

## Salisbury Town Centre Revitalisation

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### Transport Assessment Report

Prepared for: City of Salisbury  
Date: 28 June 2012



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|------------------|--------------|---|----------------|--------|-------------|----------|---------|
| Report Title     |              | Transport Assessment Report   |                |        |             |          |         |
| Document ID      |              |   | Project Number |        | 217729      |          |         |
| File Path        |              | P:\217729\Admin\Rep\final report\Salisbury Transport Assessment Report.docx |                |        |             |          |         |
| Client           |              | City of Salisbury   | Client Contact |        | Greg Waller |          |         |
| Rev              | Date         | Revision Details/Status   | Prepared by    | Author | Verifier    | Approver |         |
| 1                | 31 May 2012  | Internal review   | RB             | RB/MH  | RH          |          |         |
| 2                | 8 June 2012  | Draft for Client Review   |                | RB/MH  | RH          | RS       |         |
| 3                | 28 June 2012 | Final for Client  |                | RB/MH  | RH          | RS       |         |
|                  |              |   |                |        |             |          |         |
| Current Revision |              | 3   |                |        |             |          |         |



# Contents

|  |           |
|--|-----------|
| <b>1. Introduction</b>                   | <b>1</b>  |
| 1.1 Study Context                        | 1         |
| 1.2 Project Objectives                   | 1         |
| 1.3 Scope of the Study                   | 2         |
| 1.4 Project Study Area                   | 3         |
| 1.5 Study Process                        | 3         |
| <b>2. Existing Assessment</b>            | <b>4</b>  |
| 2.1 Road Network                         | 4         |
| 2.1.1 Arterial Roads                     | 4         |
| 2.1.2 Local Roads                        | 5         |
| 2.2 Traffic Operation                    | 5         |
| 2.3 Parking                              | 5         |
| 2.4 Public Transport                     | 6         |
| 2.5 Cycling and Pedestrians              | 6         |
| <b>3. Town Centre Structure Plan</b>     | <b>7</b>  |
| 3.1 Objectives and Planning Principles   | 7         |
| 3.2 Scenarios                            | 8         |
| 3.3 Recommended Scenario                 | 8         |
| 3.3.1 Development profile                | 9         |
| 3.3.2 Transport Infrastructure           | 11        |
| <b>4. Parking Strategy</b>               | <b>13</b> |
| 4.1 Review of previous parking studies   | 13        |
| 4.2 Proposed Master Plan                 | 14        |
| 4.3 Master Plan Parking Strategy         | 14        |
| 4.4 Future Parking Demand                | 16        |
| <b>5. Transport Modelling Assessment</b> | <b>18</b> |
| 5.1 Introduction                         | 18        |
| 5.2 MASTEM – Saints Road Assessment      | 18        |
| 5.2.1 Model Review                       | 18        |
| 5.2.2 Model Comparisons                  | 19        |
| 5.2.3 Conclusion                         | 20        |
| 5.3 Aimsun Modelling                     | 21        |
| 5.3.1 Base Model                         | 21        |

|           |                                      |           |
|-----------|--------------------------------------|-----------|
| 5.3.2     | Future Scenarios                     | 22        |
| 5.3.3     | Future Traffic demands               | 23        |
| 5.4       | Aimsun Modelling Outcomes            | 24        |
| 5.4.1     | Model Operation Comparison           | 24        |
| 5.4.2     | Network Statistics                   | 27        |
| 5.4.3     | Traffic Volume comparisons           | 29        |
| 5.4.4     | Bus Operation                        | 31        |
| 5.4.5     | Summary                              | 33        |
| <b>6.</b> | <b>Transport Infrastructure Plan</b> | <b>35</b> |
| 6.1       | Road Network                         | 35        |
| 6.1.1     | DPTI Roads                           | 35        |
| 6.1.2     | City of Salisbury Roads              | 36        |
| 6.2       | Public Transport                     | 37        |
| 6.2.1     | Option Assessment                    | 37        |
| 6.2.2     | Preferred Operation                  | 37        |
| 6.3       | Implementation Plan                  | 38        |
| <b>7.</b> | <b>Summary</b>                       | <b>39</b> |

## Appendices

### Appendix A

Structure Plan Development Profiles

### Appendix B

Saints Road Extension Traffic Volumes

### Appendix C

Saints Road Select Link Plots

### Appendix D

Existing Aimsun Calibration Report

### Appendix E

Bus Operation Comparison Graphs

### Appendix F

Scheme Drawings



# 1. Introduction

Aurecon has been engaged by the City of Salisbury (Council) to undertake a Traffic Modelling and Local Network Strategy study for the Revitalisation of the Salisbury Town Centre (STC).

The City of Salisbury is undertaking a Structure Planning Study that will result in the Revitalisation of the Salisbury Town Centre. The transport planning and traffic modelling inputs to the master planning process will provide a level of confidence that an integrated solution is tailored to meet the objectives of the Revitalisation.

A successful Structure Plan for the Town Centre will be seen as providing an accessible road network with reduced levels of congestion and improved accessibility, designed to reduce car use and using the latest environmental sustainable practices to increase the levels of walking and cycling as transport modes and to provide high levels of permeability and legibility.

## 1.1 Study Context

The Salisbury Town Centre is a strategic centre earmarked as a Transit Oriented Development by the State Government as part of its 30 Year Plan for Greater Adelaide. As a result the Town Centre has been subject to a master planning process. With the future investment in transport infrastructure and development interests from private sector, the opportunity to build on to its strengths and enhance its vitality has been investigated.

The Salisbury Town Centre Revitalisation Project will assess the opportunities and constraints for the Salisbury Town Centre. It will develop a policy framework and action plan to guide existing and future land uses while enhancing economic, social and environmentally sustainable development opportunities. The project will take a pragmatic approach in ensuring that the outcomes can be implemented particularly in relation to recognising the commercial reality associated with strategic property development objectives. This development of the Structure Plan has been undertaken by Hames Sharley in consultation with City of Salisbury and Leedwell Strategic.

A broader master planning approach to the Salisbury Town Centre will ensure integrated planning and delivery of various elements that would contribute to the “vitality” of the Salisbury Town Centre.

## 1.2 Project Objectives

The City of Salisbury has commenced a Master Planning process for the Salisbury Town Centre. A focus of the Master Planning process for this year will be the development of a Structure Plan for the Town Centre and include a Council Property Development Strategy. The outcome of both projects will be to define a future investment strategy for the Town Centre that will continue after completion of the structure plan outcome.

Accessibility is a key element to good urban design. An integrated transport network that facilitates the objectives of the revitalisation of the Town Centre is the desired outcome. The City of Salisbury in partnership with the Department of Planning, Transport and Infrastructure (DPTI) recognise the need for the development of a transport model that informs the development of the structure planning process and future investments in the Centre.





**Figure 1 – Study area**

### **1.3 Scope of the Study**

The original scope of the traffic modelling and local network strategy as indicated in the Study Brief included the following:

- Model the regional network effect of the Saints Road extension to increase the opportunity to capture passing traffic to the Salisbury Town Centre.
- Model the existing local network condition, and provide a current assessment of the network report at a technical level.
- Provide input to the draft structure plan development process by contributing at both internal staff workshops and community workshops.
- Model the structure plan options generated including the outcomes of the Saints Road review, and develop a report on these options identifying opportunities, constraints and first order costings.
- Model the preferred structure plan outcome and develop a local road network strategy in conjunction with the structure planning program and strategic property developments identified in the master planning process.
- Assess the options developed for the proposed future operation and concept plan developed by DPTI for the Salisbury Interchange with particular focus on Park Terrace and Gawler Street.

During the Study the above scope was changed to reflect the additional requirement of the Council and stakeholders to provide a Parking Strategy with the Master Plan.



## 1.4 Project Study Area

The extent of the study is based upon the need to identify two objectives.

The assessment of the likely impacts of the Saints Road extension on the **regional network** and specifically on traffic entering the Town centre:

- Park Terrace
- Commercial Road, and,
- Salisbury Highway

The assessment of the opportunities associated with the structure planning process to the **local network** servicing the Town Centre including the local streets within that network including:

- John Street
- Gawler Street
- James Street
- Church Street
- Mary Street
- Ann Street
- Wiltshire Street
- Ponton Street

## 1.5 Study Process

The study was undertaken in five key phases as indicated below:

1. Undertake Strategic Modelling of the Saints Road extension to determine if benefits warrant inclusion into the Structure Plan;
2. Undertake existing Aimsun model development and assessment of existing transport conditions. The key deliverable was the Aimsun Calibration report which was accepted by DPTI;
3. Assist Hames Sharley with the development of the Structure Plan for the Town Centre
4. Develop a high level Parking Strategy for the Town Centre based on the agreed Structure Plan;
5. Undertake Aimsun modelling of the transport infrastructure for the preferred Structure Plan scenario, including assessing options for John Street and bus services.

## 2. Existing Assessment

### 2.1 Road Network

#### 2.1.1 Arterial Roads

The arterial network in the study comprises three main routes as indicated below:

**Salisbury Highway:** This road is a major north south road that connects Salisbury and Elizabeth with the metropolitan area. It is a four lane divided road with minimal access between Park Terrace and Gawler Street. The remaining sections provide direct access to abutting properties. Traffic volumes are typically in the order of 40,000 vehicles per day

**Park Terrace:** This road is a major east-west road that connects Salisbury Highway with Main North Road. The cross section of this road varies with two lanes in each direction. It is a four lane divided road with minimal access between Park Terrace and Wiltshire Street and east of Fenden Road. A wide single lane section occurs between Wiltshire Street and Fenden Road. Direct access is provided to abutting properties. Traffic volumes typically vary between 19,000 and 23,000 vehicles per day.

**Commercial Road:** This road connects Park Terrace with John Rice Avenue and is one of the key access roads to Edinburgh Parks and Elizabeth industrial areas. It is a two lane un-divided road with direct access along its full length. Traffic volumes are typically in the order of 10,000 vehicles per day.

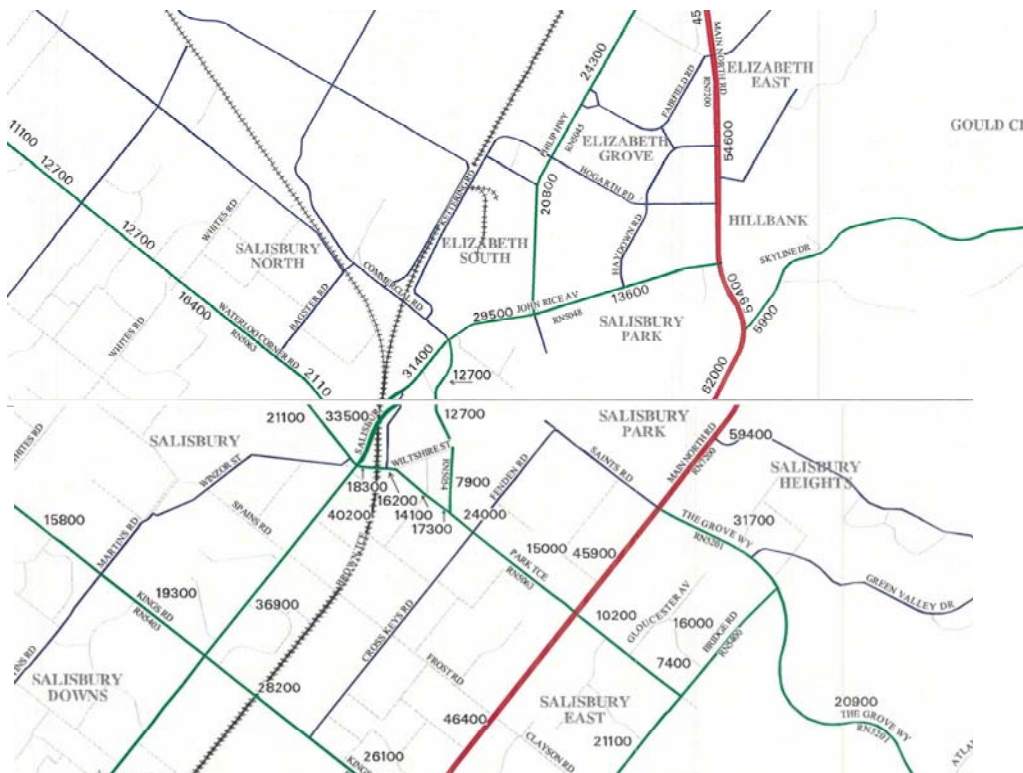
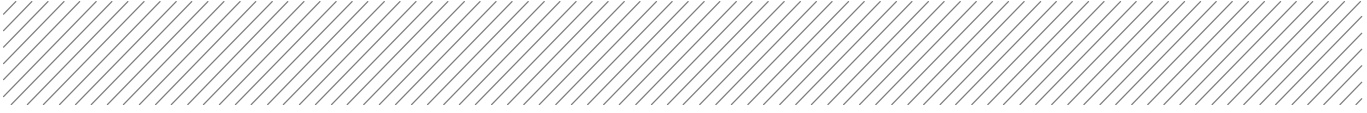


Figure 2 – Daily Traffic volumes (Source DPTI)





Waterloo Corner Road and John Rice Avenue whilst forming part of the study area do not impact on traffic operation. The daily traffic volumes for the area are shown in Figure 2.

### **2.1.2 Local Roads**

The key local roads that provide access to the Town centre are Wiltshire Street, Gawler Street and John Street. The local road network in the Town Centre comprises two lane undivided roads, except for a section of John Street between Gawler Street and Ann Street which is 1-way travelling in an easterly direction.

On-street parking is provided on all of the roads, although it is restricted in some sections to provide for bus stops or increased footpath width. Bicycle lanes are only provided on a short section of Gawler Street north of Park Terrace to John Street.

## **2.2 Traffic Operation**

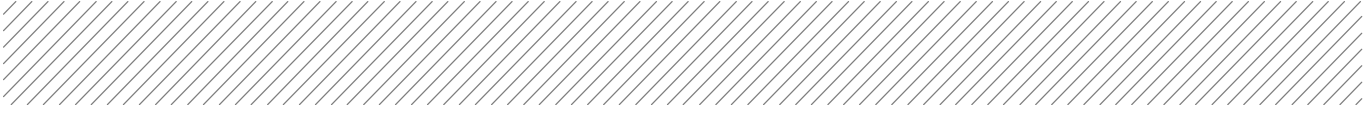
Vehicular travel patterns around the Town Centre are very much influenced by the constraints which exist. These include:

- The one way access along the major portion of John Street requires traffic to circulate more than necessary.
- Access along Park Terrace in the vicinity of the rail crossing and the impact this has on roads like Gawler Street and Wiltshire Street within the local network.
- The lack of a clear or indirect access around the immediate CBD area. On the northern side this is affected by the undeveloped nature of Commercial Road and the proximity of the Little Para River. On the southern side access is compromised by the rail crossing and the lack of crossing opportunities this presents.
- The inadequacy of Ponton Street to handle the significant volumes emanating on a daily basis from the eastern suburbs.
- In addition to the above it is clear that the city does indeed have peak travel flows in both the morning and afternoon periods suggesting that significant activity is being generated by travel to and from work in the CBD and the major Schools within the area on Park Terrace and Commercial Road. These peaks highlight the delays and deficiencies when trying to gain access to roads like Ponton Street and Gawler Street in the local network and Main North Road, Commercial Road, Park Terrace and Salisbury Highway in the major network. Currently attempts to manage this via traffic signal phases, is not working effectively.

## **2.3 Parking**

The existing parking demand has been briefly assessed based on the QED Report (dated September 2003) and review of aerial photography over the last 3 years. The key points of this review are:

- The Judd and Sexton Street car parks appear to be fully utilised.
- The car parks on the western and southern side of Parabanks are also well utilised and so are the car parks located to the western side of Gawler Street (primarily with the interchange).
- The eastern Parabanks car park appears to be 60 to 80 % utilised, with the northern car park only 20% utilised.
- The private car parks located on the businesses between John and Wiltshire Streets vary in utilisation but overall they are well utilised (greater than 70%)



The review of the parking data and previous reports indicates that within the core area of the Town Centre a large proportion of the available car parking spaces is still being used for long term parking, in particular by workers. The QED study of 2003 surveyed 183 staff of businesses within the Town Centre and indicated a strong unwillingness to walk further than 2 minutes from a car park to their intended destination. Whilst this is a small sample of the employees in the Town Centre it is reinforced by parking surveys that show a high occupation rate in centrally located car parks and low occupancy of the parking areas on the fringes of Town Centre. This equates to a desire to walk less than 150 m, and as such it would be ideal to locate parking facilities within 100m of the destinations for employees, shoppers and residents.

## **2.4 Public Transport**

The Town Centre is well served by public transport and in addition to the rail and bus interchange bus routes through the city centre exist via Gawler Street, James Street, Church Street, Wiltshire Street and the eastern end of John Street. However there are many routes and the Passenger Transport Services Division of DPTI have indicated this has resulted in confusion with some users of the system. Facilities at bus stops and the connections to bus stops via the network of paths are considered substandard and need to be significantly improved, particularly for disabled users.

## **2.5 Cycling and Pedestrians**

In respect to the provision of pedestrian and cycling access this is not prevented to any degree but connectivity is often disrupted due to either the spread of facilities or inconsistencies in the quality and continuity of footpaths that exist.

### ***Pedestrian***

The following observations have been made regarding pedestrian movement around the Salisbury Town Centre:

- Facilities are considered satisfactory within the Town Centre area
- The pedestrian network is considered underutilised, particularly its connections to surrounding community facilities. This due to the poor state or lack of facilities in some locations and a lack of signage indicating particular locations within the Town Centre
- There are particular issues with connectivity across Salisbury Highway / Rail Corridor particularly safety.
- The rail crossing and Park Terrace provides an impediment to north south movement along the rail corridor

### ***Cyclist***

Major links to external routes from the Town Centre do exist as part of the Local Area Bicycle Plan, reviewed in 2006, and cover a number of roads including Cross Keys Road, Saints Road and Fenden Road where dedicated bicycle lanes exist. However within the core area only a short section of Gawler Street provides on-road bicycle lanes.

These are further supplemented by the local road network as part of the “bike direct” initiative where local roads are used to add to the network on the basis that local roads with low traffic volumes are safer for cycling access. Specific “bicycle lockers” are provided at the Salisbury interchange.

### 3. Town Centre Structure Plan

This section briefly outlines the structure planning process undertaken to provide the relevant inputs into the detailed Aimsun modelling of the preferred Structure Plan. The Structure Plan was prepared by Hames Sharley, together with separate report that outlines the process together with recommendations on how to implement the plan. The following section briefly summarises key components of the structure plan that impact on the transport modelling study.

#### 3.1 Objectives and Planning Principles

The key project objectives for the revitalisation of the Salisbury Town Centre have been developed by the overall project team and include:

**Objective A – Sustainable Capital Investment** – Ensure that any capital investment is underpinned by a sustainable return on investment

**Objective B – Market Acceptance** – Ensure that the adopted strategies to reposition the Town Centre are underpinned by a structure that the market will support, participate in and invest capital / human resources

**Objective C – Appropriate Spatial Framework** – An appropriate spatial framework (structure plan and precinct development) will be developed in conjunction with the local community and key stakeholders

**Objective D – Fosters Social Vitality** – Fostering social vitality is a key to establishing community ownership on a variety of levels

**Objective E – Environmental Sustainability** – Ensure the Salisbury Town Centre can adapt to future variations in climate condition and does not detrimentally affect the environment and still achieve the renewal outcomes

**Objective F – Embody Flexibility** – Ensure the strategy remains flexible, such that development is promoted where it satisfies the criteria identified in the implementation strategy.

These objectives have been created to compare and assess high level structure plan options that will in turn inform the economic rationale for the implementation strategy.

Extensive community, government agency and key stakeholder consultation was undertaken by the Structure Plan project Team. This consultation provided a basis for a number of community aspirations that have been translated into project objectives as well as planning principles that underpin the preparation of the structure plan options. These planning principles are highlighted below.

1. Provide progressive leadership and being economically deliverable;
2. Has a consolidated core;
3. Is framed by a legible and easy to understand movement network
4. Provides active and functional public spaces and streets;
5. Cultivates social vitality and environmental sustainability
6. Has a flexible, responsive built form and density framework

## 3.2 Scenarios

Three structure plan scenarios have been developed in line with the above Planning Principles. These scenarios are briefly described below.



**Figure 3 – Structure Plan Scenarios**

### *Scenario 1 – Revitalise the Current Heart of the Salisbury Town Centre*

In this scenario future development is focussed around John Street with minimal changes elsewhere in the Town Centre.

### *Scenario 2 – Reinforce and Extend the Heart of the Salisbury Town Centre*

In this scenario future development is focussed around John Street and an extended Church Street with higher density developments surrounding these roads. The road hierarchy is modified so that John and Church Streets become high/main streets.

### *Scenario 3 – Relocate the Heart of the Salisbury Town Centre to the Interchange*

The focus of future development moves to the west closer to the rail interchange with high density developments located close to the new core.

The three scenarios were assessed against the project objectives and with Scenario 2 the preferred scenario, which was also supported by the community.

## 3.3 Recommended Scenario

The recommended structure plan is shown in Figure 6 and has the following key elements:

- Improve pedestrian connectivity within and surrounding the Salisbury Town Centre
- Improve the road network to facilitate movement into the Salisbury Town Centre
- Create a focus for civic development
- Bring green space into the Salisbury Town Centre

- Create active frontages along Church and John Streets
- Provide active frontages surrounding the Civic Square as well as softening the landscaping to promote use
- Create opportunities for development of key sites
- Increase densities within the Salisbury Town Centre
- Provide opportunities to establish residential and mixed-use developments to increase the permanent resident population within the Salisbury Town Centre
- Develop entrance statements at key entry points surrounding the Salisbury Town Centre
- Simplify bus movement and facilitate stronger linkages between the Town Centre and an upgraded transport interchange



**Figure 4 – Preferred Structure Plan**

### 3.3.1 Development profile

In developing the structure plan consideration was given by the project team to the level of development that could be supported within the Town Centre. On this basis the following was developed by Hames Sharley that would be used in assessing the transport infrastructure:



**Tier 1 Sites** - Considered to be sites that require no significant intervention from Council - rather they are controlled by a single entity and require innovative procurement strategy/ market thirst to facilitate and should be undertaken within a 3 year time frame;

**Tier 2 Sites** - Considered to be sites that can be availed for development within a 3 to 7 year period, however may require intervention from local/State Government, and

**Tier 3 Sites** – Considered to be sites that are held tightly, or difficult to establish a quantum of site area. These sites are unlikely to occur in the short term but are desirable to underpin the long term viability of the Town Centre development, and should be undertaken after 7 years.



**Figure 5 – Location of Development Sites**

Figure 5 above shows the location of the various sites within the Town Centre with Appendix A providing the expected levels of development including provision of parking for each location. A summary for each tier of development is provided in Table 1 below.

**Table 1: Summary of Development Profile**

|                       | Retail (m2)  | Commercial (m2) | Medium rise residential | Low density residential | aged care residential |
|-----------------------|--------------|-----------------|-------------------------|-------------------------|-----------------------|
| Tier 1 Total          | 14063        | 27224           | 399                     | 34                      | 0                     |
| Tier 2 Total          | 20182        | 4600            | 1192                    | 120                     | 302                   |
| Tier 3 Total          | 16328        | 4725            | 739                     | 0                       | 0                     |
| <b>Combined Total</b> | <b>50573</b> | <b>36549</b>    | <b>2330</b>             | <b>154</b>              | <b>302</b>            |

### 3.3.2 Transport Infrastructure

The proposed Structure Plan has identified a range of improvements to the road network, public transport operation and pedestrian / cycling connectivity. A list of the key components is provided below.

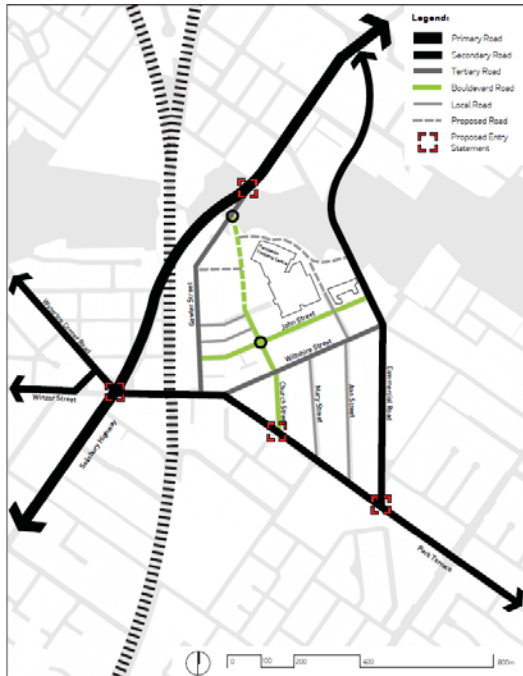
#### Pedestrian Network



#### Key Actions

- Strengthen existing links from the Salisbury Town Centre to open spaces and key destinations
- Establish a legible, connected pedestrian network that identifies strategic/historic sites within the Salisbury Town Centre through an interpretive walk
- Provide visual and physical amenity to pedestrians
- Ensure safety through passive surveillance and active frontages
- Augment pavement treatment
- Ensure accessibility to all

## Vehicle Network



### Key Actions

Extension of Church Street to Salisbury Highway, becoming the primary North-South link within Salisbury Town Centre

Creation of a ring road to the north of Parabanks

Extension of Ann Street to the ring road

John Street remains one-way, possibly becoming two-way in the long-term to maximise efficiency

High quality gateway statements at key entry points

## Public Transport Network

### Key Actions

Update interchange and simplify bus movement

Assess options for bus movement on Wiltshire Street or John Street

Provide a bus stop that services the core area of the Town Centre

## 4. Parking Strategy

This section details the development of the Parking Strategy for the Salisbury Town Centre. It includes a review of existing conditions and reports, development of the key principles and assessment of the parking associated with the proposed Structure Plan.

### 4.1 Review of previous parking studies

Previous parking studies have been reviewed as part of developing a future parking strategy for Salisbury Town Centre including:

- Salisbury Town Centre Parking and Implementation Strategy (PPK Consultants, 1993)
- Salisbury Town Centre: Technically, are there enough parks? (Author unknown, undated)
- Salisbury Town Centre Car Parking Review (QED, 2003)
- Salisbury Town Centre Car Park Review (Luke Gray, 2011)

These studies were solely based on the current or past layout of the Town Centre and as such many of the findings would not be relevant to a drastically changed future Salisbury Town Centre. However, the problems that would remain unchanged are the needs of the local people, habits, preferences and their opinions on all things parking. The elements of the previous studies that will be relevant to the future Town Centre are summarised below.

#### Parking supply and demand

- Surveyed shortfall of short term parking spaces during peak times in the Core area.
- Encourage employees away from short term central parking to long term remote locations.
- Employees unlikely to walk further than 100 m to 200 m unless short term parking incurs a charge and long term is free.
- Staff using central parking areas, up to 60% of all spaces of individual car parking areas.

#### Utilisation of private car parks.

- No integrated parking between businesses.
- Shared-use of parking facilities to be encouraged through pedestrian and vehicle interconnections between private parking areas.
- Encourage shared use of parking as 60% of shoppers visited only one business, with 22% visiting 3 or more.
- A shared use discount of 20% may be applied to parking demand calculations. To be considered when developing a Parking Plan.

#### New parking areas.

- Provide new parking areas particularly to the west of Gawler Street.
- Provide decked parking on Parabanks.

#### Parking rates / Restrictions / Controls.

- Development Plan rates - parking rates over estimating parking demand.
- Introduce permit system for STC and traders
- Most convenient parking limited to 1 hour. Including Sexton Car Park.

- Suggest introduction of pay and display for on-street parking in most convenient locations, e.g. John Street, for a maximum stay of 30 minutes to encourage higher parking turnover.
- Least convenient parking limited to 4 hours. (PPK 1993)
- Paid Parking - Staff and shoppers unwilling to pay for safe and secure parking.
- Whilst encouraging the growth of Salisbury Town Centre paid parking should be limited to the most convenient locations. After a sustained period of growth parking charges could be introduced to manage parking demand more effectively.

Connectivity.

- Poor pedestrian links.
- Good quality pedestrian links between car parks and from car parks to key destinations to be provided.
- Safety and security and adverse weather cited in survey as a deterrent to walking between parking areas and destination.
- Provide covered and well lit footpaths on main pedestrian paths from parking areas to town centre and other key destinations.
- Surveyed willingness to walk: with 54% less than a 1 minute walk or 75 m and 30% less than 2 minute walk (150 m).
- 100 m should be considered a reasonable distance to walk from car to destination.

## 4.2 Proposed Master Plan

Three options were considered for the Salisbury Town Centre Master Plan with the preferred scenario to reinforce and extend the heart of the Centre. It has indicated that car parking be provided behind buildings to maintain active frontages. This could include provision of multi-deck car parks in specific locations to underpin development as well as ensuring that visitors walk within the centre to provide opportunities for further street activation.

Three tiers were used to support the Master Plan with Tier 1 being of highest priority (next 3 years) and located close to existing heart of the Town Centre. Tier 2 locations have a medium priority and hence development could be expected to occur in 3 to 7 years with Tier 3 locations to be developed after 7 years. The proposed locations are shown in Figure 5.

## 4.3 Master Plan Parking Strategy

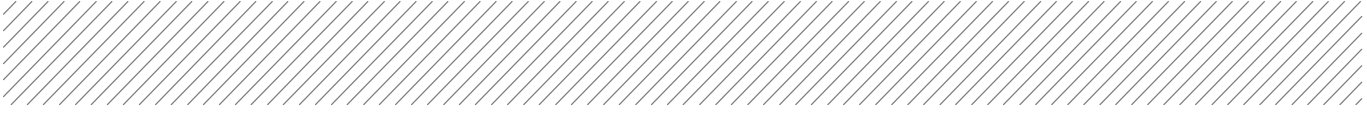
The parking strategy should aim to utilise car parking as a tool to activate the distinctive precincts of Salisbury Town Centre whilst providing a safe, connected, economically viable, and an integrated car parking outcome. The Salisbury Town Centre will need to be an attractive and convenient place to live and shop when compared to other district centres; this need for convenience requires a parking strategy that accommodates the parking demand to within reasonable levels.

Key principles in formulating the car parking strategy are as follows:

### Long Term car parking

Where practical provide separate facilities for long term parking on the periphery of the Town Centre. This will free up spaces in the core area for short term parking associated with retail and other uses. Possible locations include the hotel car park just west of the rail station, the DPTI car park west of the rail line south of Park Terrace and the current under-utilised spaces in Parabanks northern car park (Short term only). It is also suggested that any sites that could be redeveloped in the area between





Wiltshire Street and Park Terrace also be considered for long term parking. A key requirement for all of these sites is to ensure that pedestrian movement to the core area is safe and convenient.

### **On-street parking**

Encourage short term high turnover parking along John Street and Church Street including its extension to Gawler Street. It should be noted that parking restrictions of less than 1 hour are difficult to enforce by patrolling parking enforcement officer marking tyres. Parking meters with pay and display tickets provide a quicker means of identifying vehicles flaunting parking regulations. Charge users for the most convenient on-street parking spaces with maximum stay of 30 minutes but provide free or smaller fee for all-day parking in a more remote location. This will deter employees parking all day or shuffling between short term parking areas.

### **Development Parking**

The Structure Plan indicates various locations for mixed use development. These typically occur where there is existing at-grade parking. For these sites the following should be considered:

- Separate out residential parking (but not visitor) from other uses with retail parking provided in basements and/or rooftop depending on development.
- Where practical the parking associated with retail uses should be located close to the retail uses
- Use of parking rates comprising a value range to allow for future flexibility in development strategies and determination.
- Interconnect individual parking areas for separate developments, primarily at basement level.
- Allow vehicles to utilise all available parking spaces to facilitate the shared use of parking spaces, taking advantage of the differing peak parking demands of different land uses.
- Group together land uses that have non-competing peak parking demands to further facilitate shared parking.
- Contribution to a car parking fund where a particular development provides a net loss in overall number of car parks including existing spaces.

In addition to limit parking supply, consideration should be given to adopting lower rates for provision of parking for developments located within the core area of the Town Centre.

### **Alternative Parking Arrangements**

To reduce the overall parking demand consideration should be given to:

- New residential development to provide share pool cars to reduce car dependency with a resultant reduction in parking demand.
- In the long term consider parking tariffs for staff car parking areas.
- Promote sustainable transport modes.
- Develop an associated financial plan to test the viability of a multi-deck car park including consideration of a Car Parking Fund and the effect of pricing.
- Annual monitoring of parking trends to establish parking rates and factors that can be incorporated into a parking plan, including:
- Survey of TOD parking trends (demand and utilisation / turnover) with the results defining the Salisbury Town Centre parking rates.
- An inventory of parking provision as land is developed.

#### 4.4 Future Parking Demand

The future parking demand was estimated using data provided by Hames Sharley, which the location, development type, floor areas, and approximate number of parking spaces available on each site for Tier 1 to Tier 3 sites.

Due to the difficulty in predicting future parking scenarios, high, medium and low parking demands have been considered as follows:

1. High - based on the current Salisbury (City) Development Plan (DP).
2. Medium - Planning SA Parking Bulletin – Parking Provisions for selected land uses (2001).
3. Low - based on the parking rates used for the Bowden Urban Village Master Plan transport orientated development (TOD).

The lower TOD parking rates represent a more sustainable transport policy that is gaining momentum in all levels Government and is a specific principle of the 30-Year Plan for Greater Adelaide.

The parking rates stipulated in the current Salisbury (City) Development Plan (DP) are considered high as recent data of parking demand for land uses in district centres indicates that the DP rates are relatively high compared to items 2 and 3 above.

The parking demand scenarios are shown in Table 2.

**Table 2: Parking Demand Rates**

| Land Use | High<br>(Salisbury Development Plan rates)  | Medium<br>(Planning SA Parking rates)       | Low<br>(TOD rates)                            |
|----------|---|---|---|
| Dwelling | 2 per dwelling                              | None given assumed 1.5 per dwelling.        | 1 per dwelling                                |
| Office   | 4 per 100m <sup>2</sup> of total floor area | 4 per 100m <sup>2</sup> of total floor area | 1.5 per 100m <sup>2</sup> of total floor area |
| Retail   | 7 per 100m <sup>2</sup> of total floor area | 5 per 100m <sup>2</sup> of total floor area | 3 per 100m <sup>2</sup> of total floor area   |

It should be noted that other land uses typically associated with a town centre, such as restaurants, gymnasiums, consulting room were not indicated by Hames Sharley. Consequently these uses have not been considered as part of the parking demand calculation.

The number of parking spaces provided on-site, the high, medium and low parking demand, the surplus or deficit of parking (provided on-site parking less the parking demand) and the number of parking spaces lost to development based on total capacity and current utilisation are summarised in Table 3.

**Table 3: Summary of Parking Demand, Supply and Balance**

| Tier         | Parking provision of developed areas | Loss of existing parking due to developed land | High Parking Demand | Parking provision less High parking demand | Medium Parking Demand | Parking provision less Medium parking demand | Low Parking Demand | Parking provision less Low parking demand |
|--------------|--------------------------------------|--|---------------------|--|-----------------------|--|--------------------|---|
| Tier 1 Total | 1,373                                | 474 (474)                                      | 2,948               | -1,575                                     | 2,444                 | -1,071                                       | 1,267              | 106                                       |
| Tier 2 Total | 3,436                                | 1,620 (745)                                    | 4,828               | -1,392                                     | 3,615                 | -179   | 2,290              | 1146                                      |
| Tier 3 Total | 1,234                                | 421 (374)                                      | 2,952               | -1,718                                     | 2,161                 | -927   | 1,371              | -137                                      |
| <b>Total</b> | <b>6,053</b>                         | <b>2,515 (1,593)</b>                           | <b>10,728</b>       | <b>-4,685</b>                              | <b>8,221</b>          | <b>-2,178</b>                                | <b>4,928</b>       | <b>1,115</b>                              |

The loss of existing parking due to developed land indicated in column 2 in the above table has to components; the first is the total number of car park spaces lost, whilst the number in brackets refers to the number of existing utilised spaces that could be lost.

Key points from the table are:

- For the high and median demand scenarios the number of parking spaces provided by the developable areas does not satisfy the parking demand, with a shortfall ranging between 4,700 and 2,200 spaces.
- This shortfall increases to between 3,800 and 6,300 spaces if the loss of existing car parking is taken into account.
- There is a surplus of 1,110 car parks if the low (or TOD) demands are used. However there would be a shortfall of 480 spaces if the loss of existing car parking is taken into account.

In addressing the shortfall, consideration should be given to providing the extra car parking either side of Church Street (including its extension to Gawler Street) or increasing the number of levels of car parking for the Judd Street site. The provision of the extra car parks around the existing Church or John Street sites would benefit areas of existing need.

## 5. Transport Modelling Assessment

### 5.1 Introduction

This section details transport modelling undertaken for the study, which comprises two parts as indicated below:

- MASTEM strategic modelling of the impacts of providing the Saints Road Extension
- Aimsun microscopic modelling of the existing conditions, future modelling of options and the recommended scheme in the vicinity of the Town Centre area.

### 5.2 MASTEM – Saints Road Assessment

This assessment has been undertaken using DPTI's strategic transport model MASTEM model for metropolitan Adelaide. The study area for the MASTEM model is shown in Figure 6 below. It extends from Main North Road in the east to Bagsters Road in the west, John Rice Avenue to the north and just south of Park Terrace.

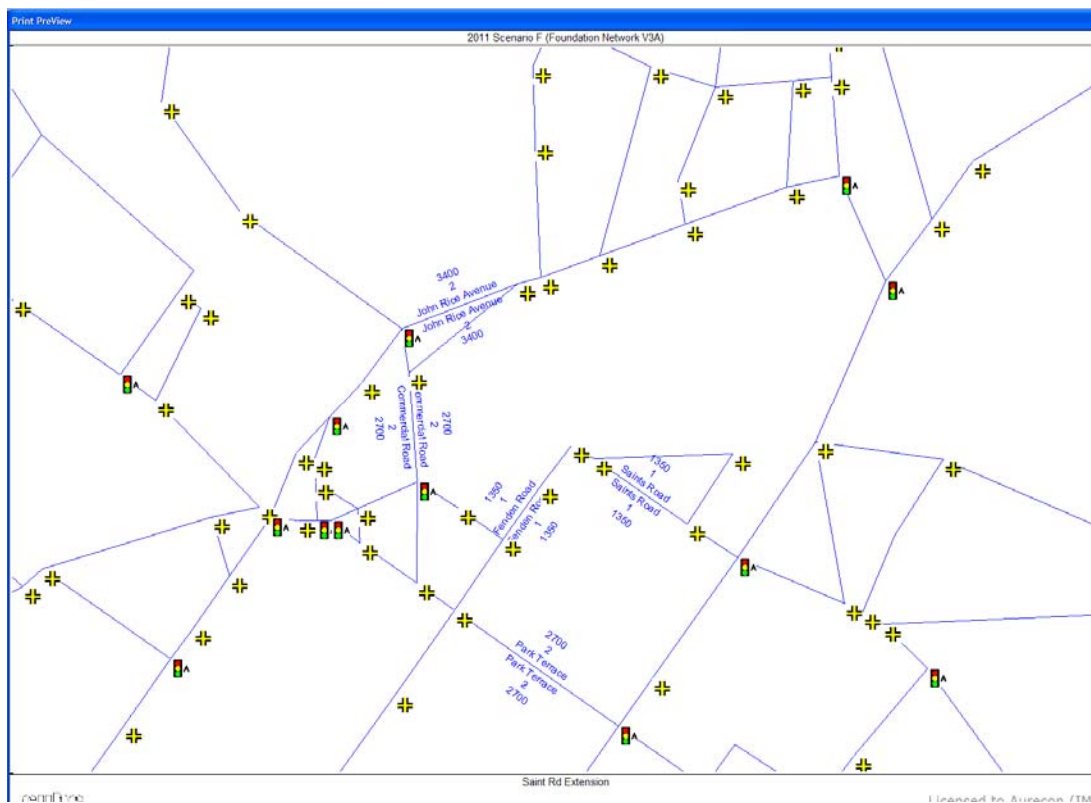
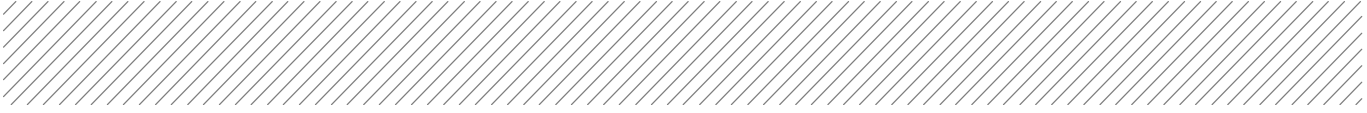


Figure 6 – Model area

#### 5.2.1 Model Review

The Base Model was reviewed to ensure appropriate linkages and intersection treatments were coded into the model. The review highlighted that there was no connection of Bagsters Road from Waterloo Corner Road to Commercial Road. This link is considered essential in providing traffic movements to the Edinburgh Parks area and has been included in the model.



The initial model indicated a daily volume in the order of 2,500 vehicles per day (vpd) on Ponton Street compared to the traffic count of about 7,500 vpd. This is not considered unexpected as the MASTEM model has the zone for the Salisbury Town Centre being located south of Park Terrace with connections to the road network on Park Terrace at Commercial Road and Salisbury Highway. The result of these connections is that the amount of through traffic within the study area is considered appropriate. However the traffic into the Town Centre is considered low with minimal traffic on Gawler Street.

Further refinement of the model has shown a better distribution of traffic into the Town Centre by making modifications to the locations of the zone centroid connector (relocated to James Street) and the actual zone (shifted further north). As a result of these changes traffic now enters the Town Centre area from Gawler Street, Waterloo Corner Road and Wiltshire Road. Based on the revised layout it is estimated that the daily traffic on Ponton Street would be in the order of 6,000 to 6,500 vehicles per day.

The Saints Road Extension was then added to the Base Model for the above mentioned networks. This new road connection extended from the current Saints Road / Fenden Road junction to the Commercial Road / Wiltshire Street signalised intersection. Ponton Street was realigned to form a junction with the new road. The new road consisted of a single lane in each direction with a travel speed of 60kph.

### **5.2.2 Model Comparisons**

Two methods have been used to assess the traffic impacts of the Saints Road Extension; link and screen line volumes, and select link assessment. The assessment was undertaken for both the AM and PM peak periods.

#### **Volume Assessment**

The volume assessment reviewed data on the road links along Saints Road and Commercial Road and across three screen lines (west of Main North Road, west of Fenden Road and west of Salisbury Highway).

The AM peak link volumes without and with the Saints Road Extension in 2011 are shown in Appendix B. They indicate the volume on the new link is 604 and 245 vehicles per hour (vph) in the westbound and eastbound directions respectively. There is an increase of 205 vph in the westbound (peak) direction on Saints Road just east of Fenden Road. In the PM peak the corresponding volumes are 162 and 576 vph for west and eastbound directions, with about a 60 vph increase in the eastbound direction on Saints Road.

The model indicates that the AM peak traffic volume increases from 713 in 2011 to 807 vph two-way in 2031. A slightly larger increase occurs for the PM peak from 738 to 846 vph (two-way). On this basis the daily traffic volume on Saints Road Extension is expected to be in the order of 7,000 to 7,500 vpd in 2011 and is expected to increase to about 8,500 vpd in 2031.

A review of the volumes indicates that the majority of volume on the new link is a straight transfer from traffic that was using Ponton Street and Park Terrace. The model shows that with the Saints Road extension no traffic is using Ponton Street in either direction.

Traffic volumes across three screen lines have been reviewed and they indicate the following changes in traffic patterns during the AM peak:

- At Main North Road - an increase of 160 vph in the westbound direction on Saints Road and 80 vph decrease on Park Terrace,



- At Fendon Road – an increase of 110 vph in the westbound direction on Saints Road and 65 vph decrease on Park Terrace, and
- At Salisbury Highway – an increase of 70 vph on Commercial Road and a decrease of 60 vph on Waterloo Corner Road in the westbound direction. Note there is also a 80 vph reduction in the southbound volume on John Rice Avenue.

Similar changes occur in the PM peak in the eastbound direction but the changes in volumes are lower with only an 80 vph increase on Saints Road west of Main North Road

The traffic volume changes indicated above are typically within 5 to 15 percent of the model link volume.

### Select Link Assessment

The select link assessment provides an indication of the origin and destination of traffic using a road link in the model as well as the route chosen to use the particular link. In this assessment it has been used to identify the origins and destinations of traffic using the proposed Saint Road Extension.

The assessment indicates the majority of traffic using the proposed link has an origin to the east of Main North Road along the Grove Way road corridor. However the destination of traffic is essentially a 50 / 50 split between the Town Centre and Elizabeth/Edinburgh Parks. A review of the traffic entering the Town Centre zone indicates that there is a slight reduction of 30 vph in traffic entering the zone from the east. However at Saints Road (east of Fenden Road) there is a 100 vph increase in traffic entering the Town Centre with a decrease of 60 vph along Park Terrace. This indicates that the additional traffic the Saints Road extension is attracting is not destined to the Town centre but beyond to Edinburgh Parks / Elizabeth.

For the PM peak the split favours traffic from the Town Centre with approximately 60% of the traffic on Saints Road extension. The traffic volumes indicate that there is no change in traffic entering the zone from the east. As for the AM peak there is a slight increase of 20 vehicles in traffic on Saints Road from traffic generated by the Town Centre again transferred from Park Terrace.

Appendix C provides the outputs of the select link assessment for the 2011 and 2031 AM and PM peak periods. The 2031 select link plots indicate that the distribution of traffic changes between 2011 and 2031. For 2031 the directional split between the Town Centre reduces to approximately 30% in both peak periods.

### 5.2.3 Conclusion

DPTI's MASTEM model has been used to identify the traffic demands for the proposed Saints Road Extension. The original model had to be revised to better distribute traffic to the Salisbury Town Centre.

Traffic volume on the proposed link is expected to be in the order of 7,000 to 7,500 vpd in 2011 and increasing to 8,500 vpd in 2031. Peak traffic volume (one-way) on the Saints Road Extension is expected to increase from 604 vph in 2011 to 715 vph in 2031.

The modelling indicates that the proposed Saints Road Extension caters for traffic travelling to the Salisbury Town Centre and Edinburgh Parks / Elizabeth South from Salisbury East / Golden Grove. The traffic on the proposed extension is primarily traffic diverted from Ponton Street and Park Terrace, and to a lesser extent from John Rice Avenue. The review of traffic patterns indicates that the provision of the Saints Road Extension does not increase traffic flow into the Town Centre.

## 5.3 Aimsun Modelling

The Aimsun modelling comprises two parts; the first is the development of a base model with the second part identifying and testing of options. The models have been developed to reflect both the morning and evening peak periods and with dynamic route capability to reflect the vehicle route choice and their reaction to the prevailing traffic conditions. This provides an additional level of confidence regarding the Salisbury model operation in calibration and more importantly option testing.

A separate report provides the details of the Base model calibration (Appendix D) and option testing assessment. Summaries of these reports are provided below.

### 5.3.1 Base Model

Stage 1 of this process was the development of a fully calibrated/ validated base Aimsun model reflecting existing traffic conditions. The subsequent stages assess the future probable schemes and associated traffic generation/ growth associated with the Salisbury Town Centre.

The base Aimsun model has been developed reflecting traffic conditions in the morning period, 07:00-09:30 and evening period, 15:00-18:00, replicating observed traffic conditions for the year 2011.

The road network was constructed and calibrated utilising the Aimsun microscopic traffic simulation software. Detailed coding of lane and junction descriptions were developed using aerial photographs of the region, on-street measurements and knowledge of the network operation. During the calibration process, model parameters have been adjusted, to improve model operation.

The first stage of the model build was to ascertain the traffic movements through the study area. These were derived from the higher tier MASTEM modelling with a cordoned trip matrix extract reflecting the Aimsun study area. Development of the matrices utilised traffic count data to derive appropriate trip matrices for both the morning and evening periods.

The second stage involved comparisons of observed and the modelled data comparing the following statistics:

- Turn counts
- Link counts
- Screenline counts

Lastly the validation process centred on the following elements:

- Journey time analysis
- Queue length assessment

The analysis concludes that the Aimsun Salisbury Town Centre model is appropriately calibrated/ validated reflecting existing conditions for both peak periods. Therefore it is considered that the model is a suitable tool to analyse the performance and connectivity issues and to test the proposed actions associated with the local road network within the study area.

### 5.3.2 Future Scenarios

The following future scenarios have been assessed for this study. They have been agreed to by DPTI and Council.

|               |   |
|---------------|---|
| 2021 Base     | 2021 model without development  |
| 2021 Option 1 | 2021 model with all Tiers of development provided, bus movement along Wiltshire Street and John Street operation as existing  |
| 2021 Option 2 | 2021 model with all Tiers of development provided, bus movement along Wiltshire Street and John Street with two-way operation |
| 2021 Option 3 | 2021 model with all Tiers of development provided, bus movement along John Street and John Street two-way operation           |

All the option models contained the following infrastructure requirements:

#### Road Infrastructure

##### DPTI Roads

- Commercial Road – provide new junction with the Ring Road and a painted median from Park Terrace a to new junction with the Ring Road
- Park Terrace – provide new signalised junction with Church Street and modify the Gawler and Wiltshire Street junctions to provide bus priority to the Interchange

##### Council Roads

- Extend Church Street from Jane Street to Gawler Street
- Provide traffic signals at the Church Street / Park Terrace intersection including change in layout for Gawler Street
- Provide Ring Road behind Parabanks Shopping Centre to connect with Ann Street and Commercial Road
- Extend Ann Street from John Street to the Ring Road
- Provide a connection between Gawler and Church Streets north of the existing Council office.

#### Public Transport

- Train frequency as per requirements of the electrification project at 7.5minute frequencies in both directions
- Bus routes all routes were to use Wiltshire or John Streets for the respective options. However for bus services using Salisbury Highway / Gawler Street, they travel along the Ring Road and Ann Street.
- A single stop provided between Church and Ann Streets
- For the Wiltshire Street bus services (Options 1 and 2) a bus lane is provided from just north of Park Terrace to the entry into Gawler Street.
- For John Street (Option 3) bus services would enter the interchange via new roadway directly in line with John Street

Figure 7 provides a pictorial view of the model.

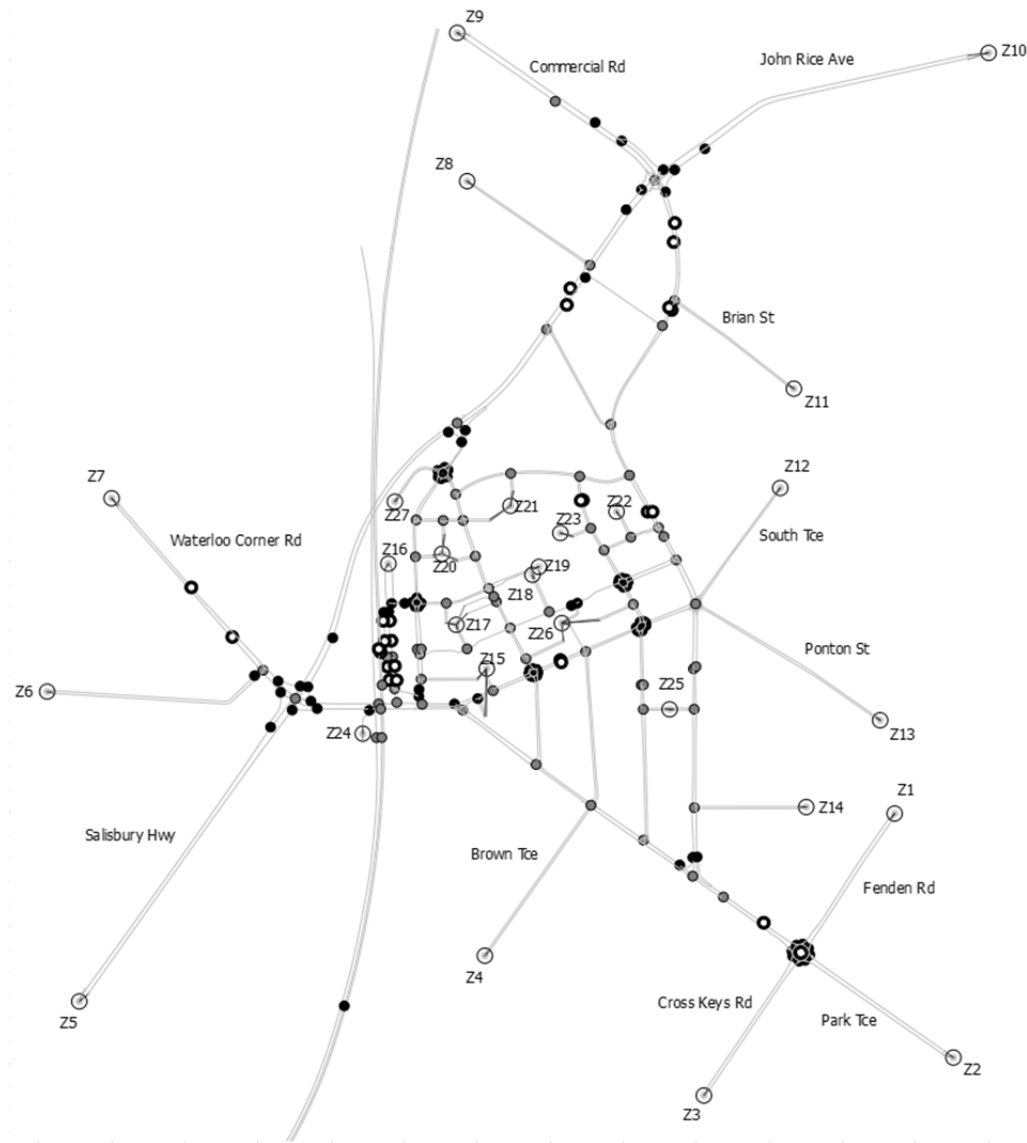
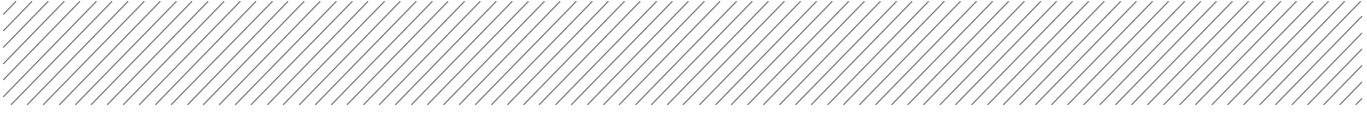


Figure 7 – 2021 Aimsun Model, general layout

### 5.3.3 Future Traffic demands

The future traffic demands for the 2021 base model were determined from DPTI's MASTEM model. For the options the traffic demands were based on the development profile estimated by Hames Sharley for the proposed Structure Plan. The total development for the structure plan was provided as follows:

- Residential development – 2,886 units with 2,330 medium density residential and 330 aged care
- Commercial development – 36,550 m2 of office space
- Retail development – 50,550 m2 of retail development which includes cafes, restaurants and shopping



The following rates were used to estimate the total number of AM and PM peak hour trips generated by the above development:

- Residential rates range from 0.2 trips per unit for aged care to 0.6 trips per unit for medium density residential
- Commercial rate is 2 trips per 100m<sup>2</sup> of office space
- Retail rate is 8 trips per 100m<sup>2</sup> of retail space.
- The retail trips were reduced by 20% to account for shared usages
- The retail rate for the AM peak is assumed to be 25% of the PM peak rate due to the reduced number of shoppers.

The generated traffic (3,080 and 5,380 trips in the AM and PM peak hour respectively) was assigned to each of centroids as the Structure Plan indicated the location of individual developments within the Town Centre. The distribution of traffic was assumed to be the same as the Salisbury Zone in the MASTEM model.

These additional demands were then added to the 2021 Base model to provide the OD trip matrix for the Aimsun assessment. In addition some minor changes were made to the MASTEM traffic patterns as it appeared there was a significant increase in traffic travelling to Winzor Street. This traffic was redirected to Salisbury Highway. This was also undertaken for Ponton Street and with some minor redirection to Park Terrace.

## **5.4 Aimsun Modelling Outcomes**

### **5.4.1 Model Operation Comparison**

A visual comparison of the three models indicates that the traffic operation is similar for all the models and is primarily determined by the operation of the signalised intersections along Salisbury Highway (Park Terrace, Gawler Street and Commercial Road) and the Park Terrace rail crossing. The roads within the Town Centre area operate satisfactorily during both peak periods. However there are times when congestion levels are high for short periods. Typically the congestion clears within 10 to 15 minutes.

Screen shots of the model at specific times during the peak periods are shown in Appendix B and a number provided in the following figures below to highlight specific locations.

#### **Gawler Street / Salisbury Junction**

For all options there are times within the peak periods where there is significant congestion at this location. Primarily it is caused by

- a) high turn volumes entering / exiting Gawler Street;
- b) insufficient phase time provided at the traffic signals, but particularly to the right turn out to head north and
- c) the large number of buses turning at this location.

The queues block through traffic along Salisbury Highway and Gawler Street. Along Gawler Street the queues extend back to the junction with the Church Street Extension and restrict traffic flow along the Ring Road.



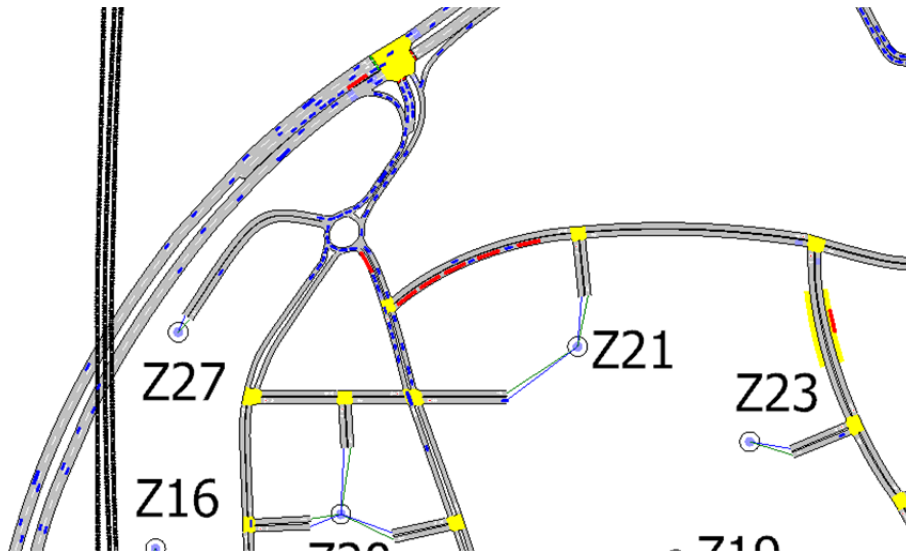


Figure 8 – 2021 Option 1 Model, morning peak

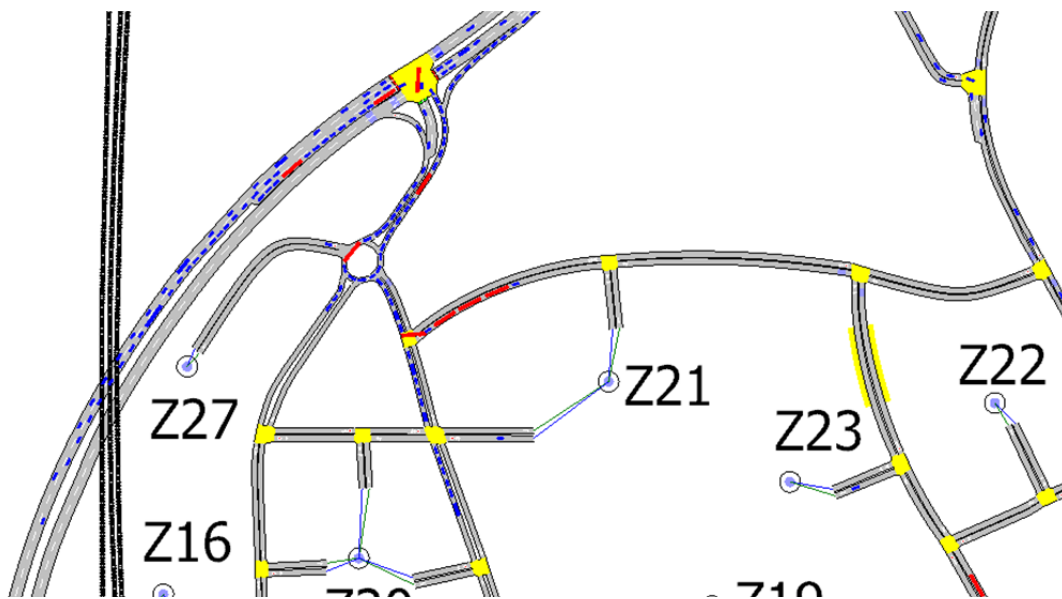


Figure 9 – 2021 Option 3 Model, morning peak

### Wiltshire Street Bus lane

For Options 1 and 2 the proposed bus lane for Wiltshire Street results in increased congestion along a short section of the street and is exacerbated by the operation of the Park Terrace rail crossing. Typically the congestion is for short periods of time. In some instances the location of the bus stop between Church and Mary Streets results in buses queuing and blocking car traffic.

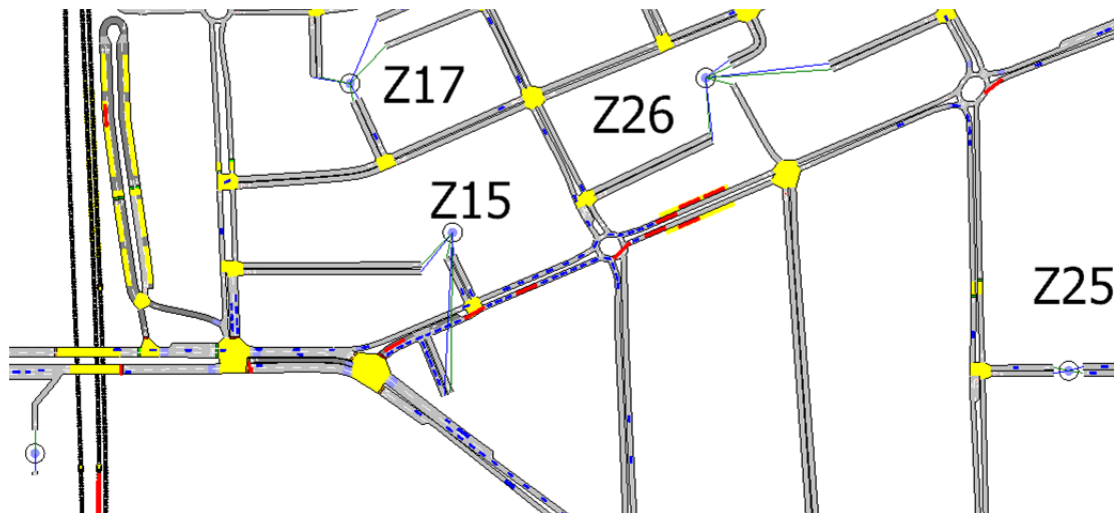


Figure 10 – 2021 Option 2 Model, evening peak

### Commercial Road / Ring Road junction

For all options this junction was coded with no storage lane to reduce impact on the Little Para River bridge. However, for all options there are periods where vehicles wishing to undertake a right turn into the Ring Road delay through traffic travelling along Commercial Road. In some instances the queues from this location extend back to Bridge Street.

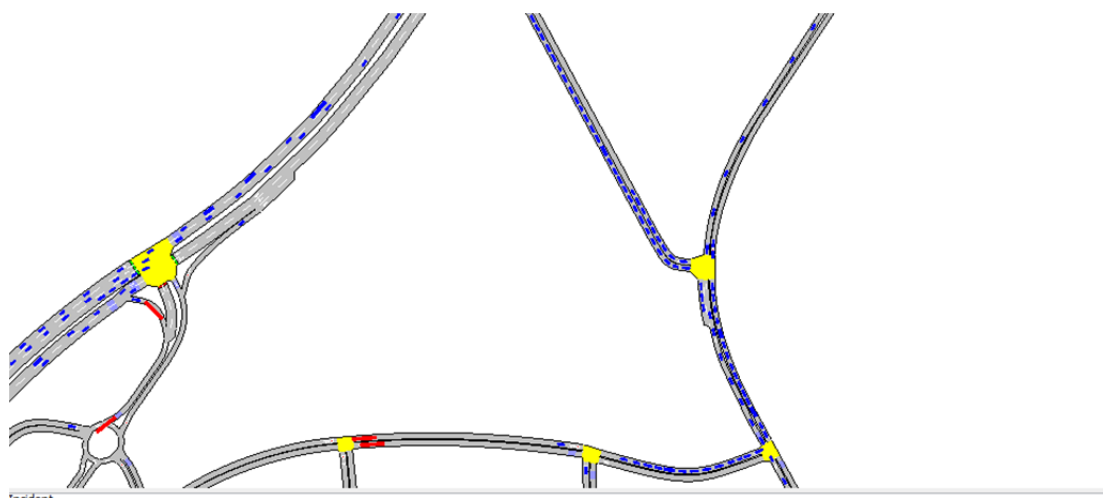


Figure 11 – 2021 Option Model, morning peak

### Park Terrace Rail Crossing

In the both peak periods the impacts of the rail crossing results in significant delays / congestion along Park Terrace east of the rail crossing and on the Salisbury Highway / Park Terrace intersection. Typically the queues along Park Terrace extend beyond Wiltshire Street and in the worst cases the queues can extend back to Commercial Road. However it was noted that the queues did clear within a five to ten minute period.

The delays at the Salisbury Highway intersection did impact on movement eastbound on Park Terrace as vehicles were queued along Waterloo Corner Road and on the left and right turns into Park

Terrace. These queues took longer to dissipate as the signals catered for the primary north south movement along Salisbury Highway.

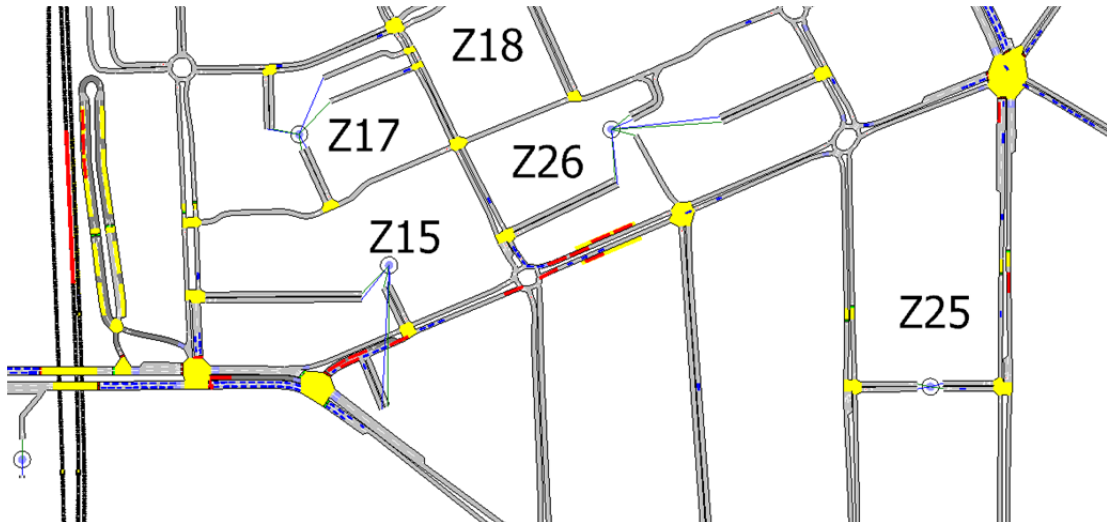


Figure 12 – 2021 Option 1, evening peak

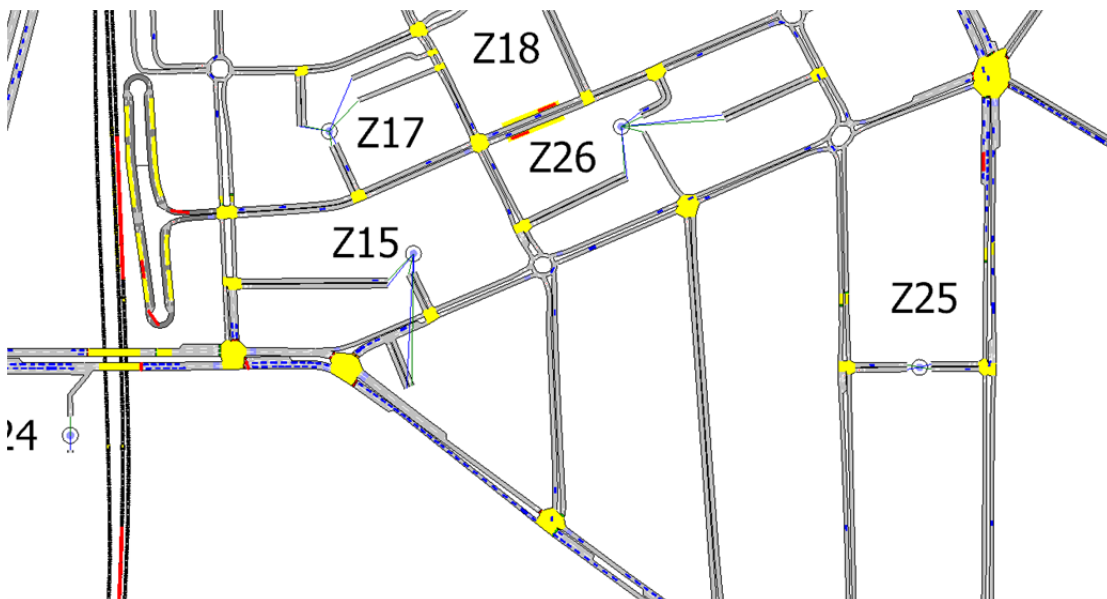


Figure 13 – 2021 Option 3 morning peak

#### 5.4.2 Network Statistics

The overall network delay, travelled distance, number of vehicles, speed, unreleased vehicles (number of vehicles that cannot enter the network) and lost vehicles are compared between the three options.

The coefficient of variance values which indicate the relative stability of the models varies between in the AM and PM peaks, typically the value should be less than 5%. However for this assessment we have selected five replications that run smoothly in all three models as well as both peak periods.

Consequently this value has a greater range. As shown in **Table 4**, the overall network statistics are very similar between the three options in the AM peak period.

**Table 4 – 2021 Network Statistics in Morning Peak (08:00-09:00)**

| Morning Peak | Mean Delay (sec/km) |             |             | Total Distance (km) |             |             | Total Number Vehicles (veh/h) |             |             |
|--------------|---------------------|-------------|-------------|---------------------|-------------|-------------|-------------------------------|-------------|-------------|
|              | Option 1 AM         | Option 2 AM | Option 3 AM | Option 1 AM         | Option 2 AM | Option 3 AM | Option 1 AM                   | Option 2 AM | Option 3 AM |
| MEAN         | 168                 | 164         | 160         | 4,498               | 4,482       | 4,523       | 8,922                         | 8,946       | 8,985       |
| STD DEV      | 10                  | 11          | 16          | 43                  | 18          | 47          | 87                            | 65          | 127         |
| MIN          | 156                 | 152         | 142         | 4,429               | 4,454       | 4,442       | 8,860                         | 8,848       | 8,852       |
| MAX          | 180                 | 179         | 179         | 4,546               | 4,496       | 4,561       | 9,068                         | 9,020       | 9,148       |
| RANGE        | 24                  | 27          | 37          | 117                 | 42          | 119         | 208                           | 172         | 296         |
| CoV          | 5.7%                | 6.5%        | 10.1%       | 1.0%                | 0.4%        | 1.0%        | 1.0%                          | 0.7%        | 1.4%        |
|              | Mean Speed (km/h)   |             |             | Unreleased Vehicles |             |             | Lost Vehicles                 |             |             |
|              | Option 1 AM         | Option 2 AM | Option 3 AM | Option 1 AM         | Option 2 AM | Option 3 AM | Option 1 AM                   | Option 2 AM | Option 3 AM |
| MEAN         | 28                  | 29          | 28          | 128                 | 129         | 107         | 24                            | 18          | 16          |
| STD DEV      | 0                   | 0           | 1           | 32                  | 39          | 13          | 2                             | 2           | 5           |
| MIN          | 28                  | 28          | 27          | 94                  | 91          | 93          | 22                            | 14          | 12          |
| MAX          | 29                  | 29          | 29          | 158                 | 193         | 127         | 27                            | 20          | 22          |
| RANGE        | 1                   | 1           | 2           | 64                  | 102         | 34          | 5                             | 6           | 10          |
| CoV          | 1.6%                | 1.2%        | 3.8%        | N/A                 | N/A         | N/A         | N/A                           | N/A         | N/A         |

**Table 5** shows that the 2016 Option model has a slightly higher mean delay than the 2016 Do-Min model in the PM peak period.

**Table 5 – 2021 Network Statistics in Evening Peak (17:00-18:00)**

| Evening Peak | Mean Delay (sec/km) |             |             | Total Distance (km) |             |             | Total Number Vehicles (veh/h) |             |             |
|--------------|---------------------|-------------|-------------|---------------------|-------------|-------------|-------------------------------|-------------|-------------|
|              | Option 1 PM         | Option 2 PM | Option 3 PM | Option 1 PM         | Option 2 PM | Option 3 PM | Option 1 PM                   | Option 2 PM | Option 3 PM |
| MEAN         | 81                  | 88          | 80          | 4,881               | 4,903       | 4,901       | 9,842                         | 9,940       | 9,904       |
| STD DEV      | 4                   | 6           | 4           | 32                  | 49          | 29          | 78                            | 85          | 66          |
| MIN          | 78                  | 77          | 76          | 4,850               | 4,823       | 4,859       | 9,716                         | 9,852       | 9,828       |
| MAX          | 87                  | 91          | 86          | 4,929               | 4,943       | 4,940       | 9,928                         | 10,068      | 9,972       |
| RANGE        | 10                  | 14          | 10          | 79                  | 120         | 80          | 212                           | 216         | 144         |
| CoV          | 4.6%                | 6.7%        | 4.5%        | 0.7%                | 1.0%        | 0.6%        | 0.8%                          | 0.9%        | 0.7%        |
|              | Mean Speed (km/h)   |             |             | Unreleased Vehicles |             |             | Lost Vehicles                 |             |             |
|              | Option 1 PM         | Option 2 PM | Option 3 PM | Option 1 PM         | Option 2 PM | Option 3 PM | Option 1 PM                   | Option 2 PM | Option 3 PM |
| MEAN         | 30                  | 30          | 31          | 2                   | 21          | 9           | 19                            | 22          | 19          |
| STD DEV      | 0                   | 1           | 0           | 3                   | 24          | 9           | 6                             | 7           | 8           |
| MIN          | 30                  | 29          | 30          | 1                   | 1           | 0           | 12                            | 15          | 8           |
| MAX          | 31                  | 31          | 31          | 7                   | 55          | 18          | 29                            | 32          | 27          |
| RANGE        | 1                   | 1           | 1           | 6                   | 54          | 18          | 17                            | 17          | 19          |
| CoV          | 1.5%                | 1.8%        | 1.0%        | N/A                 | N/A         | N/A         | N/A                           | N/A         | N/A         |

### 5.4.3 Traffic Volume comparisons

Traffic volumes on key roads within the modelled area have been compared and indicated in Tables 6 and 7 below for the AM and PM peak periods respectively. It should be noted that these volumes are average volumes recorded from 5 different replications of the model. Figure 16 shows the location of the traffic counts indicated in the tables.

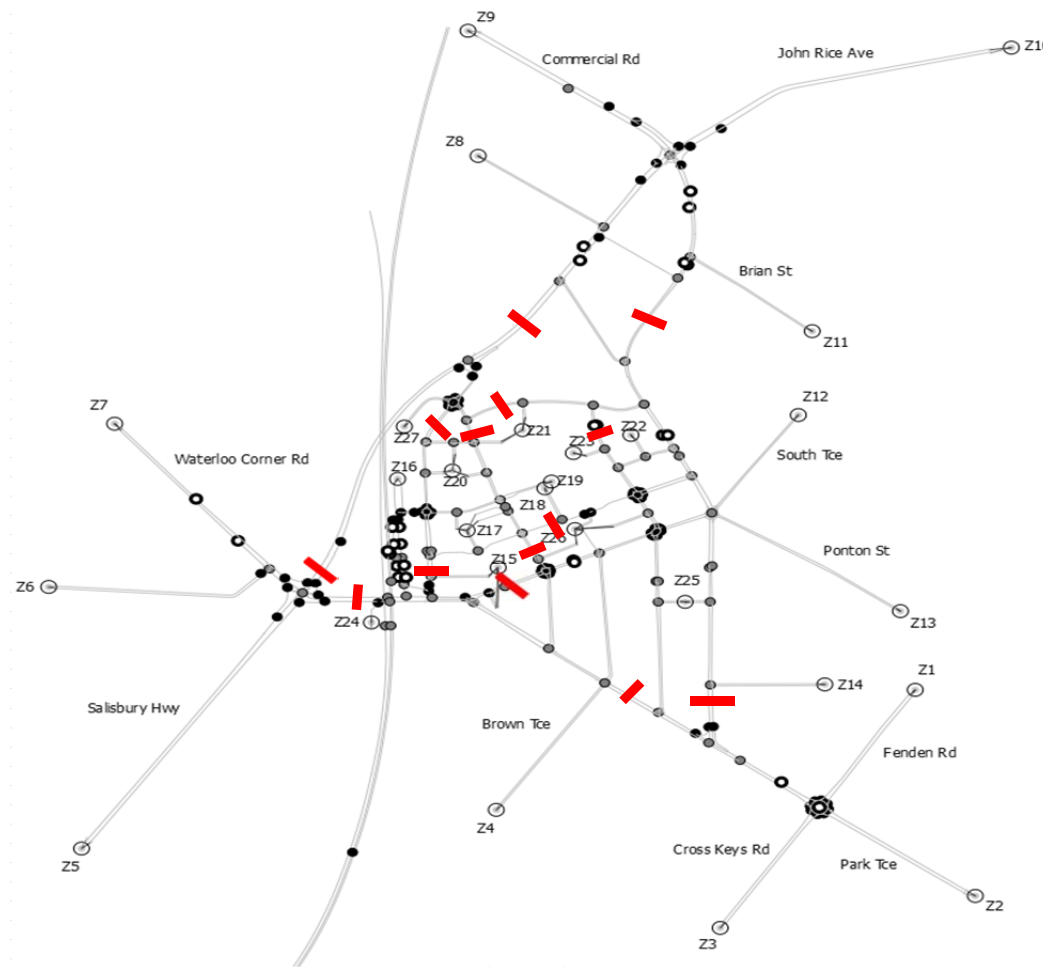


Figure 14 – Location of traffic count comparisons



**Table 6 – Stream Statistics in Morning Peak (08:00-09:00)**

| Road                    | Flow Direction | AM Peak Hour Volume |          |          |                     |
|-------------------------|----------------|---------------------|----------|----------|---------------------|
|                         |                | Option 1            | Option 2 | Option 3 | Existing (2011 vol) |
| Gawler Street south     | Northbound     | 114                 | 118      | 144      | 206                 |
|                         | Southbound     | 187                 | 262      | 246      | 172                 |
| Gawler Street north     | Northbound     | 78                  | 69       | 83       | 110                 |
|                         | Southbound     | 142                 | 113      | 119      | 307                 |
| Church Street south     | Northbound     | 422                 | 354      | 320      | 250                 |
|                         | Southbound     | 204                 | 177      | 187      | 111                 |
| Church Street north     | Northbound     | 212                 | 233      | 251      | 0                   |
|                         | Southbound     | 549                 | 531      | 479      | 0                   |
| Link Road               | Eastbound      | 132                 | 119      | 131      | 191 <sup>(1)</sup>  |
|                         | Westbound      | 140                 | 103      | 91       | 89 <sup>(1)</sup>   |
| Ann Street              | Northbound     | 132                 | 98       | 134      | NA                  |
|                         | Southbound     | 131                 | 132      | 139      | NA                  |
| John Street             | Eastbound      | 66                  | 50       | 127      | 94                  |
|                         | Westbound      | 0                   | 187      | 222      | 0                   |
| Wiltshire Road          | Eastbound      | 291                 | 272      | 240      | 178                 |
|                         | Westbound      | 237                 | 205      | 203      | 86                  |
| Commercial Road south   | Northbound     | 666                 | 664      | 566      | 610                 |
|                         | Southbound     | 317                 | 320      | 303      | 168                 |
| Commercial Road north   | Northbound     | 874                 | 888      | 844      | 764                 |
|                         | Southbound     | 696                 | 773      | 716      | 505                 |
| Park Terrace east       | Eastbound      | 523                 | 542      | 573      | 520                 |
|                         | Westbound      | 689                 | 633      | 613      | 575                 |
| Park Terrace west       | Eastbound      | 757                 | 765      | 838      | 770                 |
|                         | Westbound      | 848                 | 843      | 854      | 600                 |
| Salisbury Highway south | Northbound     | 1626                | 1633     | 1599     | 1489                |
|                         | Southbound     | 1270                | 1260     | 1293     | 1049                |
| Salisbury Highway north | Northbound     | 1425                | 1427     | 1410     | 1317                |
|                         | Southbound     | 1498                | 1461     | 1455     | 1147                |

The main points of an analysis of the traffic data indicate the following:

- Traffic growth occurs on the external arterial road network.
- There is little variation in traffic volumes for the three options on the arterial road network during the peak periods for the peak periods
- In the AM peak period there is more variation in the traffic volumes between the options on the selected local roads than the PM peak.
- Traffic volumes reduce on Gawler Street but increase on Church Street. This highlights the new role of Church Street as the main focus access into the core area of the Town Centre.
- There is significant growth in traffic volumes on Wiltshire Street with or without buses using the road.
- A comparison of volumes on Wiltshire and John Streets indicates that if the road is used as a bus route traffic is displaced to other roads
- Traffic volumes on the Ring Road are lower than existing due to the difference recording location as existing traffic measured at the Gawler Street roundabout whereas model volumes are recorded midblock.

**Table 7 – Stream Statistics in Evening Peak (17:00-18:00)**

| Road                    | Flow Direction | PM Peak Hour Volume |          |          |                     |
|-------------------------|----------------|---------------------|----------|----------|---------------------|
|                         |                | Option 1            | Option 2 | Option 3 | Existing (2011 vol) |
| Gawler Street south     | Northbound     | 145                 | 156      | 189      | 209                 |
|                         | Southbound     | 171                 | 209      | 147      | 137                 |
| Gawler Street north     | Northbound     | 155                 | 145      | 132      | 253                 |
|                         | Southbound     | 74                  | 57       | 65       | 240                 |
| Church Street south     | Northbound     | 231                 | 237      | 207      | 185                 |
|                         | Southbound     | 329                 | 329      | 415      | 277                 |
| Church Street north     | Northbound     | 359                 | 337      | 369      | 0                   |
|                         | Southbound     | 319                 | 327      | 303      | 0                   |
| Link Road               | Eastbound      | 208                 | 159      | 172      | 298 <sup>(1)</sup>  |
|                         | Westbound      | 110                 | 98       | 88       | 329 <sup>(1)</sup>  |
| Ann Street              | Northbound     | 159                 | 141      | 135      | NA                  |
|                         | Southbound     | 95                  | 113      | 136      | NA                  |
| John Street             | Eastbound      | 91                  | 114      | 210      | 149                 |
|                         | Westbound      | 0                   | 92       | 93       | 0                   |
| Wiltshire Road          | Eastbound      | 385                 | 384      | 328      | 181                 |
|                         | Westbound      | 358                 | 321      | 345      | 183                 |
| Commercial Road south   | Northbound     | 216                 | 223      | 192      | 429                 |
|                         | Southbound     | 602                 | 598      | 573      | 344                 |
| Commercial Road north   | Northbound     | 619                 | 620      | 595      | 551                 |
|                         | Southbound     | 890                 | 926      | 883      | 614                 |
| Park Terrace east       | Eastbound      | 682                 | 687      | 704      | 497                 |
|                         | Westbound      | 557                 | 549      | 554      | 580                 |
| Park Terrace west       | Eastbound      | 973                 | 975      | 1007     | 788                 |
|                         | Westbound      | 854                 | 859      | 867      | 860                 |
| Salisbury Highway south | Northbound     | 1640                | 1618     | 1616     | 1460                |
|                         | Southbound     | 1685                | 1678     | 1691     | 1445                |
| Salisbury Highway north | Northbound     | 1632                | 1611     | 1620     | 1500                |
|                         | Southbound     | 1635                | 1595     | 1616     | 1541                |

#### 5.4.4 Bus Operation

The new routes were assessed on the number of buses and the travel time improvements expected for either the Wiltshire or John Street option.

In terms of bus numbers along the two streets the modelling indicates that during the peak hour, typically there are between 110 and 120 buses travelling in both directions. This is expected to reduce to about 60 buses in the off-peak periods during the day and even less at night. The following figures show the distribution of buses in the eastbound direction for the AM peak in Option 1 (Wiltshire Street) and the PM peak in Option 3 (John Street). Appendix E provides the remaining graphs for comparison purposes.

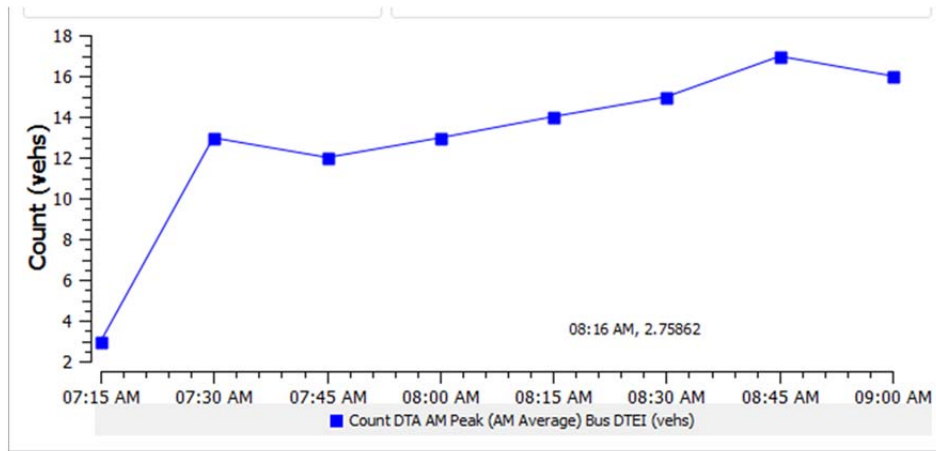


Figure 15 – Bus Volume Option 1 Wiltshire Street Morning Peak (eastbound)

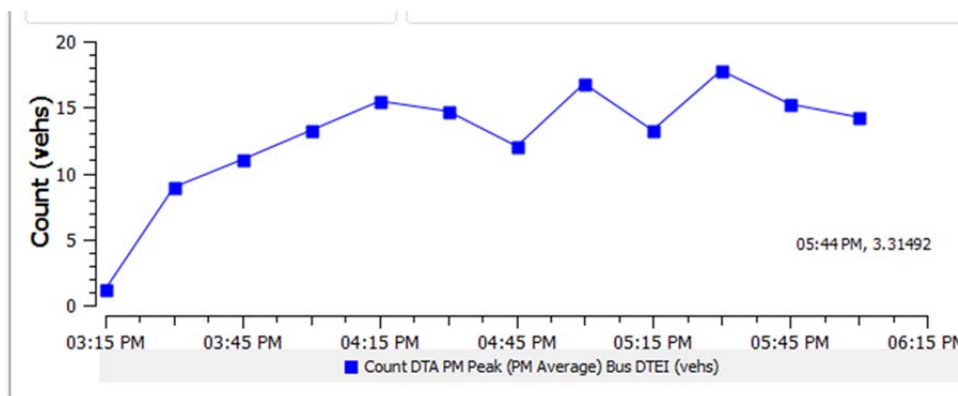


Figure 16 – Bus Volume Option 3 John Street Evening Peak (eastbound)

A travel distance (TD) analysis was adopted for the assessment of bus operation between the three options. The TD plots are provided for one route (No 205) with Appendix E showing two other routes.

As shown in **Figure 17 and 18** there is significant travel time benefits with Option 3 compared to the routes using Wiltshire Street. The difference of between two to three minutes is due to the delays associated with traffic using Park Terrace and in particular the interaction with rail crossing. The same differences are evident in the PM peaks and for other bus routes within the Town Centre.

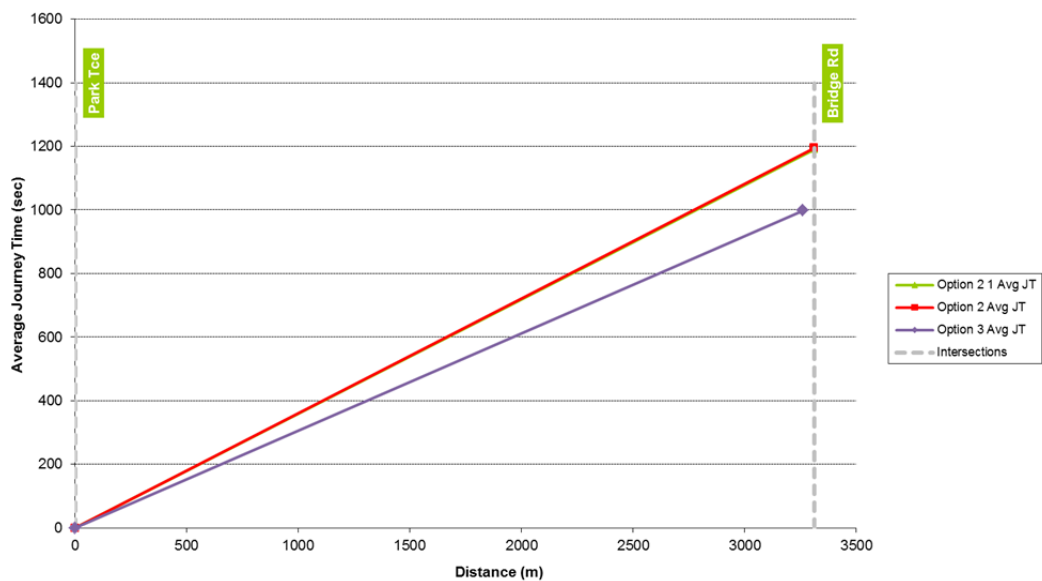


Figure 17 – Bus TD Plot for Route 205 northbound Morning Peak (08:00-09:00)

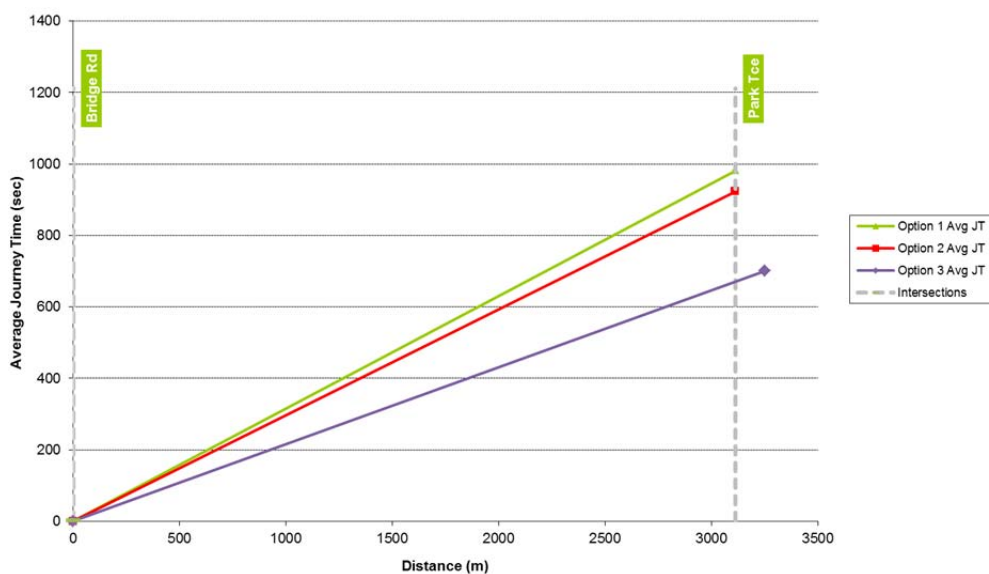
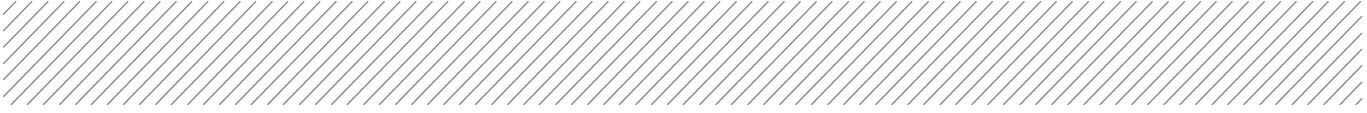


Figure 18 – Bus TD Plot for Route 205 southbound Morning Peak (08:00-09:00)

#### 5.4.5 Summary

The key outcomes of the modelling are indicated below:

- There is congestion along Park Terrace as a result of the rail crossing. However it typically clears within 5 to 10 minutes. The longer periods result when passenger trains stop at the interchange. The major intersections with the Salisbury Highway at Park Terrace and Commercial Road show high levels of congestion during peak periods, primarily due to high turn volumes.

- 
- In addition there are short periods of high congestion at the Commercial Road / Ponton Street intersection and the Park Terrace / Fendon Road roundabout in both peak periods.
  - The proposed road improvements within the Town Centre such as the Church Street extension, Ring Road and Ann Street improve traffic flow through the Town Centre.
  - There are times during the modelling period when there are significant levels of congestion at the Gawler Street / Church Street / Ring Road roundabout. Although this is also attributed to queues extending back from the Gawler Street / Salisbury Highway junction
  - For each scenario there are between 110 and 120 buses travelling in both directions in the peak hour that use either Wiltshire or John Streets. It is acknowledged that outside of the peak hour the number of buses would reduce by approximately half. However this still equates to one bus every minute passing any one point.
  - Overall traffic operation within the Town Centre is better with Scenario 3 (John Street bus operation). This is primarily due to reduced congestion along Wiltshire Street and interaction with Park Terrace rail crossing and less delay associated with the interchange operation.
  - The provision of two-way traffic along the full length of John Street only improves traffic flow marginally within the Town Centre
  - The modelling highlighted the need to investigate the form of a number of junctions within the model to improve overall operation. These include
    - The Church Street / Gawler Street roundabout – this junction should be relocated south and include the Ring Road leg. This is expected to have two advantages with reduced delay for buses using the Ring Road and additional queuing space to Salisbury Highway.
    - The Commercial Road / Ring Road junction – the initial modelling did not provide a storage lane for right turn traffic into the Ring Road from Commercial Road. The modelling showed that this resulted in long queues (up to 8 vehicles) forming along Commercial Road and restricting through movement along this road.



## 6. Transport Infrastructure Plan

This section details the preferred transport infrastructure provision to support the proposed Structure Plan. Included in this section is a very preliminary estimation of construction costs as well as an indication of the timing of works.

### 6.1 Road Network

The following sections detail the road improvements suggested to support the proposed Structure Plan. Preliminary impact assessment and cost estimates have been prepared for each item. A 25% contingency has been allowed for in the estimates but design or project management fees are not included. The estimates costs do not include pavement upgrading to cater for the new bus routes and landscaping / urban design treatments beyond the kerb line.

#### 6.1.1 DPTI Roads

##### Commercial Road

Painted median – this involves the provision of a painted median from Park Terrace through to the junction with Ring Road to allow for safe storage for right turning traffic. It also allows for the provision of a peak period cycle lanes and protected pedestrian refuges. It is proposed to retain the current lane arrangements at Ponton Street intersection.

A proposed cross section would be to provide a 3.3m wide lane and 1.35m bike lane in each direction with a 2.9m wide painted median. It is intended that this cross section continue to just north of Little Para River. However the existing lane arrangements at the intersection with Ponton Street should remain.

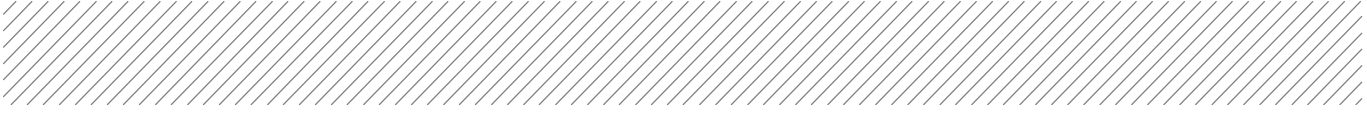
Key impact is the loss of on-street parking during the peak periods but this is considered a minor issue. The estimated cost for this work is \$250,000.

Modify and widen Little Para River bridge - this involves the widening of the Little Para River Bridge to allow for the provision of a right turn storage lane and on-road cycle lanes. The current width is 9.2m (6.9m wide roadway) and includes a pedestrian path on the western side. The proposed width is 14.6m. Key impact is on the Little Para River reserve and possibly services that may be located within the road reserve. The estimated cost for this work is \$500,000.

##### Park Terrace

New Signalised intersection with Church Street – this involves the construction of a new set of traffic signals at the Park Terrace / Church Street junction to encourage traffic to enter the core of the Town Centre. Line marking changes will be required to provide the right turn lane into Church Street. It is not intended to provide the right run out as this movement can be undertaken at Wiltshire Street. No major impacts are expected. The estimated cost for this work is \$500,000.

Gawler Street / Wiltshire Street Bus lane – this bus lane extends along Park Terrace from Gawler Street to Wiltshire Street and then along Wiltshire Street. It involves removing the solid median along Park Terrace and reducing the number of right turn lanes on Wiltshire Street as well banning the right turn into Gawler Street from Park Terrace for general traffic. Key impacts are expected to be change in travel patterns for banning the right turn, but alternative entry is available via Church Street, and increased congestion on Wiltshire Street.



A proposed scheme has been developed (refer Appendix F) which shows the changes to the junctions. The estimated cost for this work including the junction treatment is \$450,000.

### **6.1.2 City of Salisbury Roads**

*Provide Ring Road* – this involves the upgrading of the existing road to cater for buses and to improve the horizontal alignment, particularly near the western end, as well as providing an extension to Commercial Road through the eastern Parabanks car park. The existing width varies but is typically greater than 7.5m wide. A proposed cross section would be to provide a 3.2m wide lane and 1.2 bike lane in each direction with 2.2m wide parking lanes if required.

Depending on future development of the shopping centre there could future provision to widen to provide a larger footpath to activate the frontage of the building. Key impacts are loss of car parking and possible removal of vegetation to improve the alignment or widen the roadway. The estimated cost for this work is \$350,000 and does not include any land acquisition costs.

*Church Street Extension* – this involves the extension of Church Street northwards to provide a new intersection with Gawler Street and the Ring Road. It is proposed that the existing road would also be upgraded to provide an improved urban design outcome. The road would be configured as a two lane road with 3.0m wide lanes, 1.2 bike lanes and 2.2m wide parking lanes.

Minor impacts include a loss of car parking and possible removal of vegetation to provide the new road. The estimated cost for this work is separated into 3 components; extend new road at \$1,500,000 excluding land acquisition costs, new junction with Gawler Street at \$300,000 and upgrade existing at \$150,000.

*Ann Street Extension* – this involves the extension of Ann Street northwards from John Street to the new Ring Road. An existing road already exists but would need to be upgraded to cater for increased traffic loading as a bus route. It is proposed that the existing road would also be upgraded to provide an improved urban design outcome. The road would be configured as a two lane road with a proposed cross section comprising 3.2m wide lanes, 2.6m wide bus stops, and where possible 2.2m wide parking lane.

Key impact is a loss of car parking in the eastern Parabanks car park. The estimated cost for this work is \$100,000.

#### **John Street –**

*John Street Two-way* – this involves converting the existing one-way operation to two-way with parallel parking. Widening and kerb alignment changes would be required. The proposed cross section would comprise 3.0m wide traffic lanes and 2.2m wide parking lanes in each direction.

The main impact is expected to be related to loss of trade to abutting properties during construction. The estimated cost for this work is \$2,500,000. As indicated previously the changes to the streetscape design is not included in the costs.

## 6.2 Public Transport

### 6.2.1 Option Assessment

In the development of the Structure Plan various options were considered to improve public transport services with the town centre. These included upgrading the interchange, provision of improved pedestrian connections across the rail lines, changes in routes to concentrate services to particular roads and provision of “super” stops.

Discussions were held with the Public Transport Services Division (PTSD) of DPTI regarding these options with their preferred option to concentrate all services along John Street. An alternative of using Wiltshire Street was considered a viable alternative by PTSD. Consideration was given to providing a couplet arrangement of bus travelling away from the interchange on John Street and to the interchange on Wiltshire. However given that objective of improving the simplicity of bus movement this was not considered viable.

The Aimsun modelling has shown that by concentrating services to one route, either John Street or Wiltshire Street, the number of buses services along this route in 2021 varied between 100 and 120 buses per hour in both directions. It is expected that the bus volumes would reduce to 60 to 65 per hour between the peak periods and 40 per hour at night.

A review of other locations within the Adelaide indicates the following:

- Hutt Street (south of Wakefield Street) – 30 buses per hour in peak periods
- Pulteney Street (south of Wakefield Street) – 45 buses per hour in peak periods
- King William Street (south of Gouger Street) – 26 buses per hour in peak periods
- O’Connell Street (north of Ward Street) – 105 buses per hour in peak periods
- No buses currently travel along Rundle Street or Gouger Street.

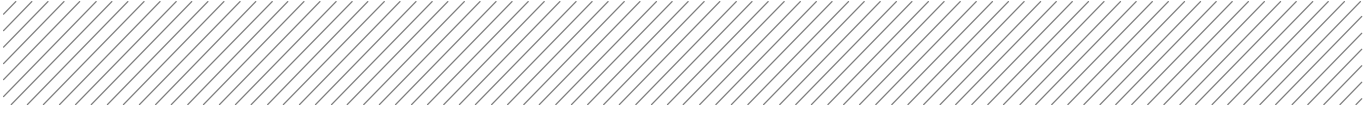
It is intended that John Street and to a lesser extent Church Street be considered main streets in a road hierarchy for the town centre. Key components of this are activation of the street areas to improve safety and provision of café /outdoor dining and possible retail areas with residential development. Whereas Wiltshire Street is expected to be more of major collector road, and hence will provide access to the office / educational (TAFE) precinct. Consequently the level of traffic associated with the bus use is not expected to impact on the function of the abutting land uses.

It should be noted that for O’Connell Street whilst there is an equivalent number of buses using the road compared to John Street, the overall traffic volume is also quite high. Hence the difference in ambient noise between the two locations would expect to be significant with John Street having less than 4,000 vehicles per day compared to the 25,000 vpd on O’Connell Street.

### 6.2.2 Preferred Operation

The Structure Plan provides for flexibility in the provision of public transport within the Town Centre with a number of routes available for use with the preferred routes indicated below:

- Wiltshire Street as predominant route through the Town Centre
- Gawler Street / Ring Road / Ann Street for services accessing the Town Centre from Salisbury Highway
- Commercial Road for services from the east on Park Terrace.



In terms of bus stops it is proposed key stops are proposed along Wiltshire Street between Church and Mary Streets, Ann Street between John Street and the Ring Road and along Commercial Road.

The major impacts are that the number of buses increases significantly on Wiltshire Street, which could have an impact on pavement life, if the pavement strength is insufficient. This is also expected to be an issue for the Ring Road and Ann Street.

The proposed operation of the interchange is subject to further investigations by DPTI to improve safety and connectivity to the Town Centre and west across the rail lines. Aimsun modelling has shown that the existing interchange arrangement can cater for the proposed bus services using Park Terrace / Wiltshire Street. In particular the bus lane entry operates satisfactorily with some minor queuing during peak periods. For the exit from the interchange there is some congestion when Park Terrace traffic flows but this quickly dissipates when the Park Terrace is closed due to the rail crossing.

However, the preference in the long term would be to modify the entrance to the interchange from Park Terrace so that it operates similarly to the Mawson Interchange where passengers board / exit on the platform side. This would require a new right turn lane entrance to the interchange just east of the rail crossing and restricting access to Gawler Street to left in /out only.

### **6.3 Implementation Plan**

The timing for the infrastructure detailed above will be dependent on the future development patterns within the Town Centre, including private land owners.

The following works would be considered to match the three tiers of development identified in section 3.3 of this report.

#### **Tier 1 (1 to 3 years)**

- Commercial Road median
- Pedestrian connection improvements
- Church Street / Park Terrace intersection – improve to provide access to core of Town Centre

#### **Tier 2 (4 to 7 years)**

- Provide Church Street extension to Gawler Street
- Provide and upgrade Ring Road to Commercial Road
- Upgrade and extend Ann Street
- Church Street / Park Terrace intersection – signalise
- Modify bus routes after completion of Ring Road and Ann Street works

#### **Tier 3 (after 7 years)**

- Wiltshire Street and Park terrace bus lane
- Modify John Street to two-way flow
- Streetscape improvements to Church and Gawler Streets



## 7. Summary

The City of Salisbury is developing a Structure Plan and Implementation Strategy that will result in the Revitalisation of the Salisbury Town Centre. The transport planning and traffic modelling inputs to the Structure Plan provide a level of confidence that an integrated solution is tailored to meet the objectives of the Revitalisation.

### Existing Conditions

The existing traffic operation and conditions in the Town Centre are primarily influenced by the rail crossing on Park Terrace. This is particularly so during the peak periods where queues can extend beyond Wiltshire Street and block access to key streets. There are times where peak movements from schools in the area can result in increased traffic congestion. The use of Ponton Street as a bypass route for traffic to Edinburgh Parks results in significant congestion at its intersection with Commercial Road.

Parking demand within the Town Centre is concentrated around the southern end of the Town Centre whereas (spare) supply is concentrated towards the northern end of Gawler Street within the Parabanks Shopping Centre. It is also noted that a large proportion of long term parking is still concentrated round John Street (particularly within the Parabanks car parks) even though some timed parking has been implemented at the Sexton and Judd Street car parks.

Public transport accessibility is good although there is confusion with the location of stops outside of the Interchange.

Pedestrian linkages across the town centre are inconsistent, particularly across the rail line to the west of the Town Centre. There is a need to improve pathways to key destinations within the Town Centre and linkages to outside destinations. The cycle network within the Town Centre is considered poor with only a short section of Gawler Street providing bike lanes for on road cyclists. Other connections are considered satisfactory.

### Structure Plan Inputs

Integrated transport planning and infrastructure investment will be required to support the Structure Plan. The key objectives for the development of the Structure Plan include;

- Improving and simplifying public transport access within the Town Centre;
- Improving access to all areas within the Town Centre for vehicular traffic
- Improving pedestrian and cycle links within and external to the Town Centre
- Identifying a parking strategy to support the proposed development

Options were considered for improving public transport access to the Town Centre including provision of loop services and modifying the operation of the interchange. DPTI's Public Transport Services Division provided input into the preferred treatments for bus movement and connectivity to the Town Centre.

Road infrastructure improvements considered key opportunities for:

- Removing through traffic from the Town Centre
- Providing Main / High Streets through the core of the Town Centre
- Ring Roads to provide alternative routes to areas within the Town Centre

The figure below shows the how transport infrastructure is provided with the proposed structure plan.



## Parking Strategy

The parking strategy for the Town Centre should aim to utilise car parking as a tool to activate the distinctive precincts of Salisbury Town Centre whilst providing a safe, connected, economically viable, and an integrated car parking outcome. The Salisbury Town Centre will need to be an attractive and convenient place to live and shop when compared to other district centres; this need for convenience requires a parking strategy that accommodates the parking demand to within reasonable levels.

Key principles in formulating the car parking strategy are as follows:

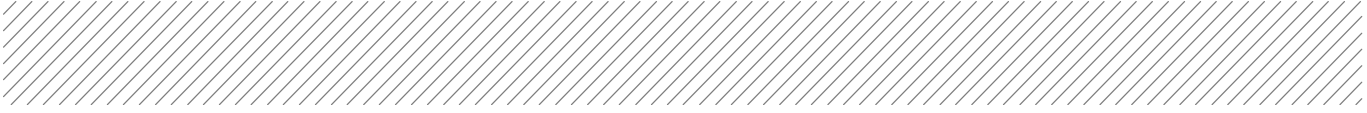
### Long Term car parking

Where practical provide separate facilities for long term parking on the periphery of the Town Centre. This will free up spaces in the core area for short term parking associated with retail and other uses. Possible locations include the hotel car park just west of the rail station, the DPTI car park west of the rail line south of Park Terrace and the current under-utilised spaces in Parabanks northern car park (Short term only). A key requirement for all of these sites is to ensure that pedestrian movement to the core area is safe and convenient.

### On-street parking

Encourage short term high turnover parking along John Street and Church Street including its extension to Gawler Street. This should be undertaken using parking meters with pay and display tickets with maximum stay of 30 minutes but provide free or smaller fee for all-day parking in a





more remote location. This will deter employees parking all day or shuffling between short term parking areas.

### **Development Parking**

The Structure Plan indicates various locations for mixed use development. These typically occur where there is existing at-grade parking. For these sites the following should be considered:

- Separate out residential parking (but not visitor) from other uses with retail parking provided in basements and/or rooftop depending on development.
- Use of parking rates comprising a value range to allow for future flexibility in development strategies and determination.
- Contribution to a car parking fund where a particular development provides a net loss in overall number of car parks including existing spaces.

### **Saints Road Assessment**

DPTI's MASTEM strategic model has been used to identify the traffic demands for the proposed Saints Road Extension. The review was undertaken based on existing (2011) and a future year (2031). The original model had to be revised to better distribute traffic to the Salisbury Town Centre.

Traffic volumes on the proposed Saints Road Extension are expected to be in the order of 7,000 to 7,500 vehicles per day in 2011 and increasing to 8,500 vehicles per day in 2031. Peak traffic volume (one-way) on the Saints Road Extension is expected to increase from 604 vehicles per hour in 2011 to 715 vehicles per hour in 2031.

The modelling indicates that the proposed Saints Road Extension caters for traffic travelling to the Salisbury Town Centre (40%) and Edinburgh Parks / Elizabeth South (60%) from Salisbury East / Golden Grove. The traffic on the proposed extension would be primarily traffic diverted from Ponton Street and Park Terrace, and to a lesser extent from John Rice Avenue. The review of traffic patterns indicates that the provision of the Saints Road Extension does not increase traffic flow into the Town Centre.

The strategic modelling has highlighted that Saints Road Extension does not increase traffic volumes into the Town Centre but provides more of bypass for movement to Edinburgh Parks and Elizabeth South.

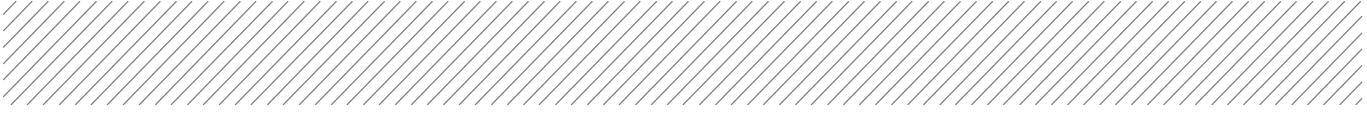
### **Aimsun Modelling**

The Aimsun modelling of the Structure Plan was undertaken to determine impacts of the proposed development and test alternatives for future bus provision and included development of:

- An Existing model – used for calibration and a basis for future models
- Future models (based on the year 2021) – that included testing of three scenarios)

The Structure Plan has identified a range of transport improvements to support the revitalisation of the Salisbury Town Centre. These have been modelled to identify a preferred route for buses and treatments for junction and intersections on the proposed road network.

All the models provide for the future residential, retail and commercial development targets indicated for all three tiers indicated in the Structure Plan as well as the increase in train / bus frequencies. The base year for the future model is 2021 and the increase in traffic generated by the future



developments was estimated using the RTA Guidelines for traffic generation and distributed in the same manner as DPTI's MASTEM strategic model.

Key transport infrastructure improvements recommended in the Structure Plan to support the revitalisation are included in the scenarios. DPTI and Council agreed to the road improvements to be modelled in the three scenarios. However the specific recommendation that in the long term John Street reverts to two-way operation was modelled as a separate option. On this basis the three future scenarios modelled are:

- Scenario 1 – John Street one way with bus travel focussed on Wiltshire Street
- Scenario 2 – John Street two way with bus travel focussed on Wiltshire Street
- Scenario 3 – John Street two way with bus travel focussed on John Street

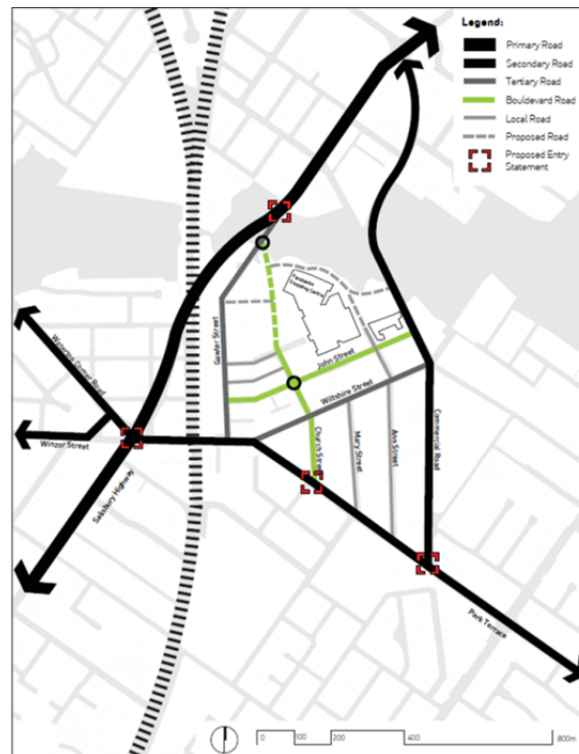
The key outcomes of the modelling are indicated below:

- There is congestion along Park Terrace as a result of the rail crossing. However it typically clears within 5 to 10 minutes. The longer periods result from when passenger trains stop at the interchange. The major intersections with Salisbury Highway at Park Terrace and Commercial Road show high level of congestion during peak periods, primarily due to high turn volumes.
- In addition there are short periods of high congestion at the Commercial Road / Ponton Street intersection and the Park Terrace / Fendon Road roundabout in both peak periods.
- The proposed road improvements within the Town Centre such as the Church Street extension, Ring Road and Ann Street are expected to improve traffic flow through the Town Centre.
- There are times during the modelling period when there are significant levels of congestion at the Gawler Street / Church Street / Ring Road roundabout. Although this is also attributed to queues extending back from the Gawler Street / Salisbury Highway junction
- For each scenario there are between 110 and 120 buses travelling in both directions in the peak hour that use either Wiltshire Street or John Street. It is acknowledged that outside of the peak hour the number of buses would reduce by approximately half.
- Overall traffic operation within the Town Centre is better with Scenario 3 (John Street bus operation). This is primarily due to reduced congestion along Wiltshire Street and interaction with Park Terrace rail crossing and less delay associated with interchange operation.
- The provision of two-way traffic along the full length of John Street only marginally improves traffic flow within the Town Centre
- The modelling highlighted the need to investigate the form of a number of junctions within the model to improve overall operation. These include
  - The Church Street / Gawler Street roundabout – this junction should be relocated south and include the Ring Road leg. This is expected to have two advantages with reduced delay for buses using the Ring Road and additional queuing space to Salisbury Highway.
  - The Commercial Road / Ring Road junction – the initial modelling did not provide a storage lane for right turn traffic into the Ring Road from Commercial Road. The modelling showed that this resulted in long queues (up to 8 vehicles) forming along Commercial Road and restricting through movement along this road.

The Aimsun modelling has highlighted that a two way John Street provides improved traffic operation as it allows for better distribution traffic. From a road operation perspective the preferred bus strategy is to provide for buses along John Street. However the modelling indicates that if current services remain that there could be between 100 and 120 buses (two-way) travelling along the road in the peak hour. This would reduce to about 60 buses (two-way) outside of the peak periods.

## Recommendations

The preferred road improvements are indicated in the figure below and would support the proposed Structure Plan.



### DPTI Roads

- Commercial Road – modify to provide single lane in each direction with a painted median and widen the bridge over the Little Para River
- Park Terrace – Provide new traffic signals at junction with Church Street and modify junction with Gawler Street to restrict right turn to bus only movements. Consider modifying the junction with Commercial Road to prioritise movement to Commercial Road.

### City of Salisbury Roads

- Provide a Ring Road between Gawler Street and Commercial Road, which will act as a bus route from the west.
- Ultimately convert John Street to two way operation
- Extend Church Street to Gawler Street and provide new intersection with the Ring Road and Gawler Street.
- Extend Ann Street to the Ring Road, which will cater for buses from the Ring Road.

### Public Transport

- Use of Wiltshire Street as predominant bus route based on amenity principles
- Locate a super stop between Church and Mary Streets.
- Extra stops located on Commercial Road and Ann Street to facilitate access to Parabanks Shopping Centre

# Appendix A

## Structure Plan Development Profiles



# Appendix B

## Saints Road Extension Traffic Volumes



# Appendix C

## Saints Road Select Link Plots





# Appendix D

## Existing Aimsun Calibration Report



# Appendix E

## Bus Operation Comparison Graphs



# Appendix F

## Scheme Drawings



