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City of South Perth

Report for South Perth Station Precinct Transport and Access Strategy FINAL

August 2016



INFRASTRUCTURE | MINING & INDUSTRY | DEFENCE | PROPERTY & BUILDINGS | ENVIRONMENT



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Executive Summary

This report provides an update to the 'Report for South Perth Station Precinct, Transport and Access Strategy, May 2012'. The outcomes of this report results from the City of South Perth Town Planning Scheme Amendment No 25 which allows increased density of development within the South Perth Station Precinct.

The study area is shown in Figure 1.

The City of South Perth requires a transport and access strategy to identify any traffic and transport issues within the South Perth Station Precinct and to provide measures to upgrade the safety and efficiency of movements for traffic, public transport, pedestrians and cyclists. The report recommends future works for consideration by the City of South Perth to address increased travel demand.

The South Perth train station is planned to be located within the Kwinana Freeway reserve near the north-west corner of Richardson Park. Access to the station will be predominately by pedestrians who live, work or visit the precinct. The role for the train station is considered to be for commuters to Perth and other metropolitan destinations, for employees to the potential new development close to the station and for visitors to the Perth Zoo and South Perth foreshore.

Traffic and patronage analysis was undertaken for scenarios with and without the South Perth train station in 2016 and 2031.

The roads within the precinct are adequate to accommodate the existing traffic volumes, however the future traffic forecasts from the ROM24 model from Main Roads WA indicates higher levels of congestion will occur in the peak direction. It is clear from the forecast traffic volumes that there will be considerable pressure on Labouchere Road from 2031 should development occur as proposed. The construction of a rail station within the precinct in 2031 is not forecast to reduce traffic volumes significantly compared with the 'No Station' scenario. There will need to be a significant change in travel behaviour to allow the network to operate satisfactorily beyond 2031 to include broader transport initiatives.

It is clear from current and forecast traffic volumes there should be no downgrading of Labouchere Road (Angelo Street to Mill Point Road) from the current cross section which includes two lanes (mostly) in each direction.

If forecast traffic volumes continue to increase by 2031, a significant upgrade of Labouchere Road and/or travel behaviour change will be required. The daily capacity of the single lane entry from Mill Point Road becomes saturated resulting in congestion in and around the intersection with Mill Point Road.

The Freeway access capacity will continue to deteriorate to 2031. All other roads are forecast to have sufficient capacity at midblock sections until at least 2031.

It is clear from the modelling that forecast traffic volumes by 2031 will result in significant overcapacity of Labouchere Road and access to/from the Freeway. This study is focussed on the precinct and has not considered the broader impacts including Freeway access in any detail as it outside the scope of this study. However, Freeway access should be subsequently examined to include consideration of the broader regional movements. The Mill Point Road/Labouchere Road site is impacted by access to the Kwinana Freeway which is already congested during the am peak hour. Without a major capacity upgrade to the Kwinana Freeway and access ramps to it, modification to this intersection in isolation will provide limited benefits to performance. As a result, longer term network improvements will be required



together with measures to reduce/manage the travel demand. These broader measures are identified in Section 8.2.

The peak period patronage to the train station on a typical weekday is forecast to be much lower than the other stations on the Perth to Mandurah railway line. The train patronage from the STEM modelling indicates that the typical weekday train patronage in 2016 and 2031 will range from 700 to 800 passengers which is only about 16 to 18 per cent of the total daily public transport patronage in South Perth. This indicates that the majority of the public transport trips will still be by bus or ferry to the South Perth Station Precinct even after a new station is built. However, the role for the South Perth train station will be most important for visitors to access the Perth Zoo and to attend major events, such as the Skyshow, on South Perth foreshore. South Perth train stations. When the large pedestrian movements occur, streets leading from the train station to the Perth Zoo and the South Perth foreshore will require traffic and pedestrian management plans for safe crowd control. It should be noted that no part of the earlier STEM analysis has been updated as part of this report.

The traffic and access strategy was developed by considering the traffic, parking management, bus operations, and the pedestrian and cyclist movements through the South Perth Station Precinct with and without the South Perth train station.

In order to encourage safer traffic movements along Labouchere Road, measures to slow down the traffic, especially near areas where high levels of pedestrian and cyclist movement could occur, were considered. These areas are located along the principal desire line for pedestrian movement between the Mends Street ferry jetty, through Windsor Park to the Perth Zoo and continuing along Charles Street or Richardson Street to Melville Parade where the proposed train station would be built. The implementation of traffic signals at the intersection with Richardson Street would provide benefit for pedestrians.

Within the Mends Street retail precinct, traffic calming is proposed with the implementation of a street design with no kerbs and a slight curvature in the alignment that would allow improved footpath amenities with more seating, public art and landscaping along both sides of the street. This would provide a more attractive street for pedestrians while maintaining a proportion of the current on-street parking and the two-way traffic flow. A raised plateau at the northern end of Mends Street opposite the ferry terminal is proposed to encourage lower speeds along the South Perth Esplanade which is particularly important given the pedestrian generation from the Ferry and Mends Street activities.

Parking management is an issue within the Precinct, especially during special events at the Perth Zoo and along the South Perth foreshore. Patrons to these events should be encouraged to use public transport so that traffic and parking issues are minimised. During weekdays with South Perth train station, park and ride activity needs to be discouraged to provide car parking for local businesses. All day parking restrictions with the introduction of a four-hour ticket parking policy will need to be considered.

Measures to manage the travel demand by encouraging more use of public transport, pedestrian and cycling to and within the precinct are proposed. These initiatives are summarised in Figure 1.





Figure 1 Initiatives to Improve Transport Access within the South Perth Station Precinct

Source: Google map modified by GHD

In discussion with the City off South Perth, the removal of the right hand turn movements into and out of Hardy Street & Lyall Street was raised. The implications on accessibility and traffic reassignment would need to be further considered.



Key recommendations for transport access and road safety with traffic calming to and within the South Perth Station Precinct, indicative costs and suggested priorities are shown in Table 1.

Table 1 Recommended Infrastructure Upgrades with Indicative Costs and Prio	rities
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Proposed Traffic Control	Location	Cost *	Priority (Short 1-3 years Medium 5 years
Median closure allowing left turn in/out only and right turn in only	Labouchere Road/Mends Street	\$30,000	Short
Median closure allowing left turn in/out only	Labouchere Road/Charles Street	\$30,000	Short
Median closure allowing left in/out turn only	Labouchere Road/Bowman Street	\$30,000	Short
Traffic signals (Civil works upgrade)	Labouchere Road/Angelo Street	\$1,100,000	Medium
Traffic signals (Minimal civil works)	Labouchere Road/Richardson Street	\$500,000	Medium
Raised Plateau	Mends Street/South Perth Esplanade	\$30,000	Medium
Streetscaping and traffic calming	Mends Street	Approx. \$1M	Medium
Widen Melville Parade to better accommodate on- street parking	Melville Parade	\$200,000	Short
Improved pedestrian and way finding signing	To and from zoo (and new train station if built)	\$50,000	Short
Investigate replacing current two hour parking and unrestricted free parking in zone with either three or four hour limit	Lyall Street, Hardy Street, Charles Street, Richardson Street, Melville Parade	TBD	Short
Upgrade to South Perth Esplanade parking and cycling facilities	South Perth Esplanade	\$350,000	Short

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Proposed Traffic Control	Location	Cost *	Priority (Short 1-3 years Medium 5 years
To improve pedestrian phasing and access to Mill Point Road North (from Mill Point Road East)	Mill Point Road/Labouchere Road	\$1,100,000 TBC (in conjunction with Main Roads)	Medium
To improve pedestrian phasing and performance	Mill Point Road/Mends Street	\$750,000 TBC (in conjunction with Main Roads)	Medium
Additional suite of Traffic Management Measures	Mill Point Road North.	\$1M (TBC)	Short/Medium

* Costs high order only, estimated using concept design only – more exact costs cannot be determined until detailed design undertaken. Costs for any services implications are unknown.

In the short term, the local streets west of Labouchere Road within the South Perth Station Precinct are considered adequate for pedestrian and cyclist activity and for local on-street parking and traffic access. However, as the new office, retail and residential developments are progressively planned and built in the South Perth Station Precinct, the streetscapes could be incrementally modified to accommodate increased pedestrian and cyclist activity, to improve the urban amenity along the footpaths and to provide indented car parking bays and traffic calming treatments as required. The costs for the City of South Perth to modify these streetscapes should be minimised and have not been specifically itemised in the proposed infrastructure works (refer to paragraph below).

Indicative improvements/upgrades to the streets within close proximity to the proposed South Perth Railway Station, that is, those streets bounded by Labouchere Road, Richardson Street, Melville Parade and Judd Street) would typically relate to kerb narrowing (or raised thresholds) to curb traffic speed and improve pedestrian accessibility through the precinct and across roads, centralised medians inclusive of landscaping and reticulation, changes to paving at road junctions (i.e. at Labouchere Road), provision of indented car parking bays, and improvements to pedestrian and cycling facilities. A budget of \$600 to \$850K is suggested.

Consideration was given for the introduction of a community bus service in the City of South Perth. A potential route was developed with a loop connecting Mends Street and the ferry terminal, the Old Mill, Perth Zoo, the future South Perth train station, the South Perth library and City Administration Centre and the Commercial Precinct in Angelo Street.

It is recommended that a community bus service be considered for implementation by the City of South Perth to cater for the inter-peak local community trips.

A detailed service and implementation plan with a business case should be undertaken to determine the financial viability of a community bus service for South Perth. If considered viable, it could be implemented initially on a trial basis for six months. The continued operation would be determined based on the patronage and the community acceptance of the community bus service.



It is considered that a SATURN/Paramics model or similar would be a valuable tool for the City of South Perth to assess the cumulative impacts of development and allow a consistent approach when preparing transport assessments for DA's. The model would be updated as new development occurs and relevant data supplied to developers.

It is acknowledged that the land use assumptions result in traffic demand generated vastly exceed the capacity of the network and there is a need to further model the area to ensure accuracy of predicted future volumes and also assess potential network treatments.



1. Introduction

This report provides an update to the 'Report for South Perth Station Precinct, Transport and Access Strategy, May 2012'. The outcomes of this report results from the City of South Perth Town Planning Scheme Amendment No 25 which allows increased density of development within the South Perth Station Precinct.

The study area is shown in Figure 2.

Sections of the report updated from the earlier report are indicated by **** in the heading.

1.1 Background

When the Perth to Mandurah railway line was first proposed in 2002, the State Government stated its commitment to the construction of a train station at South Perth. The Kwinana Freeway was realigned near Richardson Street, at the cost of about \$3M, to allow for the proposed station platform during construction of the railway line, but early construction of the full station was not justified. In order to support the business case for the construction of this station, the South Perth Station Precinct Planning Study was undertaken within the area shown in Figure 2.





Figure 2 Study Area for the South Perth Station Precinct Study

Source: South Perth Station Precinct Plan, WAPC, Department of Planning, City of South Perth, January 2011

The land within an 800 m walking distance of the station will need to accommodate more compact, mixed-use developments to generate more patronage at this station as shown in Figure 3. The proposed Amendment No. 25 to the City's Town Planning Scheme No. 6 will provide a planning framework to accommodate such development.





Figure 3 Proposed Higher Density Development in the South Perth Station Precinct Plan

Source: South Perth Station Precinct Plan, WAPC, Department of Planning, City of South Perth, January 2011

The South Perth train station is planned to be located within the Kwinana Freeway reserve near the north-west corner of Richardson Park as shown in Figure 4.

The land at this section of Richardson Park could potentially be redeveloped with a building linking directly into a new pedestrian overpass to the station platforms.

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Figure 4 Location for the Future South Perth Train Station





Site of the proposed South Perth train station within the Kwinana Freeway

Richardson Road looking towards the future South Perth train station site

1.2 Scope of Work (****)

The following tasks were conducted for the update of the 'Report for South Perth Station Precinct, Transport and Access Strategy, May 2012':

- Review ROM24 Landuse inputs for each zone used in the Report for South Perth Station Precinct, Transport and Access Strategy, May 2012' for 2016, 2021 and 2031. Update the land use in ROM24 based on City of South Perth requirements. Main Roads then ran the ROM24 for years 2016, 2021 and 2031 (with and without the Station) using the appropriate forecast road network.
- The forecast traffic generation from the Station Precinct used in the May 2012 report for 2016, 2021 and 2031 were compared with the current predictions.
- Intersection volumes at the key intersections were analysed to determine if the earlier recommendations are still valid:
- Intersection surveys were undertaken at:
 - Mill Point Road/Labouchere Road Intersection
 - Mends Street/Labouchere Road Intersection
 - Bowman Street/Labouchere Road Intersection
 - Lyall Street/Labouchere Road Intersection
 - Hardy Street/Labouchere Road Intersection
 - Charles Street/Labouchere Road Intersection
 - Richardson Street/Labouchere Road Intersection
 - Angelo Street/Labouchere Road Intersection
 - South Perth Esplanade/Mends Street Intersection

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- Pedestrian and cycle access requirements were updated.
- Public transport services were discussed with PTA to confirm future planning and a stakeholder meeting held to confirm collective view of relevant agencies.
- A crash assessment was undertaken based on Main Roads Crash Analysis Reporting System (CARS).
- Findings of the assessment have been documented and recommendations made to include:
 - Road and intersection requirements
 - Pedestrian/cyclist requirements
 - Public transport requirements.
- Specific planning tasks undertaken are broken down as follows:
 - A review of relevant planning documents and previous reports to generate assumptions for employment, population, education and health ROM24 activity inputs.
 - A workshop with the City of South Perth was undertaken to confirm assumptions.
 - A forecasting model was built and relevant information supplied to Main Roads for use within the ROM24 model.

1.3 Report Structure

This report is comprised of the following sections:

- In Section 2, policies and studies for strategic and local planning, master planning and traffic and transport planning relevant to the South Perth Station Precinct are summarised.
- In Section 3, the stakeholder consultation discussions about transport issues for the South Perth Station Precinct with various government agencies are summarised.
- In Section 4, the existing transport conditions including the road network, car parking, public transport and pedestrian and cycling movements are described.
- In Section 5, the future transport network is assessed based on strategic traffic and patronage modelling and a road network capacity analysis. Several options for the configuration of Mends Street were developed and are evaluated.
- In Section 6, a review of the sustainable transport including public transport, pedestrian access and bicycle movements was conducted. An assessment of a local community bus for South Perth was conducted.
- In Section 7, a Local Traffic Management Plan was prepared that includes road network, public transport, car parking and pedestrian and cycling access strategy for the study area. An implementation plan is proposed with estimated costs for the transport infrastructure.
- In Section 8, a summary of the findings about transport and access for the South Perth Station Precinct is provided.



2. Literature Review

A literature review of studies, reports and findings relevant to the study area and the adjacent areas was undertaken and is summarised in this section.

2.1 Statutory Planning

The City of South Perth Town Planning Scheme No. 6 (TPS6) provides the current statutory framework for managing development and land use within the City of South Perth. Schedule 9 of the TPS6 relates to Special Control Area SCA1 – South Perth Station Precinct. The SCA1 is an area in close proximity to the proposed South Perth train station and includes all land between Richardson and Darley Streets to the south and east, and Scott Street and Frasers Lane to the north. Schedule 9 contains development and land use provisions specific to the area that aim to encourage more intensive mixed use development. Figure 5 below shows the four sub-precincts that collectively comprise the South Perth Station Precinct. A large portion of the precinct is designated as the Special Design Area where buildings may exceed the 'basic' height limits subject to satisfying prescribed performance criteria. Figure 5 also shows the extent of the Special Design Area. Figure 5 shows the 'basic' height limits for all land in the SCA1.

The provisions of the SCA1 were introduced into the scheme through Amendment No. 25 in January 2013. The amendment was prepared following the South Perth Station Precinct Study which was completed in 2010 and published by the Western Australian Planning Commission in January 2011.

The City of South Perth is currently undertaking Scheme Amendment No. 46 which aims to address some of the ongoing issues with the scheme provisions.



Figure 5 South Perth Station Sub-Precinct Plans (Source: City of South Perth Town Planning Scheme No. 6)



Sub-precincts



Building Heights

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Special Design Area



2.2 Strategic Planning

Various State Government strategies and policy documents were reviewed and the key relevant points for transport and access at the South Perth Station Precinct are provided in the following sections.

2.2.1 Directions 2031 and Beyond: Metropolitan Planning Beyond the Horizon, August 2010

In August 2010 the West Australian Planning Commission (WAPC) released *Directions 2031 and Beyond: Metropolitan Planning Beyond the Horizon* to guide development within the Perth Metropolitan Region and to manage the significant population projections for Perth in the next 21-year period. This policy document, based on the identified six key themes of a liveable, prosperous, equitable, accessible, green and responsible city, was developed with significant community and stakeholder input.

Directions 2031 plans for more than half a million new residents in Perth and Peel, with an estimated population of 2.2 million. Planning for the 35-40 per cent increase in Perth's population presents challenges in terms of housing, infrastructure, services, and jobs.

Directions 2031 encourage a 'connected city' pattern of urban growth. This is described as:

- Promoting a better balance between greenfield and infill development.
- Planning and developing key public transport corridors, urban corridors and transit oriented developments to accommodate increased housing needs and encourage reduced vehicle use.
- A 50 per cent improvement on current infill residential development trends of 30 to 35 per cent; with a target of 47 per cent or 154,000 of the required 328,000 dwellings as infill development.

Directions 2031 provides a policy that considers that private vehicles will continue to be a predominant mode of transport for the future, therefore road systems will play an important role in future movement networks. The plan identifies congestion as a significant economic cost, and identifies the need for improvements to and expansion of the road network in the metropolitan area to meet transport demands. Within existing developed areas, such as the district centre of South Perth, Directions 2031 identify opportunities to intensify existing activity, and promote new uses to make better use of transit facilities and services.

2.2.2 Moving People Network Plan

In late 2011, the Department of Transport was developing the Moving People Network Plan that would establish a policy that is similar to the SmartRoads program developed by VicRoads in Victoria. The Moving Network People Plan will be a 20-year investment plan for the transport network for the Perth and Peel Regions and that will be strategically linked to State government policies, such as:

- Directions 2031 and Beyond;
- The draft Public Transport Plan for Perth 2031;
- The draft WA Bicycle Network Plan; and
- The Perth Freight Plan.

It is based on the transport planning principles and it will take a whole of network approach with a focus on moving people and goods, and not vehicles. It will encourage walking and cycling and will use for integrated transport and land use decision-making.



2.2.3 Central Metropolitan Perth Sub-regional Strategy, August 2010

The *Central Metropolitan Perth Sub-regional Strategy* provides local level guidance to support Directions 2031. The strategy addresses issues that require a regional response, such as provision of housing choice and affordability, infrastructure, and growth. The strategy identifies growth areas for the central sub-region, and sets targets for future urban infill projects.

The sub-regional strategy identifies that local governments are responsible for developing realistic, market-oriented plans and strategies to encourage innovative infill. The strategy recognises that the assessment of current infrastructure network capacity is a key challenge in achieving infill targets. Congestion is noted as a growing issue.

In 2010 the total estimated resident population in the City of South Perth (CoSP) is 43,908 based on population projects from the 2006 census. The CoSP for the overall local government area has a target of 6,000 additional dwellings; currently the CoSP local government area has 20,167 dwellings. South Perth, as a district centre, is identified as a major growth area in the strategy. The strategy sets a target of 800 additional dwellings for the area.

2.2.4 South Perth Station Precinct Background Report, May 2010

The CoSP and WAPC commissioned the *South Perth Station Precinct Background Report* to provide a framework for development in the precinct surrounding the planned South Perth train station on the Perth to Mandurah railway line.

The report plans for a study area within an 800 m radius of the proposed South Perth train station located within the Kwinana Freeway reserve, at the north western corner of Richardson Park.

The Plan cites ABS population projections, indicating the population of South Perth could reach almost 56,000 by 2031, compared to an estimate resident population of 40,853 in 2006 (this study only considers a proportion of South Perth). This increase would be accompanied by an increase in other employment and traffic generating uses, such as office, retail and service type industries that currently occupy 80 per cent of the commercial area in South Perth.

While the Station Precinct is relatively well served by all modes of transport, catered for by multiple bus services and a direct ferry service to Perth CBD, traffic and parking volumes are considered a concern to residents in the South Perth Station precinct.

Peak hour access to/from the Kwinana Freeway is a key cause of traffic congestion in the area. The report identifies that, with redevelopment of the precinct, a great deal of traffic attracted to the area would be in an opposite direction to current peak flows. Additional traffic, therefore, is anticipated to predominantly utilise available capacity on the network, and not contribute to existing congestion.

(Note: It is acknowledged that access to the Freeway is and will continue to be a cause of congestion however comments in relation to opposite directional flow are not supported.)

Whilst the planned train station will further enhance public transport access within the precinct, there is no park and ride facility planned and management of car parking will be a key issue for the precinct.



2.2.5 South Perth Station Precinct Plan, January 2011

The *South Perth Station Precinct Plan* was released by the WAPC and CoSP in January 2011, providing a framework to guide development in the precinct surrounding the planned South Perth train station.

The precinct plan encourages uses within the 800 metre walkable catchment that would encourage patronage of the station, including office and commercial development and improved access to the City's community facilities. The precinct plan facilitates increased residential development, with 950 dwellings proposed representing an additional population of 1,710. This was revised up from the 800 additional dwellings in the Central Metropolitan Perth Sub-regional Strategy from August 2010.

The precinct plan identifies that the level of development proposed will substantially increase the level of activity in the precinct. The plan acknowledges that design solutions require additional analysis and design. This includes the need to recommend traffic and parking management strategies.

The Precinct Plan identifies that the area bounded by Richardson Street, Melville Parade, Bowman Street and Labouchere Road will require further assessment to determine the future form of the road system to improve traffic flow, bus connectivity and road safety within the cell, accommodate the needs of pedestrians and cyclists, and to facilitate the greening up of the road reservations. Signals at Labouchere Road, Mill Point Road, and the freeway on ramp require extensive works to provide a more pedestrian-friendly outer precinct and to facilitate safer and more efficient movement through the intersection. This is discussed in more detail later in this report.

2.2.6 South Perth Railway Station Business Case, October 2010

As part of the South Perth Station Precinct Plan, developed with the WA Planning Commission, the City has prepared a business case which considered options that would strengthen the feasibility of constructing the South Perth railway station, adjacent to Richardson Park.

The City of South Perth commissioned a detailed financial analysis and business plan for the South Perth railway station. It was prepared by Syme Marmion & Co in October 2010. The business case was based on the need for urban redevelopment adjacent to the station to encourage increased rail patronage, associated with a provision of destination uses such as office and commercial development.

The City strongly believes that the South Perth community would benefit greatly from the provision of a railway station, with the proposed cost of the \$30M being outweighed by the consumer demand and benefits that it would bring such as improved access and reduced parking congestion.

The business case assessed a number of options and determined there is strong feasibility for constructing the station with demonstrated financial and environmental sustainability. The two options considered the construction of a building on the north-west corner of Richardson Park, which would assist in creating a vibrant transit-oriented hub, aligned with the train station.

Option 1 – Commercial Development

• A built form of approximately four stories, with 10,000 m² of commercial space, with no proposal for residential use.

Option 2 – Mixed Use Development

Both residential and commercial use, with a higher density and a built form of up to 12 stories including 14,400 m² of residential floor space and 4,000 m² of commercial floor space.



The business case identified that, even without dedicated parking, the railway station would generate "park and ride" demand, placing pressure on street and private parking. The report identifies the need for a comprehensive parking strategy for the precinct in response to increasing demand.

The business case recommended an "alternative station design, mixed use" as the preferred option for development of the station. The option, incorporating mixed use development within the station design, presents benefits including:

- Reduced travel distance to work;
- Reduced greenhouse gas production and petrol consumption;
- Reductions in travel costs and travelling times;
- Reduced road congestion; and
- Increased opportunities for non-car based commuting, such as walking, cycling and public transport.

As part of the development of the business case, a public forum was held in May 2009. The key findings from this forum on the South Perth Station Precinct are summarised as follows.

The precinct vision developed through the Community Engagement study conducted by Estill & Associates in April 2007 was:

"A leafy, walkable, and vibrant mixed-use urban precinct studded with reminders of South Perth's history, and accessible by a wide range of public transport modes."

The Precinct Plan could result in:

- 120,000 m² of commercial floor space, employment for 4,300 workers, 950 dwellings and a population of 1,700.
- ► An estimated train patronage of 2,300 2,800 boardings per day compared to 800 1,100 boardings per day within the current precinct.

Car parking was considered a key issue for any redevelopment proposals and demand will need to be carefully assessed and managed. A need for shared parking with reciprocal use rights between tenants and buildings should be considered. Other parking controls to be considered are hours of use in a similar way to the Perth CBD with a maximum 5 hour parking limit anywhere in the precinct and opportunities for cash-in-lieu parking funds.

- Public Transport Authority presented a station design for an unmanned and unserviced station to minimise the operational costs.
- A planning and urban design framework for land use and development should be developed to encourage use of the station and corresponding rail service and integrate the station and its functions with the surrounding urban development and sub-region.

The outcome of the study will be incorporated into the Town Planning Scheme.

The key topics covered at the Public Forum included:

• The area has relatively low levels of employment self-sufficiency compared to the Perth average and other inner Perth centres, reflecting the fact that most of the workforce travels into the CBD or other



regional centres to work. This has implications for the traffic network which gets easily congested in peak hour. If more employment were provided in the area there would be less strain on the road network and a more efficient use of the existing rail line.

- A comparison was made to Subiaco which changed from a station precinct with no commercial office space to becoming a significant business destination and an excellent example of Transit Oriented Development.
- There is a need to create more activity in the area and more destination uses in the 800 m catchment of the station in order for the Public Transport Authority (PTA) to be able to justify the station. The PTA has a preference for developments to be of primarily business use.
- Issues and considerations such as rail patronage and operations, how to integrate the proposed development with the existing community, the precinct heritage, station access, parking, safety and the viability of the proposed development.
- There are no plans for park and ride facilities at the station and no direct bus routes to the station (although there may be some transfer from services on Labouchere Road).
- Tourist traffic to Perth Zoo is likely to be a key patronage source.

In terms of walking and cycling, routes to the station will need to be reinforced and crossing points on Labouchere Road and Mill Point Road will be important.

- The objectives of, and requirements for, achieving a Transit Oriented Development.
- Current public transport services in South Perth, access to and from the Kwinana Freeway and infrastructure capacity.

The draft development controls for the South Perth Station Precinct were based on the information in Table 2:

Attribute	Description
Land Use	Mixed Use
Street wall (both maximum and minimum)	2-3 storeys generally but 3-5 storeys for applicable frontage to the special design areas.
Overall height	As per the precinct height map, but height limits may be relaxed subject to meeting all of the performance criteria
Residential density	R160
Front setback	0 m min for street wall, 4.5 m min above street wall (except truncations)
Commercial component	Minimum commercial floor space equivalent to 1 x site area with bonus for additional
No residential on ground floor	Mandatory

Table 2 Development Controls for the South Perth Station Precinct

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Attribute	Description
Privacy and shading	Defined in detailed Development Controls
On-site parking	 Minimum of 1 bay per unit on site for residential dwellings Minimum of 1 bay per 50 m² on site for commercial floor space
Environmental	5 Star
Vehicle crossovers	1 per lot per street

It was considered important that the design of the South Perth train station should incorporate views of the river and have a strong pedestrian linkage with the Perth Zoo and Mends Street. Concerns were expressed regarding:

- Bus access to the station and how the train services will affect traffic, parking and the ferry service.
- The safety for pedestrians when crossing roads to access the station.

2.3 Transport Planning

Several transport planning studies relevant to the South Perth Station Precinct conducted for the State Government and the City of South Perth are summarised in this section.

2.3.1 South Perth Integrated Transport Plan, 2006

The City of South Perth prepared an Integrated Transport Plan in 2006 that considered the roles for the road network, public transport, land use planning, pedestrians and cyclists. The key relevant elements from this plan are summarised as follows:

Road Network

The City generally has a well-connected arterial road system with high capacity links between major nodes for business, freight and private travel. The road network plays an important role in supporting the effectiveness of an integrated network via:

- Good quality access to the arterial road network that minimises delay to buses.
- Access to appropriately located commuter park and ride facilities.

The Plan endorsed the existing functional road hierarchy and recommended that future planning align with that hierarchy. Strategies also seek to prevent the filtering of undesirable traffic through residential precincts and the control of traffic by appropriate management measures and initiatives.

Public Transport

The bus network within the City provides a commuter link to the Perth CBD and the Fremantle CBD and at the same time serves the City of South Perth in meeting the needs of local residents. Opportunities exist to better integrate the differing arms of public transport, access key regional shopping centres, universities and major activity centres within and adjacent to the City of South Perth.

The Plan



identifies the need for two types of bus route:

- Local feeder services servicing local activity centres, shopping centres, schools and universities.
- Cross suburban services to connect to adjacent communities, the Perth CBD and the more regional public transport services operating out of the Perth CBD.

Ferries

Limited use is currently made of the ferry system and the Plan recommends that a greater use of the existing route through better coordination of the existing ferry and bus services and the possible extension of the ferry service to other routes such as Canning Bridge, Applecross and Shelley be explored.

Rail

At the time of the report the City was not serviced by rail however the southern railway was planned to include stations at Canning Bridge in the immediate future and Richardson Park at a later date.

Land use Planning

The Strategies are based on recognition that land use planning is integral in developing a coordinated and integrated approach to transport planning. Strategies recommend that reviews of planning policies and schemes consider the impact on the transport network as a whole and the stated objectives of the Integrated Transport Plan.

Pedestrians

Whilst the City of South Perth does not have a formal pedestrian plan, it has created and developed a number of pedestrian oriented precincts such as Mends Street, Preston Street and Angelo Street.

Pedestrians are generally well catered for by the provision of footpaths on most streets; however, there is a lack of formal crossing facilities on most distributor roads which requires further consideration.

Cyclists

Currently the City of South Perth has a Bicycle Plan which is steadily being implemented through the introduction of shared paths, dedicated on road bicycle lanes and traffic calming streets to reduce vehicle operating speeds.

Key Initiatives

Some of the key initiatives proposed in the Integrated Transport Plan directly relevant to the South Perth Station Precinct are:

- Develop appropriate traffic management strategies, including physical intervention, enforcement and education to regulate residential street traffic speeds.
- Inappropriate management of commuter parking and failure to provide long term parking for South Perth commuters to the Perth CBD, such as at Mends Street for ferry commuters, may discourage the use of public transport.
- Lack of information such as direction signing specifically for pedestrians and cyclists to major destinations may reduce the ability for some users to negotiate the local network. Provide adequate signage on major cycle and walking routes.



- Examine design guidelines, in order to ensure that future traffic management proposals are appropriately cycle-friendly.
- Significant traffic generators such as the Mends Street precinct have the potential to increase traffic flows. Associated with this is a potential increase in parking and public transport demands.
- Consider the principles of the Transit Oriented Development when designing future developments in the vicinity of the Canning Bridge and Richardson Park.

2.3.2 South Perth Bike Plan 2011 - 2016

The City of South Perth prepared the South Perth Bike Plan in 2010 with a vision for the South Perth Bicycle network from 2011 to 2016 and provided specific measures to improve the bicycle network. The Plan recommended the consolidation of existing routes to be more effective, rather than creating new routes. The key cycling routes within the South Perth Station Precinct are shown in Figure 6.





Figure 6 Key Cycling Routes within the South Perth Station Precinct

Source: Perth - Fremantle Bicycle map, WA Department of Transport, 2011

The bicycle routes to be considered for upgrading over the five-year time frame that are relevant to this South Perth Station Precinct are shown in listed as follows:

- Labouchere Road, Angelo Street to Mill Point Road, Traffic Study and Design of Bicycle Provision. To undertake a traffic study for Labouchere Road to determine potential for bicycle lanes or suitable cycling provisions and to continue route SE31 north to connect Perth Zoo to the Mends Street precinct.
- Mill Point Road, Harper Terrace to Coode Street, Traffic Study and Design of Bicycle Provision.
 Undertake a traffic study for Mill Point Road to determine impact of Riverside Drive closing, and



design bicycle lanes or suitable cycling provision on Mill Point Road to divert commuter (high speed cyclist) from Sir James Mitchell Park.

- Overpass near Richardson Park, Signage. Direct cyclists from the PSP to SE28 route by means of pavement marking. Install holding line at the PSP approach.
- Overpass connections to Melville Parade, Fillet. Provide fillet to path intersection with Melville Parade.
- Richardson Park, Improvement Works. Rebuild path connection from Melville Parade into Richardson Park. Modify signage from SE31 to SE28 to signify change of route. Improve connections to Perth Zoo
- Amherst Street, Green Edge Lines. Install green edge lines on concrete path through zoo car entrance and exit.
- Amherst Street/Labouchere Road, Kerb Ramps, Median Refuge and Signage. Provide a crossing of Amherst Street from Labouchere Road. Install two kerb ramps and a median refuge. Install directional signage, SE28 (Angelo and Amherst Streets), SE31 (Labouchere Road).

2.3.3 South Perth Station and Peninsula Area Parking Study, 2008

Uloth and Associates conducted the South Perth Station and Peninsula Area Parking Study in 2008 for the City of South Perth to assess the car parking demand and capacity for car parking in this north-west area of the City of South Perth. The study area included three precincts, namely the Peninsula Precinct north of Mill Point Road, the Commercial Precinct east of Labouchere Road including the Mends Street sub-precinct and the Business Precinct west of Labouchere Road including the Richardson Reserve.

The overall supply of public car parking surveyed in the study is provided in Table 3.

Precinct	On-street Parking	Off-street Parking	Total Car Park Spaces	
Peninsula (north of Mill Point Road and Harper Terrace)	373	85	458	
Business (west of Labouchere Road)	397	298	695	
Commercial (east of Labouchere Road)	286	680	966	
Total	1,056	1,063	2,119	

Table 3 Public Car Parking Supply in the South Perth Station and Peninsula Area

Source: Uloth & Associates, 2008

Specific recommendations in the study regarding the overall parking strategy that are relevant to the South Perth Station Precinct for the short and long term are provided as follows:



Short Term

- The number of 2-hour parking spaces within the Business Precinct should be reduced to 52 spaces, within Bowman Street, Lyall Street, Hardy Street and Charles Street, as indicated in Figure 7, with all remaining spaces unrestricted.
- No ticket parking should be implemented within the Business Precinct (including Richardson Reserve car park) in the short term.
- The existing parking restrictions within the Mends Street Sub-Precinct should be better enforced (possibly through the introduction of ticket parking).
- Allow some all-day ticket parking within Parking Station No.11 on weekdays, as shown in Figure 7.
- Perth Zoo should enforce the 'Zoo Only' parking at its Mill Point Road car park.
- A residential permit system should be introduced for Parker Street.

Long Term

- When the South Perth Train Station is built, the unrestricted on-street parking within the Business Precinct should be converted to 4-hour ticket parking (except for the southern side of Richardson Street), as shown in Figure 8.
- A permit parking system should be introduced to allow local residents and employees to park all-day within these 4-hour spaces, with permit availability.
- It is recommended that the southern side of Richardson Street and the northern part of the Richardson Reserve car park should provide all-day ticket parking at a rate of 80 cents per hour, as indicated in Figure 8.
- It is recommended that the southern part of Richardson Reserve car park should provide ticket parking for up to a maximum of 6 hours, at a flat rate of \$1. It would be necessary to implement independent ticket machines for the separate parking areas at Richardson Reserve, with clear signage to delineate which ticket machine relates to each area.
- Parking in Amherst Street and the Sports Club car park should remain free and unrestricted.
 However, this should be monitored and a 6-hour restriction should be implemented if necessary.
- A 6-hour time limit should be introduced at the Windsor Park car park in the long term, as shown in Figure 8 in order to prevent all-day parking by commuters.





Figure 7 Recommended Short Term Parking Strategy from the 2009 Parking Study

Source: Uloth & Associates, 2009





Figure 8 Additional Long Term Parking Strategy from the 2009 Parking Study

Source: Uloth & Associates, 2009

2.3.4 Draft Public Transport Plan for Perth in 2031, 2011

In June 2011, the State Government released the draft Public Transport Plan for 2031 for public consultation and comment. It is a strategic long term visionary plan for draft and public comment. The plan identifies a major expansion of the passenger rail network and many opportunities for new and upgraded stations, including a bus-rail interchange at Canning Bridge. However, the plan does not have a commitment for the South Perth Station Precinct or a train station at South Perth with higher density mixed use development in this precinct. The train station could be considered a destination only special events station to service the Perth Zoo and other major events on the South Perth foreshore on weekends and during holiday periods.

2.3.5 Town Planning Scheme (TPS) No 25 - Current Status September 2015 (****)

The City of South Perth has provided the following information in relation to TPS No 25 and development within the precinct.



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2003	Town Planning Scheme 6 Gazette				
2005	Government Commitment to build Railway Station				
2006 - 2007	Community Engagement Report				
2007 – 2010	Studies and Pre-consultation > Precinct Plan				
2010 – 2012	Scheme Amendment Process				
2013	Scheme Amendment No. 25 Gazetted: 18 January 2013				





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Figure 11 **Special Design Area**



Figure 12 Summary of Developments

	Name & Type of Development	Street Address	Building Size: Plot Ratio Area (sqm) appx,	# Residential Units	Status	# Above ground storeys + basement levels
1	Charles Street Development Office Development	12-16 Charles Street	13,800	N/A	DAP Approval August 2013	9+0
2	Melville/Richardson Street Mixed Development	1-3 Richardson Street	17,000	70	DAP Approval November 2013	13+0
3	Mill Point Road/Harper Terrace Mixed Development	98 Mill Point Road	2,504	14	DAP Approval August 2014	6+0
4	Pinnacle South Perth Mixed Development	30-34 Charles Street	6,800	102	DAP Approval August 2014	20+0

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-	Name & Type of Development	Street Address	Building Size: Plot Ratio Area (sqm) appx.	# Residential Units	Status	# Above ground storeys + basement levels
5	Civic Triangle/Civic Heart Mixed Development	1 Mends Street	36,500	294	DAP Approval May 2015	38+5
6	Mixed Development	96 Mill Point Road	33,000	118	DAP Approval November 2014	21+4
7	Mixed Development	14, 16,18 Hardy Street	5,600	39	DAP Approval December 2014	8+1
8	Mixed Development	31 Labouchere Road and 24 <u>Lyall</u> Street	37,400	148	DAP Approval February 2015	39+5
9	Mixed Development	3/74-7/74 Mill Point Road	11,400	97	To be determined by DAP in February 2015	29+2
	TOTAL			883		

2.3.6 South Perth Foreshore – Strategy and Management Plan May 2015 (****)

In May 2015 the City of South Perth prepared the South Perth Foreshore Strategy and Management Plan. The document is to guide future activities and development along the South Perth Foreshore.

The document acknowledges as key factors the physical and visual connection to the foreshore, particularly the Mends Street precinct and the Perth Zoo; and public transport including ferry connections and the future train station near Richardson Park and the Kwinana Freeway.

In relation to Mends Street the Strategy states:

"Development the Mends Street Node as: An active piazza and promenade, an arrival place with day/night activities. A gateway for the Mends Street Precinct with connecting stories and interpretation of heritage, zoo and the river. An integrated transport node utilising the river to connect with the Mends Street precinct and surrounding areas"



3. Stakeholder Consultation (****)

Key government stakeholders were consulted with in-person meetings to obtain data, reports and information for the traffic modelling, the transport assessment and the development of the transport and access strategy. These meetings were also used to discuss the issues and opportunities in the South Perth Station Precinct relevant to transport and access. The views and policy positions of the various agencies are documented in this section.

3.1 City of South Perth 28 August 2015 (****)

A meeting was held with the City of South Perth on 28 August 2015 to confirm the scope of the Transport and Access Strategy update. It was confirmed that the land use and road network will have changed from the earlier report due to the TPS 25 amendment and the deviation of Riverside Drive due to Elizabeth Quay. A two stage approach was agreed, Stage 1(the subject of this report) to update the traffic data and test the recommended modifications to the network and Stage 2 (future work) to possibly develop a SATURN model.

3.2 State Government (****)

Previous comments received from key government stakeholders have been updated following communication in September/October 2015 and a stakeholder meeting on 7 October 2015. This section summarises their comments and views.

3.2.1 Main Roads Western Australia

The following comments were provided by Main Roads WA (MRWA) staff (David Van den Dries):

- Main Roads question if the traffic modelling will consider the future railway train station at South Perth? This will influence the traffic modelling outputs. ROM24 now considers public transport.
- In 2011, the land use densities were only considering maximum 10 storeys development. Now Main Roads are in receipt of applications which are significantly larger. This will have considerable implications on the road network. The major entry to the freeway north is exceeding capacity. Others routes to the south connecting Canning Highway are also experiencing significant delays/congestion. This will be a significant issue to address. (The City of South Perth acknowledge this will occur at limited times during the morning peak hour)
- Main Roads suggest a much broader study to consider the wider impacts of access.

3.2.2 Public Transport Authority (****)

PTA was asked to review their earlier response and has been updated as follows (Gary Merritt):

Little benefit would result in re-routing any bus services to a proposed South Perth train station when passengers on the existing bus services will incur longer travel times to Perth CBD with a bus transfer. All bus routes through South Perth will continue through to Perth CBD and would not terminate at South Perth. Passengers would not likely transfer from bus to rail on trains to Perth that will be already heavily patronised with few additional seats and would not provide a faster trip to



Perth. For the few passengers who do want to transfer to a train to travel to destinations other than Perth CBD, they can easily walk from Labouchere Road to the station.

- Passengers within walking distance of the station will have an option to use either the bus or train to Perth CBD and this could potentially free up space on the current bus services.
- Where buses are delayed by traffic, such as at Mill Point Road/Labouchere Road, bus priority measures with bus lanes and queue jumps at intersections should be considered.
- Some bus routes may have increased service frequencies in the future and this could make the bus services more attractive to use than the train services for short trips to Perth CBD.
- No seats will be available on the train at South Perth travelling into Perth in the AM peak hour.
- Patronage has significantly increased since the ferry from the Mends Street jetty has moved into Elizabeth Quay, however commuter peak period weekday patronage is still relatively low with the busy times on the ferry being the middle of the day and on weekends.
- PTA is not opposed to a new ferry but does not believe it will make a significant difference to traffic movements. A well-researched justification is required for any proposal to introduce a new ferry from the South Perth Station location.
- PTA advised that the cost of a station at South Perth is likely to be in the order of \$30-\$50M and the cost is unlikely to be justified by demand.

Further to the initial stakeholder meeting the following comments were received from PTA.

Public Transport Service Plans (****)

- The South Perth Station Precinct is currently well served by bus routes 30, 31 and 34 and the crossriver ferry at the Mends Street jetty.
- No changes to the route or services are planned for Routes 30 and 31.
- In 2011, Route 34 was reviewed and was removed from Mill Point Road north of Freeway Access Road. This section of the route was replaced by a new separate route operating between the Old Mill on the Peninsula and the Esplanade Busport in Perth CBD. The new route operates from Monday to Sunday.

Transperth does not model bus patronage, but based on current estimates have suggested that by 2031, all bus routes 30, 31 and 34 would each be operating on 5-10 minute headways in the peak period. The patronage demand on Route 34 is not strong. There is a possibility of shorts on Labouchere Road to provide better than a 5-minute service which is currently available. The service frequency would be unlikely to change if a train were to stop at South Perth as most of the routes will be operating outside the study area.

Integrated Ferry/Zoo Ticket

Transperth considers an integrated zoo and public transport (bus, train or ferry) ticket is worth considering to promote the use of public transport to the zoo and to relieve the need for car parking at the zoo. However, it may not significantly generate more public transport usage to the zoo based on observations at Taronga Zoo in Sydney. It may only shift the location for the purchasing of the zoo tickets to the public transport operator.



Location of the South Perth Train Station and Bus Integration

The location of the train station at South Perth should ideally be as close as possible and preferably within sightlines of Labouchere Road and the Perth Zoo.

If a South Perth train station was built, the local bus network would not be modified to service the station. South Perth station would essentially be a local walk on station as there is no benefit and possibly a time penalty for bus passengers if the bus route deviating into the station. However, the station must have at least two bus stops for the train replacement services during the shutdown of railway line for maintenance periods. Buses would need to stop as close to the station entrance as possible and the entry/exit roads to/from the station would need to be designed to accommodate bus movements.

Options for Ferry Services to/from Crawley

Options for direct ferry services from South Perth to the UWA campus at Crawley were discussed at the stakeholder workshop. Transperth staff noted that the patronage demand for a direct ferry service may not warrant the service. Furthermore, the location of the ferry terminal along the South Perth foreshore west of the South Perth station will not be possible due to constraints for navigation and environmental restrictions in the Swan River.

3.2.3 Department of Transport

A meeting was held with Craig Wooldridge the Department of Transport (DoT) on Thursday 19 May 2011. The following comments were provided regarding the future public transport train and bus services. A summary of subsequent stakeholder discussion held on 7 October 2015 is documented in Section 3.2.6.

- It was suggested that only every second train on the Perth to Mandurah railway line would stop at South Perth due to the lower patronage demand compared with the other stations. If the trains from Cockburn Central stop at South Perth, it would still provide a 15-minute peak frequency in both directions. This would not delay the passengers who are on the trains to Kwinana, Rockingham and Mandurah who have a longer train journey.
- If the South Perth train station was built, it may affect the patronage on the existing South Perth ferry services.
- There are limited bus services along Labouchere Road. There have been previous attempts to get 24-hour bus lanes on Labouchere Road and any increase in bus frequencies / routes here will require bus lanes on Labouchere Road due to current traffic congestion.
- The demand for people to travel on that route will need to be demonstrated.

Options for Ferry Services to/from Crawley

The following comments were provided regarding the options for a ferry service to the University of Western Australia (UWA) campus at Crawley from a proposed ferry terminal located immediately west of the Kwinana Freeway near the proposed South Perth train station.

- The Ferry terminal on the Kwinana Freeway side is very exposed in windy and inclement weather. This needs to be explored in more detail.
- A further link for the ferry service to the Canning Bridge rail station and/or the Raffles Hotel (area currently subject to a planning study for a significant increase in density) should be explored.



- Travel time from train to UWA by ferry is likely to be longer than train/bus including transfer times. Bus services currently operate to UWA from the Esplanade Busport in Perth CBD every five minutes in the peak period during university terms. The demand for a direct ferry route to Crawley needs to be assessed to determine the viability of the service.
- If a ferry was to operate from South Perth train station area to Crawley, it would be preferable to coordinate the timing of the train and ferry services. Trains could be stopping at South Perth station every five minutes in the peak period.
- A ferry terminal at South Perth station needs to accommodate all waiting passengers without any impact on the Principal Shared Path along the Kwinana Freeway or the Milyu Nature Reserve in the Swan River.

3.2.4 Department of Transport – Bikewest (****)

Daniel Storey from Bikewest provided the following comments regarding the bicycle network in the South Perth Station Precinct study area:

A number of Perth Bicycle Network (PBN) routes exist in the vicinity of the South Perth Station Precinct:

- The most important is the Principal Shared Path (PSP) along the Kwinana Freeway. This path is currently at capacity and cannot take additional pedestrians generated from the precinct development. Additional path network capacity should be constructed as part of the proposed development.
- Labouchere Road is an important north-south PBN route (SE31). At present the route does not run north of Angelo Street on Labouchere Road but this should be continued to the Perth Zoo, and then to Mill Point Road. Some modifications to the road in this location are to be undertaken but provision for cyclists on that section is important.
- Richardson Park. At present the SE31 route deviates from Labouchere Road through Richardson Park and to the PSP using the freeway pedestrian/cyclist overpass. It is proposed to change this section to SE28 that runs east-west on Angelo Street, and continue SE31 north-south as mentioned in point 2 above. An east-west link for cyclists needs to be included in the proposed network, to connect riders from the station, and the PSP to Angelo Street through to Coode Street and towards Douglas Street. This captures a number of commuter riders in the South Perth suburb to the PSP that can take them to the city.
- The South Perth Esplanade forms a Recreational Bicycle Route, and although some riders use the shared path on the river side, many use the road itself. There are concerns at the intersection with Mends Street and some treatments need to be investigated to give east-west cycling a priority through the Mends Street precinct. Investigations into one-way road treatments or narrower roads (reduction of on-road parking in this location) should be considered.
- Mends Street may not be the best link for cyclists to access the South Perth Esplanade, but instead Harper Terrace may be a safer route to avoid the traffic and pedestrian activity in Mends Street.
- Mill Point Road also needs to be looked at as a potential east-west route for cyclists in the long term. Commuter cyclists currently pose issues through Sir James Mitchell Park with their speed in a pedestrian and recreational environment. Diverting high speed riders onto suitable on-road alternative facilities is the recommendation in the latest South Perth Bike Plan.



End of trip facilities are essential considerations, not only to new residential and commercial developments, but to all destinations, including recreational areas and cafe precincts. The amount of parking spaces should take into consideration the quantities specified in Austroads and the City's Town Planning Scheme. Any recommendation for the provision of end of trip facilities should reflect the goals of the Government to increase cycling and walking activity and reduce car dependency in this precinct, for a more effective transport system.

The following additional comments were received from Daniel Storey, Project Leader Local Bicycle Routes Review, Integrated Transport Planning, Department of Transport in October 2015:

- DoT would like the capacity of the PSP to be considered and whether local trips to the development can be made on the eastern side of the freeway through new or existing infrastructure rather than having to utilise the PSP which will be a high speed commuter route.
- Adequate connections to the PSP are essential to this development.
- The developer should be providing infrastructure for cycling on the basis of it being a train station in the future, and to ensure the surrounding area is well connected for pedestrians and cyclists.
- Consider the use of bicycle boulevards on quiet roads, and protected bike lanes on busier roads as best practice cycling infrastructure. Shared paths compliment the road network but are not considered adequate on their own.
- End of Trip facilities for the development need to be adequate. Appropriate mode share targets for local trips should be 10% plus.

3.2.5 Stakeholder Meeting on 7 October 2015 (****)

A meeting was held with City of South Perth, DoT, Main Roads, PTA and Transperth to discuss current issues and requirements.

- The City confirmed that the planning scheme is being reviewed and the initial work for this project is to focus on the study area and earlier report only.
- Main Roads advised that traffic signals along Canning Highway will be rationalised to favour major road traffic which will impact access from the side roads.
- Transperth confirmed that additional ferry services are not supported until residential density and demand supports justification. Costs associated with increased ferry services are significant.
- The City advised significant new development has been approved. A new Parking Strategy is being developed. Through traffic will be impacted by new development and alternative routes /behaviour will need to be established.
- The City sought advice from Main Roads on options available to optimise traffic signals on Mill Point Road. Ideas for upgrade of traffic signals to support growth and development over the next 3-5 years are required.
- Transperth emphasised the need to allow free flow for buses at peak times to maximise benefit of adding additional buses.
- The City advised that the Civic Heart development will occur over the next two years, deliveries and construction traffic to be managed.



- Transperth noted that there will be an increase in the use of bus stops as part of the current and planned development. It is important to advise Transperth of any construction impacts to current stops.
- PTA advised that the Government position on the construction of the South Perth Station has not changed from the earlier report. The State Government acknowledge future planning for a Station at South Perth however currently have no plans or budget in place for its construction. The City is lobbying for the Station in the longer term however in the short term additional buses, ferry and bus priorities are supported.
- Transperth advised that the existing ferry service is not well used and additional services cannot be justified. Improvement to bus services is more likely to include peak hour short running along Labouchere Road. No measures are budgeted at this stage.
- Main Roads advised that the current bus lane on Kwinana Freeway between Judd Street and Perth will be lost due to plans to use the emergency lane as a traffic lane. Clearly this will impact bus travel time to the City.
- A potential queue jump facility in Labouchere Road at the intersection with Mill Point Road was discussed and the ability for a bus to enter it behind the queue. Queue lengths will need to be checked.
- The City and Transperth will liaise further to address the transport of construction workforce to the construction sites.

3.2.6 Swan River Trust

A meeting was held with the Swan River Trust (Paul Stephens) on Friday 20 May 2011 (a subsequent meeting has not been undertaken). The following issues and comments were provided:

- The marine estuary park next to the station area and the freeway is a Class A environmentally protected area. The Swan River Trust (SWT) and the Department of Environment and Conservation (DEC) will not likely support such a ferry terminal or ferry operations.
- Due to the shallow river depth in the area, significant dredging will be required through the protected area. This will add significantly to the cost of the ferry operations and the construction of a ferry terminal at South Perth near the proposed train station.
- Any ferry operations would be severely restricted with the shallow water and navigational problems. The ferry route would have to deviate around the marine estuary park and the water ski area near the Narrows.
- The speed of any low-wash ferry would be limited to 8 knots or less and therefore a ferry service to the UWA campus would be very slow. It would make the ferry services too slow and unattractive for commuters and students.
- A connection to the foreshore and possible ferry terminal to the west of the proposed train station would significantly add to the train station cost with another pedestrian overpass and lift tower on the foreshore side of the freeway.



The Swan River Trust does not want to encourage more people activity along the protected foreshore. Cyclists and pedestrians via the existing footbridge are enough traffic along the foreshore. No more development or activity is to be encouraged west of the freeway.

3.2.7 Perth Zoo

Claire Wright of the Perth Zoo was consulted on 16 May 2011 (a subsequent meeting has not been undertaken) regarding the South Perth Station Precinct and the future plans for the Perth Zoo. Claire provided the following comments:

- Access for motorists from the Kwinana Freeway travelling to the Zoo via the Freeway Access Road exit is not clear.
- The ticket parking spaces in Richardson Street are a deterrent to Zoo patrons.
- The Perth Zoo supports the idea for a train station at South Perth.
- The Pedestrian Actuated Crossing south of Hardy Street across Labouchere Road to the zoo entrance works well for pedestrians crossing to the Zoo and to Windsor Park.
- A site inspection confirms the existing Zoo logo and signage at the Mends Street ferry terminal is clear for visitors to walk from the ferry terminal to the zoo. It could however be enhanced by one additional sign at the entrance to Windsor Park from Mill Point Road



4. Existing Transport Conditions

The existing transport network and services to and within the South Perth Precinct study area are described in the following sections. The information has been summarised under the topics for the road network, car parking, public transport and pedestrian and cyclist movements.

4.1 Road Network

The existing road network within the South Perth Station Precinct study area is shown in Figure 13.





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Source: Google map modified by GHD

Signalised intersections exist at the following locations:

- Labouchere Road/Mill Point Road where the Kwinana Freeway traffic enters and exits the Precinct.
- Mends Street/Mill Point Road which provides an important access to the shopping village and provides a safe crossing point for pedestrians between the ferry terminal and the Perth Zoo.
- A pedestrian actuated crossing exists on Labouchere Road between Charles Street and Hardy Street opposite the entrance to the Perth Zoo.

4.1.1 Road Hierarchy

The Road Hierarchy as defined by Main Roads WA consist of six types roads as shown in Table 4.

Road Type	Description
Primary Distributor	Provide for major regional and inter-regional traffic movement and carry large volumes of generally fast moving traffic. Some are strategic freight routes and all are State Roads.
Regional Distributor	Roads that are not Primary Distributors, but which link significant destinations and designed for efficient movement of people and goods within and beyond regional areas. They are managed by local governments.
District Distributor A	Carry traffic between industrial, commercial and residential areas and generally connect to Primary Distributors. These are likely to be truck routes and provide only limited access to adjoining property.
District Distributor B	Perform a similar function to type A District Distributors, but with reduced capacity due to flow restrictions caused by frequent property accesses and roadside parking in many instances. These are often older roads with a traffic demand in excess of that originally intended.
Local Distributor	Local Distributor roads are managed by local government. Their role is similar in both built up areas and rural areas, but traffic volumes and thus traffic management requirements differ significantly
Access Road	Provide access to abutting properties with safety aspects having priority over the vehicle movement function. In urban areas, these roads are bicycle and pedestrian friendly, with aesthetics and amenity also important. Access Roads are managed by local government.

Table 4 WA Road Hierarchy Classification System

Source: Main Roads Western Australia, 2010

The classifications of road types within the South Perth precinct were obtained from the Main Roads WA Road information mapping system. The road hierarchy for the South Perth Station Precinct using this classification system is shown in Figure 14. Only a few road types from the hierarchy are represented in



the area. Labouchere Road and Mill Point Road are both classified as District Distributor B type roads. The continuation of Mill Point Road (north of Labouchere) and Angelo Street are both classified as Local Distributor type roads. The Kwinana Freeway is the only Primary Distributor in the study area and it generates the highest volumes of traffic from the Freeway Access Road interchange. All other streets are classified as Access Roads.





Source: Google map modified by GHD

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As shown in Figure 15, Labouchere Road and Mill Point Road both have two lanes in each direction and carry traffic between different residential, commercial and industrial regions. There are frequent property access points along these two roads which may impede traffic flow. Mends Street is currently used for parking, cyclists and vehicles, as shown in Figure 16.

Access for all vehicles into Mends Street is important to support the local businesses and to provide visual surveillance in the evenings when the footpath is quieter for a safe pedestrian environment.

Figure 15 Distributor B Roads in the South Perth Station Precinct





Labouchere Road with on-street parking near the Perth Zoo

Mill Point Road west of Mends Street



Figure 16 Mends Street in the South Perth Station Precinct

Mends Street looking south at Mill Point Road

Mends Street at the South Perth Esplanade

4.1.2 Traffic Volumes (****)

Peak hour intersection surveys were undertaken in October 2015. Traffic volumes were obtained from the City of South Perth at numerous locations within the study area. These traffic counts on the Council-controlled roads were collected in February 2016 by the City of South Perth. The traffic volumes on the



on and off-ramps to the Kwinana Freeway at Mill Point Road west of Labouchere Road are based on the latest counts from the Main Roads WA Web Site from 2014/15. The Average Weekday Traffic (AWT) volumes are summarised to the nearest 100 vehicles and are shown in Figure 17. As expected, the highest traffic volumes are generated along Mill Point Road and Labouchere Road (District Distributor B type roads). Traffic volumes for other access roads, such as Melville Parade and Richardson Street, were significantly lower.





Source: Google map modified by GHD. Traffic counts are from 2016 from City of South Perth and Main Roads WA

In late January 2014, a 300 metre section of Riverside Drive was permanently closed in order to facilitate the construction of Elizabeth Quay. Traffic previously using this route has now been diverted around the



construction site via Barrack Street, The Esplanade and William Street. The volume change on Mill Point Road would not appear to have changed significantly however is not consistent and cannot be directly attributed to the closure. The following table indicates changes to traffic flow on Mill Point Road based on the limited data available.

Road	Location	Riverside Drive Closure	Date of Survey	Average weekday (vpd)	
Mill Point Road	East of Onslow Road	Before	26/2/2013	22,069	
Mill Point East of Road Onslow Road		After	1/5/2014	23,381	
Mill Point Road	East of Onslow Road	After	27/5/2015	22,729	

A midblock capacity analysis was undertaken for all roads (other than access roads) where traffic volume data was available. Typical mid-block capacities for urban roads with interrupted flow have been sourced from *Austroads Guide to Traffic Engineering Practice Part 2: Roadway Capacity*.

Based on the existing traffic volumes, all roads had sufficient mid-block capacity and this is shown for the roads in study area as shown in Table 5.

Table 5	Capacity	Analysis	for Existing	Traffic Volumes	(2015) (****)
	Suparity	Analysis	IOI EXISTING		(2010) (

Road	Lane Direction/ Type	One-way Mid- block capacity (veh/h)	Peak Volume (veh/h)	Existing Capacity Utilisation (%)	
Labouchara Road	Northbound	1,900vph	1,330vph	70%	
	Southbound	1,900vph	741vph	39%	
Mill Doint Dood	North Bound	1,900vph	939vph	49%	
	South Bound	1,900vph	1,044vph	55%	
Manda Street	Northbound	600vph	119vph	20%	
wenus Street	Southbound	600vph	128vph	21%	

4.1.3 Crash History January 2010 to December 2014 (****)

Crash history data, for the past five years (2010-2014), was obtained from Main Roads WA Crash Analysis Reporting System (CARS) at the key intersections along Labouchere Road, Mill Point Road and Mends Street within the study area. A summary is shown in Figure 18. The statistics are colour-coded to indicate the level of crash risk.



Angelo Street/Labouchere Road Intersection

There have been 23 reported crashes, 2 hospital, 1 medical, 19 PDO major and 1 PDO minor. Predominant crash patterns include right angle and rear end collisions. Right angle collisions are significantly over represented compared with the network average.



Richardson Street/Labouchere Road

There have been 5 reported crashes, 1 medical, 3 PDO major and 1 PDO minor. Crash patterns include right turn rear end collisions in Labouchere Road and right turn through collisions in Labouchere Road.



Charles Street/Labouchere Road

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There have been 3 reported crashes, 2 PDO major and 1 PDO minor. Crash patterns include right turn right turn through collisions in Labouchere Road and a right angle collision involving a right turning vehicle from Charles Street colliding with a south bound vehicle on Labouchere Road.



Hardy Street/Labouchere Road

There have been 2 reported crashes, 2 PDO major. The movements involved a U turn and a right turn side swipe.

Lyall Street/Labouchere Road

There have been 3 reported crashes, 3 PDO minor. The movements involved a U turn and two "other".

Bowman Road/Labouchere Road

There have been 4 reported crashes, 2 PDO major, 2 PDO minor. Crash patterns include a rear end collision northbound on Labouchere Road and a right angle collision involving a right turning vehicle from Bowman Street colliding with a north bound vehicle on Labouchere Road.





Mends Street/Labouchere Road

There have been 11 reported crashes, 3 hospital, 3 medical, 3 PDO major and 2 PDO minor. Predominant crash patterns include right turn through collisions. Rear end collisions are over represented and right turn through collisions are significantly over represented compared with the network average.



Mill Point Road/Labouchere Road

There have been 41 reported crashes, 7 medical, 24 PDO major and 10 PDO minor. Predominant crash patterns include rear end collisions. Rear end collisions and right turn through collisions are significantly over represented and collisions occurring at night with the street lights on are over represented compared with the network average.

(The collision diagram from CARS is not included as it is not representative of the geometry)

Mends Street/Mill Point Road

There have been 23 reported crashes, 2 medical, 9 PDO major and 12 PDO minor. Predominant crash patterns include rear end collisions on Mill Point Road. Rear end collisions and collisions occurring during dark with street lights on are over represented compared with the network average.





Mends Street/Esplanade

There have been 13 reported crashes, 3 medical, 3 PDO major and 7 PDO minor. Crash patterns include traffic turning right from Mends Street colliding with westbound and left turning traffic on South Perth Esplanade. Three collisions involved cyclists. Right angle collisions are significantly over represented compared with the network average.



Summary

The signalised intersection of Mill Point Road/Labouchere Road had the highest number of recorded crashes at 41 with seven casualties. The majority of these crashes (21) were rear end collisions. The likely cause of this high number of rear end collisions is high traffic volume during peak hours on Mill Point Road and the high proportion of right turning vehicles at the intersection. These factors increase the likelihood of the rear end collisions due to increase conflict with slowing or stationary vehicles.



The location with the second highest crash risk is at Mill Point Road/Mends Street with 23 crashes and 0 casualties. Both of the signalised intersections with high traffic volumes in Mill Point Road had the highest crash risk.

Labouchere Road/Angelo Street intersection had 23 reported crashes and 2 casualties, a high proportion (18) of right angle crashes occurred. This is particularly concerning given that right angled crash types have a high ratio of casualty to total crashes relative to other types of crash types.

The Labouchere Road/Richardson Street intersection had a total of five recorded crashes and one casualty.

Labouchere Road/Mends Street intersection also had a high number of crashes with 11 in total including three casualties.





Figure 18 Summary of Crash Statistics (2010-2014) (****)

Source: Google map modified by GHD

4.2 Car Parking

Existing car parking within the South Perth region is a combination of on-street and off-street parking as shown in Figure 19. There are three broadly defined parking zones within the study area where there are different car parking requirements as listed below:

- Zone 1: Residential;
- Zone 2: Perth Zoo; and



• Zone 3: Mends Street commercial.

Figure 19 Existing Car Parking within the South Perth Station Precinct



Source: Google map modified by GHD

The approximate number of on-street and off-street car parks for each of these zones is shown in Figure 20. The majority of car parking in the residential zone is on-street parallel along both sides of Bowman Street, Lyall Street, Hardy Street, Charles Street, Richardson Street and Melville Parade.

On-street parking along Richardson Street is shown in Figure 21. These parking areas are a combination of 2 hour restricted and unrestricted. An off-street car park exists adjacent to Labouchere Road which provides parking for visitors to Richardson Park.



On-street parking exists within the Perth Zoo parking zone along Mends Street between Labouchere Road and Mill Point Road and it is restricted to 1 hour and 2 hour limits. Some on street ticket parking exists along Labouchere Road south of Richardson Road. Two off-street ticket car parking areas exist adjacent to Windsor Park and Perth Zoo as shown in Figure 22. These parking spaces are provided for zoo visitors.

A total of 430 off-street parking spaces are provided for the patrons of the businesses in the Mends Street commercial zone with access via Mends Street and Darley Street/Ray Street. Time-restricted onstreet parking exists along Harper Terrace, Mends Street, Parker Street, Darley Street and South Perth Esplanade. Time restricted parking also exists along Mends Street as shown in Figure 21.



Figure 20 Approximate Number of Existing Car Parks in the South Perth Station Precinct







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Parking in the residential area along Richardson Street west of Labouchere Road

Short term car parking in the commercial precinct in Mends Street



Figure 22 Off-Street Car Parking in the South Perth Station Precinct

Windsor Park parking area adjacent to the Perth Zoo entrance with access from Labouchere Road

Perth Zoo parking area with access from Mill Point Road

4.3 Public Transport

The closest train station to the precinct is located at Canning Bridge which is approximately 4 km south of the South Perth Precinct. Therefore, access to the train stations on the Perth to Mandurah railway line are not within a walkable catchment area for the South Perth precinct study area.

The existing public transport services for the South Perth area are operated under contract for Transperth and they consist of bus and ferry services that are described in the following sections.

4.3.1 Bus Network (****)

The existing bus routes and bus stops within the South Perth Station Precinct are shown in Figure 23 and Figure 24 respectively. All of these bus routes operate to the Perth CBD via the Kwinana Freeway. The frequencies of the regularly scheduled bus routes for weekday, Saturday and Sunday time periods are given in Table 6.

Patronage data for the bus stop in the South Perth Precinct was obtained from Transperth. The data was collected on both weekdays and weekends from 1 March 2011 to 1 April 2011 and August 2015. The data was averaged for both weekdays and weekends as shown in Figure 26, Figure 27 and Figure 27a respectively. Weekday patronage is significantly higher than on the weekend which is expected. Patronage into the Perth CBD during the AM and out from the Perth CBD during the PM is high, which is expected as a result of commuter demand.





Figure 23 Existing Bus Routes within the South Perth Station Precinct (****)

Source: Transperth Route Map





Figure 24 Existing Bus Stops within the South Perth Station Precinct (****)

Source: Transperth, 2015

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Table 6Existing Public Transport Service Frequencies in the South Perth Station Precinct
(minutes)

Route	Name	AM Peak	Interpeak	PM Peak	Evening	Saturday Davtime	Saturday Evening	Sunday Davtime	Sunday Evening
30	Perth - Curtin University via Labouchere Road and Hope Avenue	10	30	10	60	60	60	60	60
31	Perth - Salter Point via Labouchere Road and Canavan Crescent	10	30	10	60	60	60	60	60
34	Perth - Cannington via Como	15	30	15	60	30	60	60	-
Ferry	Perth (Barrack Square) - Mends Street Jetty	20	20	20	20	20	20	20	20

Figure 25 Bus Stops in the South Perth Station Precinct



Northbound bus stop in Labouchere Road opposite the entrance to the Perth Zoo with a bus shelter



Southbound bus stop in Labouchere Road at the Perth Zoo with no bus shelter





Figure 26 Average Weekday Patronage within the Study Area (March/April 2011)









Figure 27a Patronage (August 2015) (****)

4.3.2 Ferry Services

In addition to the bus services, the South Perth precinct has regular direct ferry services from the Mends Street ferry terminal across Perth Water to Barrack Square. It provides an alternative transport mode to access the Perth Zoo that is popular with visitors, tourists and for South Perth commuters travelling to Perth CBD. The frequency of the ferry service is shown previously in Table 6. The way finding signage of the route from the ferry to the zoo for pedestrians is confusing and inconsistent with the Transperth ferry timetable information and on-site signage along the foreshore and located in Windsor Park.





Figure 28 Ferry Services between Mends Street Jetty and Barrack Street Jetty

Source: Transperth Ferry Timetable, July 2011, updated 2016

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Figure 29 Ferry Services between Perth and South Perth



Ticket vending machine for ferry passengers at Mends Street Jetty

4.4 Cyclist and Pedestrian Movements

Designated pedestrian and cyclist pathways within the precinct are shown in Figure 30. There is a Perth bicycle network route located along Angelo Street which continues through Richardson Park (as a shared path). This shared path is very narrow at 2 metres, is poorly signed and has no linemarking. The shared path through Richardson Park connects into another shared path which runs along Kwinana Freeway corridor which is a Principal Shared Path (PSP).

Lyall Street and Melville Parade are local bicycle friendly streets. There is a shared path which runs along waterfront adjacent to the South Perth Esplanade. Labouchere Road and Mends Street are designated as walking trails. The PSP along Kwinana Freeway and shared path along the South Perth Esplanade are shown in Figure 31. There are bicycle parking facilities located on Labouchere Road, Mends Street and the South Perth Esplanade. These facilities consist of bicycle parking rails (inverted 'U' type) and lockers as shown in Figure 33.





Figure 30 Pedestrian and Cycle Linkages in the South Perth Station Precinct

Source: City of South Perth TravelSmart Guide, April 2008

Figure 31 Cyclist Paths in the South Perth Station Precinct



Shared path for pedestrians and cyclists along the South Perth Esplanade

Principal Shared Path along the Kwinana Freeway

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Figure 32 Facilities for Cyclists in the South Perth Station Precinct





Bicycle parking rails in Mends Street near the pedestrian crossing

Bicycle lockers at the Mends Street Jetty along the shared path next to the South Perth Esplanade

A pedestrian actuated crossing (PAC) exists across Labouchere Road between Hardy Street and Charles Street near the entrance to the Perth Zoo as shown in Figure 33. It provides a safe crossing location for visitors to the zoo and residents on the west side of Labouchere Road. A number of informal crossing points are also provided with cut-outs in the centre median island on Labouchere Road providing other opportunities for pedestrians to make a staged crossing. There are a number of pedestrian crossings along Mends Street as shown in Figure 33.



Figure 33 **Pedestrian Crossings in the South Perth Station Precinct**

Pedestrian crossing in Mends Street leading to the Pedestrian crossing in Labouchere Road at Hardy Street near the entrance to the Perth Zoo

There are several paths through Windsor Park which link Mends Street and Mill Point Road to the Perth Zoo and Labouchere Road as shown in Figure 34. The shared path adjacent to Richardson Street is shown in Figure 34.

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supermarket



Figure 34

The proposed linear path in the South Perth Station Precinct Plan links the ferry terminal to the future South Perth station along Mends Street, Labouchere Road and Richardson Street as shown in Figure 34. This would utilise the Windsor Street Path and Richardson Street pedestrian links.

Pedestrian Paths in the South Perth Station Precinct



Through Windsor Park between Mends Street and Mill Point Road and the Perth Zoo



Along the south side of Richardson Street looking west towards Melville Parade



5. Assessment of the Future Road Network (****)

In order to determine the future road network requirements with and without the South Perth train station, transport modelling was conducted based on the future land use scenarios.

5.1 Study Area (****)

The South Perth Station Precinct – Precinct 15 is defined in the City of South Perth Town Planning Scheme No. 6 is shown in Figure 35.



Figure 35 City of South Perth Town Planning Scheme No. 6 extract of South Perth Station Precinct (Source: City of South Perth)

For the purpose of this investigation, the South Perth Station Precinct area aligns with the Town Planning Scheme No. 6 Precinct 15 boundary as shown in Figure 35. The precinct is affected by Special Control Area 1, with specific provisions for comprehensive new development outlined in Schedule 9 of the scheme.

The South Perth Station Precinct is contained wholly within ROM24 zone 652. ROM24 zone 652 also includes:

• All of Precinct 1 – Mill Point



- Part of Precinct 2 South Perth Central; and
- Half of one street block within Precinct 3 South Perth Civic.

5.2 ROM24 Model Assumptions (****)

The land use inputs have been based on information provided by the City of South Perth and the Town Planning Scheme No. 6. The previous Transport and Access Strategy (2012) report was also reviewed to inform the assumptions that were made.

The approximate land area of street blocks was measured for all zoned land within the ROM24 zone 652. The following assumptions were made in determining these areas:

- The areas measured only apply to the area of the precincts identified within ROM24 zone 652.
- The approximate area has been determined using the City of South Perth's Intramaps system.
- The areas have been rounded to the closest 100m².
- The areas have been grouped together based on zoning.
- Where split coded zones exist, it is assumed the land will be developed to the highest density code.
- It is assumed that the majority of future land development will occur within the South Perth Station Precinct, due to the drivers for change that exist in this precinct compared to other precincts, including the policy framework and focus on development in this area.
- Development in the other precincts located outside of the South Perth Station Precinct is assumed to occur at a much slower rate. Maximum development potential has already been achieved and the unlikelihood of zoning changes or increases in density coding in these areas, are key considerations for this lower growth rate assumption.

The assumptions applied for those precincts located outside the South Perth Station Precinct are:

- In Precinct 1 (Mill Point), there is already an existing high proportion of multiple dwelling developments therefore it is assumed there will not be complete redevelopment of this precinct.
- In Precinct 2 (South Perth Central), there is already a high proportion of single dwellings. Complete redevelopment would require significant amalgamation of lots to achieve the maximum development potential. It is assumed this will not occur within the projected timeline relating to these investigations.
- The small portion of Precinct 3 (South Perth Civic) may experience some redevelopment however the land comprises of multiple lots and again would require amalgamation for complete redevelopment. It is assumed this will not occur within the projected timeline relating to these investigations.



5.3 Findings (****)

It is assumed that only 10% of the area outside of the South Perth Station Precinct and within ROM24 Zone 652 will be redeveloped by 2031.

The South Perth Station Precinct is assumed to experience more redevelopment; therefore, it is assumed that the area will be redeveloped to 80% of its zoned capacity.

It is assumed that development will continue to occur in the Station Precinct even in the absence of a train station due to the area's proximity to the central business district, its desirable location close to the Swan River and its connectivity to other areas via public transport and the freeway.

The proportion of the modelled development potential to be achieved in each target year is shown in Table 7.

Year	Proportion of development				
2016	5%				
2021	25%				
2026	45%				
2031	15%				
Post 2031	10%				

Table 7Proportion of Development.

5.4 Residential Dwellings (****)

The scale of development within the South Perth Station Precinct compared to the remainder of the ROM24 zone 652 is assumed to be considerably different due to the different planning mechanisms that guide development.

The residential dwelling numbers within the South Perth Station Precinct have been modelled using an approximate average of plot ratios derived from recent planning approvals in the precinct; it is assumed that future development will be of a similar scale to currently approved development.

The residential dwelling numbers in the remainder of the ROM24 Zone 652 have been modelled by calculating the development potential of the land based on existing zonings and densities. To model dwelling potential, the following assumptions have been made:

- It is assumed that areas coded R50 or greater will be developed as multiple dwellings. An average dwelling size of 100m² has been assumed.
- It is assumed that areas coded R40 or less will be developed as single houses or grouped dwellings.
 The average site area of the Residential Design Codes for that coding has been assumed. Where
 a mixed use development is proposed where the coding is R40 or less, the dwelling size has been
 determined by applying the minimum open space requirement to the average dwelling size.


We have assumed that the base data provided by Main Roads WA for 2016 is base for both private dwellings and population in private dwellings. These figures are shown in Table 8.

Table 8	2016 ROM24 Zone 652 Dwelling	and Population Data	(Source: Main Roads WA)
i able o	ZUTO KUWIZA ZUTIE OJZ DWEITITI	y and Population Data	(Source. Main Roaus WA)

ROM24 Zone	Population in Private dwellings	Total Private Dwellings
652	4419	2681

Based on the assumption that 80 per cent of land within the Station Precinct will be redeveloped and 10 per cent within the remainder of the ROM24 zone, it is assumed that 70 per cent of land in the entire ROM24 zone will remain undeveloped. It is assumed that, from 2026 onwards, the base values specified in Table 8 will be reduced by 30 per cent as existing building stock is replenished through redevelopment.

Population forecasts were based on applying the most recent Census statistics for people per household for the suburb of South Perth (2.1 average people per household, 2011 Census Quick Stats, ABS). The proposed population generated from redevelopment of the ROM24 Zone 652 is shown in Table 9.

Year	Population in Dwellings	Dwellings
2016	4,760	2,844
2021	6,468	3,657
2026	8,215	4,316
2031	9,240	4,804
Post 2031	9,923	5,129

Table 9Dwelling and Population Data for ROM24 Zone 652

Note: No part of the STEM analysis has been updated and information in Section 5.8.1 Table 15 will not correspond with the above information in Table 9.

5.5 Employment (****)

It is assumed that the non-residential areas outside the South Perth Station Precinct (but inside ROM24 Zone 652) will comprise a land use mix reflective of an 'office' driven centre. Similarly, it is assumed that the 'Scott-Richardson', 'Esplanade' and 'Stone-Melville' sub-precincts within the South Perth Station Precinct will comprise a land use mix reflective of an 'office' driven centre. It is assumed that the Mends Street Sub-Precinct within the South Perth Station Precinct will comprise a land use that the distribution of commercial floor space will be in accordance with Table 10.



Centre Type	Manufacturing	Retail	Construction	Community	Health	Other
Office driven centre	0%	37%	2%	4.50%	4.50%	52%
Retail driven centre	0%	52%	7%	12%	12%	17%
Square metre per employee	100	20	100	25	25	15

Table 10Floor space distribution and square metre per employee values

Employment has been modelled by calculating the approximate commercial floor space that could be generated through redevelopment of the area and applying a square metre per employee to determine the approximate number of employees within that employment type.

We have assumed that the base data provided by Main Roads WA for 2016 is base for employment. These figures are shown in Table 11.

Table 11	2016 ROM24 Zone 652 Em	nlovment Data ((Source: Main Roads WA)	
		pioyment Data	Ource. Main Roaus WA	

ROM Zone	Manufacturing	Retail	Construction	Community	Health	Other
652	352	1,204	277	253	62	1,756

Based on the assumption that 80 per cent of land within the Station Precinct will be redeveloped and 10 per cent within the remainder of the ROM24 zone, it is assumed that 70 per cent of land in the entire ROM zone will remain undeveloped. It is assumed that from 2026 onwards, the base values specified in Table 11 will be reduced by 30 per cent as existing floorspace is replenished.

Table 12 outlines the modelled employment generated from redevelopment of ROM Zone 652.

Year	Manufacturing	Retail	Construction	Community	Health	Other
2016	352	1,661	283	303	112	2,517
2021	352	3,945	313	554	363	6,324
2026	246	7,695	284	930	796	12,648
2031	246	9,065	302	1,081	947	14,932
Post 2031	246	9,979	314	1,181	1,047	16,454

Table 12Employment Data for ROM24 Zone 652

5.6 Future Considerations (****)

The above figures have been modelled examining the existing planning framework in place within the City of South Perth. During a meeting with the City of South Perth it was noted that the community have raised concern regarding the scale of development within the South Perth Station Precinct, particularly for those sites where height limits do not apply.



The City is currently amending the scheme provisions to limit the extent of the variations applicable for building height limits as per scheme amendment No. 46. Other changes are proposed to schedule 9 of the scheme which could impact on the land use mix and extent of development.

Whilst the changes have not come into effect at this point in time, it is recommended that these figures be reviewed should any amendments to the planning framework occur that are likely to result in a significant change to the status quo.

5.7 Future Traffic Volumes

A review of the requirements for the road hierarchy based on the analysis of the traffic modelling was conducted using the ROM24. An assessment of the capacity for the road network to handle the traffic with an agreed land use scenario was conducted for the years 2016, 2021 and 2031.

The traffic demand on the road network with and without construction of the proposed South Perth Train Station was determined by using the Regional Operations Model from Main Roads WA. This was used to assess the impact and improvements required to bring the road network and intersections up to a suitable standard where the station is either implemented or not implemented by the State Government.

This traffic modelling task considered the short, medium and long term impacts of increased traffic volumes and bus transport on the regional and local road network. ROM24 values were calibrated against 2016 survey data.

It should be noted that the ROM24 forecasts, load traffic from zones onto the road network. In relation to traffic from zone 652, all traffic is loaded onto the network at two points (Mill Point Road and Labouchere Road) therefore "distorting" volumes on these roads. It is likely therefore that further detailed modelling (microsimulation) would be required to consider the implications in more detail in addition to a review of Main Roads zone centroid connections to the network.

It should also be noted that the ROM24 modelling can only be considered as indicative in view of the uncertainty of when or if development occurs, the likely mode shift and travel behaviour change by 2031 and the actual car ownership achieved within the precinct. Peak spreading will also influence the network performance.

The actual trips on the road network have been calibrated against current volumes for analysis purposes which provide a more realistic outlook for the future years. Actual traffic growth should continue to be monitored and forecasts revisited because travel behaviour, including greater mode share is likely to impact actual trip generation.



5.7.1 ROM24 Zones

The following figure shows the ROM24 Zones.



The forecast traffic volumes for each design year for each ROM24 zone has been established by the ROM24 modelling, based on the City of South Perth Town Planning Scheme No. 6. Results are discussed in Section 5.7.2.

5.7.2 ROM24 Modelling Results (****)

The traffic volumes from the Main Roads WA ROM24 model for the roads in the South Perth Station Precinct area are shown in Table 13. 2031 (S) includes the South Perth Station.

A calibration has been applied to the forecast ROM24 volumes and includes comparing the difference between actual recorded volumes for 2016 and forecast volumes for 2016 and adding or subtracting the difference to the forecast ROM24 volumes for 2021 and 2031.



				Average Annual Weekday Traffic (AAWT)				
Road	Direction	2016 Survey	2016 ROM24	Difference	2016 Calibrated	2021 Calibrated	2031 Calibrated	2031 (S) Calibrated
Labouchere	Northbound	10,130	15,100	+4,970	10,130	15,130	23,930	23,130
Road (between Angelo Street and Mends Street)	Southbound	5,170	11,500	+6,330	5,170	10,670	18,670	17,170
Labouchere	Northbound	9,900	18,000	+8,100	9,900	14,700	25,100	24,000
Road (between Mends Street and Mill Point Road)	Southbound	5,140	13,100	+7,960	5,140	10,940	23,140	21,740
Mill Point	Westbound	N/A	9,300	N/A	13,180	15,580	20,380	19,880
Road (east of Mends Street)	Eastbound	N/A	9,600	N/A	11,675	14,575	18,375	18,175
Mill Point	Westbound	10,980	7,100	-3,880	10,980	14,480	22,280	21,580
Road (west of Mends Street)	Eastbound	10,475	8,400	-2,075	10,475	13,475	17,575	16,775
-	Exit Freeway	19,600	21,400	+1,800	19,600	28,300	39,400	37,900
reeway On-ramp	Enter Freeway	25,300	25,100	-200	23,500	33,200	46,200	45,200

Table 13 Traffic Volumes from the ROM24 Traffic Model from 2016 to 2031 (****)

The implications on the road network of these future traffic volumes were examined in terms of roadway capacity as was undertaken for existing conditions in section 4.1.2. A future capacity analysis based on the ROM24 results is provided in Table 14. Given that the ROM24 traffic volumes output are provided in AAWT, peaking factors have been determined from existing traffic counts in order to calculate the future peak traffic volumes. The peak hour factor is assumed constant for all scenarios. The critical traffic capacity is 1,900 veh/h in each direction for all roads investigated (1,000vph in the median lane and 900vph in the kerbside lane) based on Austroads.

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As previously discussed it should be acknowledged that as traffic volumes increase travel behaviour will change over time. Given substantial increase in traffic generation by 2031 scenario year it is more likely that peak spreading will occur thus resulting in less intense but longer peaks. Therefore the assumption of a constant peak factor may lead to overestimating peak period demand on roads in 2031. It is not possible to quantify however but will clearly influence demand and subsequent infrastructure requirements. The assessment is therefore likely to be robust. Ongoing review of actual traffic volumes must be undertaken.

This analysis shows that the section of Labouchere Road between Mends Street and Mill Point Road and Angelo Street and Mends Street will have capacity exceeded beyond 2031. The Freeway access capacity will continue to deteriorate to 2031. All other roads are forecast to have sufficient capacity at midblock sections until at least 2031.

Road	Direction	2016	2021	2031	2031 S
Labouchere Road (between Angelo Street and Mends Street)	Total Northbound	69%	104%	164%	158%
	Total Southbound	38%	79%	138%	127%
Labouchere Road (between Mends Street and Mill Point Road)	Total Northbound	52%	77%	132%	126%
	Total Southbound	32%	69%	146%	137%
Mill Point Road (east of Mends Street)	Total Westbound	55%	66%	86%	84%
	Total Eastbound	61%	77%	97%	96%
Freeway On-ramp	Exit Freeway	103%	149%	207%	199%
	Enter Freeway	124%	175%	243%	238%

 Table 14
 Future Capacity Analysis Based on ROM24 Results (****)

Note: It is accepted that the land use assumptions result in traffic demand generated vastly exceed the capacity of the network so further modelling for the area is required to ensure accuracy of predicted future volumes and also assess potential network treatments.

It is clear from the forecast traffic volumes that there will be considerable pressure on Labouchere Road from 2031 should development occur as proposed. The construction of a rail station within the precinct in 2031 is not forecast to reduce traffic volumes significantly compared with the 'No Station' scenario. There will need to be a significant change in travel behaviour to allow the network to operate satisfactorily beyond 2031.



5.8

5.8 Future Patronage at South Perth Train Station

The patronage at the proposed South Perth train station using the STEM modelling conducted by the Department of Planning was estimated for the years 2011, 2016, 2021 and 2031. These results will be used to inform the traffic management plan around the future South Perth railway station for pedestrian and vehicle movements. (No further STEM modelling has been undertaken since the 'Report for South Perth Station Precinct, Transport and Access Strategy, May 2012')

5.8.1 STEM Model Assumptions (Not updated from 2012 Study)

Data inputs for the STEM model were based on the base 2011 STEM model data and followed those of the ROM model. As the STEM zone that encompasses the Station Precinct is larger than the equivalent ROM zone, an additional 10 percent was added to the dwelling numbers to take into account growth envisaged for this additional area. It was assumed that there would be no new dwellings before 2016.

The following ratios were applied to the demographic inputs of the model:

- 1.4 people/dwelling as per STEM 2011 base data;
- 2011 base data Primary School age children to population ratio of 6.08% used;
- > 2011 base data High School age children to population ratio of 3.30% used;
- 2011 base data labour force to total population ratio of 54.78% used; and
- 2011 base data employed residents to labour force ratio of 96.28% used.

Individual STEM employment categories were equated to the ROM categories to allow for the transfer of the ROM calculations into the STEM model. The ratios of the 2011 STEM employment numbers within each ROM category were applied to the 2016 and 2031 projections (i.e. education comprises 15.2 percent of the wider community services category, health 52.2 percent and welfare 32.6 percent).

As per the ROM model calculations, it was assumed that there will be no additional agriculture, mining, construction, manufacturing, wholesale, transport and storage jobs in the zone.

The following model runs with patronage or boardings and alightings at the Mends Street ferry terminal, bus routes in the study precinct and at South Perth and Canning Bridge stations were conducted based on the following requirements.

- 2011 (2008) base model patronage with no station at South Perth and existing land use data.
 Canning Bridge station, ferry patronage and bus stops within the precinct.
- 2016 patronage with no station at South Perth. Canning Bridge train station, ferry patronage and bus stops within the precinct.
- 2016 patronage with a new station at South Perth. South Perth and Canning Bridge train station patronage, ferry patronage and bus routes at stops within the precinct.
- 2031 patronage with no station at South Perth. Canning Bridge train station, ferry patronage and bus stops within the precinct.
- 2031 patronage with a new station at South Perth. South Perth and Canning Bridge train station patronage, ferry patronage and bus routes at stops within the precinct.



The statistics for the population and employment data for 2016 and 2031 for the STEM modelling for the South Perth train station are given in Table 15.

Type of Land Use	2011	2016	2031
Dwellings	3,818	3,866	4,868
Residents	5,398	5,412	6,815
Primary School age children	328	657	1071
High School age children	178	357	582
Persons in labour force	2,957	2,965	3,733
Total employed residents	2,847	2,855	3,594

 Table 15
 Land Use Data for the STEM Patronage Model in the South Perth Station Precinct

Note: No part of the STEM analysis has been updated and values will not therefore correspond with earlier figures in Table 9.

No new ferry terminal at South Perth train station was included in the options. With the South Perth train station, bus routes will not divert off Labouchere Road and will remain with the existing routes and frequencies. The South Perth train station will have every second train stopping. Therefore, only the Cockburn Central trains will stop at South Perth, and the Mandurah trains will operate as existing.



5.8.2 STEM Modelling Results

The boardings and alightings on a typical weekday for all modes of public transport (bus, train and ferry) within the South Perth Station precinct for each scenario are shown in Figure 36.



Figure 36 South Perth Station Precinct Boarding and Alighting Forecasts by Scenario

A breakdown of the patronage forecasts by mode within the South Perth Station Precinct for each scenario is shown in Figure 37. For the scenarios with the South Perth train station, the train patronage is less than 20 per cent of the total patronage with the buses accounting for at least 60 per cent of the total patronage and the ferries for 16 to 27 per cent of the total patronage.





Figure 37 South Perth Train Station Patronage Estimates by Mode and Scenario

Factors which may contribute to the slight reduction in total patronage based on the STEM modelling from 2006 to 2016 are:

- Reduced public transport patronage in South Perth may be associated with the improved accessibility for all South Perth residents to train services via the Canning Bridge train station on the Perth to Mandurah railway line after the opening in December 2007.
- The trip generation data in the model has little (if any) population or employment growth in South Perth from 2006 to 2016. Therefore, the trip production or attraction matrix will not increase significantly to generate higher patronage.
- Public transport trips are dominated by certain purposes, such as work and tertiary education trips.
- Public transport trips are also dominated by certain key destinations (CBD and university campuses).
- The growth at key destinations, such as Perth CBD and to the university campuses will dominate the short term patronage reductions that are shown with these STEM results.

The large zone for the South Perth area will not produce robust patronage estimates and further analysis with smaller zones is required to allocate the patronage more accurately to the train, bus and ferry. Furthermore, the South Perth station will have a major role as a special events, zoo tourist and visitor market which is not included in the STEM model. The STEM model is mostly appropriate as a weekday peak period commuter patronage model based on population and employment data as inputs. The South Perth train station, even with higher density office development around the station, will not be accurately estimated when a large part of the patronage will be from zoo visitors and for special events.

From the patronage estimates provided by STEM for 2016 and 2031, the South Perth station will have about 700 to 800 boardings and alightings per day. This is based on the peak period commuter patronage. The STEM model indicates more growth in bus patronage than train patronage in 2031. The South Perth Railway Station Business Case, report prepared by Syme Marmion in October 2010 forecasted



2,300 to 2,800 boardings per day for the fully developed precinct versus 800 - 1,100 boardings for public transport with the current development. This is comparable to the Department of Planning STEM modelling.

The STEM results give about 1,600 boardings daily in 2006 and 2016 for all public transport modes with no new station, and 2,400 to 2,700 daily boardings in 2031 with or without the train station. The total patronage from STEM in 2006 and 2016 is about 2,900 per day. Total patronage in 2031 (boardings and alightings) are forecast at about 3,800 with no new station and about 5,100 with a new station. This would make South Perth station about as busy as Subiaco station in 2005 and busier than Bayswater and Bassendean stations on the Midland line.

However, the STEM model results are total patronage for bus, ferry and train. The proportion of patronage on the train mode only is much lower at 700 to 800 for the daily boardings and alightings. This makes the train station patronage at a level similar to Guildford station or the former Lathlain station that was closed on the Armadale line and Karrakatta or Loch Street stations on the Fremantle line which are considered very low patronage stations.

5.8.3 Perth Zoo and Special Events Train Patronage

The STEM mode only provides weekday boardings and alightings based on typical weekday activities, but it does not account for the high level of expected train patronage for journeys to Perth Zoo and to special events along the South Perth foreshore.

Perth Zoo is major attraction for Perth and WA residents. It is also a major attraction for interstate and international visitors. The total number of visitors to Perth Zoo from 2006 to 2009 is shown in Figure 38. The average annual number of visitors over the four years is about 617,000. The origin of the visitors to Perth Zoo is shown in Figure 39 with almost 80 percent of the visitors from Western Australia.





Figure 38 Annual Visitors to Perth Zoo

Source: Perth Zoo visitor statistics, 2006 to 2009



Figure 39 Origin of Visitors to Perth Zoo

Source: Perth Zoo visitor survey, 2009

Perth Zoo also conducts a series of summer concerts and provides a venue for seminars and other corporate events. Some events held within the grounds are outsourced to private organisers. This outsourcing of events acts as a secondary attraction for Perth Zoo which extends the operating hours



and generates an increased number of visitors. A minimum of eight events are typically held at the Perth Zoo each year with the average annual attendance ranging from 20,000 to 28,000, as given in Table 16.

 Table 16
 Summary of Special Events at Perth Zoo

Attendance Capacity	Average Attendance per	Total Annual Number	Average Annual
per Event	Event	of Events	Attendance
5,000	2,500 - 3,500	8 minimum	20,000 to 28,000

Source: Perth Zoo, 2010

The City of South Perth conducts a number of annual events at Sir James Mitchell Park. The approximate attendances at some of the major events held at the South Perth foreshore are given in Table 17.

Table 17 South Perth Events at Sir James Mitchell Park

Event	Approximate Attendance
Australia Day Sky Show	110,000 (2010)
Mellen Events	25,000 (2010)
RSPCA Million Paws walk	15,000 (2010)

Source: South Perth Railway Station Business Case, 2010

These attendance statistics to Perth Zoo and special events show the strong demand for special events train services to stop at the South Perth train station. The South Perth train station would have a significant role for a mass transit mode for visitors to major events, similar to other train stations in the Perth railway network such as the Showgrounds and Burswood train stations.

5.9 Road Network Requirements (****)

SIDRA modelling was undertaken to analyse the future performance of key intersections within the South Perth Precinct as listed below:

- Labouchere Road/Angelo Street Intersection (high incidence of right turn crashes and casualties).
- Labouchere Road/Richardson Street Intersection (high incidence of casualties).
- Labouchere Road/Mill Point Road (high incidence of rear end, right turn crashes and casualties).
- Mill Point Road/Mends Street (high incidence of rear end collisions)

SIDRA software is an advanced micro-analytical traffic evaluation tool used in the design of most types of intersections. Inputs into the program include intersection geometry, traffic volumes, path and movement data, priorities and gap acceptance. Turning count surveys were undertaken by GHD and were used as inputs into the SIDRA modelling. The model was run for the AM and PM peaks during a 'typical' weekday.

One of the key outputs is the Level of service (LOS) which is a measure of the average delay of each individual traffic lane. There are six tiers from LOS A to LOS F with LOS A describing free flow traffic operations and LOS F describing a breakdown in vehicular flow. A summary of the results for the



modelling for each intersection is provided in the following sections. Full Sidra summary reports are not included however can be made available if required.

5.9.1 Labouchere Road/Angelo Street Intersection (****)

For the existing conditions model run undertaken in SIDRA, the following lanes were found to have poor LOS.

- Angelo Street: LOS F for all movements during the AM peak hour.
- Amherst Street: LOS F for all movements during AM peak hour and through and right turn movements during the PM peak hour.

The geometric input for the existing conditions model run is shown in Figure 40.

One of the key issues with this intersection is that there are high volumes of vehicles undertaking a right turn from Angelo Street to Labouchere Road, especially during the AM peak. Given that there are high volumes of through traffic along Labouchere Road, this results in delays for vehicles undertaking the right turn manoeuvre. Delays on other approaches are less concerning due to lesser traffic volumes.

For the same traffic volumes, the model was run again with traffic signals with some change to the geometry, as shown in Figure 40 to determine if the LOS of the right turn from Angelo Street onto Labouchere Road could be improved. For traffic signals a LOS E (am) was achieved for the right turn from Angelo Street onto Labouchere Road and all traffic clears within a single cycle.

In addition to the improvement in the right turn operation, traffic signals would improve the safety at the intersection. This intersection has a significant crash history which has resulted in a high number of causalities as discussed previously in section 0. Further investigations are required and discussed with Main Roads to determine a suitable outcome incorporating traffic signals.



Figure 40 Geometric Layouts used in the SIDRA Analysis for the Labouchere Road/Angelo Street Intersection



Existing configuration - Stop sign control

Alternative configuration - Traffic signals

The above Sidra analysis is based on current volumes as surveyed in 2015, existing daily traffic volumes on Labouchere Road are in the order of 16,000vpd, the ROM24 forecast volumes for 2021 are 37,100vpd and for 2031; 53,900vpd. It is clear that significant upgrade would be required to accommodate these volumes. Analysis has been performed for 2021 based on factoring from 2015 using annual growth from 2016 ROM24 forecast to 2021 ROM24 forecast, to test likely requirements.

Location	2016	2021	Annual Growth Factor
Labouchere Road (between Angelo Street and Mends Street)	26,600vpd	37,100vpd	7.9% pa
Labouchere Road (between Mends Street and Mill Point Road)	31,100vpd	41,700vpd	6.8% pa
Mill Point Road (east of Mends Street)	18,900vpd	24,200vpd	5.6% pa

Table 18	Traffic growth -	I abouchere and	Mill Point	Roads	(****)
I able to	Trainc growin -	· Labouchere and		Rudus	



Various intersection layouts have been tested for 2021 to assess likely requirements and the geometry shown in Figure 41 indicates optimum results. However, this layout could not be accommodated due to local constraints.



Figure 41 Labouchere Road & Angelo Street - optimum intersection geometry (****)

The intersection level of service (LoS) is C, no movement is forecast to be worse than LoS D. Significant upgrade of Labouchere Road and the intersection would be required. A more detailed assessment will need to be undertaken as development occurs.

It is recommended that traffic signals be installed at this location.

5.9.2 Labouchere Road/Richardson Street (****)

As indicated in Section 0, there were 5 reported crashes at the intersection of Labouchere Road and Richardson Street.

The data indicates through traffic are colliding with traffic exiting Richardson Street however there would not appear to be a significant safety issue in the short term. This may increase as traffic volumes increase along Labouchere Road and/or the new train station is installed.

For the existing conditions model run, the following movements were found to have poor LOS.

Richardson Street: LOS F/E for right turn onto Labouchere Road during AM/PM peak hour.

Although these movements experience a poor LOS, this is considered to be a lesser issue as traffic volumes from Richardson Street are relatively low. However, this intersection has a crash history which is higher than expected for an intersection with lower traffic volumes as discussed previously in section 0.

Traffic signals have been assessed at this intersection using SIDRA with good operational results with benefits increasing for the use of signals in lieu of other traffic control as the traffic volumes increase along both roads. All movements are forecast to clear the intersection in a single cycle.

A roundabout at the intersection has been assessed, however in view of the geometric constraints and merge issues to create a single lane roundabout, this is not considered a viable option.



Figure 42 Geometric Layouts used in the SIDRA Analysis for Labouchere Road/Richardson Street Intersection

Road North





5.9.3 Future Traffic Volumes (****)

An analysis of future traffic volumes (2021) for a signalised intersection was undertaken to determine whether improvements in level of service was likely. The following geometry was analysed.







The intersection level of service (LoS) is A, the exit movements from Richardson Street are LoS E. A more detailed assessment will need to be undertaken as development occurs.

It is recommended that traffic signals be installed at this location and are the preferred option in view of the benefits for access and safety. There will also be significant benefits for pedestrians crossing Labouchere Road. The geometry analysed does not include turn lanes and a two lane approach on Richardson Street. It will be necessary to satisfy Main Roads requirements for any traffic signal installation and will require conceptual drawings to Main Roads standards.

If forecast traffic volumes continue to increase by 2031, a significant upgrade of Labouchere Road and/or travel behaviour change will be required. The daily capacity of the single lane entry from Mill Point Road becomes saturated resulting in congestion in and around the intersection with Mill Point Road.

The City of South Perth have previously suggested that traffic signals should be installed at the intersection of Labouchere Road/Hardy Street instead to service pedestrians walking to Perth Zoo, Windsor Park or to the future train station (to replace the existing pedestrian signals near the zoo). Should this occur the operation of these signals will be similar to that analysed for Richardson Street. The right turn from Richardson Street should be banned, to force drivers to execute the turn more safely at the Hardy Street signals. Further turning restrictions could be considered as traffic volumes warrant; however these should not be implemented in the short to medium term due to restricted permeability to/from the precinct. It is considered that traffic signals should be installed to facilitate access to the Station Precinct as volumes warrant addressing safety and traffic management requirements.

As stated in Section 0 there have been 2 recorded crashes at the intersection of Labouchere Road and Hardy Street. The data indicates there would not appear to be a significant safety issue.

GHD are supportive of traffic signals located at either Richardson Street or Hardy Street to facilitate access to/from the Station Precinct when volumes warrant.

The following options are proposed:

- Option 1: Traffic signals be installed at the intersection of Richardson Street/Labouchere Road; OR
- Option 2: Traffic signals be installed at the intersection of Hardy Street/Labouchere Road intersection the right turn from Richardson Street into Labouchere Road being banned.

5.9.4 Labouchere Road/Mill Point Road (****)

A road safety audit conducted at this intersection in March 2011 identified the following key issues:

- The left turn queue in Labouchere Road extends beyond the end of the double left turn lanes.
- The right turn from Mill Point Road (eastern leg) is substandard length (plan available to lengthen right turn lane).
- East bound through traffic on the Freeway connection are masked by eastbound right turning traffic. This is an issue for westbound right turning traffic on Mill Point Rd. A double diamond phasing arrangement is recommended.
- Walk phase for all movements recommended.
- Poor alignment of pram ramps and gaps in medians.

A Sidra analysis has been undertaken for the following scenarios.



Current Operation

Figure 44 Labouchere Road/Mill Point Road existing geometry

An analysis for the current operation for the AM and PM peak hours indicates an intersection LoS of D/F, with the longest queue being 225 metres turning left from Labouchere Road in the AM peak. In the PM peak the longest queue is in excess of 700m on the Freeway connection. A stop rate of 0.76/0.79 is indicated. The average intersection delay is around 112 seconds in the PM peak.

It should be noted that the through/right lane in Labouchere Road is very short and will also impact the operation of the intersection due to traffic overflowing into the left turn lane.









It should be noted that the Sidra graphic is for analysis purposes only and does not represent the appearance of the actual layout.

An analysis (current volumes) including the bus queue jump facility at the intersection indicates an intersection LoS of D, the queue length in Labouchere Road is forecast to increase to 277 metres from 225 metres, the am stop rate remains is 0.82. The queue length in Mill Point road is forecast to increase to 179 metres from 223 metres. The average intersection delay is 47 seconds.

The analysis indicates therefore that queuing in Labouchere Road and Mill Point Road will be extended should the queue jump facility be introduced based on current conditions; however, traffic is still forecast to clear the intersection in a single cycle.

Analysis for 2021 with a bus queue jump facility indicates significant queuing on Labouchere Road and Mill Point Road and an intersection LoS of F, indicating further regional capacity improvement is likely to be required.

Double Diamond

The implementation of a double diamond will require the addition of a through lane in Labouchere Road. Analysis indicates LoS E and increased queue length on Mill Point Road and Labouchere Road. Stop rates also increase to 1 for some movements.

Single Diamond on Mill Point Road

Analysis with the implementation of a single diamond on Mill Point Road indicates LoS F and increased queue length on Mill Point Road and Labouchere Road, a number of movements are LoS E/F.

No Right Turn from Labouchere Road with a Single Diamond

Analysis with the implementation of a single diamond on Mill Point Road together with a right turn ban from Labouchere Road indicates LoS F and increased queue length on Mill Point Road and Labouchere Road with a number of movements as LoS E/F. Whilst this will provide safety benefits based on the audit recommendations it does not improve capacity or operation.

Comment

The site is impacted by access to the Kwinana Freeway that is congested during the am peak hour. Without a major capacity upgrade to the Kwinana Freeway and access ramps to it, modification to this intersection in isolation will provide limited benefits to performance. However, safety benefits will be achieved by the addition of a single diamond phase arrangement on Mill Point Road.

The South Perth Station Precinct is planned to be a significant transit-oriented development in which most of the trips generated from it are made by public transport when the new railway station is built. However, this is not reflected in the overall ROM forecasts for 2031 with a new railway station.

A bus queue jump lane is not considered feasible at this intersection in view of the site constraints and lack of access to the facility at peak times.



5.9.5 Mends Street/Mill Point Road (****)

A Sidra analysis has been undertaken for the following scenarios:

Current Operation



Figure 46 Mends Street/Mill Point Road existing geometry

Analysis for the current operation (am and pm peak hours) indicates an intersection LoS of C/D with queues on Mill Point Road of 83m westbound (AM) and 89m (PM), and eastbound 120m (AM) and 193m (PM).

Eastbound Left turn on Mill Point Road under give way control (i.e. slip lane)

Analysis indicates little change to the operation of the intersection compared with the existing operation.

Eastbound and westbound Left turn on Mill Point Road under give way control (slip lanes)

Analysis indicates little change to the operation of the intersection compared with the existing operation.

Analysis for 2021 indicates an intersection LoS of D (AM) and eastbound queues increasing to 200m, PM analysis indicates an intersection LoS of F with queues in excess of 1km.

The site is impacted by access to the Freeway; this is congested during the am peak hour and without major capacity upgrade to the Freeway and access thereto, modification to this intersection in isolation will provide limited benefits to performance. The site is also constrained to allow significant upgrade without land acquisition.

Broader network upgrade would be required to have any significant impacts on this intersection.

5.10 Configuration of Mends Street

The functionality for Mends Street north of Mill Point Road was investigated in this study to consider if it should be maintained for two-way traffic, be changed for one-way traffic or closed or converted to a



shared use zone (where pedestrians and vehicles share the road) with wider footpaths to improve the streetscape and amenity and to encourage more street activity for pedestrians. As shown in Figure 47, Mends Street is currently used for parking, cyclists and vehicles. Access for all vehicles into Mends Street is important to support the local businesses and to provide visual surveillance in the evenings when the footpath is quieter for a safe pedestrian environment.

Figure 47 Mixed Use of Mends Street





Roadway in Mends Street looking south from South Perth Esplanade

Wide footpath in Mends Street looking south

Six options were developed for the configuration of Mends Street north of Mill Point Road. They are described in Table 19.

Number	Name	Description
M1	Existing Two-way	Two-way street with no change from existing
M2	Two-way with Traffic Calming	Two-way street with traffic calming measures, such as gentle curves to road alignment and narrower sections to slow down traffic
M3	Two-way with No Kerb Street	A street design similar to James Street in Northbridge with no kerbs and parking on coloured pavers next to the footpath
M4	One-way Southbound	One-way configuration southbound for traffic possibly with space for a bicycle lane
M5	Two Cul-de-sacs	No through traffic with two cul-de-sacs from either end (allowing access to the businesses from either end)
M6	Shared Zone	A shared zone (pedestrians, cyclists and traffic share the road together) with a slower speed (10 km/h)

Table 19 Options for the Configuration of Mends Street



A multi-criteria analysis (MCA) approach was used to assess the six options. The criteria used to assess the six options were:

- Traffic Impact for the impact on traffic and movement.
- Pedestrian access and safety.
- Amenity to encourage more footpath and cafe activity.
- Impact on parking and loading zones for businesses.

The estimated cost for capital works, maintenance and operations was excluded from the assessment because all options are more expensive than existing and by including cost in the assessment none of them would be considered. The scoring for the assessment of the six Mends Street options were determined through consensus with the study team and is given in Table 20.

Option	Name	Traffic Impact	Pedestrian Access and Safety	Amenity	Parking and Loading Zones
M1	Existing Two-way	Very Low	Poor	Poor	Average
M2	Two-way with Traffic Calming	Low	Good	Average	Average
M3	Two-way with No Kerb Street	Low	Average	Good	Average
M4	One-way Southbound	High	Very Poor	Poor	Poor
M5	Two Cul-de-sacs	Very High	Good	Good	Poor
M6	Shared Zone	High	Very Good	Good	Poor

Table 20 Scoring for the Assessment of the Mends Street Options

The criteria that provided the highest scores across the four options are pedestrian access and safety and amenity. This supports the objective of designing a street that is "pedestrian friendly" and attractive for visitors going to restaurants and businesses. It provides a more pleasant walking link between the ferry terminal through Windsor Park to connect to the Perth Zoo.

With an equal weighting for each of the four criteria, the assessment results are given in Figure 48. Options M2 and M3 have the highest scoring and as a result, a combination of a street with traffic calming and a "no kerb" treatment between the parking lanes, traffic lanes and footpaths is recommended because it is more likely to achieve a slower and safer street environment for pedestrians and cyclists without significantly affecting access to businesses and parking in the street.





Figure 48 Assessment of the Mends Street Options

The preferred option for Mends Street is a combination of options M2 and M3 for a two-way street with a slight curvature to promote traffic calming and with no kerb along the footpath. A perspective sketch of this streetscape configuration is shown in Figure 49. It shows a view of Mends Street looking south from the South Perth Esplanade with the parking spaces aligned along the footpath between the landscaping areas for public seating with public art. This street treatment will encourage traffic to operate slower while maintaining full access to businesses for loading and deliveries and short term on-street parking to promote business activity.

Two examples of the types of treatment are shown in Figure 50 from Northbridge with the curved section of Lake Street between Aberdeen Street and Newcastle Street and the section of James Street east of Lake Street with no kerb and parking allowed within the footpath reservation. The treatment for Mends Street is envisaged to be a combination of these types of street scaping.





Figure 49 Perspective Sketch for the Preferred Streetscaping for Mends Street

Figure 50 Examples of Types of Treatment for Mends Street



Use of red pavement with a slight curve in Lake Street north of Aberdeen Street, Northbridge to promote traffic calming

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Source: Google Streetview, 2011

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Use of coloured pavement and footpath treatments with a no kerb street and parking along the footpath area in James Street east of Lake Street, Northbridge

Source: Google Streetview, 2011



6. Sustainable Transport Assessment

An assessment of the public transport system and the pedestrian and cyclist network was undertaken. Future requirements for sustainable transport modes were developed and are detailed in the following sections.

6.1 Public Transport

This section details the role for the South Perth train station and the future requirements of the bus and ferry network and facilities.

6.1.1 Role for the South Perth Train Station

The purpose of this train station is to be a destination station rather than a highly-trafficked commuter station. Only every second train would stop at the station during peak periods. This station will provide walk on access for workers accessing higher density offices and commercial Scott-Richardson sub precinct and tourists accessing the zoo and Mends Street precinct. Most of the train passengers would be walking to the station primarily from the walkable catchment of 800 m around the station.

Limited short term parking is proposed instead of park and ride facilities because the majority of patrons will come from the walkable catchment. Limited space also precludes the provision of significant parking facilities (see also Section 4.2 for information regarding parking policies). A suitable drop off area for 'kiss and ride' commuter activity should be an important focus of this station especially when the parking facilities will be limited. It is important that this drop off facility has sufficient lighting, shelter and seating typical to that shown in Figure 51.



Figure 51 Drop off Areas for Kiss and Ride Activity

Source: 'Kiss and Ride' or drop-off zone (Austroads, 2008)

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It is not recommended that buses be diverted from Labouchere Road to stop at the proposed station in Melville Parade for passengers to interchange with the trains as the existing bus routes (30, 31 and 34) currently provide direct bus services to Perth CBD via the Kwinana Freeway with bus stops in Labouchere Road and Mill Point Road. These services, which are a relatively high frequency during the peak periods, are well patronised. Consequently, if the bus routes were diverted to the train station in Melville Parade, these bus passengers would have a longer travel time to Perth CBD with a longer trip on the bus or with additional time to transfer between bus and train services. The only bus passengers that would benefit with a bus-train transfer at South Perth are those who are not travelling to Perth CBD. Any deviation of these bus routes into the proposed South Perth train station along Hardy Street or Richardson Street to Melville Parade would add travel time to the bus services and potentially discourage patronage. Furthermore, the peak period trains at the proposed South Perth station will most likely have fully seated loads and little room for additional passengers transferring from the local bus routes.

Pedestrian linkage via Richardson Street from Labouchere Road would be the preferred access for the expected low number of passengers transferring between bus and train services. The pedestrian linkages are described in Section 6.2. Furthermore, animal footprints could be added from the new train station to the zoo or to the ferry to promote and guide pedestrian access to and from public transport to the zoo.

6.1.2 Future Bus Network and Facilities

It is proposed that no changes be made to the existing bus network with bus routes or the location of the bus stops. However, consideration should be given to rebranding the bus stops for the zoo at the zoo entrance and at the bus stops near tourist accommodation in Perth CBD. This may include signage to simply indicate that this stop is for the South Perth Zoo. Some examples from other locations where this concept has been successfully employed are shown in Figure 52. This branding could also be implemented at the Barrack Square ferry terminal so patrons are aware that they can reach to zoo from that location.



Figure 52 Bus Stop Branding at Zoos

Bus stop branding at the Adelaide Zoo



Aquarium bus stop in Prague

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In the South Perth Station Precinct Plan, a bus route was proposed to service the South Perth train station via a one-way bus loop in Richardson Street, Melville Parade and Hardy Street. If a bus stop at the South Perth train station was implemented, it may require the traffic signals in Labouchere Road to be relocated to Hardy Street to provide the right-turning buses a priority movement over the north-south traffic in Labouchere Road. A bus stop at the South Perth train station should only be introduced if significant bus-rail transferring would occur at this station. Any bus service to the South Perth train station would likely operate in non-peak periods for a community bus, for rail replacement bus services or special events bus service, when the traffic volumes along Labouchere Road will not be similar to weekday peak period conditions.

In late 2011, the City of South Perth was informed that the Public Transport Authority (PTA) is working with all Perth metropolitan local governments to define the location of priority bus lanes on local roads as part of the Department of Transport's Moving People Network Plan. The PTA have advised GHD that at the recent South Perth workshop for the "Moving People, Network Plan", Labouchere Road was identified as a primary public transport route and would be considered for bus lanes. Consequently, the PTA is developing a plan that would consider the implementation of kerbside bus lanes in Labouchere Road between Angelo Street and Mill Point Road. In view of the current and forecast traffic volumes in Labouchere Road, the implementation of a kerbside dedicated bus lane in each direction would adversely impact on traffic flow and performance resulting in congestion and reduced travel times for general traffic and it is not recommended in this transport access study. The bus service frequency along Labouchere Road (currently one bus every 5 minutes during the peak periods) would need to be much higher (one bus every minute during peak periods) to justify bus lanes in both directions.

6.1.3 Potential for a South Perth Community Bus Service

A local shuttle bus service, similar to the Perth Central Area Transit (CAT) bus routes was investigated for suitability and viability for the South Perth Station Precinct. The CAT bus service in Perth is popular with commuters from the CBD train stations to access the high density employment areas in West Perth and East Perth, for tourists and visitors to Perth CBD and for the local residents of Perth city who use the bus to travel from the residential areas of West Perth and East Perth to the retail and commercial areas.

In the context of the future South Perth train station, most of the commuters will be within an easy walking distance of the station (less than 400 metres) if they are working in the new high density employment zone west of Labouchere Road. Furthermore, visitors to the Perth Zoo will be within walking distance to the zoo entrance via a footpath along Richardson Road with a pedestrian-actuated crossing over Labouchere Road. Local residents within the South Perth Station Precinct live in a very walkable community. For public transport to Perth CBD and other key metropolitan destinations, the local residents have access to the Transperth bus network with direct bus services to Perth CBD.

With these public transport travel demands already met by walk or bicycle access, or the existing public transport system, the public transport demand that is not well serviced for South Perth residents is for non-commuter trips. The operation of a shuttle bus route from the future South Perth train station to Mends Street would only have a few bus stops and it would be a costly investment for trips that can be walked within 15 minutes. The demand for such a short bus route between Melville Parade and Mends Street jetty would be expected to be very low.



However, if a community bus service was provided for a larger catchment area in the City of South Perth, it would likely have greater patronage and provide an alternative for short trips by car to the various shopping villages within the City of South Perth. Many cities and Councils throughout Australia fund or operate community bus services for this purpose. Two examples of the many Council funded community bus services operating in Australia are shown in Figure 53.

Figure 53 Examples of the Types of Vehicles used Community Bus Services for Local Councils



The Loop, Willoughby Council in Sydney, NSW



Unley Community Bus, Adelaide, South Australia

An example of a community bus route that is operated on behalf of the City of Mosman in metropolitan Sydney in NSW is shown in Figure 55. It is a free bus service branded with the pink Whale Rider logo for use by local residents. It connects to the high frequency bus services in Military Road at Spit Junction for travel to Sydney CBD.



Figure 54 Example of a Community Bus Route in Mosman, NSW

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Source: http://mosmanrider.net

Most community bus services use a mini bus with seating for up to 10 to 15 passengers and operate infrequently on a route that maximises the number of local destinations. These buses are equipped for disabled passengers and connect to local shopping centres and precincts, medical offices, bus and train stations, libraries and government services. They operate on weekdays only hourly or less often between 10 am and 4 pm. Some of these services are fully funded by the local government while some have a small fare collected by the driver. The bus routes operate with a hail and ride stop policy and do not require bus stop infrastructure and will use the existing bus stops (Transperth) and any safe location for boarding and alighting activity.

Consideration was given for the introduction of community bus service in the City of South Perth. A potential route was developed with a loop connecting Mends Street and the ferry terminal, the Old Mill, Perth Zoo, the future South Perth train station, the South Perth library and Civic Administration Centre and the Commercial Precinct in Angelo Street, as shown in Figure 55. The one-way loop is about 11 km. At an average speed of 25 km/h on streets with low traffic volumes during the interpeak period, it is estimated a bus would have a circuit time of about 26 minutes. A 30-minute frequency bus service could be provided with one bus.

The community bus service could be operated on weekdays from 9:30 am to 3 pm using a mini bus with seating for up to 10 to 15 passengers. The cost of operation for this type of community bus service can range from \$100,000 to \$300,000 per year (very rough estimate) depending on the length of the bus route, service frequency, the cost of the driver and operations and the number of vehicles required.

Recent contact with Transperth confirms anyone can operate a free community bus service, but a licence is required from the Department of Transport to operate a fare paying service and this would include, a service that required a "gold" coin donation. If the desire was that Government (Transperth) operate a free community bus (CAT or Shuttle) around South Perth it would need to be funded by others, or at least the majority of the funding from others. The funded could come from parking revenue or from local businesses. Transperth can operate any service if funded by others, but would require a long term contract.





Figure 55 A Potential Route for a South Perth Community Bus Service

Source: UBD map modified by GHD

It is recommended that a community bus service be considered for implementation by the City of South Perth to cater for the inter-peak local community trips operating on weekdays from 9:30 am to 3:00 pm. A community bus route would be refined further and developed with a timetable.

A detailed service and implementation plan with a business case should be undertaken to determine the financial viability of a community bus service for South Perth. If considered viable, it could be implemented initially on a trial basis for six months. The continued operation would be determined based on the patronage and the community acceptance of the community bus service.

6.1.4 Future Ferry Network

No new ferry terminal is recommended at the South Perth train station due to the depth of the Swan River in Melville Water and the proximity of the Milyu Nature Reserve as shown in Figure 56. There is a



need however to upgrade the existing Mends Street ferry terminal. This upgrade should include improved disabled access, amenity and shelters.



Figure 56 Opportunities and Constraints for Ferry Services to the South Perth Station Precinct

Need to upgrade the Mends Street ferry terminal

Milyu Maritime Reserve restricts any new development of a ferry terminal on the South Perth foreshore (west of the Kwinana Freeway) but may not necessarily prohibit it.

6.2 Pedestrian Access

It is proposed that the main pedestrian linkage in the South Perth Station Precinct is configured as shown in Figure 57. This arrangement would provide linkage between all the major pedestrian generators including the Perth Zoo, Richardson Park, Mends Street, South Perth Ferry Terminal and the future South Perth train station. Clearly, pedestrians will use other facilities throughout the Precinct, but this main route should be treated as the pedestrian 'arterial'. As such this route should be prioritised for any future footpath infrastructure upgrades. This access strategy should be employed regardless if the South Perth train station is constructed.

A covered pedestrian way was suggested by City staff to be built along Richardson Street from the proposed South Perth train station to Labouchere Road near the entrance of the Perth Zoo. However, this type of infrastructure for a distance of about 300 m would be costly and it is not recommended because commuters to the Precinct and visitors to the Perth Zoo and major events along the South Perth foreshore will likely use umbrellas or the patronage to these venues would be quite low during inclement weather.





Figure 57 Proposed Pedestrian Movements

This pedestrian route has been analysed against a design criteria of existing path condition, surveillance and signage for individual sections as identified in Table 21. These design criteria have been adapted from the Liveable Neighbourhoods Policy developed by the West Australian Planning Commission (WAPC).



Section	Existing Path Condition	Surveillance (e.g. activity, lighting, sightlines etc.)	Signage
Richardson St. Shared Path	Good	Average	Poor
Melville Parade	Average	Average	Poor
Hardy Street	Average	Good	Poor
Labouchere Road	Very Good	Very Good	Average
Windsor Park	Very Good	Average	Poor
Mends Street	Very Good	Very Good	Poor

Table 21 Analysis of Preferred Pedestrian Routes between the Train Station and Ferry Terminal

Path Condition

All sections along the route have an existing pathway. Melville Parade only has a footpath on the eastern side of the road and the footpath and is very narrow. There is potential to upgrade the footpath at this location given the width of the nature reserve. There may also be an opportunity to construct a footpath on the western side of Melville Parade which is currently undeveloped. There are sections of the footpath along Hardy Street where the footpath could be upgraded including an increase in path width. The path along Labouchere Road, Windsor Park and Mends Street is in very good condition.

Surveillance

Existing surveillance along the Richardson Street shared path is average given that there is a park on one side of the path. There is lighting along Richardson Street but is too far from the shared path to be effective. Surveillance could be improved by installing lighting along this section of path through Richardson Park. Any new path constructed along Melville Parade should also include installation for lighting. Surveillance may potentially be an issue through Windsor Park but is considered to be less of an issue given this is a 'high activity' area and provisions for lighting are made along the path through the park.

Signage

The existing wayfinding signage along this route is limited. There is one existing wayfinding sign at the Mends Street/Mill Point Road Intersection. Any future upgrades to wayfinding signage along this route should be made in accordance with the Wayfinding Strategy 2010 developed by J A Grant & Associates and Visualvoice. Indicative locations of wayfinding signage are shown in Figure 58. Additional signs would be required along the Richardson Street Shared Path and through Windsor Park. A concept of the mapping information that would be displayed on the signage is shown in Figure 59.

Examples of pedestrian wayfinding signage that has been successfully implemented at other locations are shown in Figure 60.



Site of future South Perth Station Richardson **D. Station** Park C. 200 Zoo Historic Windsor J. Precinct Park **B.** Historic Precinct ተ Mends St Shops A. Jetty Mends St Jetty

Figure 58 Indicative Location of Wayfinding Signage in the South Perth Station Precinct

Source: Wayfinding Strategy and Sign Concept Designs 2010

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Figure 59 Wayfinding Signage for Pedestrians through the Mends Street Precinct

Source: Wayfinding Strategy & Sign Concept Designs 2010

South Perth Station Precinct Transport and Access Strategy




Figure 60 Examples of Pedestrian Wayfinding Signage

Wayfinding signage along North Terrace in Adelaide, South Australia



Wayfinding signage along pedestrian path in the Botanic Gardens in Adelaide, South Australia

6.3 Cycling Access

The recommendations of the Bicycle Plan are supported by this study and are recommended for implementation. Details of the recommended improvements from the Bicycle Plan relevant to the South Perth Station Precinct including locations and timelines are provided in Section 2.3.2. The Bicycle Plan identifies the potential for cycle lanes or suitable cycling provision on Mill Point Road and Labouchere Road and this is discussed further in the following sections.

Labouchere Road

No formal cycle lanes exist along Labouchere Road so cyclists share the carriageway with other vehicles. Opportunities to provide cycle lanes along Labouchere Road are limited given the existing geometric configuration. The existing lane widths are already approaching minimum widths meaning that the construction of cycle lanes would require encroachment into the footpaths or median. Given that the median contains lighting, the existing median width would have to be maintained. Therefore, the only practical option would be to shift the kerb 1.5 m to allow on-road cycle lanes or provide an off-street shared bicycle / pedestrian path. Either option would result in a significant narrowing of the footpath which may not be a desirable outcome; especially as this footpath is identified as a main pedestrian linkage. Both options would also require the relocating of existing services, which would be very costly and may be impracticable.

The implementation of bus lanes along Labouchere Road south of Mill Point Road, which are not recommended by this study, would provide space for cyclists if shared use of the bus lane was permitted for cyclists.

Mill Point Road

No formal cycle lanes exist along Mill Point Road so cyclists share the carriageway with other vehicles. Similar geometric constraints exist along this section of road. The best opportunity to provide cycle lanes on Mill Point Road is between Onslow Street and Parker Street; instead cyclists are encouraged to use



the PSP along the Swan River, which is a designated shared bike / pedestrian path for commuter and recreational cyclists.



7. Local Area Traffic Management Plan

A local area traffic management plan for the South Perth Station Precinct was developed to improve the traffic flow through the Precinct, to encourage more walking, cycling and public transport usage and to promote safe movement for all users within the Precinct.

7.1 Traffic, Transport and Access Strategy (****)

The infrastructure initiatives recommended for the South Perth Precinct as shown in Figure 61.





Figure 61 Locality Plan for Proposed Infrastructure Improvements (****)

Source: Google map modified by GHD

The following sections provide details for the proposed infrastructure improvements for the South Perth Precinct.

A future bus lane has also been considered along Labouchere Road from Richardson Street to Mill Point Road which would require that this section of Labouchere Road to be reduced from two lanes in each direction to one. Based on the current and predicted peak hour traffic volumes, such a proposal would have a significant impact on road capacity (with the road near its capacity with two lanes in each direction). Accordingly, such a proposal is not considered feasible at this time unless the public transport



patronage during the peak periods increase significantly (i.e. in the order of 40% of commuters to catch public transport) and/or the capacity of the Kwinana Freeway is increased and/or an additional collector road is constructed to provide an additional entry onto the freeway south of Mill Point Road (unlikely).

Notwithstanding, if the City of South Perth is serious about promoting public transport and encouraging its use, then such a proposal should be further considered. However, there would need to be a significant increase in the frequency and capacity of buses to support such a proposal and is likely to receive much negative public reaction if done in isolation to the rest of the City.

7.1.1 Turning Restrictions (****)

There have been a total of three crashes at the Labouchere Road/Charles Street intersection in the past five years. In order to improve safety at this intersection, it is proposed that right turns out of Charles Street onto Labouchere Road are banned. This would require extension of the central median along Labouchere Road and installation of a one-way sign as shown in Figure 62. Motorists would only have to alter their route slightly to undertake a safer right turn using proposed the Labouchere Road/Richardson Street upgrade.

There have also been a total of 11 crashes at the Labouchere Road/Mends Street intersection in the past five years. In order to improve safety at this intersection, it is proposed that right turns from Mends Street onto Labouchere Road are also banned. This would require extension of the central median along Labouchere Road and the installation of a one-way sign as shown in Figure 62.

It is also considered that similar restrictions should apply to the intersection of Bowman Street/Labouchere Road intersection to facilitate developments currently under construction.



Figure 62 Turning Restrictions along Labouchere Road

Labouchere Road/Charles Street Concept Design

Labouchere Road/Mends Street Concept Design

7.1.2 Intersection Upgrades (****)

Traffic signals are proposed at the Labouchere Road/Angelo Street intersection as shown in Figure 63. This will improve the level of service for the high number of vehicles turning right from Angelo Street onto



Labouchere Road in addition to improving the level of service for other right turn manoeuvres. Safety at the intersection would also be improved, particularly in relation to severity. Provision has been made for pedestrian safety through the use of kerb ramps and median splitter islands on the approaches and a pedestrian phase.

Traffic signals are also proposed at the Labouchere Road/Richardson Street intersection as also shown in Figure 63. Traffic signals will improve the level of service for vehicles moving between Richardson Street and Labouchere Road. Safety at the intersection would also be improved for both motorists and pedestrians.







Labouchere Road/Angelo Street - Indicative Traffic Signal layout. This layout would need further investigation and be confirmed by a conceptual drawing.

Labouchere Road/Richardson Street – Indicative Traffic Signal Layout. This layout would need further investigation and be confirmed by a conceptual drawing.

A single lane roundabout has been considered at the Mends Street/South Perth Esplanade intersection. The purpose of this roundabout is to provide traffic calming along the South Perth Esplanade, pedestrian crossing facilities for those accessing the ferry and a U-turn facility for drivers who reach the end of Mends Street and want to return. However, this is not supported by the City of South Perth due to safety concerns for pedestrians. A suggested alternative is therefore a raised plateau through the intersection to slow traffic as shown in Figure 64.

An additional left turn lane for buses only from Labouchere Road onto the Freeway Access Road to access the northbound ramp of the Kwinana Freeway has been considered. However site constraints and subsequent available length of the lane would not be effective and is therefore not recommended.



Figure 64 Mends Street/Perth Esplanade Plateau



Mends Street/South Perth Esplanade Concept Plateau Design

7.1.3 Car Parking Requirements and Policies

If the South Perth train station is implemented, some commuters may want to park and ride in unrestricted parking in the area as all day parking within parking Zone 1 west of Labouchere Road (see Section 4.2). It is proposed that four-hour ticket parking should be introduced between 8 am and 6 pm Monday to Friday to discourage all day parking. Residential parking permits may be required where limited off-street parking exists. This restriction should apply on the following roads (on both sides):

- Bowman Street
- Lyall Street
- Hardy Street
- Charles Street
- Richardson Street
- Melville Parade

Existing parking arrangements within parking Zone 1 west of Labouchere Road should be maintained if no train station is built.

7.2 Other Traffic Management Measures

Consideration has also been given to other traffic calming measures within the local area west of Labouchere Road, such as road humps, roundabouts and slow points. However, given the volumes (and speeds) are low (and are not expected to increase significantly) in the medium/long term and because much of the traffic in the area is local traffic only (i.e. there is no real desire for non-local traffic to use the local streets for a cut-through movement as they do not provide short-cuts to destinations), the installation of any traffic calming is difficult to justify at this time. This is discussed further in Section 7.4.



7.2.1 Mill Point Road/Mends Street Intersection

Recent discussion with the City of South Perth indicates a desire to balance traffic flows between Mends Street and Harper Terrace. The City also would like to create additional space for pedestrians on the south east corner of the intersection to cross Mill Point Road to the Zoo and into the South Perth Station Precinct. The opportunity to remove the left turn movement from Mends Street should therefore be explored to transfer this movement to Harper Terrace and allow increased footpath width.

7.2.2 Movement Restrictions

In discussion with the City off South Perth, the removal of the right hand turn movements into and out of Hardy Street & Lyall Street was raised. The implications on accessibility and traffic reassignment would need to be further considered.

Note: The modification to allow Charles Street as left in/ left out should be deleted if the train station is implemented.

7.3 Broader Transport Initiatives (****)

It is clear from the modelling that forecast traffic volumes by 2031 will result in significant overcapacity of Labouchere Road and access to/from the Freeway. As a result, longer term network improvements will be required together with measures to reduce/manage the travel demand. These broader measures are likely to include the consideration of:

Improved end of trip facilities for cyclists.

Continued improvement of cycle paths and linkages.

Continued improvement of pedestrian paths and linkages.

Improved bus services and frequencies.

Exclusive bus lanes.

Appropriate car parking strategies.

Community bus to serve the precinct and surrounding area and future Station.

Peak hour spreading initiatives.

Carpooling incentives.

High occupancy vehicle lanes.

Development of the Ferry services.

Optimisation of existing signalised intersections.

Optimisation of the broader transport network.

Congestion charging.

Regular Town Planning Scheme reviews.

Regular monitoring of travel demand and impacts.



7.3.1 City of South Perth Model (****)

It is considered that a SATURN/Paramics model or similar would be a valuable tool for the City of South Perth to assess the cumulative impacts of development and allow a consistent approach when preparing transport assessments for DA's. The model would be updated as new development occurs and relevant data supplied to developers.

7.4 Implementation Plan (****)

An Implementation Plan inclusive of high order cost estimates and suggested timeline to implement the recommended transport infrastructure improvements detailed in the previous sections is shown in Table 22. The timeline for implementing these improvements have been developed for the short, medium and long term.



Table 22 Implementation Plan for Proposed Transport Infrastructure Initiatives

Inf	rastructure	*Cost Estimate
Sh	ort Term Improvements (1-3 years)	
•	Left turn in/out and right turn in only between Mends Street to Labouchere Road (extension of Labouchere Road central median)	\$30,000
•	Left turn in/out only between Charles Street onto Labouchere Road (extension of Labouchere Road central median)	\$30,000
•	Left turn in/out only between Bowman Street onto Labouchere Road) (extension of central median) to accommodate developments currently under construction.	\$30,000
₽	Upgrade to South Perth Esplanade	\$350,000
₽	Widen Melville Parade to better accommodate on-street parking	\$200,000
₽	Improved pedestrian and parking way finding signing	\$50,000
•	Investigate replacing current two hour parking and unrestricted free parking in zone with either three or four hour limit	TBD
Ме	edium Term Improvements (5 years)	
•	Upgrade/modification to signalised intersection at Mends Street and Mill Point Road	\$750,000 (TBC)
•	Upgrade/modification to signalised intersection at Mill Point Road and Labouchere Road	\$1,100,000 (TBC)
₽	Traffic signals at Labouchere Road/Angelo Street intersection	\$1,100,000
•	Traffic signals at Labouchere Road / Richardson Street intersection	\$500,000
•	Plateau at Mends Street/South Perth Esplanade intersection	\$30,000
•	Mends Street Streetscaping with two-way street with a slight curvature to promote traffic calming and with no kerb along the footpath. No left turn from Mends Street to Mill Point Road.	Approx. \$1 M
Aa No	ditional suite of Traffic Management Measures for Mill Point Road rth. Priority is short/medium term.	\$1m

*indicative costs only - subject to detailed design

In the short term, the local streets west of Labouchere Road within the South Perth Station Precinct are considered adequate for pedestrian and cyclist activity and for local on-street parking and traffic access. However, as the new office, retail and residential developments are progressively planned and built in the South Perth Station Precinct, the streetscapes could be incrementally modified to accommodate increased pedestrian and cyclist activity, to improve the urban amenity along the footpaths and to provide indented car parking bays and traffic calming treatments as required. The costs of these improvements could be paid for by the developers of each new project in collaboration with the City of South Perth planning and engineering staff. The costs for the City of South Perth to modify these streetscapes should be minimised and have not been specifically itemised in the proposed infrastructure works.



Indicative improvements/upgrades to the streets within close proximity to the proposed South Perth Railway Station, that is, those streets bounded by Labouchere Road, Richardson Street, Melville Parade, Bowman Street (or more correctly, Judd Street) would typically relate to kerb narrowing (or raised thresholds) to curb traffic speed and improve pedestrian accessibility through the precinct and across roads, centralised medians inclusive of landscaping and reticulation, changes to paving at road junctions (i.e. at Labouchere Road), provision of indented car parking bays, and improvements to pedestrian and cycling facilities. A budget of \$600 to \$850K is suggested.



8. Conclusions and Recommendations (****)

The conclusions and recommendations for the transport access strategy for the South Perth Station Precinct are given in this section.

8.1 Conclusions (****)

The South Perth train station is planned to be located within the Kwinana Freeway reserve near the north-west corner of Richardson Park. Access to the station will be mostly by pedestrians who live, work or visit the precinct. The role for the train station is considered to be for commuters to Perth and other metropolitan destinations, for employees to the potential new development close to the station and for visitors to the Perth Zoo and South Perth foreshore.

Traffic and patronage analysis was undertaken for scenarios with and without the South Perth train station in 2016 and 2031.

The roads within the precinct are adequate to accommodate the existing traffic volumes, however the future traffic forecasts from the ROM24 model from Main Roads WA indicates higher levels of congestion will occur in the peak direction. It is clear from the forecast traffic volumes that there will be considerable pressure on Labouchere Road from 2031 should development occur as proposed. The construction of a rail station within the precinct in 2031 is not forecast to reduce traffic volumes significantly compared with the 'No Station' scenario. There will need to be a significant change in travel behaviour to allow the network to operate satisfactorily beyond 2031 to include broader transport initiatives.

It is clear from the modelling that forecast traffic volumes by 2031 will result in significant overcapacity of Labouchere Road and access to/from the Freeway. This study is focussed on the precinct and has not considered the broader impacts including Freeway access in any detail as it outside the scope of this study. However, Freeway access should be subsequently examined to include consideration of the broader regional movements. The Mill Point Road/Labouchere Road site is impacted by access to the Kwinana Freeway which is already congested during the am peak hour. Without a major capacity upgrade to the Kwinana Freeway and access ramps to it, modification to this intersection in isolation will provide limited benefits to performance. As a result, longer term network improvements will be required together with measures to reduce/manage the travel demand. These broader measures are identified in Section 8.2.

It is clear from current and forecast traffic volumes there should be no downgrading of Labouchere Road (Angelo Street to Mill Point Road) from the current cross section which includes (mostly) two lanes in each direction.

The peak period patronage to the train station on a typical weekday is forecast to be much lower than the other stations on the Perth to Mandurah railway line. The train patronage from the STEM modelling indicates that the typical weekday train patronage in 2016 and 2031 will range from 700 to 800 passengers which are only about 16 to 18 per cent of the total daily patronage. This indicates that the majority of the public transport patronage will still be by bus or ferry to the South Perth Station Precinct even after a new station is built. However, the role for the South Perth train station will be most important for visitors to access the Perth Zoo and to attend major events, such as the Skyshow, on South Perth foreshore. When the large pedestrian movements occur, streets leading from the train station to the Perth Zoo and the South Perth foreshore will require traffic and pedestrian management plans for safe crowd control.



The traffic and access strategy was developed by considering the traffic, parking management, bus operations, and the pedestrian and cyclist movements through the South Perth Station Precinct with and without the South Perth train station both now and in future years.

In order to encourage safer traffic movements along Labouchere Road, measures to slow down the traffic, especially near areas where there are (existing or expected) high levels of pedestrian and cyclist movement, were considered. These areas are located along the principal desire line for pedestrian movement between the Mends Street ferry jetty, through Windsor Park to the Perth Zoo and continuing along Charles Street or Richardson Street to Melville Parade where the proposed train station would be built. The implementation of traffic signals at the intersection with Richardson Street would provide benefit for pedestrians.

Within the Mends Street retail precinct, traffic calming is proposed with the implementation of a street design with no kerbs and a slight curvature in the alignment that would allow improved footpath amenities with more seating, public art and landscaping along both sides of the street. This would provide a more attractive street for pedestrians while maintaining the on-street parking and the two-way traffic flow.

A raised plateau at the northern end of Mends Street (at the South Perth Esplanade) opposite the ferry terminal is proposed to provide more convenient access to improve traffic calming, and improve pedestrian amenity/safety.

Legibility for pedestrians and cyclists through the South Perth Station Precinct is good however could be enhanced by an additional Wayfinding sign to the Zoo at the entrance to Windsor Park.

Parking management is an issue within the Precinct, especially during special events at the Perth Zoo and along the South Perth foreshore. Patrons to these events should be encouraged to use public transport so that traffic and parking issues are minimised. Once the South Perth train station has been installed, 'park and ride' activity needs to be discouraged to provide car parking for local businesses, local residents and other visitors to the area. All day parking restrictions are proposed with the introduction of four-hour ticket parking (on weekdays, 8 am – 6 pm) in the local surrounding streets.

Consideration was given for the introduction of community bus service in the City of South Perth. A potential route was developed with a loop connecting Mends Street and the ferry terminal, the Old Mill, Perth Zoo, the future South Perth train station, the South Perth library and Council offices and the shopping precinct and supermarket in Angelo Street. The community bus service could be operated every 30 minutes on weekdays from 9:30 am to 3 pm using a mini bus with seating for up to 10 to 15 passengers. If the bus service was provided free with no fare collection, it would need to be subsidised by Council with revenue from rates or parking charges within the South Perth Station Precinct. However, nominal fares could be charged for passengers or it could operate with a "gold" coin donation.

8.2 Recommendations (****)

Measures to manage the travel demand by encouraging more use of public transport, pedestrian and cycling to and within the precinct are proposed.

Key recommendations for transport access and road safety with traffic calming to and within the South Perth Station Precinct have been proposed as part of a staged implementation plan and are listed in Table 23.



Proposed Traffic Control	Location	Cost *	Priority (Short 1-3 years Medium 5 years
Median closure allowing left turn in/out only and right turn in only	Labouchere Road/Mends Street	\$30,000	Short
Median closure allowing left turn in/out only	Labouchere Road/Charles Street	\$30,000	Short
Median closure allowing left in/out turn only	Labouchere Road/Bowman Street	\$30,000	Short
Traffic signals (Civil works upgrade)	Labouchere Road/Angelo Street	\$1,100,000	Medium
Traffic signals (Minimal civil works)	Labouchere Road/Richardson Street	\$500,000	Medium
Raised Plateau	Mends Street/South Perth Esplanade	\$30,000	Medium
Streetscaping and traffic calming	Mends Street	Approx. \$1M	Medium
Widen Melville Parade to better accommodate on- street parking	Melville Parade	\$200,000	Short
Improved pedestrian and way finding signing	To and from zoo (and new train station if built)	\$50,000	Short
Investigate replacing current two hour parking and unrestricted free parking in zone with either three or four hour limit	Lyall Street, Hardy Street, Charles Street, Richardson Street, Melville Parade	TBD	Short
Upgrade to South Perth Esplanade parking and cycling facilities	South Perth Esplanade	\$350,000	Short
To improve pedestrian phasing and access to Mill	Mill Point Road/Labouchere Road	\$1,100,000 TBC (in conjunction with Main Roads)	Medium

Table 23 Recommended Infrastructure Upgrades with Indicative Costs and Priorities (****)

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South Perth Station Precinct Transport and Access Strategy



Proposed Traffic Control	Location	Cost *	Priority (Short 1-3 years Medium 5 years
Point Road North (from Mill Point Road East)			
To improve pedestrian phasing and performance	Mill Point Road/Mends Street	\$750,000 TBC (in conjunction with Main Roads)	Medium
Additional suite of Traffic Management Measures	Mill Point Road North.	\$1M (TBC)	Short/Medium

* Costs high order only, estimated using concept design only – more exact costs cannot be determined until detailed design undertaken. Costs for any services implications are unknown.

In the short term, the local streets west of Labouchere Road within the South Perth Station Precinct are considered adequate for pedestrian and cyclist activity and for local on-street parking and traffic access. However, as the new office, retail and residential developments are progressively planned and built in the South Perth Station Precinct, the streetscapes could be incrementally modified to accommodate increased pedestrian and cyclist activity, to improve the urban amenity along the footpaths and to provide indented car parking bays and traffic calming treatments as required. The costs of these improvements could be paid for by the developers of each new project in collaboration with the City of South Perth planning and engineering staff. The costs for the City of South Perth to modify these streetscapes should be minimised and have not been specifically itemised in the proposed infrastructure works.

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It is recommended that a community bus service be considered for implementation by the City of South Perth to cater for the inter-peak local community trips operating on weekdays from 9:30 am to 3:00 pm. A community bus route would be refined further and developed with a detailed timetable.

A detailed service and implementation plan with a business case should be undertaken to determine the financial viability of a community bus service for South Perth. If considered viable, it could be implemented initially on a trial basis for six months. The continued operation would be determined based on the patronage and the community acceptance of the community bus service.

It is further recommended that major initiatives are further pursued by the City and transport agencies to include:

Improved end of trip facilities for cyclists.

Continued improvement of cycle paths and linkages.

Continued improvement of pedestrian paths and linkages.



Improves bus services and frequencies.

Exclusive bus lanes.

Appropriate car parking strategies.

Community bus to serve the precinct and surrounding area and future Station.

Peak hour spreading initiatives.

Carpooling incentives.

High occupancy vehicle lanes.

Development of the Ferry services.

Optimisation of existing signalised intersections.

Optimisation of the broader transport network.

Congestion charging.

Regular Town Planning Scheme reviews.

Regular monitoring of travel demand and impacts.

It is considered that a SATURN/Paramics model or similar would be a valuable tool for the City of South Perth to assess the cumulative impacts of development and allow a consistent approach when preparing transport assessments for DA's. The model would be updated as new development occurs and relevant data supplied to developers.



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