 West Road looking south towards Old Perth Road (left), Crossing on Old Perth Road to Bassendean Hawaiian shopping centre (right)

Previous improvements to Old Perth Road have improved the quality of pedestrian access in the Town Centre. Tabletops at key crossing points, as shown in Figure 15, facilitate safer movement across the road and encourage lower vehicle speed, though priority between pedestrian and vehicles is somewhat unclear.



Figure 15 Tabletops at pedestrian crossings

The intersections along Old Perth Road feature generous kerb lines that enable vehicles to make turns at a higher speed. Tightening the geometry of the kerb lines would narrow the road carriageways, forcing vehicles to slow down to navigate the turn, thereby improving pedestrian safety and lowering speeds.

Bassendean Station

The Bassendean train station and associated bus interchange are highly accessible by pedestrians, with well-maintained footpaths that provide connectivity with the surrounding area. The Midland Line Principal Shared Path provides an east-west pedestrian connection between Success Hill (east) and Ashfield (west). The area around the station is well lit and has clear signage. An underpass beneath the railway line is located approximately 220 m east of the station near the intersection of Railway Parade and Second Avenue (north of the railway) and the intersection of Guildford Road and Wilson Street (south of the railway). There is an unsignalized crossing on Guildford Road with provision of a median refuge island for pedestrian access to the underpass.

There are two signalised pedestrian crossings of Guildford Road within the Precinct. One is at the intersection with Collier Road and the other is opposite the train station, at the intersection with Old Perth Road (shown in Figure 16). These at-grade pedestrian crossings have long wait times during peak hours and as such, there is a high prevalence of pedestrians crossing outside of the signal-controlled crossing times. With traffic on Guildford Road travelling at up to 60 km/h, this presents a safety hazard that requires consideration.



Figure 16 Pedestrian crossing at Guildford Road and Old Perth Road (left), Bassendean station pedestrian overpass (right)

Success Hill Station

Success Hill Station is accessible to pedestrians via an overpass that connects to the principal shared path, Railway Parade, and the Thompson Road cul-de-sac. Accessibility from the north is provided via the shared path, Railway Parade, and Seventh Avenue providing access points from various directions north of the railway line. Pedestrian and cycling paths are generally in good condition, featuring adequate signage, space, and colour demarcation.

However, pedestrian access to the southern overpass is comparatively limited. The entrance is accessible only via Thompson Road (shown in Figure 17) and there is no connection to nearby streets such as the Lamb Street cul-de-sac and Lord Street. Additionally, the overpass abuts the rear of a single residential dwelling and is masked by thick vegetation offering minimal passive surveillance for this section.

Improving access from the south could be achieved by introducing a shared pathway running parallel to the railway line, linking the station to Lamb Street, Lord Street, Station Street and Whitfield Street (north). Widening the overpass should also be considered to enhance pedestrian and cyclist mobility, ensuring a safer and more efficient connection for all users.



Figure 17 Success Hill Station arrival area (left), Station Street looking towards Lord Street overpass (right)

Access across Perth-Midland railway

Access across the Perth-Midland railway and subsequent crossing of Guildford Road is highly restricted except at Lord Street/West Road and Bassendean station.

A mid-block underpass of Guildford Road exists opposite Wilson Street and Second Avenue (shown in Figure 18). While the underpass is well lit and broadly safe for use, the resulting crossing point over Guildford Road is challenging and in-direct. Pedestrians and cyclists are required to navigate four-lanes of high-speed traffic with sightlines restricted by the curve in Guildford Road and existing roadside trees.

The visible connection to the Town Centre at the crossing is limited. There is a lack of land use/activity on the southern side of Guildford Road that would immediately draw users. Much of the development along Old Perth Road turns-away from BIC Reserve and Wilson Street, which results in a broken pedestrian connection between the underpass.



Figure 18 Pedestrian underpass under Perth-Midland railway (left), approach to Wilson Street (right)

Broader pedestrian network

The broader pedestrian network within the Precinct away from key routes is generally good. Most streets feature a footpath on at least one side of the street and crossing points are well-aligned. The gentle topography within the Precinct and its immediate surrounds makes walking and cycling comfortable. Good levels of tree canopy on streets to the south of the Precinct further enhance this experience. Pedestrian pathways within the Precinct are shown in Figure 19.

Despite the relatively good walkable conditions within the Precinct, some locations lack pedestrian amenity and are only in-directly linked to other key places. These include:

- Land between Bassendean Oval and BIC Reserve, where an absence of mid-block links north of Old Perth Road prevents direct access between the two public open space areas.
- Between Whitfield Street (north of Guildford Road) and Success Hill station (as described above).

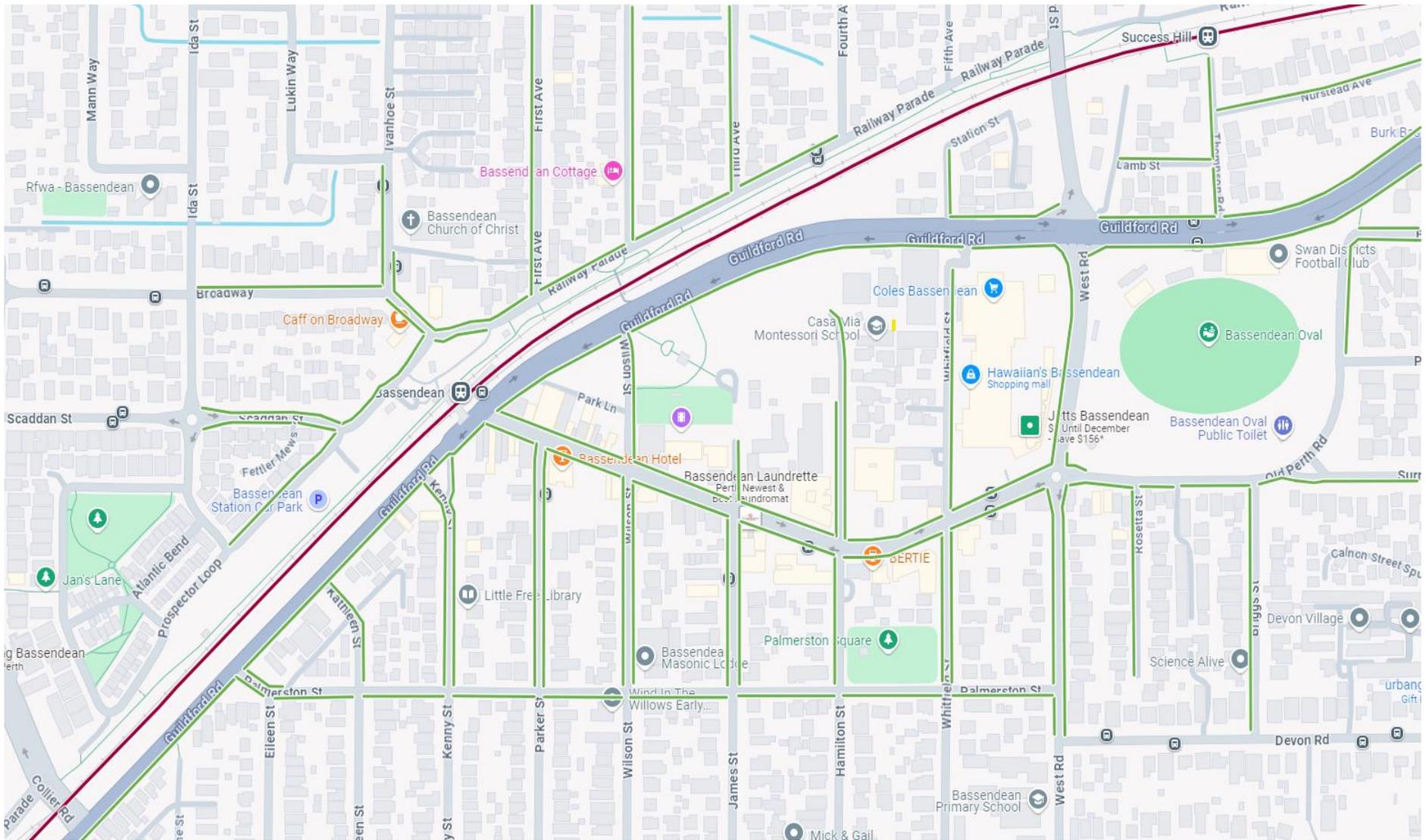


Figure 19 Pedestrian pathways in the precinct (shown with green lines)

2.6.2 Cycling infrastructure

Parts of the Precinct are well-served by cycling infrastructure, especially areas adjacent to the principal shared path that runs along the Perth-Midland railway (shown in Figure 20).



Figure 20 Whitfield Street bike connection (left), principle shared path north of Perth-Midland railway (right)

The Department of Transport's Bassendean local cycle network map, shown in Figure 21, indicates that the Town Centre and Station Frame are serviced by three north-south 'Local Bicycle Friendly Routes'. One of the routes (Whitfield Street) features a Safe Active Street treatment starting from the intersection with Reid Street in the south to the northern end of the Town Centre at Guildford Road. The other two routes (Kenny Street and Wilson Street) do not feature any dedicated cycling infrastructure and are no different to other surrounding streets. Accordingly, it is not clear why these streets in particular are identified as being 'bicycle friendly'.

The Southern Frame is serviced by Palmerston Street which is also labelled as a 'Local Bicycle Friendly Route' in the Bassendean local cycle network map. However, like Kenny and Wilson Streets, Palmerston Street does not feature any dedicated cycling infrastructure. Furthermore, it carries higher traffic volumes than many surrounding streets and features a significant gradient increase from east to west. Accordingly, it is not suitable for all ages and abilities bike riders and as such, it should not be identified as 'bike friendly'.

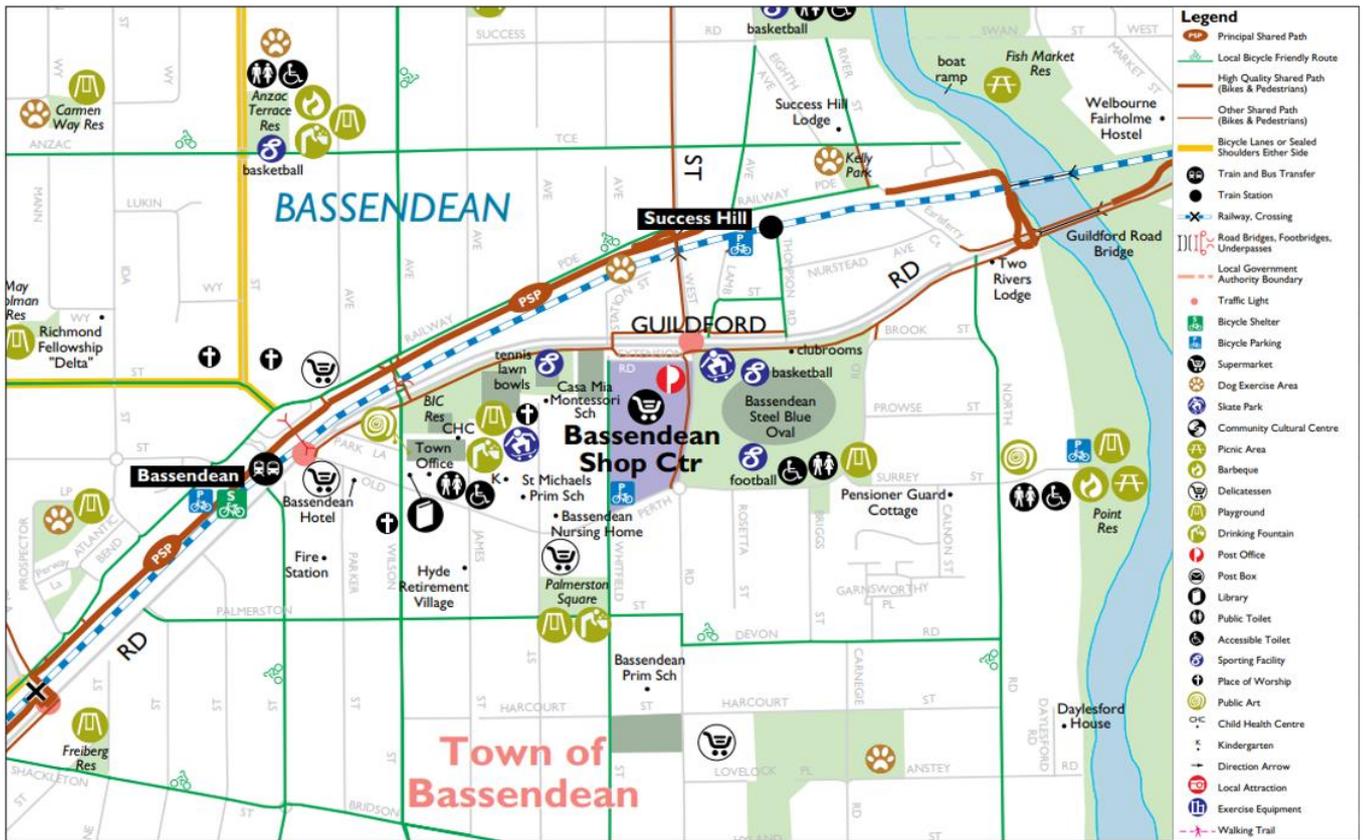


Figure 21 Department of Transport Bassendeau local cycle network map

To facilitate travel by bike within the Precinct, U-rail style bike racks are located at key destinations. Example locations include Old Perth Road (west end in front of the medical centre), in front of the Council Building and Library on Old Perth Road and at the southern entrance of Hawaiian’s Bassendeau – refer to Figure 22.

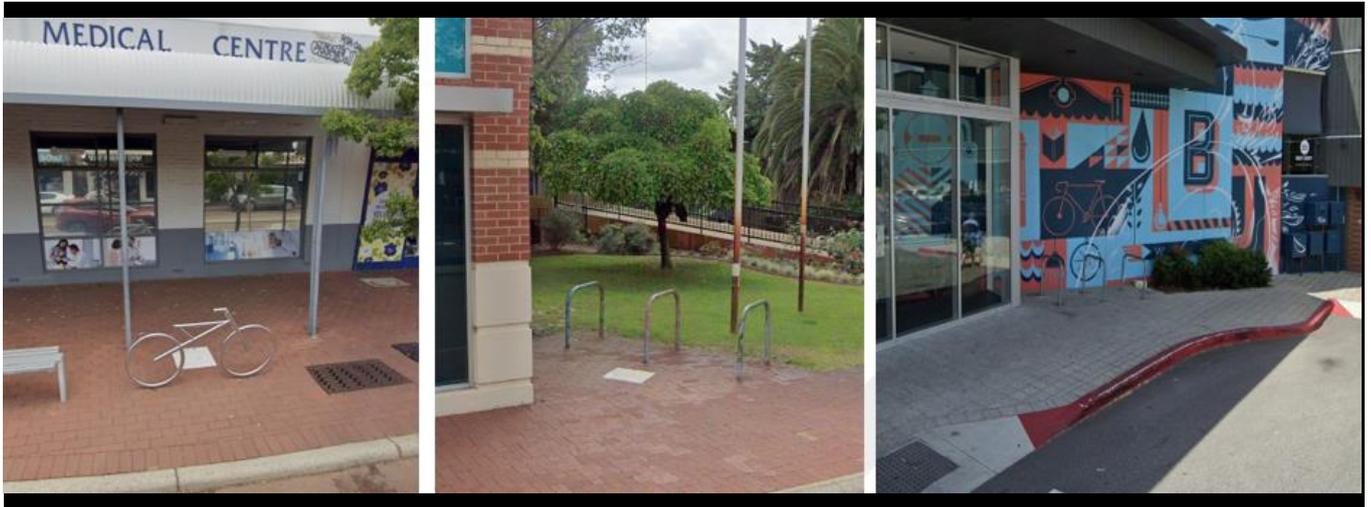


Figure 22 Bike parking within the PSP area (west end of Old Perth Rd, near Library/Council office, and Hawaiian’s Bassendeau)

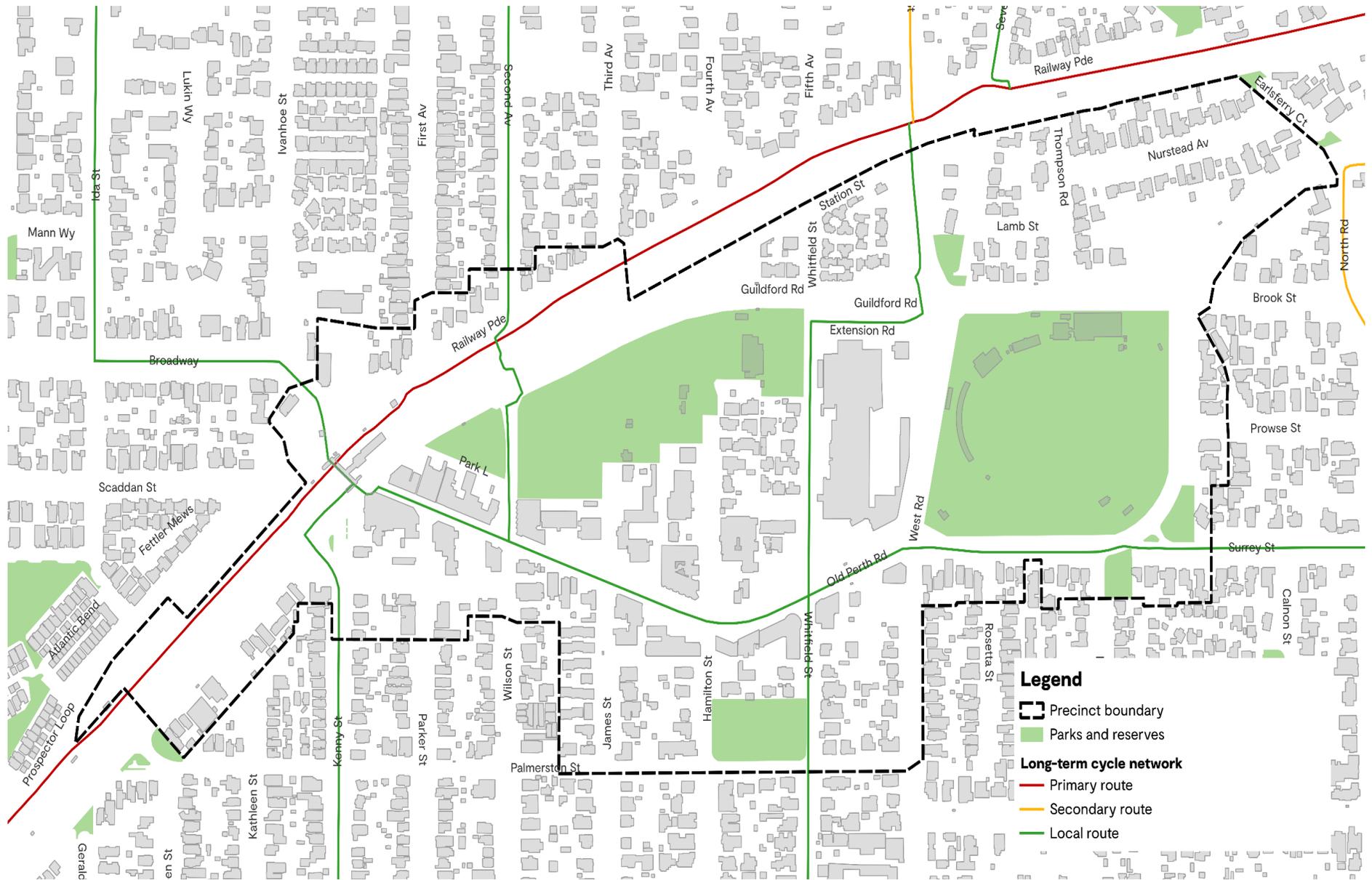
A bicycle shelter is also available at the Bassendeau station forecourt which allows free bike parking using a Transperth Smartrider card (Figure 23). There are no dedicated bicycle storage facilities at Success Hill station.



Figure 23 Bike parking at Bassendean Station

The Department of Transport's 'Long Term Cycle Network' describes the future cycling conditions for the Precinct and surrounds. Figure 24 depicts the future planned network, with the following connections of importance:

- Local routes along key connections such as Whitfield Street and Wilson Street/Second Avenue (through the Guildford Road underpass). The Whitfield Street connection, including its section along Extension Road, has been implemented.
- A secondary route extending along Lord Street, connecting to the existing principal shared path (primary route) and local route on the Lord Street bridge.



Legend

- Precinct boundary
- Parks and reserves
- Long-term cycle network**
 - Primary route
 - Secondary route
 - Local route

Figure 24 Long-term cycle network

2.7 Public transport

Public transport connectivity to and from the Precinct is provided via five bus routes as summarised in Table 12. These routes are shown in Figure 25.

Table 12 Bus access to and from Bassendean

Weekdays			Saturdays		Sundays & Public Holidays	
Operating Hours	Frequency		Operating hours	Frequency	Operating Hours	Frequency
Route 45: Bayswater Station to Bassendean Town Centre						
6:37 AM to 11:06 PM	6:37 AM - 9:09 AM	30-40 minutes	7:07 AM to 11:06 PM	60 minutes	9:07 AM to 10:26 PM	60 minutes
	10:07 AM - 2:07 PM	60 minutes				
	2:52 PM - 6:25 PM	15-20 minutes				
	6:45 PM - 11:06 PM	60 minutes				
Route 45: Bassendean Town Centre to Bayswater Station						
5:12 AM to 10:30 PM	5:12 AM - 9:39 AM	12-20 minutes	5:43 AM to 10:38 PM	60 minutes	7:27 AM to 8:37 PM	60 minutes
	10:39 AM - 2:41 PM	60 minutes				
	3:06 PM - 6:35 PM	15-30 minutes				
	7:37 PM - 10:30 PM	60 minutes				
Route 47: Morley Station to Bassendean Station						
6:22 AM to 5:57 PM	6:22 AM - 8:46 AM	35-40 minutes	No services	N/A	No services.	N/A
	10:12 AM - 2:09 PM	120 minutes				
	3:32 PM - 5:57 PM	30-45 minutes				
Route 47: Bassendean Station to Morley Station						
6:04 AM to 6:17 PM	6:04 AM - 8:28 PM	35-40 minutes	No services	N/A	No services.	N/A
	10:12 AM - 2:09 PM	120 minutes				
	3:32 PM - 6:17 PM	30-45 minutes				
Route 355: Galleria to Whiteman Park Station (via Bassendean station)						
5:11AM to 11:04PM	5:11 AM - 9:44 AM	12-15 minutes	5:49 AM to 11:03 PM	30 minutes, with some periods of 15–20-minute intervals.	7:18 AM to 10:03 PM	30 minutes, with some periods of 15–20-minute intervals.
	9:44 AM - 3:08 PM	15-30 minutes				
	3:08 PM - 6:56 PM	12-15 minutes				
	6:56 PM - 10:04 PM	30-60 minutes				
Route 355: Whiteman Park to Galleria (via Bassendean station)						
6:16AM to 12:33AM	6:16 AM - 9:52 AM	12-15 minutes	7:19 AM to 12:33 AM	30 minutes, with some periods of 15–20-minute intervals.	7:49 AM to 11:33 PM	30 minutes, with some periods of 15–20-minute intervals.
	10:07 AM - 3:08 PM	15-30 minutes				
	3:08 PM - 6:56 PM	12-15 minutes				
	6:56 PM - 12:33 AM	30-60 minutes				
Route 356: Galleria to Ballajura Station (via Bassendean station)						
4:58AM to 11:33PM	4:58 AM - 9:08 AM	10-15 minutes	6:01 AM to 11:33 PM	30 minutes, with some periods of 15–20-minute intervals.	7:32 AM to 10:32 PM	30 minutes, with some periods of 20–25-
	9:08 AM - 3:08 PM	15-30 minutes				
	3:08 PM - 6:57 PM	10-15 minutes				

Weekdays			Saturdays		Sundays & Public Holidays	
Operating Hours	Frequency		Operating hours	Frequency	Operating Hours	Frequency
	6:57 PM - 11:33 PM	30-60 minutes				minute intervals.
Route 356: Ballajura to Galleria (via Bassendean station)						
6:40AM to 12:03AM	6:40 AM - 9:08 AM	10-15 minutes	7:04 AM to 12:03 AM	30 minutes, with some periods of 15–20-minute intervals.	7:34 AM to 11:03 PM	30 minutes, with some periods of 20–25-minute intervals.
	9:08 AM - 3:08 PM	15-30 minutes				
	3:08 PM - 6:57 PM	10-15 minutes				
	6:57 PM - 12:03 AM	30-60 minutes				
Route 357: Whiteman Park Station to Bassendean Station						
4:57AM to 10:01PM	4:57 AM - 9:52 AM	15-30 minutes	6:59 AM to 8:00 PM	30 minutes	7:59PM to 8:02 PM	30 minutes
	9:52 AM - 3:46 PM	30 minutes				
	3:46 PM – 6:22 PM	13-15 minutes				
	6:22 PM - 10:01 PM	30 minutes				
Route 357: Bassendean Station to Whiteman Park Station						
6:28AM to 10:33PM	6:28 AM - 9:15 AM	13-15 minutes	7:34 AM to 8:34 PM	30 minutes	8:34 AM to 8:34 PM	30 minutes
	9:15 AM - 3:29 PM	30 minutes				
	3:29 PM - 6:27 PM	13-15 minutes				
	6:27 PM - 10:33 PM	30 minutes				

The Precinct has excellent access to public transport, with rail services at Bassendean and Success Hill, proximity to major transport interchanges at Midland, Morley and Bayswater, and bus services on Guildford Road.

It is noted that special event services such as Route 654 operate between Perth Stadium and Bassendean Station during major events at Optus Stadium. These services typically run on Fridays, Saturdays, and Sundays for limited periods, depending on the event schedule.

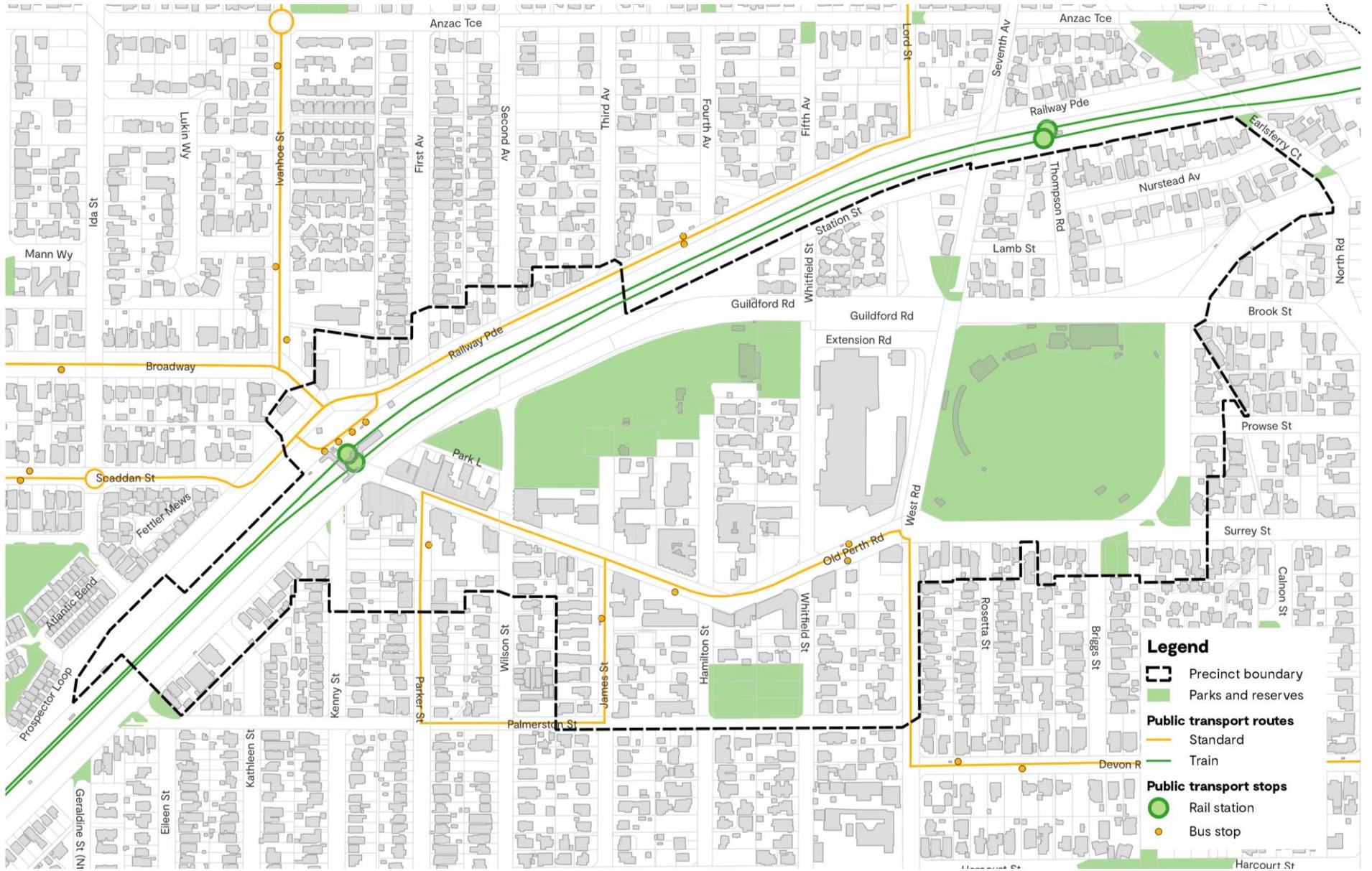


Figure 25 Public transport routes and stops

3. Assessment of growth

3.1 Traffic growth

3.1.1 Trip generation rates

To calculate traffic generation, trip rates from the WAPC guidelines and the former NSW Roads and Traffic Authority (RTA), now Transport for NSW, were used. Table 13 provides trip rates for various land uses expected to occur in the Precinct.

Table 13 Land use trip rates

Land use	Unit	Trip Generation Source	Trip Rate (Weekday)					
			AM Peak	AM In	AM Out	PM Peak	PM In	PM Out
Single	per unit	WAPC	0.8	0.2	0.6	0.8	0.5	0.3
Apartments (1, 2 & 3 BDR)	per unit	RTA	0.5	0.13	0.375	0.5	0.3125	0.1875
Retail (non-food)	per 100m ²	WAPC	1.25	1	0.25	4	2	2
F&B (Retail, food, Non-shop/office)	per 100m ²	WAPC	2.5	2	0.5	10	5	5

3.1.2 Change in demand

Existing and future land use yields within the Precinct are shown in Table 14

Table 14 Land use yield estimate

Land use	Existing	Future
Single, Apartments (1, 2 & 3 BDR)	557 dwellings	2249 dwellings
Retail (non-food)	11,980 m ²	17,984 m ²
F&B (Retail, food)	10,656 m ²	26,616 m ²

3.1.3 Net traffic generation forecast

To calculate the net traffic generated by the Precinct because of growth under the Precinct Structure Plan, the existing traffic generated from each of the precincts and frames was subtracted from the traffic forecast to be generated from the proposed increased land use intensity shown in Table 14.

Volumes were divided by forecast areas within the wider Precinct (refer Figure 26) to distribute traffic to the various intersections under assessment as part of this TIA. Distribution of floorspace and dwelling growth were estimated based on the current level of dwellings and floorspace and the area's forecast capacity to accommodate additional growth.

Traffic volumes forecast to be generated by redevelopment in the Precinct are shown in Table 15 to Table 19 (note: rounding has been applied to some figures). Trip rates have been obtained from WAPC TIA Guidelines to provide a robust assessment.

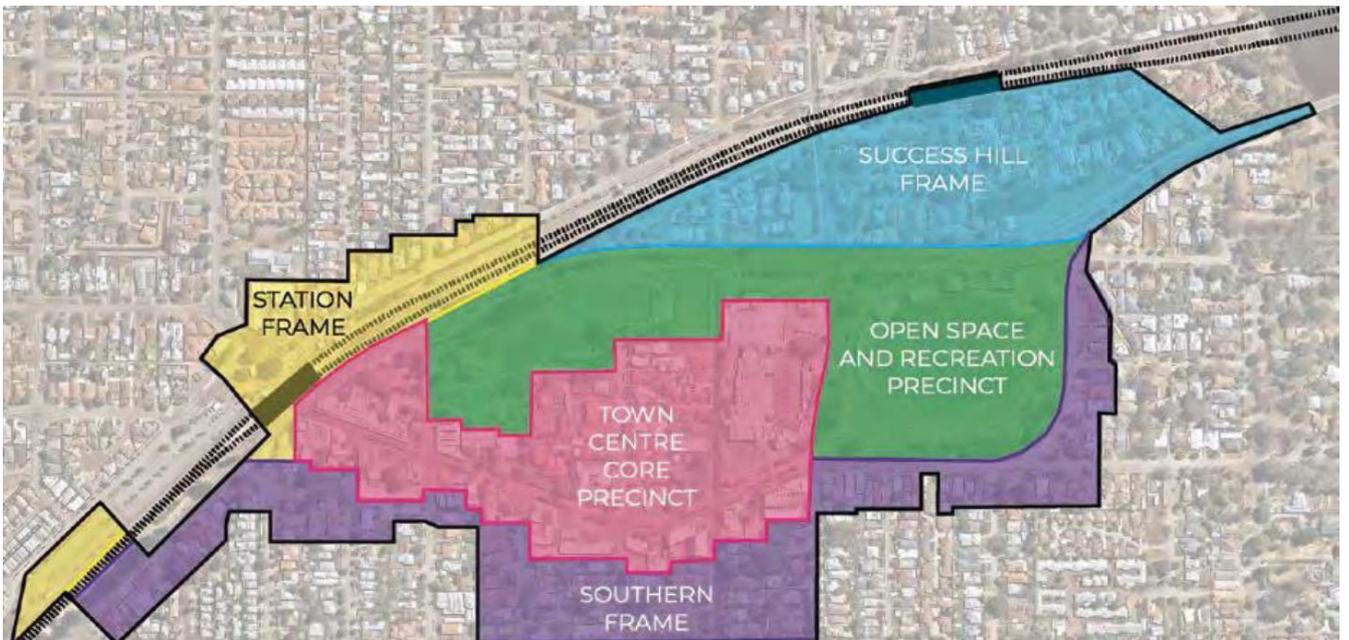


Figure 26 Traffic forecast areas

Table 15 Forecast traffic generation from Success Hill Frame

Land Use	No.	Traffic Volumes					
		AM Peak	AM In	AM Out	PM Peak	PM In	PM Out
Single	112	90	22	68	90	56	34
Apartments (1, 2 & 3 BDR)	0	-	-	-	-	-	-
Retail (non-food)	0	-	-	-	-	-	-
F&B (Retail, food)	0	-	-	-	-	-	-
Future Scenario - 2050							
Single		-	-	-	-	-	-
Apartments (1, 2 & 3 BDR)	449	224	56	168	224	140	84
Retail (non-food)	-	-	-	-	-	-	-
F&B (Retail, food)	-	-	-	-	-	-	-
Net increase							
Single	-	-	-	-	-	-	-
Apartments (1, 2 & 3 BDR)	337	135	34	101	135	85	50
Retail (non-food)	-	-	-	-	-	-	-
F&B (Retail, food)	-	-	-	-	-	-	-

Table 16 Forecast traffic generation from the Station Frame

Land Use	No.	Traffic Volumes					
		AM Peak	AM In	AM Out	PM Peak	PM In	PM Out
Single	28.00	23	6	17	23	14	9
Apartments (1, 2 & 3 BDR)	-	-	-	-	-	-	-
Retail (non-food)	-	7	6	1	21	11	11

Land Use	No.	Traffic Volumes					
		AM Peak	AM In	AM Out	PM Peak	PM In	PM Out
F&B (Retail, food)	533.00	15	12	3	60	30	30
Future Scenario - 2050							
Single	-	-	-	-	-	-	-
Apartments (1, 2 & 3 BDR)	113.00	57	14	42	57	35	21
Retail (non-food)	1,331.00	17	14	3	53	27	27
F&B (Retail, food)	900.00	23	18	5	90	45	45
Net increase							
Single	-	-	-	-	-	-	-
Apartments (1, 2 & 3 BDR)	-	34	8	25	34	21	12
Retail (non-food)	-	10	8	2	32	16	16
F&B (Retail, food)	-	8	6	2	30	15	15

Table 17 Forecast traffic generation from the Town Centre Precinct

Land Use	No.	Traffic Volumes					
		AM Peak	AM In	AM Out	PM Peak	PM In	PM Out
Single	251.00	201	50	151	201	126	76
Apartments (1, 2 & 3 BDR)	-	-	-	-	-	-	-
Retail (non-food)	6,394.00	80	64	16	256	128	128
F&B (Retail, food)	7,188.00	180	144	36	719	359	359
Future Scenario - 2050							
Single	-	-	-	-	-	-	-
Apartments (1, 2 & 3 BDR)	1,013.00	507	127	380	507	317	190
Retail (non-food)	15,970.00	200	160	40	639	319	319
F&B (Retail, food)	10,791.00	270	216	54	1,079	540	540
Net increase							
Single	-	-	-	-	-	-	-
Apartments (1, 2 & 3 BDR)	-	306	77	229	306	191	114
Retail (non-food)	-	120	96	24	383	191	191
F&B (Retail, food)	-	90	72	18	360	181	181

Table 18 Forecast traffic generation from the Open Space Precinct

Land Use	No.	Traffic Volumes					
		AM Peak	AM In	AM Out	PM Peak	PM In	PM Out
Single	56.00	45	12	34	45	28	17
Apartments (1, 2 & 3 BDR)	-	-	-	-	-	-	-
Retail (non-food)	533.00	7	5	1	21	11	11

Land Use	No.	Traffic Volumes					
		AM Peak	AM In	AM Out	PM Peak	PM In	PM Out
F&B (Retail, food)	599.00	15	12	3	60	30	30
Future Scenario - 2050							
Single	-	-	-	-	-	-	-
Apartments (1, 2 & 3 BDR)	225.00	113	28	84	113	70	42
Retail (non-food)	1,331.00	17	13	3	53	27	27
F&B (Retail, food)	900.00	23	18	5	90	45	45
Net increase							
Single	-	-	-	-	-	-	-
Apartments (1, 2 & 3 BDR)	-	68	16	50	68	42	25
Retail (non-food)	-	10	8	2	32	16	16
F&B (Retail, food)	-	8	6	2	30	15	15

Table 19 Forecast traffic generation from the Southern Frame

Land Use	No.	Traffic Volumes					
		AM Peak	AM In	AM Out	PM Peak	PM In	PM Out
Single	-	90	23	68	90	56	34
Apartments (1, 2 & 3 BDR)	112.00	-	-	-	-	-	-
Retail (non-food)	-	40	32	8	128	64	64
F&B (Retail, food)	3,197.00	90	72	18	359	180	180
Future Scenario - 2050							
Single	-	-	-	-	-	-	-
Apartments (1, 2 & 3 BDR)	450.00	225	56	169	225	141	84
Retail (non-food)	7,985.00	100	80	20	319	160	160
F&B (Retail, food)	5,396.00	135	108	27	540	270	270
Net increase							
Single	-	-	-	-	-	-	-
Apartments (1, 2 & 3 BDR)	-	135	33	101	135	85	50
Retail (non-food)	-	60	48	12	191	96	96
F&B (Retail, food)	-	45	36	9	181	90	90

3.2 Traffic distribution

The traffic forecast to be generated by each of the Precinct frames has been distributed to the network for the AM and PM peak hours, as shown in Figure 27 to Figure 36.

Ref	AM Out	271				AM In	34				
	Origin	Destination	Choice	Percentage	Traffic		Origin	Destination	Choice	Percentage	Traffic
SH 1	Success Hill Frame	Midland		25%	25		Midland	Success Hill Frame		40%	14
SH 2	Success Hill Frame	City/Town Centre		75%	76		City/Town Cen	Success Hill Frame		60%	21
				100%	101					100%	34
SH 1.1	Success Hill Frame	Midland	Guildford Rd E	100%	25		Midland	Success Hill Frame	Guildford Rd E	100%	14
SH 2.1	Success Hill Frame	City	Lord St	20%	15		City	Success Hill Frame	Lord St	15%	3
SH 2.2	Success Hill Frame	City/Town Centre	West Rd	20%	15		City/Town Cen	Success Hill Frame	West Rd	35%	7
SH 2.3	Success Hill Frame	City	Guildford Rd W	60%	45		City	Success Hill Frame	Guildford Rd	50%	10
				100%	76					100%	21

Figure 27 Success Hill Frame – AM Peak hour

	AM Out	29				AM In	22				
	Origin	Destination	Choice	Percentage	Traffic		Origin	Destination	Choice	Percentage	Traffic
STF 1	Station Frame	Midland		25%	7		Midland	Station Frame		45%	10
STF 2	Station Frame	Morley		25%	7		Morley	Station Frame		40%	9
STF 3	Station Frame	City		50%	15		City	Station Frame		15%	3
				100%	29					100%	22
STF 3.1	Station Frame	City	Railway Pde	30%	4		City	Station Frame	Railway Pde	30%	1
STF 3.2	Station Frame	City	Guildford Rd	70%	10		City	Station Frame	Guildford Rd	70%	2
				100%	15					100%	3

Figure 28 Station Frame – AM Peak hour

	AM Out	271				AM In	245				
	Origin	Destination	Choice	Percentage	Traffic		Origin	Destination	Choice	Percentage	Traffic
TC 1	Town Centre	Midland		35%	95		Midland	Town Precinct		50%	122
TC 2	Town Centre	City		65%	176		City	Town Precinct		50%	122
				100%	271					100%	245
TC 1.1	Town Centre	Midland	Old Perth Rd E	35%	33		Midland	Town Precinct	Old Perth Rd E	15%	18
TC 1.2	Town Centre	Midland	West St N	65%	62		Midland	Town Precinct	West St N	10%	12
				100%	95					25%	31
TC 2.1	Town Centre	City	Old Perth Rd W	17.5%	31		City	Town Precinct	Old Perth Rd W	0.0%	-
TC 2.2	Town Centre	City	Parker St	12.5%	22		City	Town Precinct	Parker St	15.0%	18
TC 2.3	Town Centre	City	Wilson St	12.5%	22		City	Town Precinct	Wilson St	15.0%	18
TC 2.4	Town Centre	City	James St	12.5%	22		City	Town Precinct	James St	15.0%	18
TC 2.5	Town Centre	City	Hamilton St	12.5%	22		City	Town Precinct	Hamilton St	15.0%	18
TC 2.6	Town Centre	City	Whitefield St	12.5%	22		City	Town Precinct	Whitefield St	15.0%	18
TC 2.7	Town Centre	City	West St South	20%	35		City	Town Precinct	West St South	25%	31
				100.0%	176					100.0%	122
TC 2.2-2.7	Town Centre	City	Palmerston St	60%	87		City	Town Precinct	Palmerston St	60%	73
TC 2.2-2.7	Town Centre	City	Shackleton St	40%	58		City	Town Precinct	Shackleton St	40%	49
				100%	145					100%	122

Figure 29 Town Centre Precinct – AM Peak hour

	AM Out	54				AM In	30				
	Origin	Destination	Choice	Percentage	Traffic		Origin	Destination	Choice	Percentage	Traffic
OS 1	Open Space	Midland		20%	11		Midland	Open Space		20%	6
OS 2	Open Space	City/Town Centre		80%	44		City/Town Cen	Open Space		80%	24
				100%	54					100%	30
OS 2.1	Open Space	City	West Rd N	25%	11		City	Open Space	West Rd N	25%	6
OS 2.2	Open Space	City	West Rd S	25%	11		City	Open Space	West Rd S	30%	7
OS 2.3	Open Space	City/Town Centre	Old Perth Rd	50%	22		City/Town Cen	Open Space	Old Perth Rd	45%	11
				100%	44					100%	24
OS 2.3.1	Open Space	City	Guildford Rd W	20%	4		City	Open Space	Guildford Rd W	0%	-
OS 2.3.2	Open Space	City	Palmerston St	20%	4		City	Open Space	Palmerston St	25%	3
OS 2.3.3	Open Space	Town Centre	Misc.	60%	13		Town Centre	Open Space	Misc.	75%	8
				100%	22					100%	11

Figure 30 Open Space Precinct – AM Peak hour

	AM Out					122	AM In					117
	Origin	Destination	Choice	Percentage	Traffic		Origin	Destination	Choice	Percentage	Traffic	
SF 1	Southern Frame	Midland		15%	18		Midland	Southern Frame		20%	23	
SF 2	Southern Frame	City		55%	67		City	Southern Frame		25%	29	
SF 3	Southern Frame	Town Centre		30%	37		Town Centre	Southern Frame		55%	64	
				100%	122					100%	117	
SF 2.1	Southern Frame	City	West Rd N	15%	10		City	Southern Frame	West Rd N	17.5%	5	
SF 2.2	Southern Frame	City	Old Perth Rd W	15%	10		City	Southern Frame	Old Perth Rd W	0.0%	-	
SF 2.3	Southern Frame	City	West St South	20%	13		City	Southern Frame	West St South	20.0%	6	
SF 2.4	Southern Frame	City	Parker St	10%	7		City	Southern Frame	Parker St	12.5%	4	
SF 2.5	Southern Frame	City	Wilson St	10%	7		City	Southern Frame	Wilson St	12.5%	4	
SF 2.6	Southern Frame	City	James St	10%	7		City	Southern Frame	James St	12.5%	4	
SF 2.7	Southern Frame	City	Hamilton St	10%	7		City	Southern Frame	Hamilton St	12.5%	4	
SF 2.8	Southern Frame	City	Whitefield St	10%	7		City	Southern Frame	Whitefield St	12.5%	4	
				100%	67					100%	29	
SF 3.1	Southern Frame	Town Centre	Parker St	15%	5		Town Centre	Southern Frame	Parker St	15%	10	
SF 3.2	Southern Frame	Town Centre	Wilson St	15%	5		Town Centre	Southern Frame	Wilson St	15%	10	
SF 3.3	Southern Frame	Town Centre	James St	15%	5		Town Centre	Southern Frame	James St	15%	10	
SF 3.4	Southern Frame	Town Centre	Hamilton St	15%	5		Town Centre	Southern Frame	Hamilton St	15%	10	
SF 3.5	Southern Frame	Town Centre	Whitefield St	15%	5		Town Centre	Southern Frame	Whitefield St	15%	10	
SF 3.6	Southern Frame	Town Centre	Old Perth Rd E	25%	9		Town Centre	Southern Frame	Old Perth Rd E	25%	16	
				100%	37					100%	64	
SF 2.3-2.8	Southern Frame	City/Morley	Palmerston St	60%	28		City/Morley	Southern Frame	Palmerston St	60%	15	
SF 2.3-2.8	Southern Frame	City	Shackleton St	40%	19		City	Southern Frame	Shackleton St	40%	10	
				100%	47					100%	24	

Figure 31 Southern Frame – AM Peak hour

Ref	PM Out					50	PM In					85
	Origin	Destination	Choice	Percentage	Traffic		Origin	Destination	Choice	Percentage	Traffic	
SH 1	Success Hill Frame	Midland		50%	25		Midland	Success Hill Frame		40%	34	
SH 2	Success Hill Frame	City/Town Centre		50%	25		City/Town Centre	Success Hill Frame		60%	51	
				100%	50					100%	85	
SH 1.1	Success Hill Frame	Midland	Guildford Rd E	100%	25		Midland	Success Hill Frame	Guildford Rd E	100%	34	
SH 2.1	Success Hill Frame	City	Lord St	20%	5		City	Success Hill Frame	Lord St	15%	8	
SH 2.2	Success Hill Frame	City/Town Centre	West Rd	20%	5		City/Town Centre	Success Hill Frame	West Rd	35%	18	
SH 2.3	Success Hill Frame	City	Guildford Rd	60%	15		City	Success Hill Frame	Guildford Rd	50%	25	
				100%	25					100%	51	

Figure 32 Success Hill Frame – PM Peak hour

	PM Out					43	PM In					52
	Origin	Destination	Choice	Percentage	Traffic		Origin	Destination	Choice	Percentage	Traffic	
STF 1	Station Frame	Midland		30%	13		Midland	Station Frame		45%	24	
STF 2	Station Frame	Morley		35%	15		Morley	Station Frame		40%	21	
STF 3	Station Frame	City		35%	15		City	Station Frame		15%	8	
				100%	43					100%	52	
STF 3.1	Station Frame	City	Railway Pde	30%	5		City	Station Frame	Railway Pde	30%	2	
STF 3.2	Station Frame	City	Guildford Rd	70%	11		City	Station Frame	Guildford Rd	70%	5	
				100%	15					100%	8	

Figure 33 Station Frame – PM Peak hour

	PM Out					486	PM In					563
	Origin	Destination	Choice	Percentage	Traffic		Origin	Destination	Choice	Percentage	Traffic	
TC 1	Town Centre	Midland		40%	194		Midland	Town Precinct		35%	197	
TC 2	Town Centre	City		60%	292		City	Town Precinct		65%	366	
				100%	486					100%	563	
TC 1.1	Town Centre	Midland	Old Perth Rd E	35%	68		Midland	Town Precinct	Old Perth Rd E	15%	30	
TC 1.2	Town Centre	Midland	West St N	65%	126		Midland	Town Precinct	West St N	10%	20	
				100%	194					25%	49	
TC 2.1	Town Centre	City	Old Perth Rd W	17.5%	51		City	Town Precinct	Old Perth Rd W	0.0%	-	
TC 2.2	Town Centre	City	Parker St	12.5%	36		City	Town Precinct	Parker St	15.0%	55	
TC 2.3	Town Centre	City	Wilson St	12.5%	36		City	Town Precinct	Wilson St	15.0%	55	
TC 2.4	Town Centre	City	James St	12.5%	36		City	Town Precinct	James St	15.0%	55	
TC 2.5	Town Centre	City	Hamilton St	12.5%	36		City	Town Precinct	Hamilton St	15.0%	55	
TC 2.6	Town Centre	City	Whitefield St	12.5%	36		City	Town Precinct	Whitefield St	15.0%	55	
TC 2.7	Town Centre	City	West St South	20%	58		City	Town Precinct	West St South	25%	91	
				100.0%	292					100.0%	366	
TC 2.2-2.7	Town Centre	City	Palmerston St	60%	144		City	Town Precinct	Palmerston St	60%	219	
TC 2.2-2.7	Town Centre	City	Shackleton St	40%	96		City	Town Precinct	Shackleton St	40%	146	
				100%	241					100%	366	

Figure 34 Town Centre Precinct – PM Peak hour

PM Out					56	PM In					73
	Origin	Destination	Choice	Percentage	Traffic	Origin	Destination	Choice	Percentage	Traffic	
OS 1	Open Space	Midland		35%	20	Midland	Open Space		20%	15	
OS 2	Open Space	City/Town Centre		65%	37	City/Town Centre	Open Space		80%	59	
				100%	56				100%	73	
OS 2.1	Open Space	City	West Rd N	25%	9	City	Open Space	West Rd N	25%	15	
OS 2.2	Open Space	City	West Rd S	25%	9	City	Open Space	West Rd S	30%	18	
OS 2.3	Open Space	City/Town Centre	Old Perth Rd	50%	18	City/Town Centre	Open Space	Old Perth Rd	45%	26	
				100%	37				100%	59	
OS 2.3.1	Open Space	City	Guildford Rd W	20%	4	City	Open Space	Guildford Rd W	0%	-	
OS 2.3.2	Open Space	City	Palmerston St	20%	4	City	Open Space	Palmerston St	25%	7	
OS 2.3.3	Open Space	Town Centre	Misc.	60%	11	Town Centre	Open Space	Misc.	75%	20	
				100%	18				100%	26	

Figure 35 Open Space Precinct - PM Peak hour

PM Out					236	PM In					271
	Origin	Destination	Choice	Percentage	Traffic	Origin	Destination	Choice	Percentage	Traffic	
SF 1	Southern Frame	Midland		15%	35	Midland	Southern Frame		15%	41	
SF 2	Southern Frame	City		30%	71	City	Southern Frame		35%	95	
SF 3	Southern Frame	Town Centre		55%	130	Town Centre	Southern Frame		45%	122	
				100%	236				95%	257	
SF 2.1	Southern Frame	City	West Rd N	15%	11	City	Southern Frame	West Rd N	17.5%	17	
SF 2.2	Southern Frame	City	Old Perth Rd W	15%	11	City	Southern Frame	Old Perth Rd W	0.0%	-	
SF 2.3	Southern Frame	City	West St South	20%	14	City	Southern Frame	West St South	20.0%	19	
SF 2.4	Southern Frame	City	Parker St	10%	7	City	Southern Frame	Parker St	12.5%	12	
SF 2.5	Southern Frame	City	Wilson St	10%	7	City	Southern Frame	Wilson St	12.5%	12	
SF 2.6	Southern Frame	City	James St	10%	7	City	Southern Frame	James St	12.5%	12	
SF 2.7	Southern Frame	City	Hamilton St	10%	7	City	Southern Frame	Hamilton St	12.5%	12	
SF 2.8	Southern Frame	City	Whitefield St	10%	7	City	Southern Frame	Whitefield St	12.5%	12	
				100%	71				100%	95	
SF 3.1	Southern Frame	Town Centre	Parker St	15%	20	Town Centre	Southern Frame	Parker St	15%	18	
SF 3.2	Southern Frame	Town Centre	Wilson St	15%	20	Town Centre	Southern Frame	Wilson St	15%	18	
SF 3.3	Southern Frame	Town Centre	James St	15%	20	Town Centre	Southern Frame	James St	15%	18	
SF 3.4	Southern Frame	Town Centre	Hamilton St	15%	20	Town Centre	Southern Frame	Hamilton St	15%	18	
SF 3.5	Southern Frame	Town Centre	Whitefield St	15%	20	Town Centre	Southern Frame	Whitefield St	15%	18	
SF 3.6	Southern Frame	Town Centre	Old Perth Rd E	25%	33	Town Centre	Southern Frame	Old Perth Rd E	25%	30	
				100%	130				100%	122	
SF 2.3-2.8	Southern Frame	City/Morley	Palmerston St	60%	30	City/Morley	Southern Frame	Palmerston St	60%	47	
SF 2.3-2.8	Southern Frame	City	Shackelton St	40%	20	City	Southern Frame	Shackelton St	40%	31	
				100%	50				100%	78	

Figure 36 Southern Frame - PM Peak hour

3.3 Traffic assignment

The traffic distributed to the network was subsequently assigned to the six key intersections which were modelled in SIDRA. The traffic assignment is shown in Figure 37. Growth factors are based upon historical rates in traffic growth along each route and reflect a broad level of growth in movement across the region.

Intersection and Relevant Frame	Road	Direction	Growth Factor	AM			PM		
				Existing	2050	Net	Existing	2050	Net
Guildford Rd & Collier Rd	Guildford Rd	EB	1.021%	414	539	541	737	960	965
	Guildford Rd	WB	1.166%	811	1096	1104	618	835	846
	Collier Rd	NB	1.094%	356	472	474	717	951	957
	Collier Rd	SB	1.094%	533	707	715	717	951	962
Station Frame	Collier Rd	SB			8			11	
	Collier Rd	NB			2			5	
	Guildford Rd	EB			2			5	
	Guildford Rd	WB			8			11	
Guildford Rd & North Rd	Guildford Rd	EB	1.526%	1138	1687	1705	1091	1617	1647
	Guildford Rd	WB	1.642%	995	1520	1553	1143	1746	1814
	North Rd	NB	1.000%	24	31	64	30	39	107
	North Rd	SB	1.000%	65	84	103	140	181	211
Town Centre Frame	North Rd	NB			33		18	68	
	North Rd	SB			18			30	
	Guildford Rd	EB			18			30	
	Guildford Rd	WB			33			68	
Guildford Rd & Old Perth Rd	Guildford Rd	EB	1.358%	581	825	825	1096	1556	1556
	Guildford Rd	WB	1.166%	888	1200	1245	702	949	1014
	Old Perth Rd	NB	1.000%	109	141	172	137	177	228
	Old Perth Rd	SB	1.000%	8	10	10	5	6	6
Town Centre Frame	Old Perth Rd	NB			31			51	
	Old Perth Rd	SB			0			0	
	Guildford Rd	EB			0			0	
	Guildford Rd	WB			31			51	
Open Space Frame	Guildford Rd	WB			4			4	
Southern Frame	Guildford Rd	WB			10			11	
Guildford Rd & Palmerston St	Guildford Rd	EB	1.021%	583	759	759	1105	1439	1439
	Guildford Rd	WB	1.166%	960	1298	1298	825	1115	1115
	Palmerston St	NB	1.000%	109	141	232	76	98	371
	Palmerston St	SB	1.000%	98	127	247	110	142	320
Town Centre Frame	Palmerston St	NB			73			219	
	Palmerston St	SB			87			144	
Open Space Frame	Palmerston St	NB			3			7	
	Palmerston St	SB			4			4	
Southern Frame	Palmerston St	NB			15			47	
	Palmerston St	SB			28			30	

Guildford Rd & Thompson Rd	Guildford Rd	EB	1.526%	1154	1711	1711	1131	1677	1677
	Guildford Rd	WB	1.642%	1060	1619	1695	1221	1865	1890
	Thompson St	NB	1.000%	12	16	29	21	27	61
	Thompson St	SB	1.000%	21	27	52	13	17	42
Success Hill Frame	Thompson St	NB			14			34	
	Thompson St	SB			25			25	
	Guildford Rd	EB			0				
	Guildford Rd	WB			76			25	
Guildford Rd & West Rd & Lord St	Guildford Rd	EB	1.526%	1154	1711	1783	1079	1600	1751
	Guildford Rd	WB	1.507%	1089	1607	1662	719	1061	1086
	Lord St	SB	1.172%	1045	1415	1430	707	957	962
	West Rd	NB	1.172%	385	521	585	560	758	848
Success Hill Frame	Guildford Rd	EB			10			25	
	Guildford Rd	WB			45			15	
	Lord St	NB			15			5	
	West Rd	SB			15			18	
Town Centre	West Rd	SB			35			58	
	Guildford Rd	EB			62			126	
Southern Frame	West Rd	SB			13			14	
	Guildford Rd	WB			10			11	

Figure 37 Traffic assignment to key intersections

3.4 Level of service

The following intersections have been analysed for one peak period for an agreed design year using SIDRA:

- Guildford Road/Collier Road (level crossing)
- Guildford Road/Old Perth Road
- Guildford Road/West Road/Lord Street
- Thomspson Road/Guildford Road
- North Road/Guildford Road
- Palmerston Street/Guildford Road.

3.4.1 Level of service definition

Table 20 indicates the level of service threshold based on average delay (source: Highway Capacity Manual, Edition 6). Typically, level of service C/D is desirable.

Table 20 Level of service thresholds

Level of Service for $v/c \leq 1.0$	Average delay per vehicle in seconds (d)			Level of Service for $v/c > 1.0$
	Signals	"SIDRA Roundabout LOS" method *	Sign Control *	All Intersection Types
A	$d \leq 10$	$d \leq 10$	$d \leq 10$	F
B	$10 < d \leq 20$	$10 < d \leq 20$	$10 < d \leq 15$	F
C	$20 < d \leq 35$	$20 < d \leq 35$	$15 < d \leq 25$	F
D	$35 < d \leq 55$	$35 < d \leq 50$	$25 < d \leq 35$	F
E	$55 < d \leq 80$	$50 < d \leq 70$	$35 < d \leq 50$	F
F	$80 < d$	$70 < d$	$50 < d$	F

3.4.2 Guildford Road/Collier Road (level crossing)

3.4.2.1 Geometric SIDRA model

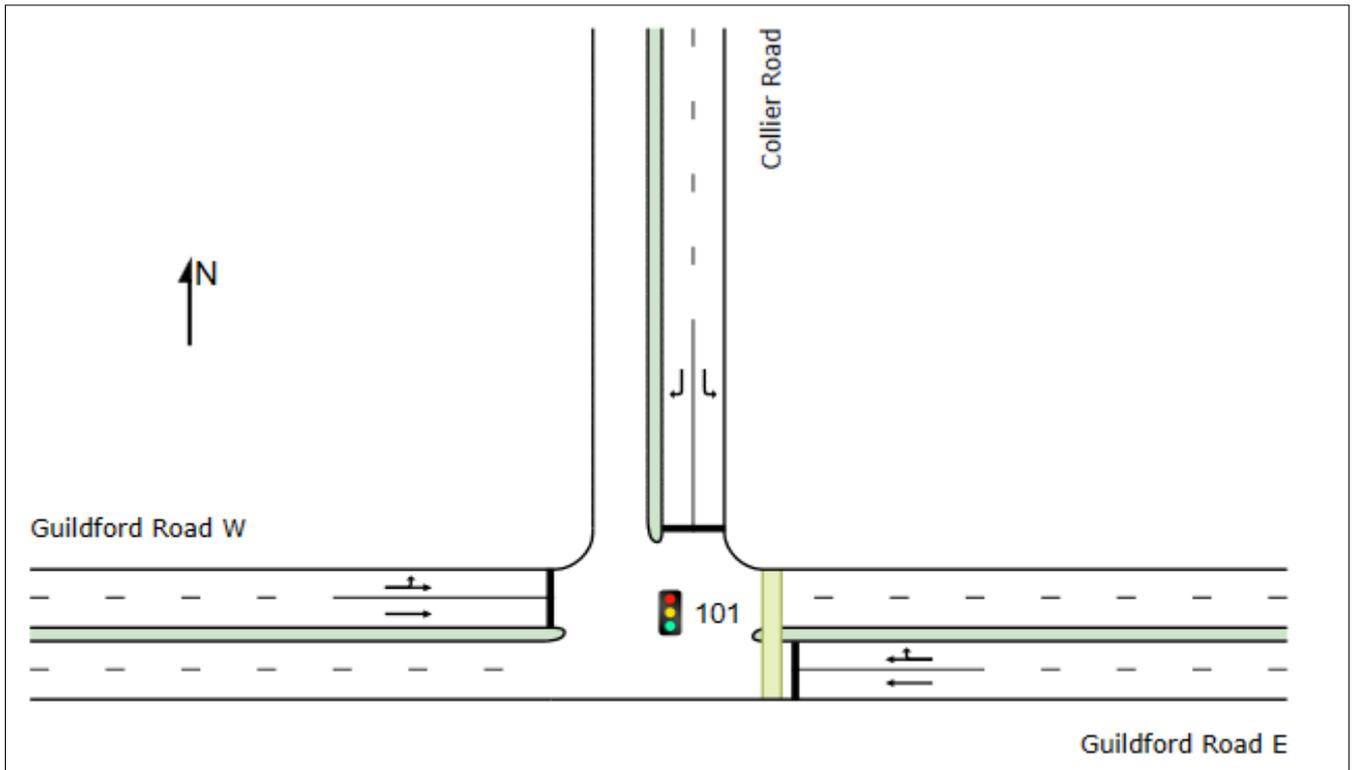


Figure 38 Geometric SIDRA model of Collier Road and Guildford Road intersection

3.4.2.2 Base year (2025) – AM and PM output results

MOVEMENT SUMMARY															
Site: 101 [Guildford Road Collier Road Existing AM Peak Hour (Site Folder: Existing)]															
Output produced by SIDRA INTERSECTION Version: 9.1.1.200															
Guildford Road Collier Road Existing AM Peak Hour															
Site Category: (None)															
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 204 seconds (Site User-Given Phase Times)															
Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total	HV]	[Total	HV]				[Veh.	Dist]				
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Guildford Road E															
5	T1	All MCs	854	1.6	854	1.6	* 0.616	8.7	LOS A	24.8	176.1	0.58	0.52	0.58	51.9
6	R2	All MCs	260	10.1	260	10.1	0.616	40.3	LOS D	14.5	109.5	0.88	0.82	0.88	36.4
Approach			1114	3.6	1114	3.6	0.616	16.1	LOS B	24.8	176.1	0.65	0.59	0.65	47.2
North: Collier Road															
7	L2	All MCs	275	5.7	275	5.7	0.419	56.4	LOS E	20.0	147.1	0.80	0.81	0.80	30.4
9	R2	All MCs	286	3.3	286	3.3	* 0.920	86.9	LOS F	24.6	177.3	1.00	0.98	1.20	24.4
Approach			561	4.5	561	4.5	0.920	72.0	LOS E	24.6	177.3	0.90	0.89	1.00	27.0
West: Guildford Road W															
10	L2	All MCs	115	1.8	115	1.8	0.253	18.8	LOS B	12.9	92.1	0.52	0.58	0.52	43.2
11	T1	All MCs	436	3.1	436	3.1	0.253	24.5	LOS C	13.3	95.9	0.53	0.51	0.53	43.5
Approach			551	2.9	551	2.9	0.253	23.3	LOS C	13.3	95.9	0.53	0.52	0.53	43.4
All Vehicles			2225	3.6	2225	3.6	0.920	32.0	LOS C	24.8	177.3	0.68	0.65	0.71	39.0

MOVEMENT SUMMARY

Site: 101 [Guildford Road Collier Road Existing PM Peak Hour (Site Folder: Existing)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Guildford Road Collier Road Existing AM Peak Hour

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 172 seconds (Site User-Given Phase Times)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total	HV]	[Total	HV]				[Veh.	Dist]				
			veh/h	%	veh/h	%	v/c	sec	veh		m				
East: Guildford Road E															
5	T1	All MCs	651	1.3	651	1.3	* 0.503	8.3	LOS A	17.7	125.3	0.54	0.48	0.54	52.8
6	R2	All MCs	289	2.9	289	2.9	0.672	34.5	LOS C	15.9	114.1	0.94	0.86	0.94	37.4
Approach			940	1.8	940	1.8	0.672	16.4	LOS B	17.7	125.3	0.66	0.60	0.66	46.8
North: Collier Road															
7	L2	All MCs	466	2.3	466	2.3	0.655	51.2	LOS D	31.6	225.3	0.88	0.85	0.88	31.8
9	R2	All MCs	288	0.4	288	0.4	* 0.837	57.8	LOS E	19.2	134.5	1.00	0.89	1.11	30.2
Approach			755	1.5	755	1.5	0.837	53.7	LOS D	31.6	225.3	0.93	0.87	0.97	31.2
West: Guildford Road W															
10	L2	All MCs	465	3.6	465	3.6	0.587	23.0	LOS C	32.3	231.9	0.69	0.76	0.69	39.8
11	T1	All MCs	776	1.2	776	1.2	* 0.587	30.7	LOS C	33.9	240.0	0.72	0.68	0.72	41.4
Approach			1241	2.1	1241	2.1	0.587	27.8	LOS C	33.9	240.0	0.71	0.71	0.71	40.7
All Vehicles			2936	1.9	2936	1.9	0.837	30.8	LOS C	33.9	240.0	0.75	0.71	0.76	39.3

3.4.2.3 Design year – 2050 – AM and PM output results

MOVEMENT SUMMARY

Site: 101 [Guildford Road Collier Road AM Peak Hour - Future 2050 (Site Folder: Future - 2050)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Guildford Road Collier Road Existing AM Peak Hour

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 200 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total	HV]	[Total	HV]				[Veh.	Dist]				
			veh/h	%	veh/h	%	v/c	sec	veh		m				
East: Guildford Road E															
5	T1	All MCs	1162	1.6	1162	1.6	* 1.088	129.5	LOS F	92.9	659.4	1.00	1.35	1.47	16.6
6	R2	All MCs	346	10.1	346	10.1	1.088	176.3	LOS F	60.9	452.7	1.00	1.28	1.53	14.7
Approach			1508	3.6	1508	3.6	1.088	140.2	LOS F	92.9	659.4	1.00	1.33	1.48	16.1
North: Collier Road															
7	L2	All MCs	285	5.7	285	5.7	0.240	19.5	LOS B	10.7	78.9	0.43	0.70	0.43	43.9
9	R2	All MCs	467	3.3	467	3.3	* 0.669	54.1	LOS D	32.8	236.0	0.89	0.92	0.89	31.1
Approach			753	4.2	753	4.2	0.669	41.0	LOS D	32.8	236.0	0.71	0.84	0.71	35.0
West: Guildford Road W															
10	L2	All MCs	153	1.8	153	1.8	0.727	28.5	LOS C	31.6	226.4	0.97	0.86	0.97	27.4
11	T1	All MCs	569	3.1	569	3.1	0.727	84.2	LOS F	31.8	228.7	0.97	0.85	0.97	27.5
Approach			722	2.9	722	2.9	0.727	72.4	LOS E	31.8	228.7	0.97	0.85	0.97	27.4
All Vehicles			2983	3.6	2983	3.6	1.088	98.8	LOS F	92.9	659.4	0.92	1.09	1.17	21.1

MOVEMENT SUMMARY

Site: 101 [Guildford Road Collier Road PM Peak Hour - Future 2050 (Site Folder: Future - 2050)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Guildford Road Collier Road Existing AM Peak Hour

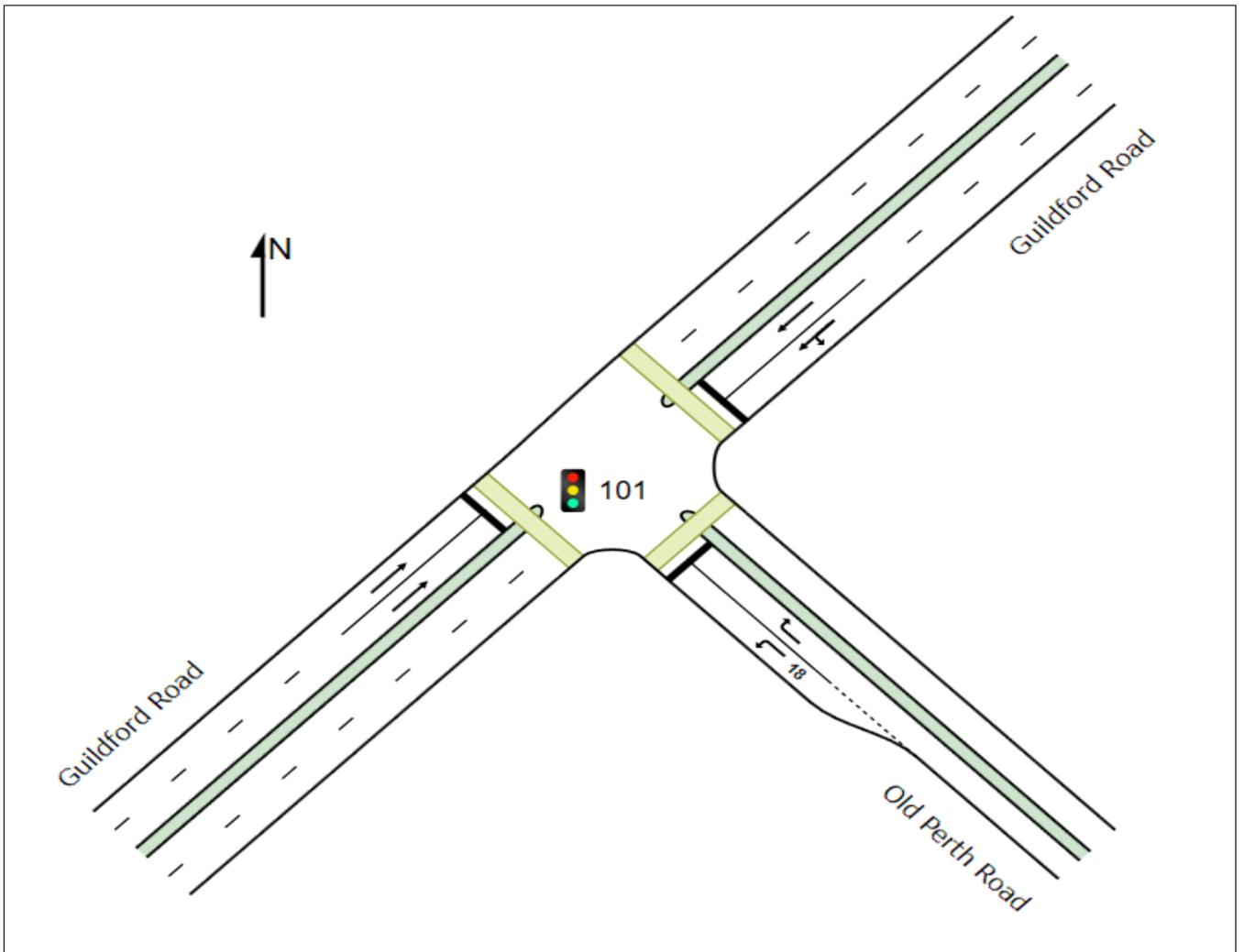
Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 200 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total	HV]	[Total	HV]				[Veh.	Dist]				
			veh/h	%	veh/h	%	v/c	sec			veh	m			
East: Guildford Road E															
5	T1	All MCs	891	1.3	891	1.3	2.362	1250.9	LOS F	241.9	1712.1	1.00	2.50	3.61	2.6
6	R2	All MCs	386	2.9	386	2.9	*4.144	2897.5	LOS F	125.4	899.5	1.00	2.18	4.42	1.2
Approach			1277	1.8	1277	1.8	4.144	1749.1	LOS F	241.9	1712.1	1.00	2.40	3.85	2.0
North: Collier Road															
7	L2	All MCs	519	2.3	519	2.3	0.374	13.9	LOS B	16.4	117.0	0.36	0.70	0.36	47.1
9	R2	All MCs	494	0.4	494	0.4	*0.404	19.5	LOS B	19.0	133.5	0.50	0.75	0.50	44.1
Approach			1013	1.3	1013	1.3	0.404	16.6	LOS B	19.0	133.5	0.43	0.72	0.43	45.6
West: Guildford Road W															
10	L2	All MCs	621	3.6	621	3.6	*2.451	1325.8	LOS F	241.6	1734.0	1.00	2.32	3.68	2.5
11	T1	All MCs	1016	1.2	1016	1.2	2.451	1446.1	LOS F	241.6	1734.0	1.00	2.83	3.68	2.5
Approach			1637	2.1	1637	2.1	2.451	1400.5	LOS F	241.6	1734.0	1.00	2.63	3.68	2.5
All Vehicles			3926	1.8	3926	1.8	4.144	1157.0	LOS F	241.9	1734.0	0.85	2.07	2.90	3.0

3.4.3 Guildford Road/Old Perth Road

3.4.3.1 Geometric SIDRA model



3.4.3.2 Base year (2025) – AM and PM output results

MOVEMENT SUMMARY

Site: 101 [Guildford Road Old Perth Road Existing AM Peak (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Guildford Road Old Perth Road Existing AM Peak

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 78 seconds (Site User-Given Phase Times)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total	HV]	[Total	HV]				[Veh.	Dist]				
			veh/h	%	veh/h	%	v/c	sec	veh		m				
SouthEast: Old Perth Road															
21	L2	All MCs	96	3.3	96	3.3	0.380	37.7	LOS D	3.5	25.0	0.95	0.76	0.95	31.3
23	R2	All MCs	19	11.1	19	11.1	*0.218	45.6	LOS D	0.8	5.8	0.99	0.69	0.99	29.2
Approach			115	4.6	115	4.6	0.380	39.0	LOS D	3.5	25.0	0.96	0.75	0.96	30.9
NorthEast: Guildford Road															
24	L2	All MCs	8	12.5	8	12.5	*0.569	14.3	LOS B	13.5	97.8	0.80	0.71	0.80	38.0
25	T1	All MCs	935	3.9	935	3.9	*0.569	18.5	LOS B	13.5	98.0	0.80	0.71	0.80	46.0
Approach			943	4.0	943	4.0	0.569	18.5	LOS B	13.5	98.0	0.80	0.71	0.80	46.0
SouthWest: Guildford Road															
31	T1	All MCs	612	4.6	612	4.6	0.337	7.4	LOSA	4.7	33.9	0.65	0.55	0.65	53.5
Approach			612	4.6	612	4.6	0.337	7.4	LOSA	4.7	33.9	0.65	0.55	0.65	53.5
All Vehicles			1669	4.3	1669	4.3	0.569	15.8	LOS B	13.5	98.0	0.76	0.65	0.76	46.8

MOVEMENT SUMMARY

Site: 101 [Guildford Road Old Perth Road Existing PM Peak (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Guildford Road Old Perth Road Existing AM Peak

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 68 seconds (Site User-Given Phase Times)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total	HV]	[Total	HV]				[Veh.	Dist]				
			veh/h	%	veh/h	%	v/c	sec	veh		m				
SouthEast: Old Perth Road															
21	L2	All MCs	117	0.9	117	0.9	0.547	36.1	LOS D	3.9	27.6	0.99	0.79	1.00	31.8
23	R2	All MCs	27	0.0	27	0.0	*0.509	44.5	LOS D	1.1	7.4	1.00	0.74	1.11	29.6
Approach			144	0.7	144	0.7	0.547	37.7	LOS D	3.9	27.6	0.99	0.78	1.02	31.3
NorthEast: Guildford Road															
24	L2	All MCs	5	0.0	5	0.0	0.338	8.7	LOSA	6.5	46.4	0.56	0.50	0.56	42.5
25	T1	All MCs	739	2.6	739	2.6	*0.338	8.6	LOSA	6.5	46.6	0.57	0.49	0.57	52.6
Approach			744	2.5	744	2.5	0.338	8.6	LOSA	6.5	46.6	0.57	0.49	0.57	52.5
SouthWest: Guildford Road															
31	T1	All MCs	1154	1.8	1154	1.8	*0.470	3.5	LOSA	5.7	40.3	0.54	0.47	0.54	56.7
Approach			1154	1.8	1154	1.8	0.470	3.5	LOSA	5.7	40.3	0.54	0.47	0.54	56.7
All Vehicles			2042	2.0	2042	2.0	0.547	7.8	LOSA	6.5	46.6	0.58	0.50	0.58	52.2

3.4.3.3 Design year – 2050 – AM and PM output results

MOVEMENT SUMMARY

Site: 101 [Guildford Road Old Perth Road AM Peak - Future 2050 (Site Folder: Future - 2050)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Guildford Road Old Perth Road Existing AM Peak

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total	HV]	[Total	HV]				[Veh.	Dist]				
			veh/h	%	veh/h	%	v/c	sec			veh	m			
SouthEast: Old Perth Road															
21	L2	All MCs	181	3.3	181	3.3	0.326	41.0	LOS D	3.7	26.3	0.93	0.76	0.93	30.4
Approach			181	3.3	181	3.3	0.326	41.0	LOS D	3.7	26.3	0.93	0.76	0.93	30.4
NorthEast: Guildford Road															
25	T1	All MCs	1311	3.9	1311	3.9	*0.674	17.6	LOS B	21.4	154.8	0.80	0.72	0.80	46.5
Approach			1311	3.9	1311	3.9	0.674	17.6	LOS B	21.4	154.8	0.80	0.72	0.80	46.5
SouthWest: Guildford Road															
31	T1	All MCs	868	4.6	868	4.6	*0.375	5.1	LOS A	6.3	46.0	0.53	0.46	0.53	55.3
Approach			868	4.6	868	4.6	0.375	5.1	LOS A	6.3	46.0	0.53	0.46	0.53	55.3
All Vehicles			2360	4.2	2360	4.2	0.674	14.8	LOS B	21.4	154.8	0.71	0.63	0.71	47.4

MOVEMENT SUMMARY

Site: 101 [Guildford Road Old Perth Road PM Peak - Future 2050 (Site Folder: Future - 2050)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Guildford Road Old Perth Road Existing AM Peak

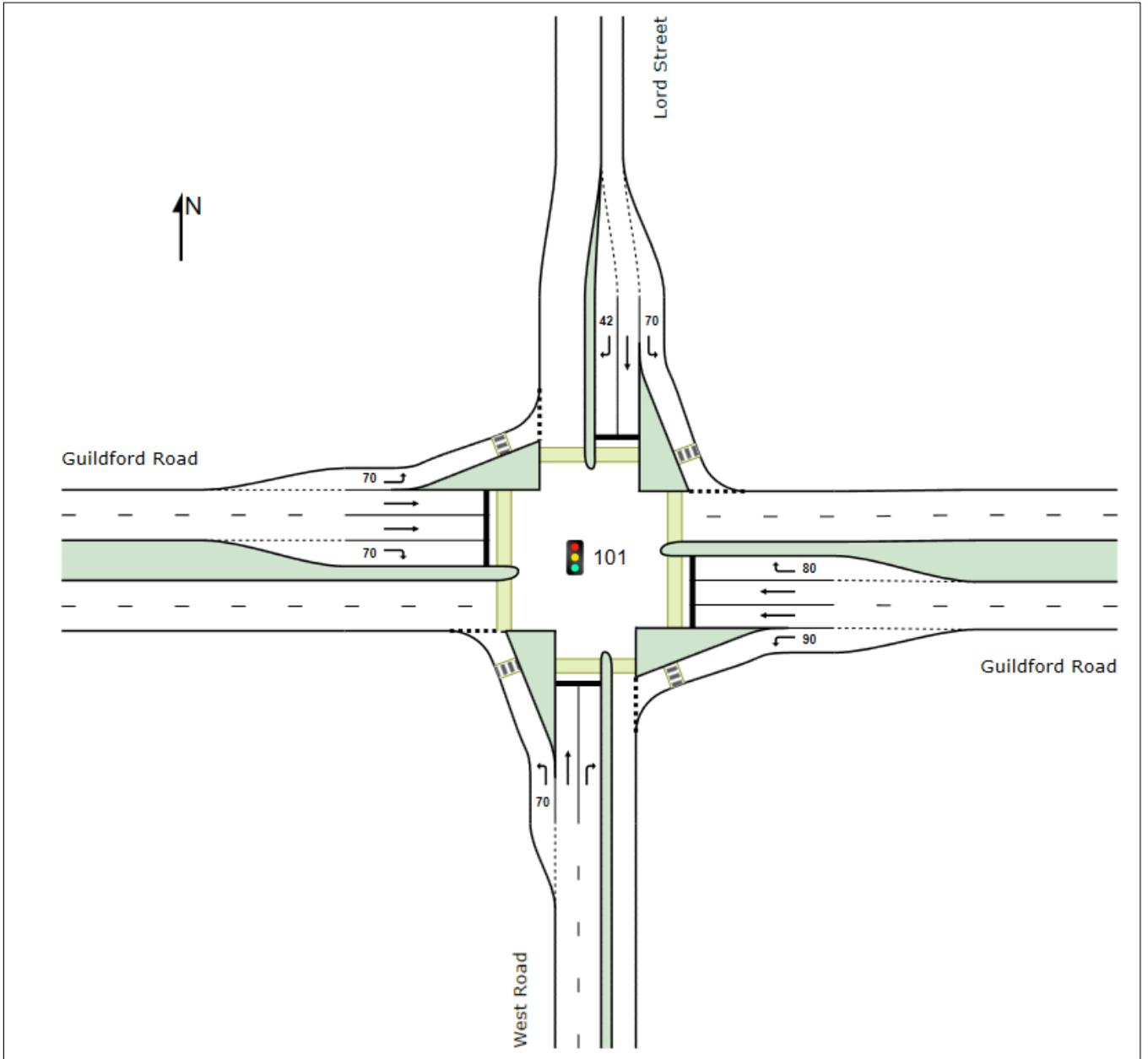
Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total	HV]	[Total	HV]				[Veh.	Dist]				
			veh/h	%	veh/h	%	v/c	sec			veh	m			
SouthEast: Old Perth Road															
21	L2	All MCs	240	0.9	240	0.9	0.198	26.5	LOS C	3.8	26.6	0.75	0.72	0.75	34.6
Approach			240	0.9	240	0.9	0.198	26.5	LOS C	3.8	26.6	0.75	0.72	0.75	34.6
NorthEast: Guildford Road															
25	T1	All MCs	1067	2.6	1067	2.6	*0.611	19.9	LOS B	17.7	126.3	0.81	0.72	0.81	45.2
Approach			1067	2.6	1067	2.6	0.611	19.9	LOS B	17.7	126.3	0.81	0.72	0.81	45.2
SouthWest: Guildford Road															
31	T1	All MCs	1638	1.8	1638	1.8	*0.563	2.4	LOS A	8.5	60.1	0.44	0.40	0.44	57.7
Approach			1638	1.8	1638	1.8	0.563	2.4	LOS A	8.5	60.1	0.44	0.40	0.44	57.7
All Vehicles			2945	2.0	2945	2.0	0.611	10.7	LOS B	17.7	126.3	0.60	0.54	0.60	50.0

3.4.4 Guildford Road/West Road/Lord Street

3.4.4.1 Geometric SIDRA model



3.4.4.2 Base year (2025) – AM and PM output results

MOVEMENT SUMMARY

Site: 101 [Guildford Road/West Road/Lord Street Existing AM Peak Hour (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Guildford Road/West Road/Lord Street Existing AM Peak Hour

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 122 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total	HV]	[Total	HV]				[Veh.	Dist]				
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: West Road															
1	L2	All MCs	48	2.2	48	2.2	0.053	15.4	LOS B	1.2	8.4	0.49	0.63	0.49	43.1
2	T1	All MCs	223	0.9	223	0.9	* 0.878	66.4	LOS E	14.8	104.3	1.00	1.04	1.28	27.5
3	R2	All MCs	193	4.4	193	4.4	0.820	66.8	LOS E	12.2	88.9	1.00	0.95	1.19	26.9
Approach			464	2.5	464	2.5	0.878	61.3	LOS E	14.8	104.3	0.95	0.96	1.16	28.3
East: Guildford Road															
4	L2	All MCs	181	2.9	181	2.9	0.142	9.5	LOS A	2.7	19.2	0.33	0.64	0.33	46.9
5	T1	All MCs	574	5.9	574	5.9	* 0.772	55.1	LOS E	17.1	125.8	1.00	0.91	1.08	32.1
6	R2	All MCs	337	3.4	337	3.4	* 1.068	150.4	LOS F	32.4	233.6	1.00	1.30	1.85	17.5
Approach			1092	4.6	1092	4.6	1.068	76.9	LOS E	32.4	233.6	0.89	0.98	1.20	26.6
North: Lord Street															
7	L2	All MCs	566	2.8	566	2.8	0.555	14.7	LOS B	15.4	110.2	0.58	0.76	0.58	47.0
8	T1	All MCs	260	2.0	260	2.0	0.656	58.2	LOS E	13.8	97.9	0.94	0.81	0.94	33.2
9	R2	All MCs	303	2.1	303	2.1	* 0.810	70.5	LOS E	18.3	130.3	0.99	0.92	1.12	30.8
Approach			1129	2.4	1129	2.4	0.810	39.7	LOS D	18.3	130.3	0.77	0.81	0.81	38.0
West: Guildford Road															
10	L2	All MCs	87	6.0	87	6.0	0.077	13.2	LOS B	1.8	13.0	0.43	0.65	0.43	47.8
11	T1	All MCs	472	4.9	472	4.9	0.625	48.9	LOS D	13.0	95.0	0.97	0.81	0.97	33.4
12	R2	All MCs	26	8.0	26	8.0	0.085	51.6	LOS D	1.3	9.9	0.87	0.71	0.87	30.5
Approach			585	5.2	585	5.2	0.625	43.7	LOS D	13.0	95.0	0.88	0.78	0.88	34.8
All Vehicles			3271	3.7	3271	3.7	1.068	55.9	LOS E	32.4	233.6	0.86	0.89	1.00	31.5

MOVEMENT SUMMARY

Site: 101 [Guildford Road/West Road/Lord Street Existing PM Peak Hour (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Guildford Road/West Road/Lord Street Existing AM Peak Hour

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 138 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total	HV]	[Total	HV]				[Veh.	Dist]				
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: West Road															
1	L2	All MCs	60	1.8	60	1.8	0.049	42.4	LOS D	1.1	7.5	0.33	0.59	0.33	46.1
2	T1	All MCs	353	0.3	353	0.3	* 1.167	244.4	LOS F	44.0	308.5	1.00	1.75	2.14	12.5
3	R2	All MCs	178	2.4	178	2.4	0.614	63.7	LOS E	11.4	81.1	0.98	0.82	0.98	27.5
Approach			591	1.1	591	1.1	1.167	169.5	LOS F	44.0	308.5	0.93	1.35	1.61	16.4
East: Guildford Road															
4	L2	All MCs	179	0.6	179	0.6	0.145	9.1	LOS A	2.7	19.1	0.30	0.64	0.30	47.2
5	T1	All MCs	560	1.5	560	1.5	0.865	79.2	LOS E	20.4	144.5	1.00	1.00	1.19	28.2
6	R2	All MCs	568	0.9	568	0.9	* 1.062	161.3	LOS F	59.6	420.8	1.00	1.28	1.66	18.0
Approach			1307	1.1	1307	1.1	1.062	105.3	LOS F	59.6	420.8	0.90	1.07	1.28	23.6
North: Lord Street															
7	L2	All MCs	382	0.8	382	0.8	0.370	14.7	LOS B	10.3	72.5	0.48	0.70	0.48	47.0
8	T1	All MCs	225	0.9	225	0.9	* 1.101	196.8	LOS F	24.9	175.3	1.00	1.40	1.94	15.0
9	R2	All MCs	137	3.1	137	3.1	0.614	87.6	LOS F	9.0	64.5	1.00	0.80	1.00	27.8
Approach			744	1.3	744	1.3	1.101	83.2	LOS F	24.9	175.3	0.73	0.93	1.02	26.5
West: Guildford Road															
10	L2	All MCs	415	1.0	415	1.0	0.555	42.4	LOS D	20.1	141.9	0.83	0.93	0.83	37.2
11	T1	All MCs	576	2.6	576	2.6	* 0.951	91.5	LOS F	24.4	174.4	1.00	1.19	1.38	25.0
12	R2	All MCs	68	1.5	68	1.5	0.105	45.1	LOS D	3.1	21.7	0.71	0.72	0.71	34.5
Approach			1059	1.9	1059	1.9	0.951	69.2	LOS E	24.4	174.4	0.92	1.06	1.12	29.3
All Vehicles			3701	1.4	3701	1.4	1.167	100.8	LOS F	59.6	420.8	0.88	1.08	1.23	23.8

3.4.4.3 Design year – 2050 – AM and PM output results

MOVEMENT SUMMARY

Site: 101 [Guildford Road/West Road/Lord Street AM Peak Hour - Future 2050 (Site Folder: Future - 2050)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Guildford Road/West Road/Lord Street Existing AM Peak Hour

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 130 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total	HV]	[Total	HV]				[Veh.	Dist]				
			veh/h	%	veh/h	%	v/c	sec		veh	m				
South: West Road															
1	L2	All MCs	61	2.2	61	2.2	0.074	81.4	LOS F	2.1	14.7	0.62	0.67	0.62	39.1
2	T1	All MCs	299	0.9	299	0.9	* 1.542	587.4	LOS F	56.3	397.1	1.00	2.39	3.52	5.9
3	R2	All MCs	256	4.4	256	4.4	1.428	461.3	LOS F	43.8	318.0	1.00	2.03	3.19	6.9
Approach			616	2.5	616	2.5	1.542	484.9	LOS F	56.3	397.1	0.96	2.07	3.10	6.9
East: Guildford Road															
4	L2	All MCs	298	2.9	298	2.9	0.260	38.6	LOS D	6.8	49.0	0.45	0.69	0.45	45.0
5	T1	All MCs	912	5.9	912	5.9	1.054	148.3	LOS F	48.0	352.7	1.00	1.50	1.70	19.1
6	R2	All MCs	541	3.4	541	3.4	* 1.516	555.8	LOS F	99.8	719.5	1.00	2.11	3.42	6.2
Approach			1751	4.6	1751	4.6	1.516	255.6	LOS F	99.8	719.5	0.91	1.55	2.02	12.3
North: Lord Street															
7	L2	All MCs	753	2.8	753	2.8	1.067	130.4	LOS F	71.0	509.1	1.00	1.30	1.69	18.5
8	T1	All MCs	349	2.0	349	2.0	1.406	465.4	LOS F	58.6	417.3	1.00	2.24	3.11	7.4
9	R2	All MCs	403	2.1	403	2.1	* 1.564	610.7	LOS F	77.2	549.8	1.00	2.16	3.57	5.8
Approach			1505	2.4	1505	2.4	1.564	336.8	LOS F	77.2	549.8	1.00	1.75	2.52	9.5
West: Guildford Road															
10	L2	All MCs	281	6.0	281	6.0	0.259	79.4	LOS E	7.6	55.8	0.52	0.71	0.52	45.7
11	T1	All MCs	1511	4.9	1511	4.9	* 1.537	573.5	LOS F	148.9	1086.4	1.00	2.88	3.47	6.1
12	R2	All MCs	84	8.0	84	8.0	0.218	84.8	LOS F	4.4	33.0	0.86	0.76	0.86	30.7
Approach			1876	5.2	1876	5.2	1.537	477.6	LOS F	148.9	1086.4	0.92	2.46	2.91	7.3
All Vehicles			5747	4.0	5747	4.0	1.564	373.9	LOS F	148.9	1086.4	0.94	1.95	2.56	8.9

MOVEMENT SUMMARY

Site: 101 [Guildford Road/West Road/Lord Street PM Peak Hour - Future 2050 (Site Folder: Future - 2050)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Guildford Road/West Road/Lord Street Existing AM Peak Hour

Site Category: (None)

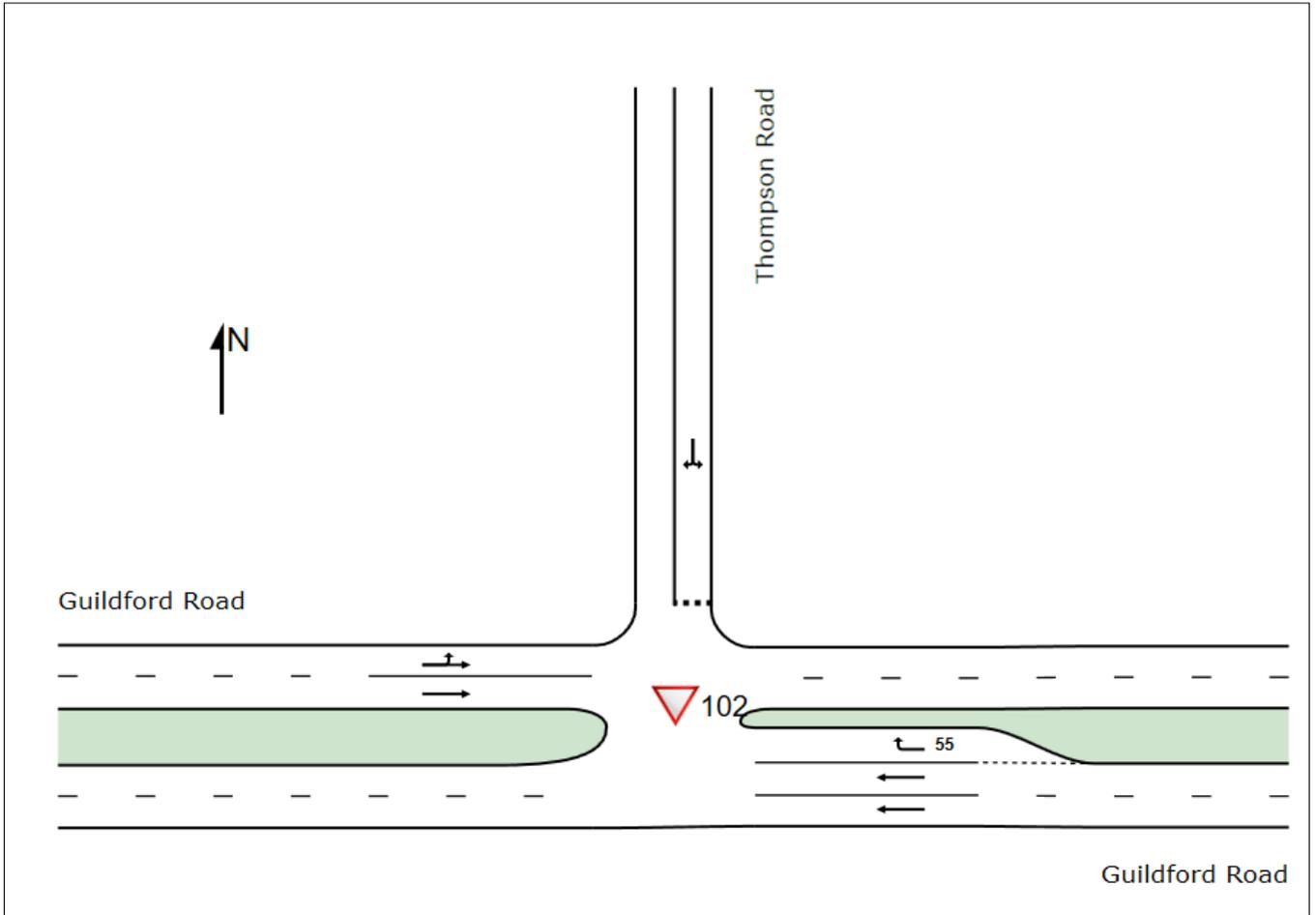
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 130 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total	HV]	[Total	HV]				[Veh.	Dist]				
			veh/h	%	veh/h	%	v/c	sec		veh	m				
South: West Road															
1	L2	All MCs	89	1.8	89	1.8	0.080	63.4	LOS E	1.6	11.6	0.36	0.61	0.36	45.9
2	T1	All MCs	534	0.3	534	0.3	* 1.349	405.6	LOS F	84.1	590.2	1.00	2.42	2.89	8.3
3	R2	All MCs	269	2.4	269	2.4	0.689	55.8	LOS E	16.0	114.0	0.98	0.84	0.98	29.3
Approach			893	1.1	893	1.1	1.349	265.7	LOS F	84.1	590.2	0.93	1.76	2.06	11.8
East: Guildford Road															
4	L2	All MCs	160	0.6	160	0.6	0.129	10.4	LOS B	2.8	19.6	0.35	0.65	0.35	46.4
5	T1	All MCs	486	1.5	486	1.5	0.562	59.3	LOS E	13.8	98.1	0.94	0.79	0.94	33.5
6	R2	All MCs	498	0.9	498	0.9	* 1.369	424.0	LOS F	80.2	566.1	1.00	1.84	2.96	7.9
Approach			1144	1.1	1144	1.1	1.369	211.2	LOS F	80.2	566.1	0.88	1.23	1.74	14.1
North: Lord Street															
7	L2	All MCs	517	0.8	517	0.8	0.588	42.3	LOS D	18.4	129.6	0.71	0.82	0.71	42.1
8	T1	All MCs	309	0.9	309	0.9	* 1.367	428.9	LOS F	49.8	351.3	1.00	2.00	2.99	7.9
9	R2	All MCs	186	3.1	186	3.1	0.877	103.6	LOS F	13.2	94.8	1.00	0.99	1.30	26.3
Approach			1013	1.3	1013	1.3	1.367	171.8	LOS F	49.8	351.3	0.85	1.21	1.51	17.2
West: Guildford Road															
10	L2	All MCs	719	1.0	719	1.0	0.855	82.1	LOS F	36.1	254.8	0.97	1.12	1.02	35.4
11	T1	All MCs	1006	2.6	1006	2.6	* 1.361	414.3	LOS F	88.0	629.8	1.00	2.30	2.94	8.1
12	R2	All MCs	118	1.5	118	1.5	0.303	80.3	LOS F	6.3	45.0	0.89	0.78	0.89	30.3
Approach			1843	1.9	1843	1.9	1.361	263.3	LOS F	88.0	629.8	0.98	1.74	2.06	12.5
All Vehicles			4893	1.4	4893	1.4	1.369	232.6	LOS F	88.0	629.8	0.92	1.52	1.87	13.5

3.4.5 Thompspon Road/Guildford Road

3.4.5.1 Geometric SIDRA model



3.4.5.2 Base year (2025) – AM and PM output results

MOVEMENT SUMMARY

Site: 102 [Guildford Road Thompson Road Existing AM Peak (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Guildford Road Thompson Road Existing AM Peak

Site Category: (None)

Give-Way (Two-Way)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total	HV]	[Total	HV]				[Veh.	Dist]				
			veh/h	%	veh/h	%	v/c	sec							km/h
East: Guildford Road															
5	T1	All MCs	1116	4.3	1116	4.3	0.293	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
6	R2	All MCs	3	0.0	3	0.0	0.011	16.4	LOS C	0.0	0.2	0.80	0.85	0.80	42.9
Approach			1119	4.3	1119	4.3	0.293	0.1	NA	0.0	0.2	0.00	0.00	0.00	59.8
North: Thompson Road															
7	L2	All MCs	5	0.0	5	0.0	2.132	1083.5	LOS F	9.7	68.0	1.00	1.48	2.77	2.7
9	R2	All MCs	17	0.0	17	0.0	2.132	1325.0	LOS F	9.7	68.0	1.00	1.48	2.77	2.7
Approach			22	0.0	22	0.0	2.132	1267.5	LOS F	9.7	68.0	1.00	1.48	2.77	2.7
West: Guildford Road															
10	L2	All MCs	9	11.1	9	11.1	0.319	5.8	LOS A	0.0	0.0	0.00	0.01	0.00	56.7
11	T1	All MCs	1215	3.4	1215	3.4	0.319	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach			1224	3.4	1224	3.4	0.319	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.7
All Vehicles			2365	3.8	2365	3.8	2.132	12.0	NA	9.7	68.0	0.01	0.02	0.03	50.0

MOVEMENT SUMMARY

Site: 102 [Guildford Road Thompson Road Existing PM Peak (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Guildford Road Thompson Road Existing AM Peak

Site Category: (None)

Give-Way (Two-Way)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total	HV]	[Total	HV]				[Veh.	Dist]				
			veh/h	%	veh/h	%	v/c	sec							km/h
East: Guildford Road															
5	T1	All MCs	1285	1.8	1285	1.8	0.332	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
6	R2	All MCs	5	0.0	5	0.0	0.017	16.1	LOS C	0.1	0.4	0.79	0.88	0.79	43.1
Approach			1291	1.8	1291	1.8	0.332	0.2	NA	0.1	0.4	0.00	0.00	0.00	59.7
North: Thompson Road															
7	L2	All MCs	8	12.5	8	12.5	0.994	148.4	LOS F	2.8	20.9	1.00	1.11	1.35	11.7
9	R2	All MCs	5	0.0	5	0.0	0.994	392.5	LOS F	2.8	20.9	1.00	1.11	1.35	11.7
Approach			14	7.7	14	7.7	0.994	242.3	LOS F	2.8	20.9	1.00	1.11	1.35	11.7
West: Guildford Road															
10	L2	All MCs	17	6.3	17	6.3	0.314	5.7	LOS A	0.0	0.0	0.00	0.02	0.00	56.9
11	T1	All MCs	1191	2.7	1191	2.7	0.314	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	59.7
Approach			1207	2.7	1207	2.7	0.314	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.7
All Vehicles			2512	2.3	2512	2.3	0.994	1.5	NA	2.8	20.9	0.01	0.01	0.01	58.4

3.4.5.3 Design year – 2050 – AM and PM output results

MOVEMENT SUMMARY

▼ Site: 102 [Guildford Road Thompson Road AM Peak - Future 2050 (Site Folder: Future - 2050)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Guildford Road Thompson Road Existing AM Peak
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total	HV]	[Total	HV]				[Veh.	Dist]				
			veh/h	%	veh/h	%	v/c	sec		veh	m				
East: Guildford Road															
5	T1	All MCs	1784	4.3	1784	4.3	0.468	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	59.6
6	R2	All MCs	23	0.0	23	0.0	0.274	53.3	LOS F	0.8	5.7	0.96	1.00	1.04	30.0
Approach			1807	4.3	1807	4.3	0.468	0.9	NA	0.8	5.7	0.01	0.01	0.01	58.9
North: Thompson Road															
7	L2	All MCs	14	0.0	14	0.0	7.051	6048.4	LOS F	31.7	221.8	1.00	1.63	3.61	0.6
9	R2	All MCs	42	0.0	42	0.0	7.051	5450.9	LOS F	31.7	221.8	1.00	1.63	3.61	0.6
Approach			56	0.0	56	0.0	7.051	5597.5	LOS F	31.7	221.8	1.00	1.63	3.61	0.6
West: Guildford Road															
10	L2	All MCs	7	11.1	7	11.1	0.472	5.8	LOS A	0.0	0.0	0.00	0.00	0.00	56.6
11	T1	All MCs	1801	3.4	1801	3.4	0.472	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	59.6
Approach			1808	3.4	1808	3.4	0.472	0.2	NA	0.0	0.0	0.00	0.00	0.00	59.6
All Vehicles			3672	3.8	3672	3.8	7.051	85.6	NA	31.7	221.8	0.02	0.03	0.06	24.8

MOVEMENT SUMMARY

▼ Site: 102 [Guildford Road Thompson Road PM Peak - Future 2050 (Site Folder: Future - 2050)]

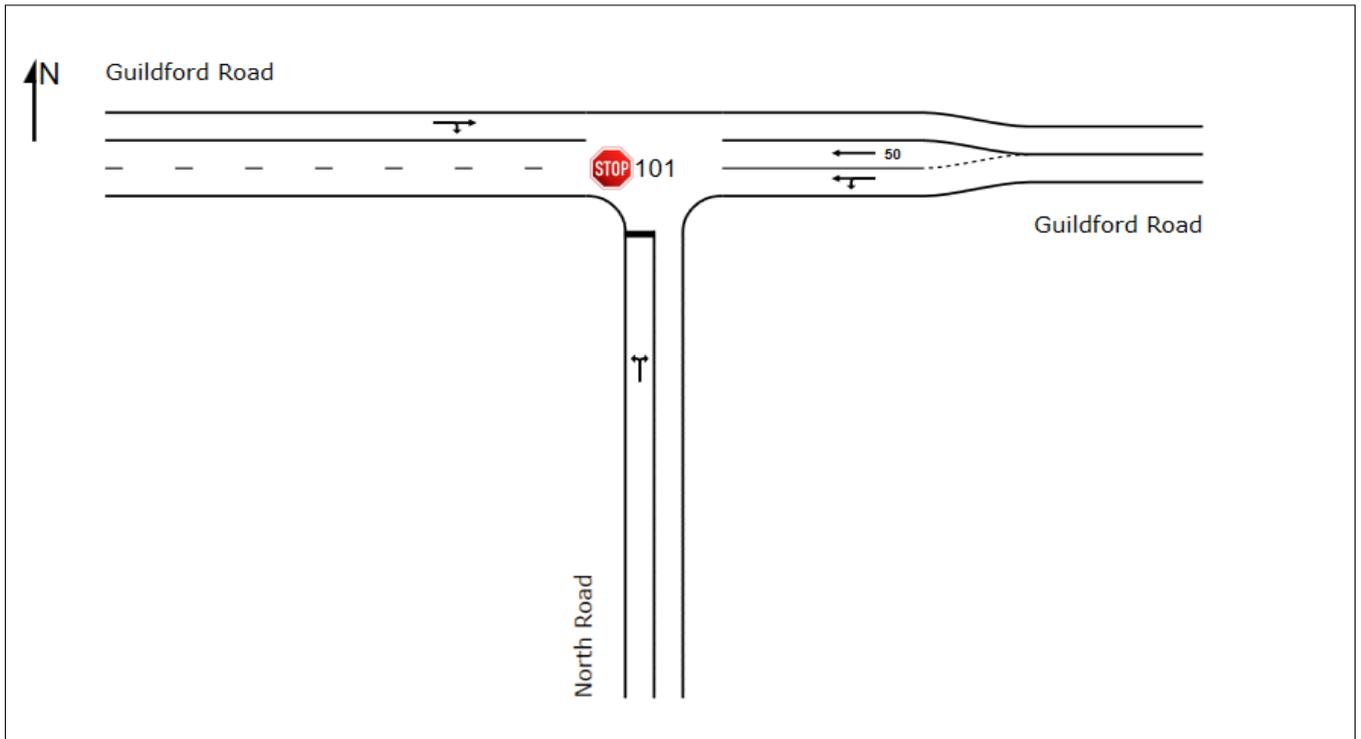
Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Guildford Road Thompson Road Existing AM Peak
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total	HV]	[Total	HV]				[Veh.	Dist]				
			veh/h	%	veh/h	%	v/c	sec		veh	m				
East: Guildford Road															
5	T1	All MCs	1989	1.2	1989	1.2	0.511	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	59.6
6	R2	All MCs	27	0.0	27	0.0	0.292	49.6	LOS E	0.9	6.2	0.95	1.00	1.05	30.9
Approach			2017	1.1	2017	1.1	0.511	0.9	NA	0.9	6.2	0.01	0.01	0.01	58.8
North: Thompson Road															
7	L2	All MCs	27	12.5	27	12.5	2.886	1823.8	LOS F	19.9	148.6	1.00	2.07	4.83	2.0
9	R2	All MCs	17	0.0	17	0.0	2.886	1702.3	LOS F	19.9	148.6	1.00	2.07	4.83	2.0
Approach			44	7.7	44	7.7	2.886	1777.5	LOS F	19.9	148.6	1.00	2.07	4.83	2.0
West: Guildford Road															
10	L2	All MCs	17	6.3	17	6.3	0.460	5.8	LOS A	0.0	0.0	0.00	0.01	0.00	56.8
11	T1	All MCs	1765	1.8	1765	1.8	0.460	0.2	LOS A	0.0	0.0	0.00	0.01	0.00	59.6
Approach			1782	1.8	1782	1.8	0.460	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.6
All Vehicles			3843	1.5	3843	1.5	2.886	21.0	NA	19.9	148.6	0.02	0.03	0.06	44.4

3.4.6 North Road/Guildford Road

3.4.6.1 Geometric SIDRA model



3.4.6.2 Base year (2025) – AM and PM output results

MOVEMENT SUMMARY

Site: 101 [Guildford Road/ North Road AM Peak Existing (Site Folder: Existing)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Guildford Road/ North Road AM Peak Existing

Site Category: (None)

Stop (Two-Way)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows [Total HV]		Arrival Flows [Total HV]		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh. Dist]		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: North Road															
1	L2	All MCs	11	0.0	11	0.0	1.924	900.4	LOS F	10.0	70.3	1.00	1.57	3.02	3.2
3	R2	All MCs	15	0.0	15	0.0	1.924	1207.1	LOS F	10.0	70.3	1.00	1.57	3.02	3.2
Approach			25	0.0	25	0.0	1.924	1079.3	LOS F	10.0	70.3	1.00	1.57	3.02	3.2
East: Guildford Road															
4	L2	All MCs	59	3.6	59	3.6	0.293	5.7	LOSA	0.0	0.0	0.00	0.06	0.00	56.6
5	T1	All MCs	1047	4.5	1047	4.5	0.293	0.1	LOSA	0.0	0.0	0.00	0.03	0.00	59.6
Approach			1106	4.5	1106	4.5	0.293	0.4	NA	0.0	0.0	0.00	0.03	0.00	59.4
West: Guildford Road															
11	T1	All MCs	1198	3.3	1198	3.3	0.661	1.3	LOSA	2.2	16.1	0.03	0.04	0.11	58.2
12	R2	All MCs	9	11.1	9	11.1	0.661	79.8	LOS F	2.2	16.1	0.03	0.04	0.11	51.4
Approach			1207	3.3	1207	3.3	0.661	1.9	NA	2.2	16.1	0.03	0.04	0.11	58.1
All Vehicles			2339	3.8	2339	3.8	1.924	12.8	NA	10.0	70.3	0.03	0.05	0.09	49.4

MOVEMENT SUMMARY

Site: 101 [Guildford Road/ North Road PM Peak Existing (Site Folder: Existing)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Guildford Road/ North Road AM Peak Existing

Site Category: (None)

Stop (Two-Way)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total	HV]	[Total	HV]				[Veh.	Dist]				
			veh/h	%	veh/h	%	v/c	sec						km/h	
South: North Road															
1	L2	All MCs	20	0.0	20	0.0	1.956	894.6	LOS F	12.0	84.3	1.00	1.76	3.50	3.5
3	R2	All MCs	12	0.0	12	0.0	1.956	1122.4	LOS F	12.0	84.3	1.00	1.76	3.50	3.5
Approach			32	0.0	32	0.0	1.956	978.1	LOS F	12.0	84.3	1.00	1.76	3.50	3.5
East: Guildford Road															
4	L2	All MCs	108	1.0	108	1.0	0.341	5.6	LOS A	0.0	0.0	0.00	0.10	0.00	56.4
5	T1	All MCs	1203	1.7	1203	1.7	0.341	0.1	LOS A	0.0	0.0	0.00	0.04	0.00	59.4
Approach			1312	1.7	1312	1.7	0.341	0.6	NA	0.0	0.0	0.00	0.05	0.00	59.1
West: Guildford Road															
11	T1	All MCs	1148	2.0	1148	2.0	0.756	13.5	LOS B	16.9	120.4	0.16	0.18	0.72	47.0
12	R2	All MCs	38	2.8	38	2.8	0.756	116.6	LOS F	16.9	120.4	0.16	0.18	0.72	42.5
Approach			1186	2.0	1186	2.0	0.756	16.8	NA	16.9	120.4	0.16	0.18	0.72	46.8
All Vehicles			2529	1.8	2529	1.8	1.956	20.4	NA	16.9	120.4	0.09	0.13	0.38	44.7

3.4.6.3 Design year – 2050 – AM and PM output results

MOVEMENT SUMMARY

Site: 101 [Guildford Road/ North Road AM Peak 2050 (Site Folder: Future - 2050)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Guildford Road/ North Road AM Peak Existing

Site Category: (None)

Stop (Two-Way)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total	HV]	[Total	HV]				[Veh.	Dist]				
			veh/h	%	veh/h	%	v/c	sec						km/h	
South: North Road															
1	L2	All MCs	42	0.0	42	0.0	4.289	3085.1	LOS F	34.0	238.3	1.00	2.35	5.61	1.2
3	R2	All MCs	25	0.0	25	0.0	4.289	2967.9	LOS F	34.0	238.3	1.00	2.35	5.61	1.2
Approach			67	0.0	67	0.0	4.289	3041.2	LOS F	34.0	238.3	1.00	2.35	5.61	1.2
East: Guildford Road															
4	L2	All MCs	93	3.6	93	3.6	0.457	5.7	LOS A	0.0	0.0	0.00	0.06	0.00	56.5
5	T1	All MCs	1635	4.5	1635	4.5	0.457	0.2	LOS A	0.0	0.0	0.00	0.03	0.00	59.4
Approach			1727	4.5	1727	4.5	0.457	0.5	NA	0.0	0.0	0.00	0.03	0.00	59.2
West: Guildford Road															
11	T1	All MCs	1795	3.3	1795	3.3	1.176	208.8	LOS F	259.2	1866.2	1.00	1.01	4.40	10.8
12	R2	All MCs	15	11.1	15	11.1	1.176	8384.7	LOS F	259.2	1866.2	1.00	1.01	4.40	10.6
Approach			1809	3.3	1809	3.3	1.176	275.3	NA	259.2	1866.2	1.00	1.01	4.40	10.8
All Vehicles			3604	3.8	3604	3.8	4.289	195.3	NA	259.2	1866.2	0.52	0.56	2.32	14.2

MOVEMENT SUMMARY

Site: 101 [Guildford Road/ North Road PM Peak 2050 (Site Folder: Future - 2050)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Guildford Road/ North Road AM Peak Existing

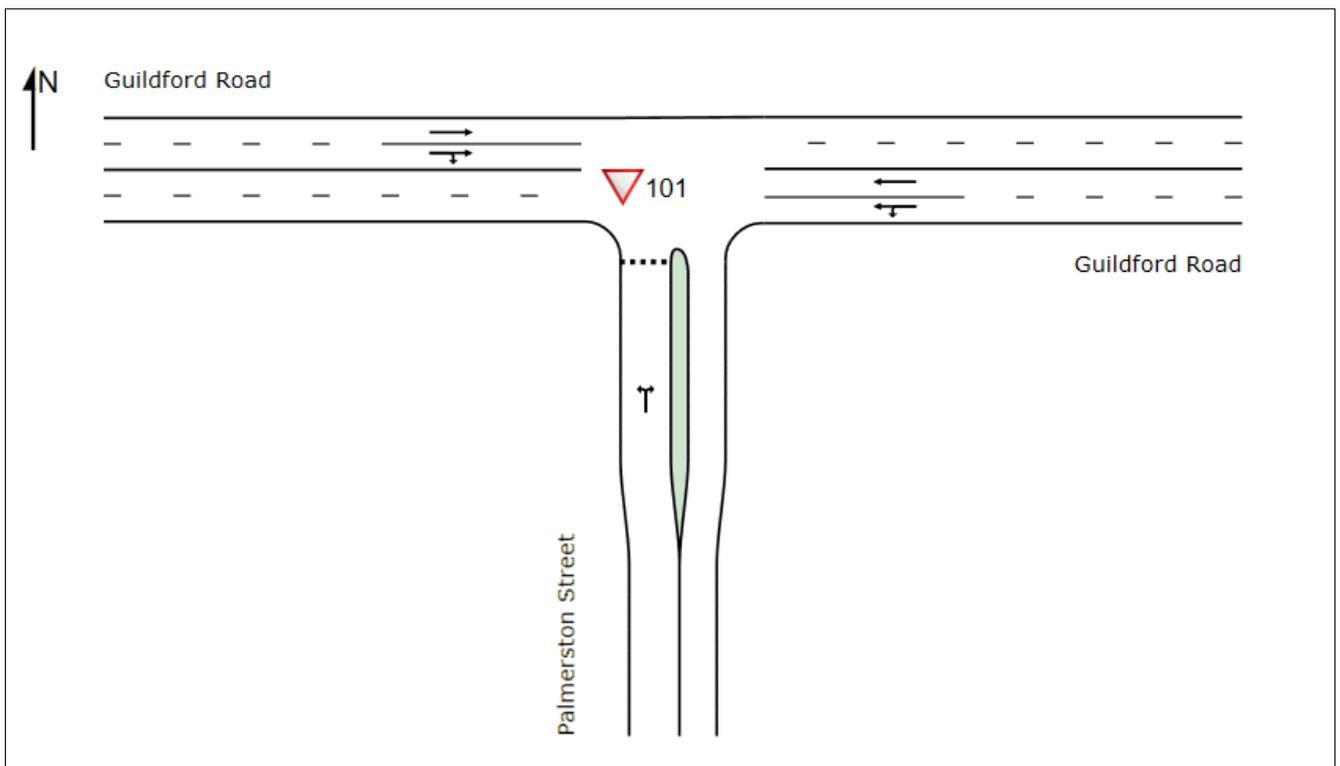
Site Category: (None)

Stop (Two-Way)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total	HV]	[Total	HV]				[Veh.	Dist]				
			veh/h	%	veh/h	%	v/c	sec			veh	m			
South: North Road															
1	L2	All MCs	47	0.0	47	0.0	10.982	9251.7	LOS F	65.5	458.5	1.00	1.96	4.69	0.4
3	R2	All MCs	65	0.0	65	0.0	10.982	8991.2	LOS F	65.5	458.5	1.00	1.96	4.69	0.4
Approach			113	0.0	113	0.0	10.982	9100.7	LOS F	65.5	458.5	1.00	1.96	4.69	0.4
East: Guildford Road															
4	L2	All MCs	165	1.0	165	1.0	0.540	5.8	LOS A	0.0	0.0	0.00	0.10	0.00	56.3
5	T1	All MCs	1909	1.7	1909	1.7	0.540	0.2	LOS A	0.0	0.0	0.00	0.04	0.00	59.1
Approach			2075	1.7	2075	1.7	0.540	0.7	NA	0.0	0.0	0.00	0.05	0.00	58.9
West: Guildford Road															
11	T1	All MCs	1734	2.0	1734	2.0	2.608	1502.2	LOS F	749.3	5336.9	1.00	1.05	7.84	2.2
12	R2	All MCs	57	2.8	57	2.8	2.608	4452.8	LOS F	749.3	5336.9	1.00	1.05	7.84	2.2
Approach			1791	2.0	1791	2.0	2.608	1595.8	NA	749.3	5336.9	1.00	1.05	7.84	2.2
All Vehicles			3978	1.8	3978	1.8	10.982	976.4	NA	749.3	5336.9	0.48	0.55	3.66	3.5

3.4.7 Palmerston Street/Guildford Road

3.4.7.1 Geometric SIDRA model



3.4.7.2 Base year (2025) – AM and PM output results

MOVEMENT SUMMARY

Site: 101 [Guildford Road/ Palmerston Street AM Peak Existing (Site Folder: Existing)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Guildford Road/ Palmerston Street AM Peak Existing

Site Category: (None)

Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total HV]		Arrival Flows [Total HV]		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh. Dist]		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%				v/c	sec				
South: Palmerston Street															
1	L2	All MCs	109	2.9	109	2.9	0.435	9.8	LOSA	1.4	10.3	0.77	0.97	1.09	41.3
3	R2	All MCs	5	40.0	5	40.0	0.435	203.0	LOS F	1.4	10.3	0.77	0.97	1.09	40.4
Approach			115	4.6	115	4.6	0.435	18.6	LOS C	1.4	10.3	0.77	0.97	1.09	41.3
East: Guildford Road															
4	L2	All MCs	8	0.0	8	0.0	0.270	5.6	LOSA	0.0	0.0	0.00	0.01	0.00	57.3
5	T1	All MCs	1011	4.0	1011	4.0	0.270	0.1	LOSA	0.0	0.0	0.00	0.00	0.00	59.8
Approach			1019	3.9	1019	3.9	0.270	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.8
West: Guildford Road															
11	T1	All MCs	614	4.3	614	4.3	0.279	0.2	LOSA	1.8	12.7	0.11	0.13	0.12	58.1
12	R2	All MCs	95	3.3	95	3.3	0.279	23.7	LOS C	1.8	12.7	0.74	0.83	0.83	45.1
Approach			708	4.2	708	4.2	0.279	3.3	NA	1.8	12.7	0.20	0.22	0.22	55.9
All Vehicles			1842	4.1	1842	4.1	0.435	2.5	NA	1.8	12.7	0.12	0.15	0.15	56.7

MOVEMENT SUMMARY

Site: 101 [Guildford Road/ Palmerston Street PM Peak Existing (Site Folder: Existing)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Guildford Road/ Palmerston Street AM Peak Existing

Site Category: (None)

Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total HV]		Arrival Flows [Total HV]		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh. Dist]		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%				v/c	sec				
South: Palmerston Street															
1	L2	All MCs	78	1.4	78	1.4	0.211	7.0	LOSA	0.7	4.9	0.68	0.76	0.70	44.3
3	R2	All MCs	2	0.0	2	0.0	0.211	221.9	LOS F	0.7	4.9	0.68	0.76	0.70	44.4
Approach			80	1.3	80	1.3	0.211	12.6	LOS B	0.7	4.9	0.68	0.76	0.70	44.3
East: Guildford Road															
4	L2	All MCs	11	0.0	11	0.0	0.231	5.6	LOSA	0.0	0.0	0.00	0.01	0.00	57.3
5	T1	All MCs	868	2.4	868	2.4	0.231	0.1	LOSA	0.0	0.0	0.00	0.01	0.00	59.8
Approach			879	2.4	879	2.4	0.231	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.8
West: Guildford Road															
11	T1	All MCs	1163	1.8	1163	1.8	0.411	0.6	LOSA	3.3	23.8	0.15	0.18	0.22	57.6
12	R2	All MCs	105	3.0	105	3.0	0.411	28.5	LOS D	3.3	23.8	0.47	0.55	0.67	48.1
Approach			1268	1.9	1268	1.9	0.411	2.9	NA	3.3	23.8	0.18	0.21	0.26	56.6
All Vehicles			2227	2.1	2227	2.1	0.411	2.1	NA	3.3	23.8	0.13	0.15	0.17	57.3

3.4.7.3 Design Year – 2050 – AM and PM output results

MOVEMENT SUMMARY

▼ Site: 101 [Guildford Road/ Palmerston Street AM Peak 2050 (Site Folder: Future - 2050)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Guildford Road/ Palmerston Street AM Peak Existing

Site Category: (None)

Give-Way (Two-Way)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows [Total HV]		Arrival Flows [Total HV]		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh. Dist]		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%				v/c	sec				
South: Palmerston Street															
1	L2	All MCs	248	1.7	248	1.7	2.082	985.9	LOS F	87.4	630.1	1.00	6.27	15.83	3.4
3	R2	All MCs	12	40.0	12	40.0	2.082	1214.2	LOS F	87.4	630.1	1.00	6.27	15.83	3.4
Approach			260	3.4	260	3.4	2.082	996.1	LOS F	87.4	630.1	1.00	6.27	15.83	3.4
East: Guildford Road															
4	L2	All MCs	21	0.0	21	0.0	0.368	5.6	LOS A	0.0	0.0	0.00	0.02	0.00	57.1
5	T1	All MCs	1366	4.0	1366	4.0	0.368	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	59.7
Approach			1387	3.9	1387	3.9	0.368	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.6
West: Guildford Road															
11	T1	All MCs	799	4.3	799	4.3	0.428	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	59.7
12	R2	All MCs	238	3.3	238	3.3	1.207	236.6	LOS F	31.0	222.9	1.00	3.10	9.38	12.0
Approach			1037	4.1	1037	4.1	1.207	54.4	NA	31.0	222.9	0.23	0.71	2.15	31.2
All Vehicles			2684	3.9	2684	3.9	2.082	117.6	NA	87.4	630.1	0.19	0.89	2.36	20.3

MOVEMENT SUMMARY

▼ Site: 101 [Guildford Road/ Palmerston Street PM Peak 2050 (Site Folder: Future - 2050)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Guildford Road/ Palmerston Street AM Peak Existing

Site Category: (None)

Give-Way (Two-Way)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows [Total HV]		Arrival Flows [Total HV]		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh. Dist]		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%				v/c	sec				
South: Palmerston Street															
1	L2	All MCs	327	1.4	327	1.4	2.226	1117.0	LOS F	118.7	840.3	1.00	8.72	21.42	3.1
3	R2	All MCs	11	0.0	11	0.0	2.226	1125.4	LOS F	118.7	840.3	1.00	8.72	21.42	3.1
Approach			338	1.3	338	1.3	2.226	1117.3	LOS F	118.7	840.3	1.00	8.72	21.42	3.1
East: Guildford Road															
4	L2	All MCs	31	0.0	31	0.0	0.316	5.6	LOS A	0.0	0.0	0.00	0.03	0.00	57.1
5	T1	All MCs	1174	2.4	1174	2.4	0.316	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	59.7
Approach			1204	2.4	1204	2.4	0.316	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.6
West: Guildford Road															
11	T1	All MCs	1515	1.8	1515	1.8	0.798	0.8	LOS A	0.0	0.0	0.00	0.00	0.00	58.4
12	R2	All MCs	306	3.0	306	3.0	1.049	104.9	LOS F	20.0	143.8	1.00	2.45	6.49	21.1
Approach			1821	2.0	1821	2.0	1.049	18.4	NA	20.0	143.8	0.17	0.41	1.09	45.0
All Vehicles			3363	2.1	3363	2.1	2.226	122.3	NA	118.7	840.3	0.19	1.10	2.74	19.7

3.5 Implications for level of service

3.5.1 Problematic intersections

Except for the Guildford Road and Old Perth Road intersection, all the intersections are forecast to experience significant increase in traffic volumes by 2050. These intersections show high degrees of saturation and average delays, resulting in poor Levels of Service (LOS F) during peak hours. The level of traffic growth experienced is driven by a combination of:

- Growth in travel demand in the wider region, which generates most impacts to intersections within the Precinct.
- Growth due to increased population and floorspace within the Precinct, facilitated by the Precinct Structure Plan.

Given the traffic impact, there are a range of options available as mitigation measures, including:

- Make incremental improvements and modifications to the road network as demand increases, such as additional traffic lanes and turn pockets, signal phasing, grade separation, etc.
- Encourage shifts to more efficient modes of transport, including active and public transport, car-share, etc.).
- Consider parking charges and road pricing to discourage private vehicle trips, particularly at peak times.
- Spread demand through staggered start times of schools, retail and commercial businesses.
- Working from home can also reduce travel demand.

3.5.1.1 Guildford Road/Collier Road – Level crossing

General comments or key issues

- AM Peak: Right turn from Collier Road onto Guildford Road (LOS F) and right turn from Guildford Road onto Collier Road (LOS D) – High degrees of saturation causing significant delays.
- PM Peak: Westbound right turn from Collier Road to Guildford Road (LOS F) and right turn from Guildford Road onto Collier Road (LOS F) – High degrees of saturation causing significant delays.

Delays are caused by the closure of the level crossing due to high frequency of train services in the AM peak hour, and insufficient lanes and short lane lengths on Collier Road.

Recommendations

- Adjustments to the signal timings to allow more green time for right turn movements from Collier Road to Guildford Road during both AM and PM peak hours.
- Widening of the intersection to add more right turn lanes to improve the capacity and reduce the high degree of saturation.
- Ideally, a grade-separated crossing would be the ultimate solution. However, there are limitations to a grade-separated crossing, including the intersection being very close to Bassendean station, flat topography, potential lack of sufficient space to accommodate safe/efficient structure design, and proximity of residences abutting Guildford Road. The capital cost of this solution would be significant. Ultimately, this option would be costly, challenging in design and cause significant construction disruption to rail, road and pedestrian network users.

3.5.1.2 Guildford Road/Old Perth Road

General comments or key issues

- AM Peak: Westbound left turn from Old Perth Road to Guildford Road (LOS B) – Moderate degree of saturation with acceptable delays resulting in a reasonably unimpeded operation.
- PM Peak: Westbound left turn from Old Perth Road to Guildford Road (LOS B) – Moderate degree of saturation with acceptable delays resulting in a reasonably unimpeded operation.

Recommendations

- The intersection's operation is likely to be reasonably unimpeded. With the proposed removal of the left turn from Guildford Road into Old Perth Road, and right turn from Old Perth Road to Guildford Road, the intersection would promote more free flow for through movements on Guildford Road.
- Left turn pocket on Old Perth Road for left turn movements onto Guildford Road can provide better network efficiency.
- Grade separation of the pedestrian crossing would greatly improve pedestrian safety as well as traffic efficiency. Limited available space may make designing a grade separated outcome challenging. The optimum outcome may be to have a grade separated pedestrian crossing directly linked to adjacent development. This would ensure a crossing is more direct and integrated with land use.

3.5.1.3 Guildford Road/West Road/Lord Street

General comments or key issues

- AM and PM Peak: Except for all left turn movements from West Road onto Guildford Road, and left turn movement from Guildford Road onto West Road, all the movements – right turn and straight through at all approaches, have a LOS D to LOS F with extremely high degrees of saturation, long queuing, and significant delays in both AM and PM peak hours.
- The better LOS for left turn movements is due to the left-turn slip lanes at each approach.
- The worst performing movements are straight through movements from Lord Street and West Road. The reason for this is high traffic volume travelling westbound in the AM peak hour and high traffic volume travelling eastbound in the PM peak hour.
- The left turn movement from Guildford Road onto Lord Street, even with a slip-lane, is LOS F in the PM peak hour. A major reason for this, the long queuing and extremely high degree of saturation on Lord Street for northbound traffic is the changes in the carriageway from two lane to single lane resulting in a bottleneck. This may be partially resolved by future duplication of Lord Street to Walter Road or Morley Drive.

Recommendations

- Traffic signal reconfiguration to allow more effective green time for right turn movements from West Road and Lord Street onto Guildford Road.
- Ensure future development at Bassendean Hawaiians shopping centre aligns with the existing extent of the West Road road reserve and existing parking areas are sleeved, or relocated to dedicated underground or mezzanine parking areas.
- Additional lanes on Lord Street to increase capacity and accommodate more traffic and thereby reduce degree of saturation and queuing.
- In the long term, the intersection could be considered for grade separation.

3.5.1.4 Thompson Road/Guildford Road

General comments or key issues

- AM and PM Peak: Both left turn movement and right turn movement from Thompson Road onto Guildford Road have LOS F in both AM and PM peak hours. The degree of saturation is about three times the maximum capacity (2.88) which indicates extremely high delays.
- The issue arises because Thompson Road is the sole entry and exit point for Success Hill Train Station from Guildford Road. As a primary distributor, Guildford Road experiences significantly higher traffic volumes during both AM and PM peak hours and has a high posted speed limit. This makes exiting from Thompson Road, particularly the right turn, difficult.

Recommendations

- A left in, left out connection of Earlsferry Court to Guildford Road should be considered in the short term, as this would help reduce traffic congestion on Thompson Road and provide an additional access point for Success Hill Train Station.
- Introduction of a roundabout at the intersection of Guildford Road and North Road, along with a connection from Earlsferry Court to Guildford Road, could also be considered in the longer term to improve traffic flow at the North Road and Guildford Road intersection. At this point, Thompson Road would likely need to be altered to left in left out.

3.5.1.5 North Road/Guildford Road

General comments or key issues

- AM and PM Peak: Both the left turn movement and right turn movement from North Road onto Guildford Road have LOS F in both AM and PM peak hours. The degree of saturation is about four times the maximum capacity (4.28) in the AM and about ten times the maximum capacity (10.98) in the PM. This shows the intersection is performing very poorly and has extremely high delays for the traffic on the North Road.
- The difficulty in making left and right turns from North Road onto Guildford Road arises because this intersection is unsignalised. Guildford Road carries high volumes of traffic during both AM and PM peak hours. This heavy traffic flow makes it challenging for vehicles to safely turn from North Road.
- Access to the petrol station on the corner of Guildford and North Road adds complexity to the intersection's operations. This is because petrol station's entry and exit points are located close proximity to the intersection which creates potential for vehicle conflict and traffic congestion. Redevelopment of the petrol station site should seek to relocate entries further from the Guildford Road and North Road intersection. This will improve safety and also provide future opportunity for assessment of duplication of Guildford Road and/or a vehicle entry to Earlsferry Court.

Recommendations

- Provision of a traffic signal would allow safer and quicker movements from North Road onto Guildford Road. However, this option would involve significant expenditure, a lengthy approval process and would increase queuing on Guildford Road in peak periods.
- As mentioned for the Thompson Road and Guildford Road intersection, introduction of a roundabout at the intersection of Guildford Road and North Road, along with a connection from Earlsferry Court to Guildford Road, could improve traffic flow.

3.5.1.6 Palmerston Street/Guildford Road

General comments or key issues

- AM and PM Peak: Both left turn movement and right turn movement from Palmerston Street onto Guildford Road have a LOS F in both the AM and PM peak hours. The degree of saturation is about two times the maximum capacity in both the AM and PM peak hours. This shows the intersection is performing very poorly and has extremely high delays for the traffic on Palmerston Street.
- Turning left or right from Palmerston Street onto Guildford Road is particularly challenging due to a few factors. Palmerston Street, which handles significant traffic to and from the Town Centre Precinct and Southern Frame, intersects with Guildford Road at an unsignalised junction. Guildford Road carries heavy traffic during both AM and PM peak hours. Additionally, the nearby Collier Road intersection and level crossing already causes long queuing, further complicating turns from Palmerston Street.

Recommendations

- Provision of a dedicated left turn pocket/slip-lane on Palmerston Street would allow easier movement of traffic turning left onto Guildford Road from Palmerston Street as they would not be delayed whilst waiting for right turning vehicles. The existing reservation at Guildford Road and Palmerston Street is of sufficient size to accommodate this modification, subject to intersection re-alignment and relocation of utility infrastructure. While sufficient space may be available, the existing extended crossovers/driveways to properties on the southern side of Palmerston Street near to the intersection may present design challenges to avoid road user confusion.

4. Future movement network

4.1 Stakeholder engagement

A meeting was held with staff from the Town of Bassendean on 6 November 2024 to discuss planned transport network upgrades within the Precinct. The following key points were discussed:

- Upgrade of Old Perth Road has been in the Town's long-term plans for about six years. The Town Centre Masterplan includes making the western end of Old Perth Road pedestrian friendly. The plan includes raising the road pavement to be flush with the kerbs.
- It was suggested that the Town should consider staging the upgrades and extending the pedestrian-friendly area from Guildford Road to Whitfield Street. It was also mentioned the need to address the generous curves at intersections, which prioritize vehicles over pedestrians along Old Perth Road. Reducing kerb radii will improve pedestrian safety.
- The need to modify the roundabout at West Road and Old Perth Road to accommodate larger trucks. The City advised that 25 m trucks are currently going over the hardstand area and into the landscaping, causing damage.
- Parking in the Town Centre area, especially during events at Bassendean Oval can be challenging and there is a community perception of limited parking availability. There are over 500 on-street bays within and around the Town Centre (refer section 5.1 and 5.1.3) suggesting that this concern may arise more so as a result of a perception of an absence of convenient parking. Improving the walkability of the area through pedestrian oriented infrastructure and enhancements could make walking more attractive and comfortable thereby resolving this community concern.
- The Success Hill precinct is a concern for the community due to its single entry and exit point at Thompson Road.

4.2 Transport network planning

The biggest component of planning for the transport network relates to the road network as it will cater for most of the movement growth in the Precinct. To assist in delivering a functional network, adoption of measures (infrastructure and services) that will encourage mode shift to non-private vehicle modes should be included in the Precinct Structure Plan.

Table 21 shows the existing (2021) share and quantum of trips to/from the Precinct by each mode along with the resulting quantum of trips should the share of private vehicle trips reduce due to the greater uptake of other modes. Future mode shares are based upon an overall growth of 9,094 vehicle trips being made per day and approximately 909 during the peak hour.

Table 21 Existing and potential mode shares

Mode	Existing mode share (2021)	Existing daily trips (2021)	Potential future mode share (2050)	Estimate future daily trips with future mode share
Private vehicle	78%	5,020	65% (-13%)	10,610
Public transport	9%	579	15% (+6%)	1,364
Cycling/walking	1%	65	5% (+4%)	455
Work from home	12%	772	15% (+3%)	1,364

4.3 Intersection controls

Suggested controls on the intersections surrounding the Precinct are as follows:

- The Guildford Road and Collier Road intersection will become heavily congested in the future and will be a major contributor to congestion. Crash volumes at this intersection warrant review of traffic safety and consideration of grade separation of infrastructure.
- Vehicle movement from Guildford Road onto Old Perth Road is limited and expected to remain that way into the future. This presents opportunity to reevaluate the intersection to promote a better public realm outcome and improved accessibility to Bassendean station.
- Vehicle access out of Thompson Road to Guildford Road is heavily constrained in both the AM and PM peaks. This will be compounded by densification in the Success Hill Frame area and increasing regional traffic along Guildford Road. Accordingly, modified access at Thompson Road will eventually be required to support movement in and out of the Success Hill area. In the short term, a left in left out connection at Earlsferry Court to/from Guildford Road could supplement access. In the longer term, a roundabout or signals at the North/Earlsferry/Guildford junction would improve access to/from the side roads. The design of such an intersection may require duplication of the nearby Guildford Road traffic bridge over the Swan River. The introduction of four-way movement at North/Earlsferry/Guildford should coincide with the modification of access at Thompson Road to left in left out. It is important to note that changes to intersections and roadways can have flow-on effects throughout the broader road network, potentially impacting traffic performance at nearby intersections and transport corridors.
- Local mode shift is unlikely to lead to a significant reduction in demand at Guildford Road and Collier Road given the regional nature of movement. Level-crossing removal will improve traffic performance at the intersection and present the opportunity to improve cycling safety along the parallel principal shared path.
- The intersection at Guildford Road and West Road/Lord Street will become congested in the future. Improving signal phasing at this intersection will improve movement in the short-term. Improvement in walking and cycling infrastructure connections north/south across the Perth-Midland railway will encourage more local pedestrian and cycling movements. Ultimately, grade separation may be required.

4.4 Walking, cycling and e-mobility

The redevelopment of the Precinct will achieve a built form that is more outward facing, with increased points of arrival for pedestrians and cyclists. This would attract increased visitation by active transport modes. To facilitate an increase in access by active modes, several infrastructure improvements are proposed, as discussed in the following sections.

Proposed improvements to the active transport network within and surrounding the Precinct include:

- Improved connectivity between Old Perth Road and BIC Reserve, and West Road and Bassendean Oval and Surrey Street via a series of mid-block pedestrian green links.
- Conversion of the western end of Old Perth Road to a one-way shared space (Figure 39).
- Increased tree canopy and weather protection along key routes such as Old Perth Road and West Road (Figure 40).
- Improved connectivity between Whitfield Street and West Road, and Success Hill station as well as along Lamb Street through to West Road.
- A footbridge linking Bassendean Oval to the Success Hill frame providing unimpeded pedestrian access across Guildford Road to and from Success Hill Station. This aligns with the draft

Bassendean Oval Redevelopment Concept Masterplan which that endorsed by the Town in December 2024.

- Connection between Whitfield Street (north of Guildford Road) and the existing railway underpass at Wilson Street/Second Avenue. Previous conceptual designs for this underpass considered extension under Guildford Road to BIC Reserve (refer Figure 41).
- Incentives to development that provide for facilities that support greater use of walking and cycling as a mode of transport.

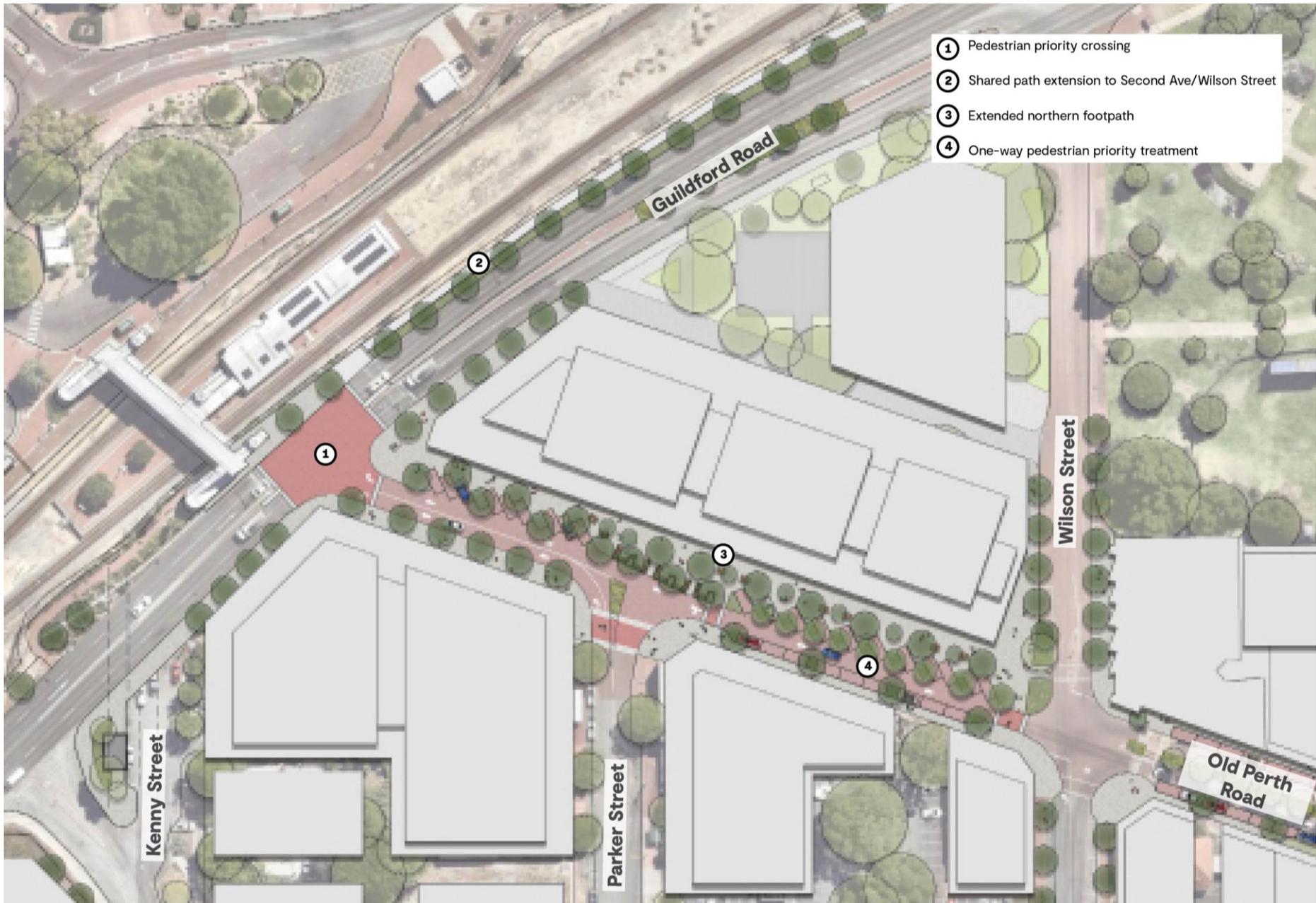


Figure 39 Old Perth Road shared space and future one-way access

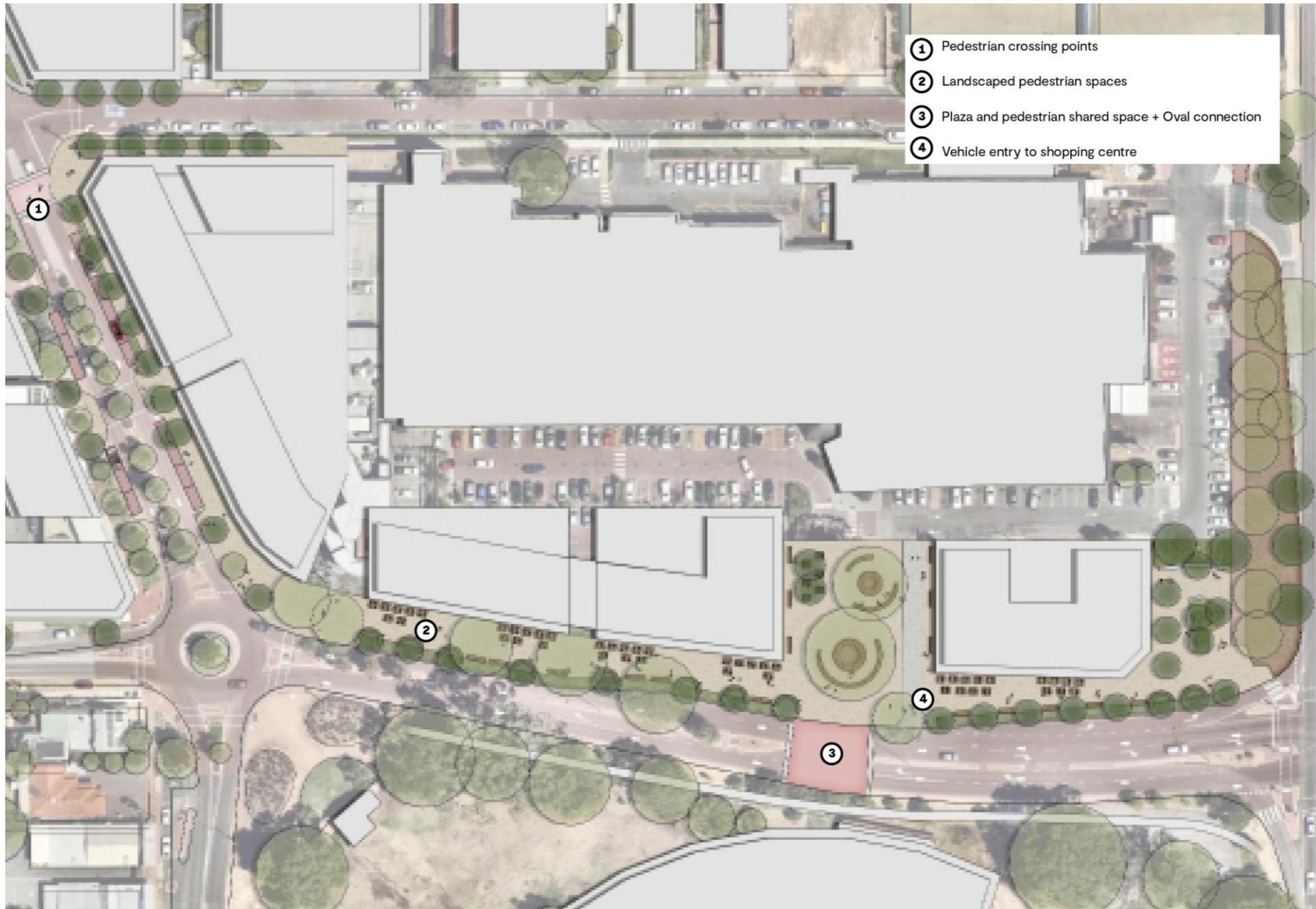


Figure 40 West Road mixed street improvement

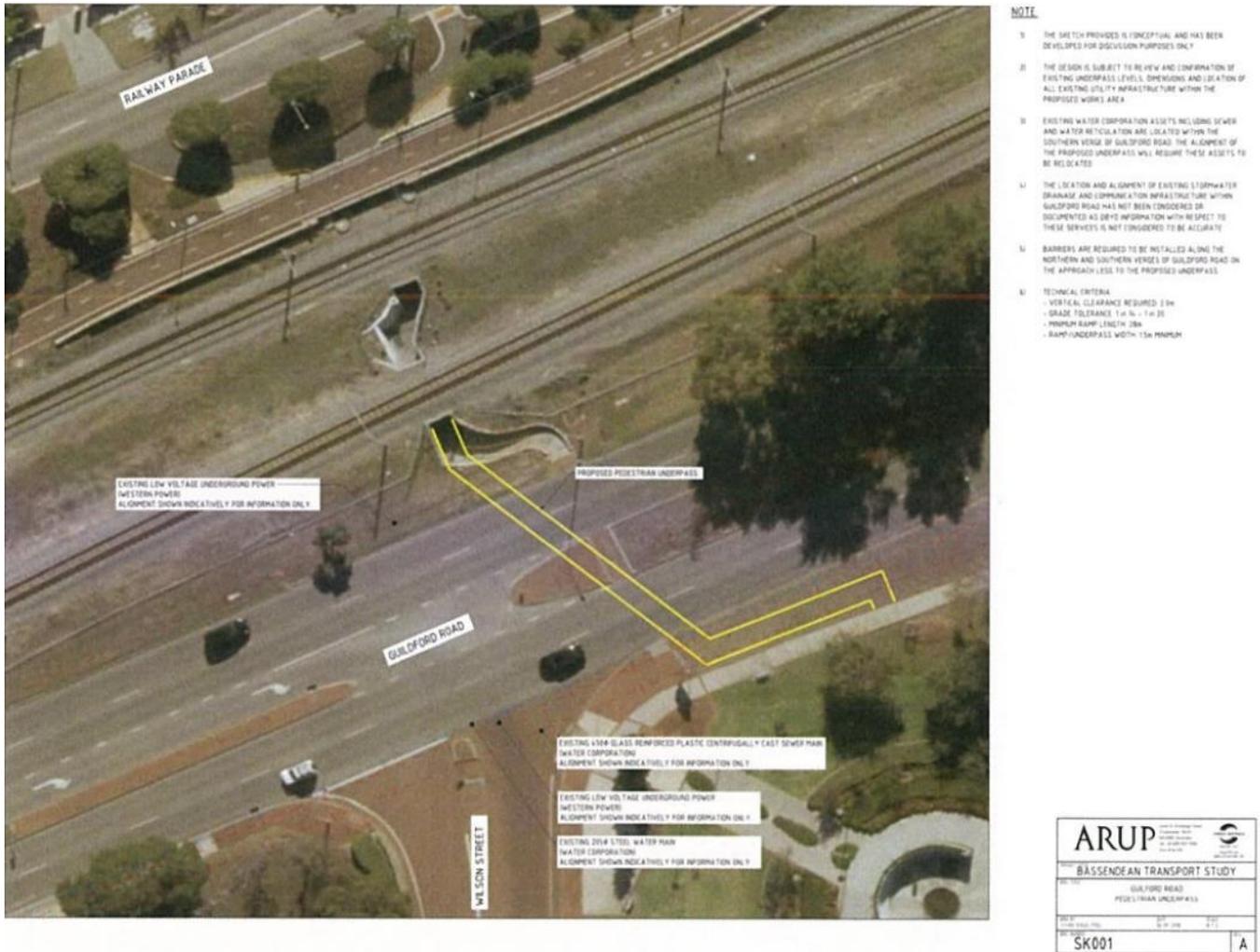


Figure 41 Concept for extension of existing railway underpass (Source: Town of Bassendean Integrated Transport Strategy)

4.5 Public transport

Public transport to the Precinct is currently of a high quality and good frequency. Existing services are comparable to other locations where a high proportion of the resident workforce works in key centres of Perth, East Perth and Midland. These places are well connected to Bassendean via the Perth-Midland railway.

Some potential additional improvements to public transport provision that could be considered for implementation include:

- Improve pedestrian safety and legibility when accessing Bassendean station by expanding the existing arrival space and improving hardscape treatment connection to Old Perth Road. Ultimately, grade separation over Guildford Road should be implemented.
- Increased frequency of existing services, in both peak and off-peak periods.
- Improvement to quality of bus stops, particularly where there is opportunity to integrate shade, shelter and safety measures adjacent to new development.
- Removal of bus embayments on Old Perth Road to provide more generous footpaths, landscaping and greater bus movement priority.

- Include public transport wayfinding throughout the Precinct so it is promoted as a viable means of accessing the centre.
- Improve access to Success Hill by constructing path access via Whitfield Street and providing a station arrival forecourt and facilities at Thompson Street and Lamb Street (see further discussion below).

4.5.1 Access to Success Hill station

Providing an improved active transport connection between Success Hill train station and Bassendean Hawaiian's shopping centre is an important objective of the Precinct Structure Plan. This connection is envisaged to improve the walkability of the station catchment. Presently, the pedestrian access is via Thompson Road and Lamb Street, and an at-grade crossing of Guildford Road via the traffic signals at Lord Street/West Road/Guildford Road. This crossing requires pedestrians to cross two left-turn slip lanes and activate the pedestrian crossing lantern.

As an alternative, the Precinct Structure Plan considers a movement outcome that:

- Provides a linear greenway north of Guildford Road and West Road/Lord Street towards Station Street.
- Connects Station Street to Lamb Street via a shared path under Lord Street.
- On surplus land at Lamb Street, provide suitable landscaping and hardscaping to provide a sense of arrival to Success Hill station. Provide bicycle and other soft infrastructure as required.
- Provide a connection to the existing platform bridge from the Lamb Street arrivals space, via the existing railway reserve.

This connection, shown in Figure 42, provides a more direct, safe and pleasant connection between the Town Centre and Success Hill station and will encourage greater use.

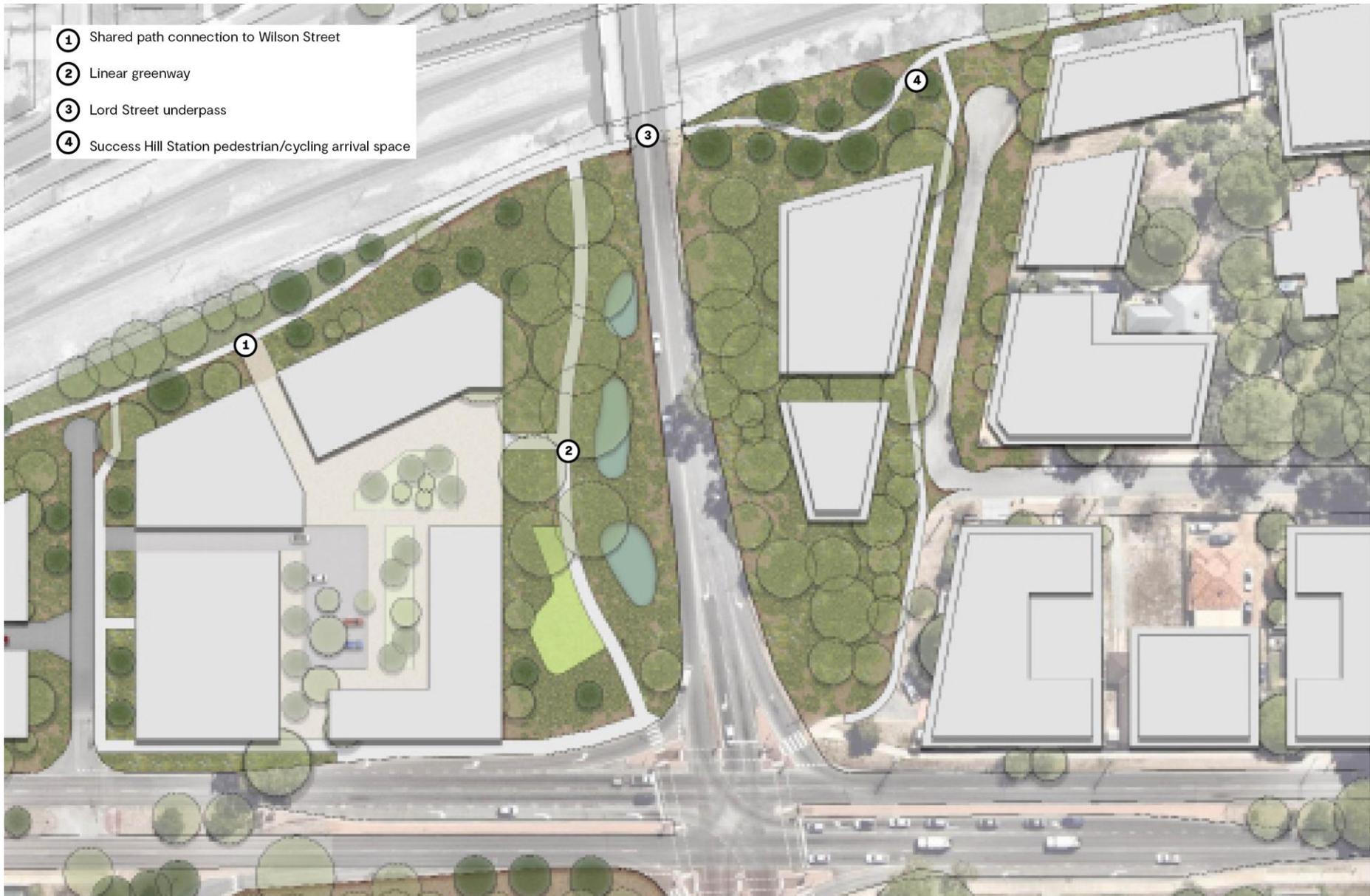


Figure 42 Success Hill Station Link

4.6 Active transport and e-mobility

Improving the provision of active transport infrastructure to and within the Precinct, along with providing adequate end of trip facilities for staff, residents and visitors, would assist in reducing car parking demand by making active transport a viable option for accessing the Precinct.

The following approaches are recommended to assist in improving the mode share of active transport to/from the Precinct:

- A pedestrian and cycle path network that includes paths adjacent to all roads, connections to bus stops and suitable crossing facilities.
- Safe and convenient road crossing connections to surrounding residential areas.
- Good cycling connectivity to nearby stations at Bassendean, Success Hill, Ashfield and Guildford.
- Sufficient end of trip facilities provided with all development (commercial and residential), i.e., bicycle and scooter parking, showers, lockers and changerooms.

Due to the reduced cost of battery technology, e-rideables (e-bikes, e-scooters, etc) are becoming more prevalent. People who may not have been able to ride a regular bicycle, perhaps due to physical issues or their journey may have been too long, may now be able to choose this mode of transport due to the assistance the electric motor provides. E-rideables would likely provide the biggest benefit for staff, resident and visitor trips.

Access by active modes would be most effective when accompanied by congestion impacts, parking supply restrictions and paid parking.

5. Parking management

5.1 Existing parking availability

5.1.1 Off-street private parking

An assessment of parking bay numbers using aerial imagery has identified approximately 820 off-street parking bays provided within the Precinct with most off-street parking contained at three key locations:

- Bassendean Hawaiian shopping centre.
- Bassendean station car park (over 420 bays).
- The Bassendean Hotel.

Parking is free of charge and available 24 hours a day at these key locations, though time-limit restrictions apply in the following locations

- Five hours at Bassendean Hotel (*customer parking).
- Bassendean station car park is restricted in use to passengers of public transport. Parking is restricted to 24 hours and a fee is payable.
- Three hours at Bassendean Hawaiian's shopping centre (*customer parking).

5.1.2 Public parking

Considerable on-street parking is available within the Precinct. Parking along Old Perth Road is significant, provided free-of-charge and typically limited to one hour. These parking bays provide valuable short-term, high-turnover parking for customers and visitors. The parking is observed to be well-used, however the high turnover means that bays are typically available.

Additional on-street parking is available in most streets throughout the Precinct, with notable areas at Hamilton Street, James Street and Whitfield Street (south of Guildford Road). This parking is not limited (generally) and no fees are payable.

Where traffic volumes exceed 6,000 vehicles per day, any on-street provision should be carefully considered and located accordingly. Traffic volumes along James Street, Hamilton Street and Whitfield Street will be considerably lower than 6,000 vehicles per day, even under a full-build out scenario.

5.1.3 Occupancy

Occupancy in the Town's publicly managed parking areas is generally low (refer Table 22). This presents an opportunity to reevaluate the need for parking and re-purpose streets for other use and transport modes.

It is noted that average occupancy for some parking areas varies significantly on weekend periods.

Table 22 Public parking areas and average occupancy (weekday) (Source: Town of Bassendean Council Meeting May 2023)

Location	Available bays	Average weekday occupancy	Estimated surplus @ 85% occupancy)
Wilson Street	91	47.5%	34 bays
Hamilton Street	85	25.6%	50 bays
Whitfield Street	79	48.4%	29 bays
Old Perth Road	75	50.7%	26 bays
James Street	57	57.1%	16 bays
Kenny Street	50	50.4%	17 bays
Parker Street	40	50.3%	14 bays
West Road	29	4.1%	26 bays
TOTAL	506	-	212 bays

5.2 Future parking provision and location

The Town's Local Planning Policy 8 – Car parking and end-of-trip facilities (LPP8) sets out the access and parking provisions for non-residential development (including commercial and mixed-use developments). The parking requirements for residential development are contained within State Planning Policy 7.3 - Residential Design Codes (SPP7.3).

SPP7.3 makes provision for resident and visitor parking within new developments. Demand for future off-site parking from new residential developments is expected to be reduced as a result.

For the majority of non-residential floorspace growth on-site parking will be provided consistent with the Town's LPP8. However, there are opportunities for various forms of parking to continue to be provided by the Town in managed off-site parking areas described earlier. There is considerable available

capacity in several locations to accommodate off-site non-residential demand for parking, even in a 2050 full build-out scenario.

Should behaviours dictating use of public parking remain the same, exceedance of available public parking capacity is not expected until the very distant future and under a scenario where ‘non-shop’ land use growth approaches forecast floorspace volumes.

Table 23 Increase in non-residential floorspace

Land use type	Existing floor area	Forecast floor area (2050)	Percentage increase
Shop/retail	11,980sqm	17,984sqm	50.1%
Non-shop	10,656sqm	26,616sqm	149.7%

5.3 Benefits of parking management

It is important to provide sufficient parking to cater to the requirements of Precinct visitors to prevent the occurrence of parking demand overflowing onto surrounding streets (obstructing traffic flow) and undesirable verge parking (causing visibility issues and aesthetically displeasing). However, it is also important to understand that excess parking provision has negative impacts as it is costly to build and maintain, is a non-productive land use, and will induce additional vehicle movements to and from the Precinct. Additional paved areas also create stormwater management issues, water pollution and heat retention.

Insufficient supply of parking can result in traffic congestion as vehicles ‘circle’ parking areas looking for an available bay. Insufficient supply can reduce economic activity as some patrons avoid the centre, choosing to visit other nearby centres with a better supply of parking. Ample supply of free parking would encourage people to drive and contribute to congestion on the surrounding road network, along with air and noise pollution. The cost of providing parking significantly increases the cost of development and this cost will be passed on through higher purchase, leasing and rental prices, reducing affordability.

The amenity of the Precinct will be negatively impacted by at grade car parking, despite the best design efforts. Space provided for parking is not available for green space and alternative productive uses and will contribute to an inflexible urban form. This would be ameliorated by the development of below ground parking.

5.4 Parking management strategies

There are numerous strategies that can be employed within the Precinct to manage the provision and use of parking to minimise negative car parking impacts.

The following sections consider potential strategies to manage parking within the Precinct. Some of the strategies are recommended to be implemented as part of the Precinct Structure Plan. By doing so, a more comprehensive approach to parking management can be achieved.

5.4.1 Cash-in-lieu

Local governments, including the Town, allow for cash-in-lieu contributions to be made for car parking where development undersupplies on-site parking. The local government accepts payment for this shortfall which is used to provide car parking bays in an adjacent or nearby parking location. This approach enables:

- Funding to be pooled for more substantive parking facilities.
- Parking facilities to be centralised for improved access.

- Design responses that favour off-site parking provision.

This strategy is not recommended for the Precinct given the lack of nearby available suitable land, sufficient areas available on-site, and the potential for parking in the surrounding area to disrupt residential amenity.

5.4.2 User-pays parking

Businesses within the Precinct will be competing with similar businesses in other surrounding activity centres to attract customers. If the Precinct charges visitors to park, this is likely to deter customers, particularly if they can visit similar businesses in nearby activity centres and park for free. There is likely a considerable surplus of parking within the Precinct, resulting in a diminished need to manage parking available through user-pay fees.

Demand for staff parking is more inelastic than visitor parking and as such, could be considered for a user pays approach. This already applies at the Bassendean station car park. Providing free staff car parking areas incentivises access by car, and it is important to recognise and clearly account for the opportunity cost of providing additional parking. Employees tend to have better access to high-frequency public transport. Employee parking is one of the least productive land uses, as these vehicles lie idle for long periods of time. Restricting employee parking is a direct way of reducing car-as-driver mode share. Restrictions on employee parking includes both statutory supply maximums applied to key development areas and active management of public parking to limit long-stay use.

In the long-term, non-shop land use demand is expected to grow within the Precinct. The Town should consider the potential for long-stay, user-pays parking nearby or incorporated into major employment centres as land is redeveloped, including:

- Bassendean Oval and adjacent redevelopment on Bassendean Hawaiian shopping centre.
- The Council's Administration site.

5.4.3 Parking restrictions

Parking restrictions are common within most of Perth's activity centres. Typical restrictions include prevention of parking and time limitations. Time restrictions on parking are currently applied within and surrounding the Precinct and should be continued (whether or not paid parking is implemented). Surrounding residential streets should be monitored post development to identify if excessive parking is occurring and the extent to which it is occurring. If so, time restrictions should be implemented beyond the immediate vicinity of the Precinct.

The implementation of parking restrictions will be influenced by the function of the road and safety requirements, with a view to preventing undesirable parking around access points, intersections and curved road geometry.

Existing one-hour restrictions along Old Perth Road appear to ensure a reasonable availability of parking with frequent turnover to make short-term parking for visitors and customers attractive and reliable.

5.4.4 Future shopping trends

Future shopping trends, particularly for supermarkets, may move more towards an online (click and collect or home delivery) model, which would reduce the requirement for mid-duration parking within the precinct and may also reduce the overall quantum of parking required. Further investigation into these trends would need to be undertaken to determine their impact on parking use and requirements.

5.4.5 Enforcement

The benefits of paid and/or time restricted parking are reduced if enforcement is not undertaken. Given the nature of most commercial land uses within the Precinct (daily convenience), very few visitors to the centre are likely to stay more than three hours. Most long stay parking (other than by residents and their visitors) would be by staff.

5.4.6 Shared/reciprocal parking

Shared parking involves the full or partial decoupling of parking from the land use. The provision of shared/reciprocal parking areas is permitted within LPP3.13 (subject to conditions). Limiting the supply of private parking results in greater parking efficiency and as such, is a more sustainable outcome. In the case of the Precinct, some parking could be shared between public and residential uses. With smaller household sizes that would be most prevalent within a higher density form within the Precinct, private vehicle ownership and vehicle trip generation will tend to decline, and alternative transport mode shares will increase, provided such infrastructure and services are installed.

Where adjacent or nearby businesses have different periods of peak car parking demand (e.g. retail versus hospitality), shared car parking facilities may provide a more efficient use of land rather than each business providing large private parking areas that do not reach capacity at the same time.

5.4.7 Mobility as a service

Car ownership rates may reduce in the future as the city densifies, space becomes less abundant and the cost of vehicle ownership increases, leading to the rise of 'mobility as a service' (MaaS) which is where people move away from personally owned modes of transportation (primarily cars) to purchasing mobility as a service as and when needed via the right mode for that journey.

On-demand transport (e.g., Uber) is a user-oriented form of transport characterised by flexible routing and ad-hoc scheduling of small/medium vehicles operating between pick-up and drop-off locations according to the passenger's wishes that is provided by the private sector¹. On-demand transport is a common means of transport for a wide range of trip purposes. Most trips occur on Friday and Saturday nights and at the start and end of the workday. It should be noted however that the use of on-demand transport to access the Precinct could potentially reduce the car parking demand but would not reduce car trips unless car-pooling also occurs. Provision of pick up and drop off points for on demand transport (rideshare and taxis) should be provided as not everyone owns, or is able to drive, a private vehicle.

Another example of MaaS is commercial car share schemes where people who are members can hire cars on demand 24/7 for durations as short as an hour. There are several car share companies in operation in Australia, with GoGet² being one of the larger ones, however it currently does not operate in Perth.

Peer to peer car sharing is like commercial car share schemes, but the cars are not owned by a commercial operator. Instead, individual owners advertise that their car is available for rent through a web-based platform such as Drive Mate, Uber Carshare or Turo, all of which are active in Western Australia. The prospective driver logs into the website, enters the location within which they want to pick up a car and how long they need it for. The choices and prices appear, and the selection is made. Like Airbnb, the deal is done online, as is the financial transaction, the keys can even be collected remotely,

¹ WA Government On-Demand Transport Green Paper

² <https://www.goget.com.au/>

and the two parties involved may never meet. Also, just like Airbnb, both sides of the deal can rate their satisfaction with the experience publicly.

5.4.8 Carpooling

Parking availability may encourage or discourage car-based trips. The uptake of carpooling will be influenced by parking availability, application/cost of paid parking, accessibility to public transport and the availability of someone else with similar travel patterns.

Businesses within the Precinct could be encouraged to develop their own carpooling schemes by the supply of information leaflets that outline and promote the benefits. Such a scheme could:

- Help match commuters.
- Offer benefits to car share drivers.
- Offer incentives and cost saving.

5.4.9 User/staff surveys and Travel Plans

Understanding the barriers that Precinct staff may face regarding reducing car usage to access the centre would help to inform the approach to parking management and transport infrastructure provision. This would also be useful in identifying the degree to which staff and visitors themselves could contribute to managing traffic and safety issues through increasing walking, cycling and public transport access to the Precinct. Travel Plans should be required to be developed by the larger commercial operators within the Precinct (requiring operators with five or less full time equivalent staff to prepare Travel Plans may be too onerous and have fewer benefits). Results of the staff surveys would help to inform the development of the Travel Plans to ensure maximum benefit.

5.4.10 Autonomous vehicles

Should autonomous vehicles (AVs) become commonplace, this will undoubtedly impact the quantum of parking required within the Precinct. However, as this technology is not yet proven, the nature of any AV related impact is unknown and subsequently, so is the required design response – possibly less parking will be required, there may be a need for additional designated drop off and pick-up points, free flowing through traffic movements, etc. These design patterns are still emerging, and as such, should be considered, however may be difficult to realistically implement in any development that occurs in the short term.

5.4.11 Integrated Parking Strategies and Parking Management Plan

Major redevelopments should include consideration of integrated policy objectives and strategies for car parking and alternative transport modes that will support a medium/high destiny urban centre served by both private vehicles and enhanced alternative transportation modes; public transport, cycling and walking. These will enable the determination of the optimum quantity and most appropriate management strategies for parking within the Precinct.

Planning for major redevelopments should detail such things as:

- General parking control and management.
- Cost of provision of parking.
- Parking needs assessment.
- Staff parking provision: location, quantum and cost.
- Incentives for staff to utilise public and active transport to access the Precinct.



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