Wagga Wagga ITS
Recommendations and Projects
Draft for Discussion

Client // Wagga Wagga City Council
Office // NSW
Reference // 16S1034000
Date // 29/06/16
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Issue: A-Dr  29/06/16

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Reference: 16S1034000
GTA Consultants Office: NSW

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1. Introduction

1.1 Background

Wagga Wagga City Council, in partnership with the NSW Department of Roads and Maritime Services, is preparing the Wagga Wagga Integrated Transported Strategy 2043 (WWITS 2043). This strategy provides an overarching transport framework for the city covering all forms of transport. This will ensure that planned growth and land use are supported by a sustainable and integrated transport system.

Council is committed to involving the community in the development of the Strategy.

Wagga Wagga Integrated Strategy Framework sets out the nine – staged framework for the development of the WWITS 2043 (Figure 1.1). Through this process a series of working papers were developed, including:

- Consultation papers
  - Stakeholders Visioning Workshop (November 2015)
  - Speak Out: community workshop (December 2015)
  - Survey Report (January 2016)
  - Our Transport: Interactive Map for GTA Consultants & City of Wagga Wagga (January 2016)
  - Moving Forward Together: workbook (March-April 2016)
  - Moving Forward Together: what matters to you (April 2016)

- Technical papers
  - Active Transport Report (draft for Public Exhibition, June 2016)
  - Wagga Wagga ITS: Recommendations and Projects (this report, June 2016)

- Final report

This report builds on the Guiding Principles and Strategies developed through the consultation process and follows the same general structure:

- Guiding Principles
- Strategies for:
  - Place based – CBD, Health Precinct, Northern Growth Area and Forest Hill

In addition, the report includes a review of the Section 94 Contributions Plan.
Figure 1.1: Wagga Wagga Integrated Transport Strategy Framework
1.2 Council’s Promise

Council is pleased to be able to offer the people of Wagga Wagga the opportunity to work with Council in the development of an integrated transport strategy.

- Council’s promise to the people of Wagga Wagga is that through this planning process we will listen and take on board what we are being told.
- We will come back to the people of Wagga Wagga and explain how their ideas and concerns have been considered and why some things may have not got up.
- Not all ideas will be implemented but if that is the case then people need to understand why.
- We hope that people will learn as they go along in this process.
- We hope to find champions in the community who can work with Council moving forward – champions can be state agencies, business owners and groups, community groups or individuals.
- Handover to Council staff and consultant teams to introduce the project in more detail and to take the participants through a visioning workshop.

1.3 Guiding Principles

Access for all user types between all trip generators and destinations:

- Provide comfortable, safe and convenient access within and around Wagga Wagga for all ages and abilities, and emerging transport technologies
- Remove access and transport barriers to social, cultural, educational, recreational activities and public facilities
- Provide connections and ease of movement between all centres and neighbourhoods

Sensibly invest in the transport system to achieve sustainable economic benefits for the community:

- Develop a transport system that supports economic development and employment
- Develop and manage an economically viable transport system based on long term usage and informed by life-cycle-costing and resource availability

As future development occurs, move towards a more sustainable and integrated transport system:

- Integrate transport planning with land-use initiatives and developments
- Work collaboratively with others to become leaders in universal access in Regional Australia
- Reduce reliance on private cars, and instead encourage walking, cycling, public transport, healthy people and healthy places
Figure 1.2: Media Coverage of Wagga Wagga ITS

CITY OF WAGGA WAGGA

Council News

FIRST PRINTED SATURDAY 2 APRIL 2016

Steer Wagga’s transport future

Chance to have your say again on strategies informed by community

Cycle ways, public transport and the condition of roads are just some of the hot topics that came out of the first stage of the Our Transport consultation. A key component of the Wagga Wagga Planning (WWTP) process, the feedback from stakeholders and broader community has been combined with the outcomes of a technical report to draft a workshop “Future Wagga’s Transport: What matters to you?” colloquium all of this information has been developed to make it easy for residents to comment online through the Our Transport website.

Manager Strategic Planning, Jacqui Ramon said the consultation process has provided valuable insights into the potential for transport in Wagga. “We’ve come up with twelve sections as a result of the feedback, covering everything from medical services to getting to and from the growing southern growth area,” she said.

“Strategy will help guide our approach to all forms of transport in Wagga for the next 20 years. In the next stage, we need as many people as possible to take a look and make sure that these strategies are on the right track. Summary reports of the consultation feedback and the workbook are available online. Staff will also be on hand at a pop-up at 160 Hill Street, Wagga Wagga to gain feedback from residents and stakeholders to go through the details and take comments.”

“Everyone is welcome to take a few moments to discuss our strategies with us so that we can create a strategy that best reflects what the community needs and expects,” Ms Ramon said.
2. Disability Access

2.1 Existing Conditions

2.1.1 Policy Context

All levels of Government across Australia have a responsibility under the Disability Discrimination Act and through the National Disability Strategy to help ensure accessible local pedestrian networks exist for all people in the community to maximise their quality of life and wellbeing. This should include universal access to all buildings and public transport facilities. However, as this has not always been required, there is a significant amount of the public domain that needs remedial works to achieve this.

This has resulted in the Disability Inclusion Act 2014 and the Disability Inclusion Regulation 2014 being enacted on 3 December 2014 by the NSW Government, which replaced the Disability Services Act 1993.

The 2014 Disability Inclusion Act requires government departments, local councils and other public authorities (set out in the Regulation), to better support and provide services to people with disability within local communities through Disability Action Inclusion Plans that include:

- how the Disability Inclusion Act’s principles will be addressed
- strategies to support people with disability
- how people with disability were consulted
- how the plan supports the State Disability Inclusion Plan

2.1.2 Existing Facilities

Specific reviews or audits of what existing facilities exist and to what standards they are achieve have not been undertaken to date. However, at a broad level it is noted that disability access is generally good within the city centre of Wagga Wagga, but as you move away it tends to become more limited.

2.1.3 Public Consultation

The public consultation process confirmed the majority of the above existing conditions. However, the following existing issues with disability access in Wagga Wagga were highlighted:

- There are inadequate footpath facilities around the medical precinct for people with mobility issues
- There is a lack of support for those with mobility issues accessing public transport
- More planning and implementation of facilities is required to achieve universal mobility access
- Additional disabled parking is required given the aging population
- With the aging population, universal access should be achieved with all sealed footpaths, kerb ramps and crossing facilities.
2.2 Strategies

In order to resolve the existing disability access issues and ensure that future development provides a suitable level of mobility access to all users, the following strategies for disability access within Wagga Wagga have been identified:

- Work collaboratively with other authorities and the private sector to become leaders in universal access in Regional Australia
- Improve permeability and connectivity to and within activity centres and neighbourhoods for all ages and abilities, so they can access social, cultural, educational, recreational activities and public facilities
- Improve and develop comfort, safety and quality of footpaths by prioritising implementation of quality walking treatments over quantity.

2.3 Best Practice - Standards and their Application

With disability access, there are the following key standards that should be considered as part of all new and upgrades of existing developments and public spaces:

- For all new and upgrades of existing buildings and access paths the Disability (Access to Premises — Buildings) Standards should be complied with
- For all new and upgrades of existing public transport facilities the Disability Standards for Accessible Public Transport (DSAPT) should be complied with, noting that all transport infrastructure (including bus stops, ferry wharves, etc.) are to be fully accessible by 2022.
- For the required number of disabled car parking spaces to be provided for a new development refer to the Building Code of Australia, and for the layout of the facilities refer to the Australian Standard for Disabled Car Parking Facilities.

The above are considered to generally relate to the minimum requirements for disability access as part of all new and upgrades of existing infrastructure. However, at times these minimum requirements are not met for a variety of reasons. To help minimise this from occurring all private and public projects should have a check point against relevant disabled access standards and demonstrate how they are consistent with the Disability Discrimination Act, or what measures are being undertaken to minimise any shortcomings. Also, where high proportions of people with mobility issues are expected, increased level of facilities should be provided.

2.4 Recommendations and Projects

Based on the above analysis and discussion, the following disability projects are proposed:

- Prepare a Disability Action Inclusion Plan as part of a Mobility Access Study in accordance with the requirements of the Disability Inclusion Act to determine universal paths of travel to key destinations for people with mobility issues.
- Develop an internal Disability Access Task Force within Council to coordinate internal efforts, ensure all disabled projects are progressing, to check all internal Council projects comply, and create strategic relationships with other authorities and the private sector to make Wagga Wagga leaders in universal access in Regional Australia.
- All private and public projects should have a check point against relevant disabled access standards and demonstrate how they are consistent with the Disability Discrimination Act, or what measures are being undertaken to minimise its impact.
- Undertake regular audits of all Council facilities against relevant disabled access standards to identify required mitigating works.
o Integrate disabled access works with Council’s Footpath Strategy, Bikeways Plan and Development Control Plans.
o Remedial disabled access works should be based on the following priority order:
  o CBD
  o Health Services Hub
  o Public transport facilities
  o Other key destinations for people with mobility issues
  o Other areas.

2.5 Cross Check of Existing Section 94 Projects

There are currently no specific disability projects listed within the existing Section 94 Contributions Plan for Wagga Wagga. However, disability access will need to be provided as part of the following transport related project types:
o Road and traffic management facilities, especially in regards to pedestrian footpaths and bridges
o Car parking facilities, namely in the number location and access to disabled car parking spaces.

While not transport specific, disability access will also need to be provided as part of all the proposed civic, community and cultural facilities, and to a more limited extent the proposed recreational facilities.

2.6 Alignment with Guiding Principles

The recommendations and actions coming out of this section were assessed for their alignment with the guiding principles. The guiding principles are shown in Table 2.1.

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<td>Provide comfortable, safe and convenient access within and around Wagga Wagga for all ages and abilities, and emerging transport technologies</td>
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<tr>
<td>2</td>
<td>Remove access and transport barriers to social, cultural, educational, recreational activities and public facilities</td>
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<tr>
<td>3</td>
<td>Develop a transport system that supports economic development and employment</td>
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<tr>
<td>4</td>
<td>Work collaboratively with others to become leaders in universal access in Regional Australia</td>
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<td>5</td>
<td>Integrate transport planning with land-use initiatives and developments</td>
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<tr>
<td>6</td>
<td>Reduce reliance on private cars, and instead encourage walking, cycling, public transport, healthy people and healthy places</td>
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<td>7</td>
<td>Provide connections and ease of movement between all centres and neighbourhoods</td>
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<td>8</td>
<td>Develop and manage an economically viable transport system based on long term usage and informed by life-cycle-casting and resource availability</td>
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Table 2.2 shows how the recommendations and actions of this section align with each of the guiding principles. In the final column, a recommendation is made for a timeframe for implementing the recommendation or action.
Table 2.2: Alignment of Disability Access Actions and Recommendations with Guiding Principles

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<tr>
<td>Undertake regular audits</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>O</td>
<td>O</td>
<td></td>
<td></td>
<td></td>
<td>Short term</td>
</tr>
<tr>
<td>Integrate disabled access works with Council’s strategies</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>O</td>
<td>O</td>
<td></td>
<td></td>
<td>Short term</td>
</tr>
</tbody>
</table>

X – fully aligned with the guiding principle
O – partly aligned with the guiding principle

Figure 2.1: An aging population requires continuous access to sealed footpaths, kerb ramps and crossing facilities
3. Walking

3.1 Existing Conditions

3.1.1 Existing Facilities

Pedestrian conditions are generally good within the city centre of Wagga Wagga, particularly along the Baylis Street and Fitzmaurice Street corridor, where there are wide and even footpaths, compliant pram ramps, signalised crossings at intersections and some mid-block zebra crossings.

Suburbs close to the city centre tend to have better facilities for pedestrians, with footpaths on one or both sides of streets. However, many streets are quite wide with non-existent or inadequate mid-block and intersection crossing facilities. A common example of a pedestrian crossing facility issue in Wagga Wagga relates to the many roundabouts that often don’t provide crossing facilities on given approaches, they don’t align with the pedestrian desireline and/or lead users to wait adjacent to the splitter island within the roundabout circulating lanes.

In other suburban areas and in villages outside the City of Wagga Wagga, many streets, including collector or major local roads, do not have footpaths on either side, posing a significant barrier to pedestrian mobility, particularly for the elderly or people with disabilities.

The rail line running through the City also poses a significant barrier to pedestrian movement, and some pedestrian overpasses have steep gradients, limited width and inadequate handrails that may be unsuitable for some people, such as people with disabilities, especially when passing other users travelling in the opposite direction.

3.1.2 Public Consultation

The public consultation process confirmed the majority of the above existing conditions. However, the following existing issues with pedestrian facilities in Wagga Wagga were highlighted:

- Pedestrians should be prioritised over other modes in high pedestrian activity areas. This should be reflected through improved and increased road allocation and movement controls along the associated road corridors.
- There are very limited crossing facilities for pedestrians on most local roads. Informal crossing activities are difficult given the number of busy traffic lanes that are often needed to be crossed.
- Wagga Wagga has an aging population, which will ideally provide continuous universal access to all sealed footpaths, kerb ramps and crossing facilities.

Future opportunities for walking within Wagga Wagga have been identified by the community, including distinguishing between pedestrians and cyclists on shared tracks to improve the safety for users and improving road crossings throughout the City.

3.2 Strategies

In order to resolve the existing pedestrian facility issues and ensure that future developments provide a suitable level of pedestrian access to all users, the following strategies for walking within Wagga Wagga have been identified:
- Update the Local Environment Plan and Development Control Plans to include walking facilities and integrating into broader networks
- Improve permeability and connectivity to and within activity centres and neighbourhoods
- Improve crossability of major roads and roundabouts, e.g. Kooringal Road/ Lake Albert Road/ Red Hill Road
- Improve and develop comfort, safety and quality of footpaths by prioritising implementation of quality walking treatments over quantity
- Create a safe environment for all road users along Baylis Street and Fitzmaurice Street, including improved conditions for active and public transport
- Develop a program for safe school access
- Increase community knowledge and connectivity of recreational walking trails, e.g. Wiradjuri Walking Track.

3.3 Network Plan

3.3.1 Network Approach

Walking has a wide range of social, environmental, health and economic benefits for individuals and society. Increasing walking can improve people’s sense of community, support economic development, activate commercial areas, improve health and wellbeing, reduce car usage and associated emissions, and decrease congestion and car parking requirements. For the first time in Australia, many of the factors are being formally monitored for evaluation in Federal Government Infrastructure Program.

Pedestrian priority treatments in urban areas require a strong urban design focus, as traditional ‘traffic engineering’ approaches to pedestrian networks have some shortcomings. Such an example is the shared zone concept of having pedestrians as the highest priority mode means pedestrians are able to occupy streets freely and move around without undue barriers being imposed by other transport modes. Alternatively, segregation can exist, but priority movements and crossing opportunities need to focus on pedestrians, with lower speed limits adopted (i.e. 40km/h high volume pedestrian areas) and all other modes being of secondary importance.

Consideration of providing such pedestrian environments and impact on traffic volumes needs to be considered at a network level through the “link” or “place” functional concept. When appropriately applied and integrated with land use, the balancing of “link” and “place” functions help form an orderly, efficient and supportive road network for the entire community.

The adoption of a “place” based road environment should be applied in areas that attract high pedestrian activity, such as the CBD and regional shopping areas along their shop fronts, and other key public destinations like hospitals, schools, libraries and recreational facilities.

The ability or need for people to park their vehicle out the front of their destination is not feasible. As with many shopping centres, car parking is located to one side and all the connecting space between retail stores is for pedestrians. The associated walking distances undertaken within a typical shopping centre are considered reasonable for the town centre area more generally.

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1 Infrastructure Australia (2016) Australian Infrastructure Plan. Priority and reforms for our nation’s future report
High quality pedestrian facilities should also be provided connecting key public destinations and the most proximate public transport service stops, to enable residents of all ages and abilities to access them and other local services.

Beyond the areas that generate high pedestrian activities, minimum pedestrian facility requirements should be achieved across all urban areas, and be required as part of the planning and approval process so Council doesn’t need to come back and provide them at a later date.

### 3.3.2 Facilities Approach

It is important that high quality pedestrian facilities are provided where high pedestrian activity occurs. The following key concepts apply to developing high quality pedestrian environments:

- **Pedestrian Level of Service.** The level of service relates to the physical aspects of pedestrian facilities, such as the width, directness, smoothness, as well as the type of crossing facilities. Typical footpath widths of 1.2m to 2.0m do not support high pedestrian volumes. At best they can accommodate two-way single file flow. Any groups or stationary people would result in low levels of service on such path widths. As such, where high pedestrian volumes are desired, 2.5 -3.0m wide and greater pedestrian paths should be used with suitable clearances to moving and parked cars, bus stops, active retail / café frontages, etc. At intersections, pedestrian’s level of service is governed by wait times. With the current types of crossing facilities available to pedestrians, the marked zebra crossing tends to provide the highest level of service with essentially no waiting time, where signalised or pedestrian refuge supported crossing facilities are dependent on the intersecting traffic volumes and platooning.

- **Pedestrian safety.** Safety at crossing points is a key issue in the attractiveness of the pedestrian network, particularly for elderly, young or less mobile users. Addressing pedestrian safety at road crossings and intersections by providing pedestrian priority crossing points is expected to provide a significant safety improvement. However, within high pedestrian areas it is recommended that lower speed limits be set.

- **Pedestrian amenity.** Apart from the provision of sufficient path widths, pedestrian priority road crossings, and lower speed limits; pedestrian amenity can refer to supporting infrastructure such as shade, seating, public toilets, and drinking fountains. In addition, urban design considerations, such as active frontages, level of separation from major traffic flows and a fine-grained urban form, contribute to increased amenity.

- **Pedestrian connectivity.** High pedestrian connectivity refers to the provision of continuous facilities along the most direct route between two attractors. They should provide a network of direct connections between key trip generators and attractors.

- **Fine grained detail matters.** In order to create attractive pedestrian routes and environments, attention to detail is critical. Many aspects of road design unintentionally prioritise vehicles over pedestrians, yet they are so commonplace that few question them. Examples of this include deviation in a pedestrian path at an intersection, to allow vehicles to clear the intersection before the pedestrian crossing, or large radius corners designed to allow for higher vehicle speeds, which in turn can increase pedestrian crossing distances, and reduce safety due to higher vehicle speeds. There are numerous other examples of poorly placed street furniture, incomplete paths, lack of pram crossings and other issues of detail that greatly impact on the overall attractiveness of the network, particularly for less mobile users or users with special needs.

For further guidance on achieving and examples of high quality pedestrian environments, the following references are provided:
3.3.3 Network Prioritisation

The 2010 Wagga Wagga PAMP provides the following priority order for the implementation of mitigating works to address the identified pedestrian hazards raised during the community engagement process:

- All identified PAMP issues in the CBD
- All identified PAMP issues within the Health Services Hub
- Major Residential to Major Suburban Service Hub, including residential to the CBD and the Health Services Hub
- Minor Residential to Major Suburban Service Hub and Major Residential to Minor Suburban Service Hub
- Recreational links, linking suburbs to each other and shared paths, creating longer routes

This, while coarse, does generally reflect where the order of highest to lowest pedestrian activity occurs. However, in terms of where to provide high quality pedestrian environments, the following areas are recommended as of highest priority:

- Shop frontages within the CBD
- Outside of the CBD, other key public destinations, such as hospitals, shopping areas, schools, libraries and recreational facilities
- Connections to adjacent off-street car parking facilities and public transport facilities from the above locations.

On the above basis, the following priority order for upgrades and ongoing development of pedestrian facilities in Wagga Wagga is recommended:

i. Shop frontages within the CBD, and connections to adjacent off-street car parking facilities and public transport facilities
ii. Health precinct road frontages, and connections to adjacent off-street car parking facilities and public transport facilities
iii. Other key public destinations, such as shopping areas, schools, libraries and recreational facilities, including connections to adjacent off-street car parking facilities and public transport facilities
iv. Residential areas most proximate the CBD, health precinct, shopping areas, schools, libraries and recreational facilities
v. Other residential areas.

It is noted that linkages between suburbs and major trip destinations over longer distances will generally be provided through the off-road shared and recreational path network, which is more driven by the development of the bicycle network.

3.3.4 Network Plan

Given the above analysis and discussion, a pedestrian network plan that identifies the land uses typically associated with high pedestrian activities and the fronting roads where high pedestrian priority areas should be provided is shown in Figure 3.1.
Figure 3.1: Pedestrian High Pedestrian Priority Network Plan
3.4 Recommendations and Projects

A number of projects have been identified to assist in improving the walkability of Wagga Wagga. These are discussed in their individual sections below.

3.4.1 Update Planning Documents

A review and update of all planning documents should be undertaken to ensure that the recommended pedestrian facilities are included. In particular, it is critical that at least minimum pedestrian facilities are being provided as part of new subdivisions, so Council doesn’t need to come back and provide them at a later date.

3.4.2 Maintenance

The maintenance of pedestrian facilities increases their desirability by users. Ensuring that existing facilities are maintained and/or improved to a high standard is an ongoing but vital activity by Council that should be undertaken.

As part of the general footpath maintenance activities, the mitigating works required to address the identified pedestrian hazards raised during the community engagement in developing the PAMP should be completed as a first priority.

Beyond this, it is expected that additional small isolated pieces of works are expected to be identified as part of the following activities, which should also be completed as part of the general footpath maintenance activities:

- Preparation of the Disability Action Inclusion Plan as part of a Mobility Access Study
- Updates to the PAMP and other strategic and master planning documents
- Setting of minimum design standards for footpaths, pram ramps and crossing facilities
- Facility reviews and audits of pedestrian facilities, ideally on an annual basis

3.4.3 Programs

There are a number of walking related programs that can help change existing behaviours and encourage more people to work. They generally need to relate an issue to current use (i.e. safety, infrastructure, attractive / amenity, etc.). A number of such programs that are considered most applicable to Wagga Wagga are provided below.

Walking School Bus

A walking school bus is a group of children that walks to school with one or more adults. It can simply be families taking turns walking their children to school or as an organised service with a designated route that has meeting points, timetables and a group of trained volunteers. Walking school buses provide flexibility to adapt to unique situations, making them appealing to communities of all sizes.

Walking Route Themes

The naming and branding of walking routes for commuter and recreational purposes is common practice in our major cities. They give a sense of place and commonality to the facilities, and hopefully their use. The naming and branding can also leverage off existing well-known features of the city to give it an initial level of significance so it is at the forefront of their minds when considering undertaking any walking activities.
Heritage Walks

There are a number of historically significant sites around the city that could reasonably be connected and accessed by walkers. The development of a route that links these sites could help form an attraction in its own right.

Shared Path Education and Awareness

Educating people on safely using shared paths helps to create a safer environment for all path users. Education and awareness campaigns are an important component of conflict minimisation in shared path environments. These campaigns should focus on promoting the safe and courteous use of shared paths and include the following key messages for pedestrians:

- **Be Aware** – Be aware of other users and try not to listen to your iPod in shared path environments as it might stop you from hearing a bike bell.
- **Listen for the Bell** – If you hear a bike bell on a shared path, move to the left hand side in a safe manner and allow the bike rider to pass.
- **Be Predictable** – Keep to the left on shared paths and walk in a predictable manner.
- **Be Considerate** – Keep pets under control and ensure children are supervised on shared paths.

3.4.4 Upgrades

The focus of any significant upgrades not covered by the PAMP should focus on the following areas, as indicated in the High Pedestrian Priority Network Plan in Figure 3.1:

- Shop frontages within the CBD
- Heath precinct road frontages
- Other key public destinations, such as shopping areas, schools, libraries and recreational facilities
- Connections to adjacent off-street car parking facilities and public transport facilities from the above locations.

In order to identify what works are required, it is recommended that pedestrian access and landscape strategies be developed for these high pedestrian areas. At a minimum they should consider the key network facility concepts outlined in Section 3.3.2.

Beyond the above high pedestrian priority areas, minimum pedestrian facility requirements should be achieved across all urban areas. Where they are currently missing a works program for their implementation should be developed and funded, so they are progressively installed over time.

Example Upgrade – Morrow Street

As an example, Morrow Street within the CBD fronts the Wagga Wagga Art Gallery and Civic Theatre. It is a reasonably wide two-lane road that is only really used by vehicles to access the kerbside and off-street car parking. Given that all those accessing the Art Gallery and Civic Theatre need to walk from the car space, there is considered to be a significant pedestrian volume crossing Morrow Street, especially between the off-street car parks to the south and the Art Gallery and Civic Theatre between Baylis Street and Tarcutta Street.

As such, there is an opportunity to make Morrow Street between Baylis Street and Tarcutta Street a high quality pedestrian environment.

Such a change has been successfully achieved in the CBD of Bendigo between Hargreaves Street and Bull Street, as shown in Figure 3.2, with the implementation of a shared zone. The
Bendigo shared zone was implemented in 2009 in response to a number of issues that are present in Morrow Street. In particular, Bendigo responded to the following relevant issues:

- the presence of significant through traffic
- street space allocation that prioritised motor vehicles
- lack of formalised street and pedestrian crossing designs
- high traffic speeds
- negative impacts of drive-through shopping
- cluttered streetscape design (source: Victorian Department of Transport 2012).

The Bendigo example has been highly successful in addressing this issue, namely in achieving the following outcomes:

- Average vehicle speeds (85th percentile) have reduced from 40.5 km/h to 27.5 km/h\(^3\). While not at the target speed of 20km/h or less, it has significantly reduced the likelihood of serious injury or fatality and is well below the 40km/h speed limit set in the area.
- 90 degree parking has been used to slow vehicle speeds and reduce road width.
- Threshold treatments designate the entry to the area with bluestone rumble pavement.
- A clear, visible space has been provided at the intersection which allows users time to identify each other and negotiate right of way.
- The treatment has provided central Bendigo with a strong sense of identity, contributing to the overall economic revitalisation of the centre.

Figure 3.2: Bendigo CBD Shared Zone Treatment

This high quality pedestrian treatment could well be applied at the Morrow Street and O’Reilly Street intersection in the Wagga Wagga CBD to support the desireline between the off-street car park to the south and Art Gallery and Civic Theatre to the north.

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3.5 Cross Check of Existing Section 94 Projects

There are only the two following specific pedestrian projects listed within the existing Section 94 Contributions Plan for Wagga Wagga:

- RT12: Footpaths & Bus Shelter – Franklin Drive
- RT20: Pedestrian bridge over open drain western side of Plumpton Road, opposite Lansdowne Avenue

Both projects are discussed in the Section 94 report. In general, pedestrian facilities should be required as part of the following transport related project types:

- Road and traffic management facilities, especially with any changes to existing road cross-sections and intersection arrangements
- Car parking facilities, namely in managing any potential conflict, and access to them and the key proximate trip destinations.

While not transport specific, pedestrian facilities will also need to be provided as part of all the proposed open space and recreational facilities, and proposed civic, community and cultural facilities.

3.6 Alignment with Guiding Principles

The recommendations and actions coming out of this section were assessed for their alignment with the guiding principles. The guiding principles are shown in Table 3.1.

Table 3.1: Guiding Principles

<table>
<thead>
<tr>
<th>Principle No</th>
<th>Guiding Principle</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Provide comfortable, safe and convenient access within and around Wagga Wagga for all ages and abilities, and emerging transport technologies</td>
</tr>
<tr>
<td>2</td>
<td>Remove access and transport barriers to social, cultural, educational, recreational activities and public facilities</td>
</tr>
<tr>
<td>3</td>
<td>Develop a transport system that supports economic development and employment</td>
</tr>
<tr>
<td>4</td>
<td>Work collaboratively with others to become leaders in universal access in Regional Australia</td>
</tr>
<tr>
<td>5</td>
<td>Integrate transport planning with land-use initiatives and developments</td>
</tr>
<tr>
<td>6</td>
<td>Reduce reliance on private cars, and instead encourage walking, cycling, public transport, healthy people and healthy places</td>
</tr>
<tr>
<td>7</td>
<td>Provide connections and ease of movement between all centres and neighbourhoods</td>
</tr>
<tr>
<td>8</td>
<td>Develop and manage an economically viable transport system based on long term usage and informed by life-cycle-costing and resource availability</td>
</tr>
</tbody>
</table>

Table 3.2 shows how the recommendations and actions of this section align with each of the guiding principles. In the final column, a recommendation is made for a timeframe for implementing the recommendation or action.
### Table 3.2: Alignment of Disability Access Actions and Recommendations with Guiding Principles

<table>
<thead>
<tr>
<th>Project</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>Timeframe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Update Planning Documents</td>
<td>X</td>
<td>X</td>
<td>O</td>
<td>O</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>immediately</td>
</tr>
<tr>
<td>Set Minimum Design Standards for Footpaths and Crossing Facilities</td>
<td>X</td>
<td>X</td>
<td>O</td>
<td>X</td>
<td>O</td>
<td>X</td>
<td></td>
<td></td>
<td>Short term</td>
</tr>
<tr>
<td>Update and Maintain Maintenance Program</td>
<td>X</td>
<td>X</td>
<td>O</td>
<td>O</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>Short term</td>
</tr>
<tr>
<td>Develop Walking Programs</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>O</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>Short term</td>
</tr>
<tr>
<td>Upgrade of Facilities</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>O</td>
<td>O</td>
<td>X</td>
<td></td>
<td></td>
<td>Short term</td>
</tr>
</tbody>
</table>

X – fully aligned with the guiding principle  
O – partly aligned with the guiding principle
4. Cycling

4.1 Existing Conditions

4.1.1 Policy Context

The National Cycling Strategy was released by Austroads and The Australian Bicycle Council in 2010. The overarching vision for the strategy is to realise a “step-change” in attitudes to cycling and in the numbers of riders in Australia. In the short term, the strategy sets the goal to double the number of people cycling across the nation over the next five years. The strategy sets out a coordinated framework for the development of cycling in Australia to 2016 under the following priorities and objectives:

- Cycling Promotion
- Infrastructure and Facilities
- Integrated Planning
- Safety
- Monitoring and Evaluation
- Guidance and Best Practice

The NSW Bike Plan (2010) includes at least $5 million a year over ten years for regional cities to complete neighbourhood cycleway networks. The state government aims to double the mode share of cycling in journey to work trips between 2006 and 2016 through promoting it as an affordable and enjoyable transport choice for everyday personal travel. This plan recognises the importance of cycling in regional and country NSW, including in terms of cycle tourism and recreational cycling. State government investment in cycling infrastructure will support access to community facilities, as well as providing end of trip facilities, safety training, improved signage, and support for community initiatives.

The Wagga Wagga Bicycle Plan was released in 2011 and covers the following five (5) years. The key vision developed as part of the Bicycle Plan is “to create an environment where cycling is an easy, enjoyable and convenient way to get about, where there are no barriers, and everyone has the confidence and desire to simply ‘pick up a bike and go’, whenever they feel like it”.

It recognises the benefits of cycling, including Council’s quadruple bottom line (environmental, social, economic and governance), as well as the wider transport network. It also highlights the considerable barriers to cycling, which include major roads, traffic volumes and speeds, and the lack of continuity in the bicycle network.

Given this, it identifies and considers the wide-ranging demographics of cyclists, which is reflected in the proposed funding allocation of bicycle lanes, shared paths and mixed traffic facilities, as follows:

- $65,000 for road markings
- $50,000 for shoulder bicycle lanes
- $7,000 annually for quarterly bicycle network cleans
- $10,000 per annum for bicycle parking facilities
- $10,000 per annum for bicycle warning signage on rural road cycling routes.
4.1.2 Existing Facilities

The current bicycle conditions in the Wagga Wagga LGA are only provided within the City and proximate suburbs, with cyclists needing to ride on-road to access more rural areas.

Most of the formal bicycle facilities are off-road shared paths, many of which have a loose gravel surface, which limits their use by road, and to a lesser extent, hybrid bike types. Broadly speaking, the extent of the network is largely unconnected, requiring users to use a range of facilities, and at times mix with traffic, between major trip generators and attractors.

However, it is noted that it is almost possible to travel around the circumference of the main urbanised area of the City along existing bicycle facilities (noting some are informal trails). Although the missing links and quality of the route could be improved, it could form a significant tourist attraction to visitors, especially if connected to other attractions like Lake Albert, Pomingalama Mountain Bike Park, disused rail corridor (rail trail) and the levy banks along the river network.

Travel within the City, particularly to access the central city from many suburban areas is difficult, namely due to the lack of connected facilities, and wide and relatively high speed roads. Given that many local roads have surplus capacity, the road carriageway cross-sections can be reallocated to better provide for cyclists. Treatment of intersections, especially at the many roundabouts, would also need to be considered, but again due to the surplus capacity, there is ability to reallocate road space and accommodate bicycle facilities that are supportive of a wide range of user abilities.

4.1.3 Public Consultation

The public consultation process confirmed the majority of the above existing conditions, noting that the main concerns centred on safety, connectivity and maintenance. Additional issues raised included the following:
- Inadequate path surfaces
- Lack of end-of-trip facilities
- Lack of separation between cyclists and vehicles
- Lack of signage for drivers that raises awareness of cyclists
- Current facilities are generally of a low cost marked lane type.

The community has recognised potential opportunities for cycling in Wagga Wagga, including providing educational programs, raising awareness of cyclists and increasing the provision of supporting facilities (such as secure storage and showers).

Other opportunities include:
- Providing high quality off-road facilities along levy banks and potentially the unused rail corridor and its alternatives
- Developing standard designs for active transport facilities to be progressively implemented from the CBD out and along key access routes
- Developing and incorporating holistic network blueprints so they have statutory weight, which will then help ensure that new developments are required to tie into and/or provide active transport facilities
- Changing development control plans and the Section 94 Plan to require active transport facilities as part of all development applications, including end-of-trip facilities
Tourism related opportunities, both from a holiday and organised events perspective with the implementation of high quality active transport facilities and supporting information that provides links to the many natural attractions in the area.

In addition, the community are aware of and support the proposed high quality cycleway corridors, as shown in Figure 4.1.

4.2 Strategies

In order to resolve the existing cycling issues and capitalise on the indicated opportunities, the following strategies for cycling within Wagga Wagga have been identified:

- Update the Local Environment Plan and Development Control plans to include cycling facilities and integrating into broader networks
- Develop a strategic network of safe, separated, connected and affordable cycling routes, utilising excess road space where appropriate
- Develop high quality recreation and tourism circuit that complements the commuter cycleways
- Support initiatives to promote cycling and improve safety for all users
- Provide connectivity between cycleways, establish links and networks
- Prioritise implementation of quality cycling treatments over quantity.
4.3 Network Plan

4.3.1 Proposed High Quality Cycleway Corridor Routes

In developing a long-term and complete bicycle network for Wagga Wagga, it is proposed that the highest priority is the implementation of the cycleway corridors, as shown in Figure 4.1. These facilities are proposed to be of a high quality that prioritise cyclists along their length and will suitably encourage the most vulnerable cyclists (i.e. segregated facilities for the most part).

The high quality cycleway corridors will form the “arterial” type cycle facilities within the overall bicycle network. The “collector” and “local” type facilities will integrate and hang off these high quality cycleway corridors.

The preferred alignments have been determined through a technical performance evaluation, as set out in Section 12 of the NSW Bicycle Guidelines.

The details around the identification and assessment of the alignment options are provided in the Wagga Wagga Active Transport Strategy Report. The report also outlines the types of facilities proposed along each route, treatment of various intersection types and broad level costing, which will be used to apply for funding from the RMS to implement the routes.

The preferred alignments for each of the proposed high quality cycleway corridor routes are shown in Figure 4.2.

Figure 4.2: Proposed High Quality Cycleway Corridor Routes
4.3.2 CBD Catchment

While the high quality cycleway corridors are implemented, the following components of the bicycle network are recommended to also be implemented where possible:

- Fill in the missing gaps along the existing off-road routes to achieve a circular route around the urbanised area of the City
- Provide the proposed bicycle network in the Wagga Wagga Bicycle Plan for a 3km catchment centred on the CBD.

Once all of the above has been implemented, then the remaining facilities that provide reasonable access for all residents in the township to the bicycle network should be implemented.

Each of the above components are discussed further below.

Missing links along the existing off-road route around the City

Based on the existing off-road bicycle facilities that exist, the following missing links could be provided to achieve a route that goes around the urbanised area of the City.

- Travers Street between Beckwith Street and Fitzmaurice Street
- Kooringal Road between the rail corridor and Wagga Wagga Christian College
- Kooringal Road between Lake Albert Road and Plumpton Road
- Redhill Road between Tamar Road and Berembee Road
- Redhill Road between Yentoo Drive and the rail corridor
- Rail corridor and Bulolo Street between Grinton Avenue and Ashmont Avenue
- Crossing of Olympic Highway between reserve and Edward Street West.

The resulting route that goes around the urbanised area of the City is shown in Figure 4.3.

Figure 4.3: Missing Links along the Existing Off-Road Route around the City
It is understood that some of the existing routes along the off-road route around the City are informal trails. Ideally these and the proposed missing links should at least use a crushed aggregate surface within sensitive environments, and asphalt or concrete surfaces within urban residential and commercial environments.

3km Catchment Centred on the CBD

The main place of employment in Wagga Wagga is the CBD. As such, it is recommended that suitable bicycle facilities connecting it to the proximate residential catchment be provided. Given that cyclists typically travel on average at 15-20km/h⁴, they can travel 3.0km in 10min.

As such, it is recommended that the bicycle facilities proposed in the Wagga Wagga Bicycle Plan (2011) that are within 3.0km of the CBD be implemented.

Figure 4.4 indicates the bicycle facilities proposed in the Bicycle Plan that are within 3.0km of the CBD that aren’t covered by the proposed high quality cycleway corridor routes or through the missing links around the City.

Figure 4.4: 3Km Catchment Centred on the CBD

It is noted that the majority of the proposed bicycle facilities in Figure 4.4 are on-road facilities. Moreover, some are located on wide low volume roads. As such, there is an ability to undertake “road diets” and provide quasi-separated bicycle facilities within the existing road carriageway.

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⁴ Average cycling speeds taken from the National Guidelines for Transport System Management in Australia – Active Travel
As an example of where this approach could be implemented, Kincaid Street is identified. Overall, its carriageway is 18m wide, with one traffic and bicycle lane in each direction, as well as kerbside parking.

Such a width is sufficient to achieve the road cross section shown in Figure 4.5 through some linemarkings and bollards or planter boxes.

**Figure 4.5: Potential Road Diet Cross-Section for Kincaid Street**

Where ever possible, “road diets” are recommended for local roads in Wagga Wagga where bicycle facilities are desired, as it achieves the following benefits:

- Provides a low cost and initial step towards provided separated bicycle facilities
- Calms traffic, so lower vehicular speeds and reduced crash rates
- Improved pedestrian safety as they have less distance to cross traffic lanes
- Reduces the width of carriageway exposed to traffic, so resealing and other maintenance works can be focused to the trafficable area.

### 4.3.3 Overall Network Plan

Given the above analysis and discussion, a bicycle network plan that includes the following is shown in Figure 4.6.

- High quality cycleway corridor routes
- Missing links along the existing off-road routes around the City
- Proposed bicycle network within a 3km catchment centred on the CBD.
4.4 Recommendations and Projects

A number of projects have been identified to assist in increasing the amount of cycling in Wagga Wagga. These are discussed in their individual sections below.

4.4.1 Maintenance

The maintenance of bicycle facilities increases their desirability by users. Ensuring that existing facilities are maintained and/or improved to a high standard is an ongoing but vital activity by Council that should be undertaken.

In this regard, the key maintenance activities and/or improvements to existing facilities Council should be undertaken are the following:

- Sweeping and spraying to remove / minimise the presence of bindi / catheads
- Converting the decomposed granite path surfaces to concrete or asphalt to maximise long-term costs and maximise user comfort
- Identify roads where quasi-separated bicycle facilities can be accommodated through “road diets” and install as part of typical linemarking, resealing etc., road maintenance works.

Figure 4.6: Bicycle Network Plan
4.4.2 Programs

There are a number of cycling related programs out there that can help change existing behaviours and encourage more people to cycle. They generally need to relate an issue to current use (i.e. safety, infrastructure, attractive / amenity, etc.). A number of such programs that are considered most applicable to Wagga Wagga are provided below.

A Metre Matters

Launched in 2009, the primary message of this campaign is that when overtaking bicycle riders, drivers need to allow a minimum overtaking distance of one metre. The minimum overtaking distance is a simple, common sense measure to give bike riders a safe space.

Share the Road

Raising driver and bike rider awareness about how to share the road is an important step in create safe and desirable bicycle routes. This concept encourages all road users to look out for one another and create a safer environment for all involved.

Shared Path Education and Awareness

Shared paths are used widely across Australia. In five of Australia’s eight states and territories, cyclists are allowed to use any footpath. In New South Wales, cyclists are not permitted to ride on the footpath. Shared paths are suitable facilities where the path width and volume of pedestrians and cyclists are appropriate to permit cyclists and pedestrians travelling in the same direction to safely pass one another. Pedestrians have right of way on shared paths at all times.

Bike Donations

There are a number of existing programs where people can donate money towards or an old bike they have. When these donations are then provided to low social economic groups, they can provide them with real transport options, especially in getting round a town the size of Wagga Wagga.

Other bicycle donation projects include those for school children, where they are located to a mentor or broader group, and they build / repair their own bike for use.

4.4.3 Upgrades

High Quality Cycleway Corridors

The commuter priority routes are proposed for Wagga Wagga, which will assist in getting commuters safely from the outer areas into the CBD in a safe, easy and convenient way. The preferred routes for each high quality cycleway corridor are shown in Figure 4.2.

It is noted that the preferred Forest Hill cycleway corridor utilises the railcorridor, at least to the east of Kooringal Road.

More detail on the types of facilities, intersection treatments and broad level costing is provided in the Active Transport Report. These outputs of the Active Transport Report will form part of a submission to the RMS for funding to implement them.

Other Proposed Upgrades

As outlined in Section 4.3, the following upgrade works are proposed to be implemented:

- Fill in the missing links along the existing off-road routes around the City
- Provide the proposed bicycle network in the Wagga Wagga Bicycle Plan for a 3km catchment centred on the CBD.
Broad Level Facility Costings

With the above proposed facility types, the following broad level costing rates are provided:

- 3.0m wide shared path = $120 to $150 per metre
- Copenhagen style cycle lanes = $280 per metre (based on installing the La Trobe Street facilities in Melbourne⁵)
- Quasi-separated (kerbside) cycle lanes = $70 to $150 per metre (based on the Albert Street facilities in Melbourne⁶)
- On-road bicycle lanes = $15 to $20 per metre.

It should be noted that the above broad level costing rates for each facility type do not consider the need to modify the existing road carriageway or road reserve, as well as any works at intersections or requirement for supporting structures. Designs are required to be prepared to understand costings in a more detailed level.

4.4.4 End-of-Trip Facility Requirements

There is currently a lack of bicycle parking and other end-of-trip facilities throughout Wagga Wagga, which forms a major barrier to individuals cycling to work or for recreational purposes. Reducing this barrier through the provision of suitable facilities can go a long way to making cycling a viable option for individuals.

Many other municipalities around Australia require end-of-trip facilities, such as parking facilities, showers and change rooms, as statutory requirements as part of any development application. Examples of these statutory requirements can be viewed through the following links:


It is recommended that Wagga Wagga update their Local Environment Plan and Development Control Plans to include bicycle parking and end-of-trip facilities that are generally consistent with at least the ACT statutory requirements, which is in line with current best practice.

In addition, consideration should be given to the ability to provide public end-of-trip facilities within the CBD and at key transport nodes (i.e. train station and bus interchanges) to account for the current deficit in facilities.

These end-of-trip facilities could be provided through the following initiatives:

- Include bicycle parking and end-of-trip facilities as part of any new or upgrades public car parking facilities
- Development strategic partnerships with gyms where Council provides some bicycle parking facilities and users can pay to use the shower and change rooms.
- As part of organising cycling events, include requirements for parking and end-of-trip facilities.

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⁵ As provided in Section 2.2 of Austroads, Safe System Roads for Local Government, 2016
⁶ As provided in Section 2.2 of Austroads, Safe System Roads for Local Government, 2016
4.5 Cross Check of Existing Section 94 Projects

There are 10 specific cycling projects listed within the existing Section 94 Contributions Plan for Wagga Wagga. Each is listed below with commentary on the projects current status and how it fits into the proposed Bicycle Network Plan in Figure 4.6:

- **RT1: Shared path – Glenfield Road between Red Hill Road and Dalman Parkway**
  It is understood that this facility has been installed. However, the resulting facility is considered to be of an informal nature, and given that it is a proposed Central Cycleway Corridor, it is recommended to be improved to a high quality standard, i.e. 3.0m wide asphalt or concrete surface with path priority crossing facilities on at least local intersecting roads.

- **RT2: Shared path – upgrade shared path around Lake Albert**
  Yet to be completed, but will form part of the proposed South Cycleway Corridor and be directly linked to the off-road route around the City. As such, this project is considered to be of high importance from a network perspective, as well as providing a recreational and tourist facility that will help attract users to Lake Albert.

- **RT6: Shared path – Red Hill Road between Holbrook Road and Bourke Street**
  Has been completed and helps form part of the off-road route around the City.

- **RT7: Shared path – Holbrook Road, between Red Hill Road and Hudson Drive**
  Has been completed and helps form part of the proposed Central Cycleway Corridor.

- **RT8: Shared path – Red Hill Road, between Holbrook Road and Hudson Drive**
  Yet to be completed, but will help connect Lloyd residents to the proposed South Cycleway Corridor and off-road route around the City.

- **RT9: Shared path – Bourke Street, between Holbrook Road and Redhill Road**
  Yet to be completed, but will help connect Bourke lands residents to the off-road route around the City.

- **RT10: Shared path – Mater Dei High School, between Plumpton Road and Main Street, via Gregadoo Road**
  Yet to be completed and does not connect into an existing or proposed shared path. As such, the shared path should be extended along Plumpton Road and/or Main Street to connect the school to the shared path network. Alternatively, a shared path could be provided along Plunkett Drive and connect to the shared path around Lake Albert.

- **RT11: Shared path – Estella Road, between Boorooma Street and Pine Gully Road**
  The section between Boorooma Street and Gunn Drive is complete, with the section to Pine Gully Road yet to be completed. In any event, the path helps connect with the proposed North Cycleway Corridor.

- **RT28: Shared path – Farrer Road, between Boorooma Street and Coolamon Road**
  Yet to be connected and should be provided as development occurs to help connect with the proposed North Cycleway Corridor.

- **RT44: Pine Gully Road – bike track**
  It isn’t clear what type of bicycle facility is proposed along Pine Gully Road, but given the likely high speed and volumes traffic on it, it should be an off-road facility, such as a shred path. Such a facility will help connect the residential developments in the area, such as Estella Rise, to the proposed North Cycleway Corridor. However, as a more direct link that includes an existing facility within Estella, it is also recommended that an east west shared path be provided between Pine Gully Road and Boorooma Street in line with Harris Road and Durack Circuit. Moreover, extending the facility further east and west into the adjacent residential areas will support their access to the proposed North Cycleway Corridor.
4.6 Alignment with Guiding Principles

The recommendations and actions coming out of this section were assessed for their alignment with the guiding principles. The guiding principles are shown in the table below.

Table 4.1: Guiding Principles

<table>
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<tr>
<th>Principle No</th>
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Table 4.2 shows how the recommendations and actions of this section align with each of the guiding principles. In the final column, a recommendation is made for a timeframe for implementing the recommendation or action.

Table 4.2: Alignment of Disability Access Actions and Recommendations with Guiding Principles

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<tr>
<th>Project</th>
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<th>Timeframe</th>
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<tbody>
<tr>
<td>Develop and Implement Strategic Bike Route Network</td>
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<td>X</td>
<td>O</td>
<td>O</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>immediately</td>
</tr>
<tr>
<td>End-of-Trip Facilities</td>
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<td>O</td>
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<td>O</td>
<td>X</td>
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<td></td>
<td>Short term</td>
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<tr>
<td>Update and Maintain Maintenance Program</td>
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<td>O</td>
<td>O</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>Short term</td>
</tr>
<tr>
<td>Develop Cycling Programs</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>O</td>
<td>X</td>
<td></td>
<td></td>
<td>Short term</td>
</tr>
<tr>
<td>Upgrade of Facilities</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>O</td>
<td>O</td>
<td>X</td>
<td></td>
<td>Short term</td>
</tr>
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</table>

X – fully aligned with the guiding principle  
O – partly aligned with the guiding principle
5. Public Transport

5.1 Existing Conditions Summary

Wagga Wagga is a major regional centre and has a reasonably extensive public transport network based on the city’s size and function. An internal bus network connects the CBD area with the surrounding suburbs. Wagga Wagga is connected to other locations in NSW and Victoria via rail and coach services. The regional airport provides services to Sydney and Melbourne, which are discussed further below.

BusAbout is the operator of a network of bus operations in Wagga Wagga. BusAbout presently operates nine public bus routes, which run primarily on hourly intervals throughout the day. There is also an extensive network of school buses which are also able to be used by the broader public, these are subject to seasonal and temporal constraints. Services primarily operate to the same frequency on weekdays and Saturdays (though Saturdays tend to have later first and earlier last services), no bus services operate on Sundays and public holidays.

The bus routes are designed around a central point (Wagga Wagga City Centre) with radial routes largely extending approximately 5km from the City Centre. A vast majority of services are wheelchair accessible with the exception of a select few services which operate only on schooldays.

Opportunities exist to rationalise the existing public bus network to be more based on travel time, rather than coverage resulting in bus roads following circuitous local routes, which could be expected to help increase its attractiveness to current and potential users. This would likely see at least a few key routes follow the arterial and collector road network. Other feeder routes could then be used within the local road network to ensure services get within 400mm of the majority of residents.

Moreover, with nearly all bus routes funneling through the main street of the CBD, which is a low speed environment and requires buses to mix with retail shoppers parking in the kerbside spaces, opportunity exists to better manage this interaction and improve bus travel times.

5.2 Strategies

In order to resolve the existing issues with public transport in Wagga Wagga and ensure that future development provides a suitable level of public transport to all users, the following strategies within Wagga Wagga have been identified:

- Review bus timetables in accordance with work, shopping, school and business hours
- Test price elasticities and the fare system
- Review routing versus network coverage
- Evaluate the Hail & Ride concept in suburbs versus having bus stops at key locations
- Communicate principles for public transport with Transport NSW (State Government body) to achieve a better public transport service in Wagga Wagga
- Investigate alternative public transport, including taxis, community bus services and school bus services, to better serve the entire Wagga Wagga community, including the mobility challenged
- Continue to work with all levels of government on the development of High Speed Rail route and terminal to service the City of Wagga Wagga.
5.3 Recommendations and Projects

The current bus network operates under a conventional concept of fixed routes and fixed timetables. As a consequence, the network is geared to provide maximum coverage with little consideration of demand patterns, origin-destination pairs and travel times. Wagga Wagga is presented with a radial route network that centres on the Bailys Street corridor in the CBD. Bus timetables are uncoordinated and focused on passengers not having to make interchanges. This means the network benefits passengers that want to travel from a suburb to the CBD or a destination en route. In an example for Wagga Wagga, a passenger going from Bourkelands to the CBD will find hourly services and a travel time of approximately 20 minutes. If the same passenger wishes to go from Bourkelands to South City Shopping Centre, the travel time would be 55 minutes at an hourly service provision with one interchange in the CBD.

An alternative to fixed route and timetable operation is the concept of flexible service operation where the services can be flexible in regards to timetable and/or to route. Examples for flexible services can be found worldwide in urban, suburban and regional areas. Australia has flexible bus services operating in Toowoomba, Yarrawonga and Adelaide.

TfNSW is aware of the challenges of providing high quality public transport in regional centres and areas. They are actively supporting flexible public transport solutions and are looking for trial locations and operational ideas. TfNSW have indicated that a regional centre with a population of 40,000 – 60,000 would be a well-received partner for an innovative public transport trial.

The review of the current bus network operations combined with community and stakeholder feedback resulted in a number of challenges to improve public transport in Wagga Wagga. This included:

- Long journey times due to network coverage requirements
- All routes pass through Baylis Street
- Poor coverage of bus stops with hail&ride in suburbs
- Service frequently hourly or bi-hourly
- Many large buses with few passengers on many routes
- Service operation not outside business hours and on Sundays.

A repeated comment during community consultation was: “Buses don’t go when and where I want to go.”

The provision of a flexible public transport service could address the issues above. Key characteristics of a successful flexible public transport service in Wagga Wagga would include:

- Meet legal and policy requirements
- Good network coverage
- Frequent services
- Local connections and CBD connections.

Whilst there are a full range of flexible service options, GTA Consultants would suggest that a combination of service operations might provide the best solution for Wagga Wagga and developed the basics for a potential flexible service concept in Wagga Wagga.

The proposed concept has two layers of bus operations:

- A Rapid Bus route that connects the two major shopping centres, the hospital and the CBD with no intermediate stops
- A feeder bus system that is based on roam zones around the four interchanges.
A potential bus network map is shown in Figure 5.1.

Figure 5.1: Potential bus network map
Rapid Bus

The Rapid Bus operates a regular service with the following interchanges:

- Kooringal Mall
- CBD (Baylis Street)
- Hospital
- South City Shopping Centre.

Rapid Buses will not stop between these interchanges. The journey times between the proposed interchanges are between 5 and 10 minutes and the total journey time between Kooringal Mall and South City would be well within 30mins. This enables an hourly service with only one vehicle and a half-hourly service with two vehicles.

The proposed routing in the CBD would be along Forsyth Street or Morgan Street and the CBD interchange would be located at the intersection of either street with Baylis Street. This would benefit journey times and service reliability and relieve Baylis Street of any bus congestion.

Feeder Buses

The feeder buses are serving a zone around each of the interchanges. Buses have no fixed routing but can roam the entire zone. The services are flexible and demand responsive and users have to book a ride in advance. Pick-up and drop-off points are flexible and demand responsive with a view never to require more than a 400m walk for any passenger.

Feeder buses connect with the rapid buses at the interchanges where connections are guaranteed. They would be smaller vehicles that can easily navigate neighbourhood streets.

The roam zones need to have a size that enables feeder buses to roam every corner of the zone and return to the interchange within 30min in order to guarantee an interchange with the Rapid Bus.

Feeder buses would serve zones as well as precinct destinations such as Charles Sturt University.

Operations

The key element to a successful feeder bus system is a combined booking and routing tool. Historically, call centres have been established and passengers would call in until a certain period before the preferred ride to make a booking. Call centres would also provide passengers with a pick-up location. Dispatchers would then coordinate the route for every bus.

With technical solutions evolving, the latest tools are downloadable apps for the mobile phone enabling passengers to book and pay for a ride. The software would then calculate optimised pick-up points for individual passengers and send text information. Modern GPS technology would allow passengers real-time vehicle tracking. An example for an operation utilising modern technology is the Bridj bus in the USA (www.bridj.com) which has also been recommended by Infrastructure Australia in their latest report.
Figure 5.2: Bridj Bus – How it works

**HOW IT WORKS.**

Drop two pins, select the trip that meets your needs, purchase in-app and walk to your tailored Bridj pick-up location. We optimize pick-ups, drop-offs, and routing based on demand meaning a 40-60% more efficient trip (on average) than traditional transit at a $2 to $6 price point.

Source: www.bridj.com

Next Steps

The operational model outlined above is one option to run a flexible and partly demand responsive bus operation. To move this idea forward, Council need to agree on the proposed principal of providing flexible bus service operation in Wagga Wagga. Once agreed, Council should discuss this idea and the options with BusAbout to understand their position and requirements and then talk with TfNSW about a potential trial run in Wagga Wagga.

5.4 Alignment with Guiding Principles

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<th>8</th>
<th>Timeframe</th>
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</thead>
<tbody>
<tr>
<td>Review Options for Flexible Bus Operations in Partnership with TfNSW</td>
<td>X</td>
<td>X</td>
<td>O</td>
<td>O</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>immediately</td>
</tr>
<tr>
<td>Develop and implement Flexible Bus Service Trials</td>
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<td>X</td>
<td>O</td>
<td>O</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>Short term</td>
</tr>
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</table>

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6. Cars, Roads and Traffic

6.1 Existing Conditions

6.1.1 Policy Context

A significant amount of work has already been carried out to guide and inform the development of the road transport network for Wagga Wagga, including:

- NSW Long Term Transport Master Plan
- NSW Road Safety Strategy 2012-2020
- NSW Murray-Murrumbidgee Regional Transport Plan
- Wagga Wagga Spatial Plan 2013-2043
- Wagga Wagga Integrated Movement Study
- Wagga Wagga Section 94 Contributions Plan 2006-2019
- Committee for Wagga Transport Related Documents:
  - Response to and Recommendation for the draft Spatial Plan (October 2013)
  - Strategic Plan (August 2014)
  - Master Transport Plan & Alternate Route Plan for Wagga Wagga (March 2015)
- Bomen Business Park Master Plan
- Wagga Wagga Airport Master Plan
- Master Plans, DCPs and other planning instruments for individual estates.

This research has identified a range of opportunities to enhance the road transport network with a view to accommodate current movement patterns and to facilitate future growth. Some specific opportunities include:

- Sturt Highway upgrade, noting its function as a strategic road freight corridor between Wagga Wagga and Mildura, including an extension of the existing rail line underpass southerly under Edward Street and into Lake Albert Road.
- Construction of a grade-separated underpass of the main north-south rail line in Bomen including a link road to the Olympic Highway and duplication Gobba Bridge and Eunony Bridge.
- Southern Orbital Route integrated with the High Speed Rail Link and airport expansion.
- The duplication of Glenfield Road, initially, between Fernleigh Road and the Dobney Avenue/Pearson Street roundabout; this duplication would require the construction of an additional overpass of the rail line.
- The upgrading of Pearson Street to Sturt Highway, including protected turning lanes, traffic islands, and any other enhancements to improve and streamline traffic flow which feeds onto Moorong and Kincaid Streets.
- An underpass of the rail line on Docker Street at the Coleman Street intersection; the purchase of the vacant land in Coleman Street (formerly Mobil Fuel depot) for a car park.
- Enhancement of the Bourke Street service roads.
- Delineation improvements at Byrnes Street and Shepherds Road.
- An alternative link between the Sturt Highway and Don Kendell Drive at the airport.
- Upgrade Inglewood Road, as important access route between the southern areas of Wagga Wagga and the airport.
6.1.2 Previous Road Network Modelling Findings

Strategic network modelling of the road network was completed as part of the Wagga Wagga Integrated Movement Study, and the following overall findings were presented:

- The future road network would operate in a similar level of service at most intersections in comparison to the existing situation. This is mainly due to the level of spare capacity that is currently available.
- The average delay at the signalised intersections along Sturt Highway will experience a higher delay than the existing situation, in particular the intersection with Tarcutta Street/Lake Albert Road.
- All signalised intersections along Lake Albert Road (with exception of Tarcutta Street) will continue to operate at a good level of service.
- Olympic Highway will experience a high level of traffic volumes and road capacity issues once future developments will occur particularly on the northern sections of the LGA. Its performance could deteriorate to level of service D/E (poor).
- Fernleigh Road and Urana Street could experience much higher traffic volumes as part of the future scenario. Encouraging more use of arterial and sub-arterial roads however could reduce this level of traffic.
- Most streets within Wagga Wagga will continue to have an acceptable level of service i.e. “LoS C” or better. However, monitoring of Olympic Highway, Sturt Highway, Pearson Street, Bourke Street would be required as part of the long term planning of the road network. These routes could experience a traffic volume that would be twice the current level.
- Holbrook Road and Hampden Avenue will experience a higher level of traffic volumes to almost three and two times their current levels, respectively.

6.1.3 Road Safety

Crash data for Wagga Wagga was obtained from the Transport for NSW Centre for Road Safety website for the years 2009-2013. Figure 6.1 shows the location of crashes within the Wagga Wagga urban area.

Crashes are concentrated along the Sturt Highway, including a concentration of crashes involving serious injury. Major north-south routes such as Glenfield Road/Pearson Street, Bourke Street/Docker Street and Lake Albert Road were also corridors along which crashes occur. There is also a concentration of crashes in the CBD area, although these crashes tend to result in less serious injuries, most likely due to lower driving speeds in those areas.
6.1.4 Public Consultation

The concerns and ideas identified through the consultation process generally reflect the technical research. A significant number of these matters relate to perceived inadequacies in the road network in terms of capacity and delay along routes such as the two Highways, the Glenfield Road corridor, the Bourke Street corridor and other routes. Figure 6.2 provides an overview of some specific issues raised during the consultation process.
6.2 Strategies

In order to resolve the existing traffic and transport issues in Wagga Wagga and ensure that future development provides a suitable level of service to all users, the following strategies within Wagga Wagga have been identified:

- Review and adjust the road hierarchy in Wagga Wagga, with a focus on improved safety for vulnerable road users
- Evaluate options for city-wide traffic calming measures and speed management
- Develop education, enforcement and engineering programs, in cooperation with RMS, to improve road safety
Use the transport model to identify pinch points and bottle necks in the road network, as well as the potential benefits of a town bypass.

Review layout of key roundabouts, consider grade separation and analyse options for the following locations:

- Sturt Highway/Lake Albert Road/Tarcutta Street
- Sturt Highway/Docker Street
- Dobney Avenue/Pearson Street (double roundabout)

Prepare road safety and traffic efficiency studies along key corridors, such as Glenfield Road and Bourke Street.

6.3 Network Plan – Road Hierarchy

In NSW there are two separate processes to classify roads – funding and functional. Both are also used in Wagga Wagga. RMS uses the funding classification for State Roads and Regional Roads. State Roads are fully owned, managed and funded by RMS.

Regional Roads are the responsibility of councils to fund, determine priorities and carry out works. They are capitalised as a council asset. Regional Roads are eligible for annual assistance grants from the State Government in recognition of their relative importance. This funding assistance comprises an identified funding pool comprising the Block Grant Program and the REPAIR Program. Each council receives an annual formula based Regional Road Block Grant for use according to council’s priorities on Regional Roads. The formula takes into account road length and traffic usage. The grant also includes a formula determined component towards the cost of traffic facilities on both Regional and Local Roads. Councils may apply for a 50 per cent contribution for specific maintenance and construction works under the REPAIR Program. Projects are prioritised by consultative committees of local councils within the six RMS Regions. Councils also apply other sources of funding to works on Regional Roads including local rates, developer contributions and funding from the Federal Government.

Councils typically use a four tier functional classification – local, collector, sub-arterial and arterial. Typically, the two higher order road categories between Council and RMS overlap, but in Wagga Wagga there is a historical discrepancy with the Regional Road route following the Docker Street / Bourke Street rather than Council’s nominated sub-arterial route along the Glenfield Road / Pearson Street.

Other network discrepancies include:

- Omission of the Eunony Bridge and approaches from both the State and Council hierarchy, which is pertinent in the context of planned upgrades of the route and the growth of the Bomen Industrial Estate.
- A future new access road for the Bomen Industrial Estate.
- Bruce Street is a higher order road than Maher Street and would provide greater connectivity with less residential frontage.
- Yentoo Drive and Kimba Drive perform a more significant traffic function than other local streets.
- There is a desire-line between the airport and southern Wagga Wagga along Brunskill Road and Inglewood Road.
- Depending on further investigations into the access requirements for the Northern Growth Area, there may be a need for inclusion of a route along Old Narrandera Road, Pine Gully Road and Estella Road.
The current Wagga Wagga road hierarchy plan was developed as part of the 2008 Integrated Movement Study and introduces a fifth road category – Major Local. This is somewhat unconventional and does not appear to add value. These routes might be better classified as collector roads. Baylis Street and Fitzmaurice Street provide important “main street” functions which is not well recognised in the current road hierarchy.

Figure 6.3 presents the existing and proposed RMS and Council road hierarchies. The proposed changes will guide and inform the type of road and traffic facilities that are required for future management of the network. Larger scale maps are provided in Appendix A.

![Existing and Proposed Road Hierarchy](image)

**Figure 6.3:** Existing and Proposed Road Hierarchy

### 6.4 Recommendations and Projects

#### 6.4.1 Network Strategy

The joint Council/RMS strategic traffic model was used to test the concerns and ideas identified throughout the research and consultation process, including:

- Current and future landuse scenarios over four years – 2015, 2025, 2035 and 2045
- A range of short and long term options for the Glenfield Road corridor
- A range of options to test network policy strategies (i.e. non-infrastructure options)
- A series of route-specific tests to understand travel patterns
- Location specific network adjustments for the CBD, Northern Growth Area and Forest Hill.

In addition to the tests for roads under the control of Council, a number of preliminary tests were conducted for the Sturt and Olympic Highways and the potential bypass options. These options are being considered as part of the current RMS Urban Highway Strategy and cannot be considered as part of the Wagga Wagga Integrated Transport Strategy.

The location specific tests are discussed in the respective sections. The other tests are discussed below. The modelling data are included in Appendix xx and were provided by Council’s modelling consultant, “Transport Modelling”.
Reading Note

- LOS Stands for Level of Service and is ranked in six grades from LOS A to LOS F, where LOS A to C are generally considered as acceptable conditions, LOS D and LOS E reflect increasing levels of congestion and are not normally used for design and planning purposes. LOS F reflects unstable traffic conditions with long delays.

Summary of assumptions used to establish the traffic model:

- Employment:
  - 45% of the population are in the labour force.
  - 70% of employment travel is by car.
  - Majority of new jobs created have been concentrated in the Bomen Industrial area.
  - Modest growth is assumed for Charles Sturt University, Royal Australian Air Force and Central Business District.
  - Minimal growth is assumed at the Hospital, Kapooka and in the neighbourhood centres.

- Residential:
  - Occupancy rate of 2.2 persons per dwelling based on previous model projections and historical ID profile occupancy trends.
  - New dwellings are provided for in line with ‘potential urban areas’ and ‘potential intensification’ areas identified in the Spatial Plan.
  - The model doesn’t include infill in existing suburbs outside of what is identified in the Spatial Plan as there is no current policy on infill development.
  - Potential lot yield is based on 12 dwellings per hectare for R3 Medium Density and 8 dwellings per hectare for R1 General Residential.

- Scenarios:
  - The base model is based on the above assumptions and we will continue with this base for now and can use the model to run different scenarios including:
  - 2.5 persons per dwelling occupancy rate (this scenario data is included in the W Drive folder below called Cookbook 37 test 2.5 Occupancy Rate (under test future).)
  - Changing the distribution of new jobs (i.e. high job growth at the hospital) – Need some input from Economic Development to determine scenario.
  - Redistribute population to infill development in existing suburbs rather than ‘potential urban areas’.

General Observations

- Traffic flow conditions are modelled for the 1-hour morning peak period, which is in line with standard analysis practice. The background data for the modelling indicates a strong sub-peak for 15-30 minutes with much stronger traffic concentrations. While this affects community perceptions about delay, it would be difficult to justify major investment decisions based on short periods of the day and perceptions.
- In terms of the 1-hour morning peak, other than a few limited routes such as the Sturt and Olympic Highways, congestion and delay in Wagga Wagga is limited to specific bottlenecks both now and into the future.
- Traffic volumes drop off steeply within a short distance from the urban area, e.g. east of Forest Hill and south of Kapooka.
Employment is concentrated close to the Sturt Highway, including the CBD, the Health Precinct and a number of industrial areas in East Wagga Wagga and along Dobney Avenue. This is a major driver behind traffic patterns and directly informs both the road network investment strategy and the landuse development strategy.

There is a strong link between the city centre and Forest Hill, which is one of the largest trip generators outside the CBD and the health precinct, with a combination of both inbound and outbound trips.

Strong growth is expected along the Sturt and Olympic Highways as well as in the Bomen industry area.

The majority of trips is fairly short and contained well within the urban areas – many of these short trips are suitable for walking and cycling, assuming safe and connected facilities are available.

Landuse Scenarios

Figure 6.4 summarises the traffic pattern as it responds to changes in landuse over the four modelling years – 2015, 2025, 2035 and 2045. The changes in landuse mean growth in both residential and employment as set out in the Wagga Wagga 2013/2043 Spatial Plan and related planning instruments.

The following comments are offered for consideration:

- In 2015 there is some congestion along the Sturt Highway in East Wagga Wagga.
- In 2025 and 2035 congestion increases starting at the Gobbagombalin Bridge, its northern and southern approaches, the Glenfield Road corridor and a short section of Red Hill Road.
- It appears that traffic is increasingly trying to avoid the Gobbagombalin Bridge via a detour along Hampden Avenue.
- In 2045 significant congestion is evident along the two Highways, Hampden Avenue and Glenfield Road.
- The CBD, the Bourke Street corridor, Lake Albert Road and Kooringal Road remain relatively free of congestion throughout the 30 year study period.

Figure 6.4: Changes in Landuse Patterns – 2015 to 2045
Figure 6.5 and Figure 6.6 summarise the traffic pattern as it responds to improvements along the Glenfield Road corridor. Two groups of tests were conducted, including:

- **Low Level Upgrade:**
  - Improve route function with less friction from side streets, parking management, improved intersections to support transfer to Regional Road
  - Reduce the traffic function for Bourke Street
  - Replace the double roundabout at Dobney Avenue with two separate staggered, signalised T-Junctions, with high capacity turning facilities
  - Signalise three intersections including left and right turn bays on all approaches, including Urana Street, Fernleigh Road and Red Hill Road

All works options were modelled for 2045 only, simultaneously with a range of other local improvements.

The following comments are offered for consideration:

- As discussed earlier, congestion along Glenfield Road starts to increase significantly in 2025 and 2035 and becomes severe in 2045, again noting the existing strong sub-peak with traffic concentrations affecting community perceptions about delay.
- There is a strong movement pattern between the southern end of the corridor and Charles Sturt University.
- Capacity reductions along the Bourke Street corridor appear to have little impact on traffic movements along Glenfield Road.
- Together the above observations would support the transfer of Regional Road status from the Bourke Street corridor to the Glenfield Road corridor.
- The modelling shows that the low level upgrade options above provide a negligible improvement of traffic conditions and Level of Service along Glenfield Road. Therefore, the long term solution for the Glenfield Road corridor has to include significant upgrades including intersections and mid-block treatments (i.e. duplication).
- A staged implementation program would need to be prepared, starting from the northern end of the corridor and working towards the south.
- As with the Sturt Highway, it would be difficult to justify major early investment in a full upgrade of the corridor based on perceptions and short sub-peak congestion patterns. However, there may be opportunities at a few key locations, such as:
- Replacement of the double roundabout with traffic signals at two high capacity T-junctions
- Sturt and Olympic Highways (northern approach) intersection, as per the Sturt Highway strategy.
- Short term options were also considered for the Urana Street roundabout, but these were not supported by the modelling.
- The need for a major upgrade will also guide and inform the planning and design of other infrastructure investment decisions, such as walking and cycling links to the south and southwest.
- Consideration was given to utilise Bourke Street via Chaston Street as a stop-gap measure to delay investment in duplication of the railway bridge and its southern approaches. This option does not appear to provide a sufficiently attractive alternative for the traffic patterns between the southern part of the corridor and the University. This option would not facilitate policy targets for cycling access and to improve safety and crossability in the Health Precinct.
Figure 6.5: Low Level Upgrade for the Glenfield Road Corridor

2045 – Do Nothing

2045 – Glenfield Road Upgrade (incl Sturt Highway Improvements)
**Bourke Street**

Figure 6.7 summarises the traffic pattern as it responds to a reduction in traffic function along the Bourke Street corridor. The reallocation of excess traffic capacity allows the use of traffic lanes for new cycling infrastructure, as identified in the walking and cycling investment framework.

All upgrade works were modelled for 2045 only as stand-alone treatments.

The following comments are offered for consideration:

- Capacity reductions along the Bourke Street corridor appear to have little impact on traffic movements along Glenfield Road and other parallel routes, which supports the transfer of Regional Road status from the Bourke Street corridor to the Glenfield Road corridor.
- The reduction in traffic capacity along the corridor would facilitate policy targets to improve cycling access and to improve safety and crossability in the Health Precinct.
Policy Scenarios

Congestion is often difficult to understand. Mathematically it is akin to compound interest, i.e. it follows an exponential curve. The curve for congestion on a typical urban arterial road is shown in Figure 6.8. It shows that during peak periods high levels of delay are experienced. During school holidays typical traffic reductions are in the order of 4%. This slight reduction in traffic delivers a 5-fold reduction in congestion of 21%. Similarly, if a person were to choose an alternate mode of transport once a fortnight, the reduction in traffic would be 10% which would deliver a 39% reduction in congestion/delay. Once a fortnight, a person could choose to ride a bicycle, walk, catch a bus, work from home or work a nine-day-fortnight.

The same principles would apply in Wagga Wagga, with some specific opportunities:

- There is a significant number of short trips that are eminently walkable or cycleable, provided the network of facilities is safe and connected.
- Input data for the model indicates that peak traffic flows in 2015 are for relatively short periods of time, i.e. 15-30 minutes. On the one hand this hides the true perception of congestion, when analysing hourly flows, as the model does. On the other, it presents an opportunity for personal travel management, i.e. by leaving slightly earlier or later.
- In contrast, the 1 hour modelling period in 2045 disguises people’s natural tendency to avoid congestion, by spreading travel patterns over a longer period of say 2 hours. Figure 6.9 presents a policy setting for 2045 with a two-hour peak period.
The following comments are offered for consideration:

- Given the short sub-peaks in 2015, there is no benefit from policy settings to further spread the peak. Rather, the model inherently does so already by assuming a 1 hour peak.
- The model indicates that the benefits of a longer peak become evident at around 2035 and prevail in 2045.
- The policy framework would be to encourage people to leave slightly earlier or later to match the model settings. This would require working with employers to say encourage “flexitime” and with the Department of Education to allow schools to start (and finish) at different times. This could happen almost immediately, given the strong sub-peak in 2015. It would become increasingly pertinent as congestion increases over the years.
- While the policy framework may support delay in widening of the Pearson Street railway bridge, it is inadequate to off-set duplication of the Gobbagombalin Bridge.
- Mode shift is a key supplementary policy opportunity, e.g. improve public transport and encourage cycling and walking by improving safety, increasing network coverage and enhancing connectivity and crossability.
- A range of other measures are available through travel demand management programs such as Travel Smart\(^7\).

6.4.2 Road Safety

There are clear road safety concerns in key areas of Wagga Wagga, such as the two highways, other major road corridors, the health precinct, the CBD and near schools. Road safety is an integral element of all recommendations and projects associated with these areas. In addition, RMS and Transport for NSW are continuously developing general road safety education campaigns and initiatives which apply to the whole of the State.

Road safety has also been identified as a key issue in neighbourhoods due to the total quantum and spread along much of the local street network, even though there are few specific sites with crash concentrations.

This concern is echoed in a recent report for Austroads® which identifies a significant over-representation of crashes on local roads:

- 80% of road length in Australia is local road, mostly rural
- 24-30% of vehicle kilometres travelled is on local roads
- 52% of casualties and 40% of fatalities occurs on local roads
- 1.5 – 2.0 times the risk.

A research paper prepared for the 2015 Senate Inquiry into Aspects of Road Safety®, identifies a key opportunity to address this problem by implementing neighbourhood road safety programs traditionally referenced as Local Area Traffic Management or traffic calming, but at a more strategic level. Key findings include:

- $27 billion total annual national crash cost
- NSW ± ¼ of all crashes
- NSW crash cost saving = $0.886 Billion
- Potential national saving = $3.5 Billion
- 13% of national crash cost.

Figure 6.10 shows an example of how this principle could be applied in a typical Australian neighbourhood. In the example, 80% of streets are made safe at 30km/h through small scale traffic calming. All properties are within 500m from a 50km/hr collector road or main road. A

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8 Safe System Roads for Local Government, Research Report AP-RS18-16
9 Submission by GTA Consultants and Paul Tranter (UNSW Canberra), February 2015.
A typical “journey-to-work” of 26min would increase by just 48sec. Potential State-wide savings are $0.886 Billion every year.

Monitored trials in selected suburbs in Wagga Wagga could facilitate broader implementation locally, state-wide and nationally. Related trials are already underway in other states, such as the “Safe Active Streets Program” in Perth\(^\text{10}\).

A closely related initiative is the 2km Safe & Healthy School Zone program in the City of Ipswich, Qld (Figure 6.11). This program is based on the premise that 50% of primary school students live within 2km from their school. Creating safe routes to school, within this radius improves safety for the neighbourhood as a whole. Creating safe routes to all schools in Wagga Wagga would benefit all neighbourhoods (Figure 6.15).

Figure 6.10: Opportunity for a Child Safe Neighbourhood in a Typical Australian Suburb

Figure 6.11: Ipswich 2km Safe & Healthy School Zone program

Health

Physical Activity Levels

"Children need at least 60 minutes (and up to several hours) of
moderate to vigorous physical activity every day".

Active Transport

Family Walking:
1km = 15min
2km = 30min

15% of primary school students were
driven to school in the 1970s.

Urban Design

Streetscapes

Potential to inform School Site Selection Criteria

Network & Infrastructure Planning

Prioritisation of infrastructure investment

Town Planning

2km Safe & Healthy School Zone

50% of primary school children
are driven to school within walking
distance.
6.5 Alignment with Guiding Principles

The recommendations and actions coming out of this section were assessed for their alignment with the guiding principles. The guiding principles are shown in the table below.
### Table 6.1: Guiding Principles

<table>
<thead>
<tr>
<th>Principle No</th>
<th>Guiding Principle</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Provide comfortable, safe and convenient access within and around Wagga Wagga for all ages and abilities, and emerging transport technologies</td>
</tr>
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<td>2</td>
<td>Remove access and transport barriers to social, cultural, educational, recreational activities and public facilities</td>
</tr>
<tr>
<td>3</td>
<td>Develop a transport system that supports economic development and employment</td>
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<tr>
<td>5</td>
<td>Integrate transport planning with land-use initiatives and developments</td>
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<td>6</td>
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<td>7</td>
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</tr>
</tbody>
</table>

Table 6.2 shows how the recommendations and actions of this section align with each of the guiding principles. In the final column, a recommendation is made for a timeframe for implementing the recommendation or action.

### Table 6.2: Alignment of Disability Access Actions and Recommendations with Guiding Principles

<table>
<thead>
<tr>
<th>Project</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>Timeframe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glenfield Road / Pearson Street Corridor</td>
<td>O</td>
<td>O</td>
<td>X</td>
<td>X</td>
<td>O</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Short term</td>
</tr>
<tr>
<td>Bourke Street Corridor</td>
<td>O</td>
<td>O</td>
<td>X</td>
<td>X</td>
<td>O</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Short term</td>
</tr>
<tr>
<td>Policy Scenarios</td>
<td>O</td>
<td>O</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>Short term</td>
</tr>
<tr>
<td>Introduce Road Safety Initiatives</td>
<td>O</td>
<td>X</td>
<td>O</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>O</td>
<td>O</td>
<td>immediately</td>
</tr>
</tbody>
</table>

X – fully aligned with the guiding principle  
O – partly aligned with the guiding principle
7. Freight and Heavy Vehicles

7.1 Existing Conditions Summary

7.1.1 Public Consultation

The concerns and ideas identified through the research and consultation process have been can be summarised as follows:

- Community concerns about the safety, noise and environmental impacts of freight movements in and close to residential precincts.
- Engineering concerns about damage caused by heavy vehicles on roads assets owned by Council that are not designed to carry heavy loads.
- Strong call for redirection of heavy vehicle movements away from urban areas, especially residential and educational developments, in line with the call for a reduction in highway traffic generally.
- Recognition for some kind of freight interchange on the perimeter of the urban area to facilitate rest stops (meals, accommodation, parking) as well as trailer exchange.
- The NSW Long Term Transport Master Plan identifies the Sturt Highway through Wagga Wagga as a significant congestion point along with concerns about heavy vehicle safety.
- The freight industry has identified significant access restrictions imposed by height and weight limits along the Sturt Highway (at the railway underpass) and on the Eunony Bridge respectively, as well as the need for a bypass and the lack of a freight interchange (Figure 7.1).

Figure 7.1: Freight Transport Concerns in Wagga Wagga (source: REROC study11)

<table>
<thead>
<tr>
<th>Railway underpass – height restrictions</th>
<th>Weight and Height Restrictions Force Freight Returns</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Railway underpass" /></td>
<td><img src="image2.png" alt="Weight and Height Restrictions Force Freight Returns" /></td>
</tr>
</tbody>
</table>

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7.1.2 Policy Context
Following the research and consultation process, further freight transport issues and opportunities have been identified:

- Council is well progressed with the planning and design of the Bomen Industrial Estate, including:
  - A business case for RIFLE has been accepted by the Federal Government with funding pending State Government partnership
  - Significant improvements to the Eunony Bridge and approaches with a view to accommodate full HML access as well as potential changes to future freight transport restrictions
  - New link road and rail underpass at Bomen
  - New interchange of the link road at the Olympic Highway.

- RMS is in the process of undertaking an urban highway study for Wagga Wagga, including both the Sturt and Olympic Highways. Freight transport is a key element of the study and preliminary surveys have been undertaken to understand freight movement patterns, which indicate:
  - Approximately 500 large heavy vehicles per day operate each way on both the Sturt and Olympic Highways
  - Approximately 10% of these vehicles could be classified as “through” traffic, which travels through Wagga Wagga without stopping
  - Approximately 90% of freight traffic stops for at least a short period of time, e.g. for a short rest break and possibly overnight
  - Further analysis of the data is required to establish freight movement patterns in greater detail, which is expected to be completed as part of the RMS project.

- Recent research by Council indicates there is a large number of Wagga Wagga based freight operators. This pattern appears to confirm that the vast majority of freight traffic has local destinations. Further discussion is required with the freight operators to discuss their operating patterns and future requirements, either as part of or in parallel with the RMS study.

7.2 Strategies
In order to resolve the existing freight transport issues in Wagga Wagga and ensure that future development provides a suitable level of service to all users, the following strategies within Wagga Wagga have been identified:

- Review the existing heavy vehicle road hierarchy to protect existing road bases and residential developments, and eliminate de-facto heavy vehicle bypass routes
- Continue the development and master planning of the Bomen Industrial Estate
- Investigate the feasibility of a truck interchange/change-over location (potentially as part of the Bomen development)
- Review capacity and capability of Eunony Bridge for heavy vehicles.
7.3 Network Plan

Figure 7.2 shows the existing heavy vehicle network in Wagga Wagga. There is a significant number of freight operators with bases in Wagga Wagga, most of which are located along the Sturt Highway in the East Wagga Wagga and Dobney Avenue industrial areas. The roads in the industrial areas are local roads under care and control of Council.

Figure 7.2: Existing Heavy Vehicle Network

7.4 Recommendations and Projects

As with the development of the general road network, planning of the freight network is guided and informed by landuse planning parameters. In terms of freight, there are two key landuse parameters:

- Location of existing freight services and the investment strategies of the operators. These are mainly located along the Sturt Highway. While the Highway does afford HML access, there are height restrictions at the railway overpass.
- The advanced state of planning and design of the Bomen Industrial Estate includes the development of the road network for full HML access and beyond, essentially forming the desired Wagga Wagga freight bypass for the Sturt Highway. This investment strategy effectively precludes future investment in freight hubs elsewhere in Wagga Wagga. To maximise return on investment, there would be benefits in some freight operators relocating to Bomen. This would serve the dual purpose of also reducing freight impacts on local roads and residential neighbourhoods. There may be potential for rezoning some lands to higher value purposes. How to best share these benefits is a matter for further negotiation between council, RMS and the freight operators, possibly as part of the proposed RMS urban highway study.
With regard to reducing delay and traffic congestion for freight, this is subject to the development and planning for the general road network, as discussed elsewhere.

7.5 Action Plan

In the context of the above strategic framework for freight transport, the following actions emerge:

- Continue support for the development of Bomen as an industrial estate, including the related road network improvements as part of a “heavy vehicle bypass”.
- (Re-)classify the route along Eunony Bridge, Byrnes Road and the proposed Bomen access road as “sub-arterial” and “regional road”.
- In close cooperation with industry, prepare a business case for the establishment of a regional freight hub at Bomen, including support facilities such as food, accommodation, fuel and secure parking. A key aspect of the business case is to seek industry interest in relocation to the new facility.
- Increase traffic capacity of the freight bypass in accordance with the strategic framework for general traffic.

7.6 Alignment with Guiding Principles

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</thead>
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<tr>
<td>Continue Support for Bomen as Industrial Estate</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>immediately</td>
</tr>
<tr>
<td>(Re-)classify Routes</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>Short term</td>
</tr>
<tr>
<td>Prepare Business Case for Freight Hub in Bomen</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>Short term</td>
</tr>
<tr>
<td>Increase Traffic Capacity of Freight Bypass</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>Short term</td>
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X – fully aligned with the guiding principle
O – partly aligned with the guiding principle
8. Parking

8.1 Existing Conditions Summary

Publicly available car parking facilities are generally provided throughout the city of Wagga Wagga via kerbside parking, except within the CBD area, where a number of large off-street facilities also exist. Parking restrictions only really exist within the CBD area, except proximate to some schools, hospitals and other residential shopping precincts. There are also numerous private developments that provide publicly available parking on-site, especially in association with retail developments and community facilities.

Car parking is only seen as an issue in the CBD Precinct and the Health Precinct as these areas attract high number of trips for various purposes and by different user groups. In other business areas, in residential areas and around other key trip generators, parking appears to be adequate and has not been raised by either the community or stakeholders. Therefore, a car parking strategy should only be developed for and applied to the CBD Precinct and the Health Precinct. The two precincts require different approaches as conditions and needs are different.

In terms of the CBD area the below is outlined about the existing parking conditions. Parking for the Health Precinct will be discussed in Section 10.

Wagga Wagga CBD

The Wagga Wagga CBD precinct has had a number of parking studies undertaken over the last decade including:

- Wagga Wagga City Council – Transport and Traffic Section 2003 CBD Car Parking Plan
- Wagga Wagga City Council – Transport and Traffic Section 2004 Northern CBD Car Parking
- Stepfair – Samsa Consultants 2008 Wagga Wagga CBD Parking Study - Development of Parking Policy and Strategies

The first two studies review the existing and potential future demand for parking spaces in the CBD precinct. The overall message of these studies is that:

- Time restricted parking is in place for the CBD and is the chosen way for the future subject to a review of some restrictions
- Additional unrestricted car parking is required to satisfy CBD employees and customers
- Multi-level parking for off-street car parks should be investigated
- Section 94 contributions by the developers in the CBD should pay for development associated parking
- A need exists to upgrade the Wagga Beach car park as well as the access to it.

The 2008 Wagga Wagga CBD Parking Study - Development of Parking Policy and Strategies provides a thorough evaluation of existing car parking in the CBD including a parking inventory and an in-depth parking survey for a Friday and Saturday morning.

The surveys identified the following:

- There were a total of 4,345 public off-street car parking spaces, of which 1,328 spaces were unrestricted.
- There was a total recorded peak parking demand of 2,225 vehicles (51%) within the public off-street car parking spaces at the middle of the day (12noon to 1pm).
- There were a total of 3,198 public on-street car parking spaces, of which 1,850 spaces were unrestricted.
- Peak on-street car parking demands were also recorded between 12noon and 1pm, the street the experienced the highest utilisation being along the main street through the CBD and generally decreasing as you moved further away.

Figure 8.1 and Figure 8.2 below show car parking utilisation rates within the Wagga Wagga CBD for public off-street car parks and on-street parking respectively, based on the above car parking survey in 2006.

In addition, the study included a parking turn-over survey in July 2006 undertaken for eight off-street car parks (mix of Council and privately owned car parks) which established that in general parking restrictions were obeyed.

The study also identifies security concerns, mainly lack of lighting, for a significant numbers of car parks including Wagga Beach. This was supported in a community survey (approximately 160 responses) in which: “Some 44% of responses noted security-related issues such as safe access between car parks and destinations, suitable car park lighting, and vandalism as major concerns.”

In its conclusion, the study states:
- There generally seems to be an adequate provision of parking, although in some areas, parking (particularly on-street parking within the main retail core area) is difficult to find during peak demand periods.
Policing of parking restrictions appears to be adequate. Notwithstanding this, effective enforcement is a priority and efforts should be made to ensure all time-restricted car parks are policed.

Apart from those locations currently under consideration for future parking provisions by Council, there is no need for any immediate increase in parking provision in the CBD area unless it is associated with new development. The priority should be on utilising existing facilities more effectively.

Any apparent parking shortage should be reviewed with an objective to increase effective utilisation of existing spaces (e.g. by converting all-day parking spaces to short-stay use or encouraging shared use of off-street parking spaces at major centres where night time activities are promoted).

Commuter parking should not be expanded except where demand substantially exceeds off-street supply and all-day on-street parking is detrimental to the safety and environmental amenity of the local community. Moreover, priority should be focussed on improving commuter transport alternatives that do not increase parking demand, e.g. increasing the accessibility to the CBD by non-car modes such as public buses, walking, cycling, etc.

The study recommends an action plan with short/medium and long term actions with a total investment of approximately $13.5m where the most expensive items are multi-level off-street carparks.

The 2015 Car Parking Strategy Councillor Workshop is a review of the actions and recommendations arising from the previous three studies. It shows that whilst some actions have been implemented, a lot of recommendations are still waiting to be put into practice. The paper also suggests that parking conditions have not changed significantly since 2006. The workshop concluded in the following four recommendations:

- Investigate changing parking restrictions in selected locations
- Upgrade access and lighting from Cross Street car park to Fitzmaurice Street
- Improve signage (pedestrian and motorists) to existing day car parks
- Investigate need in the short term for improvements to access and lighting to Wagga Beach car park.

Car parking is never free, it is either paid for by rates, developers and/or users. However, it is a public asset (at least the on-road and public off-street facilities), so should be used where possible to support broader objectives, such as small business. As such, it should be considered how and when it needs to be provided as part of new developments.

There are many large off-street car parking areas in the CBD, which are a significant community asset. Consideration should be given to how they can maximise their return from a quadruple bottom line perspective.

The development of a car parking strategy would best address and achieve all of the above issues and opportunities. It would have to identify car parking rates for the CBD and others areas, user priorities, suitable walking distances, allocations and restrictions to achieve a more efficient parking system and also maximise its return as a major public asset to the community.

### 8.2 Strategies

The following emerging strategies were developed through consultation with Council, stakeholders and the community:
- Complete and implement the city-wide car parking strategy, based on the Councillors Workshop from 9 June 2015, that identifies car parking rates for the CBD and other areas.
- Review development control plan controls for parking requirements for residential and non-residential developments.
- Review alternative use of on and off street parking on prime land for commercial or community use such as green space, public arts, pop-up food or markets.
- Review parking management options versus more parking spaces.
- Quantify urban space and community benefits for parking rationalisation.
- Review and consider paid parking as a strategy for managing demand and reducing traffic in premium areas.
- Review options for staff parking in the CBD.
- Review access to and quality of long-term CBD parking, such as crossability of major roads, safety and security, shade, and pavement quality.

### 8.3 Recommendations and Projects

A starting point for understanding the parking issues within the CBD is to establish the parking demand vs. parking supply situation. Whilst there appears to be a perception of an under-supply of and over-demand for parking in the CBD, the 2006 parking survey, undertaken as part of the 2008 Wagga Wagga CBD Parking Study - Development of Parking Policy and Strategies and recent spot counts in various locations and at various times highlight a large number of unoccupied, available parking spaces. That suggests that the CBD generally does not have a shortage of parking spaces.

At the same time, the community and different stakeholders indicate that it can be difficult finding parking spaces when and where required.

Consequently, the approach for parking in the CBD should be: Whilst there is no shortage of overall parking spaces, there appears to be a deficit of having the right parking spaces in the right locations.

The approach for managing this conflict can be either:

- Provide additional parking spaces in the right location.
- Manage the existing parking spaces to meet the local requirements.

This is consistent with the recommendations from the 2008 Wagga Wagga CBD Parking Study - Development of Parking Policy and Strategies and the 2015 Car Parking Strategy Councillor Workshop.

### Additional Car Parking

Based on the consultation process associated with this study, two areas were highlighted as particularly difficult for parking in the CBD: in and around Baylis Street and in and around Fitzmaurice Street. These are obviously high demand and high value parking areas. Providing additional parking in these locations means either adding new on-street parking spaces, increasing parking densities at existing off-street car parks (i.e. multi-level) or create new off-street parking spaces.

Creating additional on-street parking is possible by changing parallel kerb parking into angled kerb parking. Given the current kerb-to-kerb width of the road corridors in Baylis Street (around 15m) and Fitzmaurice Street (around 20m), a transformation into angled parking would require significant infrastructure works to provide some additional parking spaces. It would also have an
impact on street amenity and the overall shopping environment. However, it might be possible to create additional parking spaces in Kincaid Street by changing one side of the road from parallel to angled parking without significant works and with limited impact on the pedestrian amenity.

Increasing the parking density could be achieved by creating multi-level car parks from current single-level car parks. A two-level car park already exists in Morgan Street/ Berry Street. The overall usable parking area is approximately 50mx50m including ramp. Smaller areas than this are difficult to utilise as the ramp and vehicle circulation would hardly allow a sufficient number of additional spaces to be created (the minimum length of a ramp between levels is about 32m). Two car parks in Peter Street have the required size for a potential second level. One car park in Barrand Street might be sufficient but requires detailed design plans.

Creating a completely new car park in the CBD would require a change of land use, followed by building a new (possibly multi-level) car park. Currently, existing land/ property for transformation into car parking in or around Baylis Street or Fitzmaurice Street has not been identified.

The CBD precinct already provides a high proportion of its total area to off-street car parking. A strategic review of CBD area dedicated to off-street car parking in Wagga Wagga and comparable regional centres is show in Table 8.1. This does not mean that other cities provide less car parking in the CBD area than Wagga Wagga, it shows that they provide less footprint for off-street parking in the CBD. This can be achieved by multi-level car parking, integration of car parking into mixed-use developments (shopping malls etc.) and relocation of (mass) car parking into non-CBD areas.

<table>
<thead>
<tr>
<th>CBD</th>
<th>CBD Area (approximately)</th>
<th>Off-street Car Park Area (approximately)</th>
<th>Proportion of Off-street Car Parks (approximately)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wagga Wagga</td>
<td>64 ha</td>
<td>8.5 ha</td>
<td>13%</td>
</tr>
<tr>
<td>Dubbo</td>
<td>57 ha</td>
<td>4.5 ha</td>
<td>8%</td>
</tr>
<tr>
<td>Bendigo</td>
<td>36 ha</td>
<td>1.7 ha</td>
<td>5%</td>
</tr>
</tbody>
</table>

In conclusion, any additional car parking in the CBD would come at a high financial cost and would also have an impact on pedestrian amenity and shopping environment. Wagga Wagga already provides a higher proportion of their overall CBD area for off-street car parking than other comparable regional cities as shown in Table 8.1.

Based on the consultation findings, the guiding principles for Wagga Wagga and the emerging strategies for all modes and the four precincts, provision of additional car parking in the CBD precinct is currently not recommended. Parking demand should be monitored and provision of additional car parking be re-assessed with any significant new development.

Parking Management

The idea of parking management strategies is to best utilise the existing car parking provision by managing the demand and the usage of parking spaces and therefore achieve a more efficient use of parking spaces. The two most common methods to manage parking are through parking costs or through parking restrictions (or a combination of the two).

All parking in the CBD is currently free. The introduction of paid parking has been discussed but is in general undesired by Council and the community. There is an expectation that parking is free. Changing this arrangement would be a significant culture change and would require careful planning, excellent communication and the creation of a clearly defined and visible advantage/
off-set for the community. Simply introducing a parking fee in some or all car parks or for on-street parking is unlikely to have a positive effect. Experience from other CBD areas shows, that creating paid parking spaces in otherwise free parking areas leads to significant underutilisation of the paid parking spaces.

Consequently, it is not recommended in the short term to introduce paid parking in the Wagga Wagga CBD precinct.

Parking restrictions put a maximum occupancy time for a parking space. The shorter the maximum parking time, the higher is the turn-over rate for the parking space. The purpose of this is to create high turn-over for the most valuable parking spaces. These are usually those closest to trip generators. In the CBD, the most valuable parking spaces are those on or in the direct vicinity of Baylis Street and Fitzmaurice Street. This is consistent with the impression that these areas have a shortage of parking supply. Creating high turn-over for these parking spaces can be perceived equivalent to creating additional spaces. An unrestricted parking space might be occupied by a single car for eight hours whereas a parking space with a 1-hour time restriction might be occupied by eight different cars over a period of eight hours. Therefore, the parking restriction created additional parking opportunities.

The general approach to parking management in the CBD should be to create the highest number of parking opportunities in the most desirable (and valuable) locations.

The access time from the parking space to the trip end facility (i.e. office, shop, restaurant etc.) should be proportional to the duration of stay at the facility. An employee who spends eight hours in the office might have to walk for 10min from the parking space to the office and 10min back. This equates to roughly 4% walking time. A person parking outside a shop with a 1min walk to and from the shop and spending 20min in the shop would experience a similarly proportion of walking time (5%).

Consequently, the most valuable parking locations should create a high turnover and benefit users with short business. Users with longer business stays create less turnover and should require less parking opportunity in the most valuable parking spaces.

Users with a long parking stay are often the first to arrive in the CBD. As free parking is allocated on a first-come, first-serve basis, these users would choose to park in the most valuable spaces (i.e. those with the shortest walk time to the trip end facility). This leads to parking pattern described as ‘from the inside out’, resulting in late arriving users having to park further away from the trip end facilities. Often, the late arriving users are prepared to stay for shorter periods. To accommodate this arrival order, a parking pattern of ‘from the outside in’ is a more desirable outcome.

Parking restrictions can be applied ‘all-day, all-week’ or just during specific hours. The latter approach would benefit the Wagga Wagga CBD as it allows flexibility for different time of usage, e.g. unrestricted parking after 5pm or 6pm could help hospitality and entertainment businesses as restaurants, bars and similar establishments don’t require a high turn-over at night but would value parking in close proximity.

Strategic Parking Approach for CBD

The strategic approach to achieve this outcome is to create shorter time restrictions to parking spaces on the inside and longer or no time restriction to parking spaces further out.

Time restriction for parking can reach from 5 minutes to several hours. In CBD precincts such as Wagga Wagga, common time restrictions are 30min, 1 hour, 2 hours and 4 hours. The duration of the time restriction should be guided by the character of the surroundings, i.e. the type of
business around the parking restriction. Figure 8.3 and Figure 8.4 show potential classification of on-street parking in the Wagga Wagga CBD, using high, medium and low value parking areas.

Figure 8.3: Parking Areas in Wagga Wagga CBD – North

Figure 8.4: Parking Areas in Wagga Wagga CBD – South
Once the different value parking areas are identified, parking restrictions can be put in place. Typically used parking restrictions would be:

- High value parking areas: a mix of 15min, 30min and 1h parking
- Medium value parking areas: a mix of 2 hours, 3 hours and 4 hours parking
- Low value parking areas: 4 hours parking restriction or unrestricted parking.

This approach has been largely used by Wagga Wagga City Council in the past and is generally working well. There is no reason to change this approach. Council would have to review parking value in all CBD areas on a regular basis and make changes to the restrictions in line with any changes of the business characteristics. An example for this is the stretch of Fitzmaurice Street north of Kincaid Street. This area still has a 1-hour parking restriction, however, the surrounding businesses include a service centre, a homeware store, a hair dresser and a number of restaurants which would not require the highest turnover. Consideration can be given to extending this area to a 2-hour parking restriction. This would also benefit the stretch along Fitzmaurice Street south of Kincaid Street as it provides longer parking options within a short distance.

In addition, Council operates a number of off-street car parks. Larger car parks located outside the core CBD area (Cross Street, Bolton Park and Wagga Wagga Beach) should be unrestricted all-day car parks, focussing on CBD employees. Smaller car parks located more centrally should be in line with the surrounding on-street parking restrictions. To make large off-street car parks more attractive it is important to provide high quality, safe access including lighting, DDA compliant footpaths etc. In particular, two projects would be necessary to improve the accessibility and acceptance of all-day car parks outside the CBD core area:

- A safe pedestrian crossing facility at Tarcutta Street to facilitate access between the Cross Street car park and the CBD via Morrow Street.
- A safe access between the Wagga Wagga Beach car park and Fitzmaurice Street including DDA compliant footpaths/ walkways, lighting and potentially an upgrade of the access through Sturt Street.

These projects have been recommended in all previous studies and have been partly implemented. However, personal security, associated with lack of lighting, has been identified as a key issue in the 2008 community survey. It is unlikely that these two car parks will be fully utilised by the community until all elements of safe and easy access are completed.

Lazy Assets

Lazy assets are assets that have a high value, generate no revenue for Council and have regular maintenance costs associated. Off-street car parks fall in that category if their use is free of charge. Council owns a number of off-street car parks in core CBD areas where real estate is at a premium price. A 2014 case study saw Council selling one of these assets for around $750/sqm. Given the size of Council-owned car parks in Peter Street, they would have a potential real estate value of $1.6m to $1.9m each. Selling some of these assets could provide funds for upgrade and maintenance of parking in other locations or for the upgrade of access facilities at all-day car parks as discussed in the section above.

The sale of off-street car parks in the CBD would not only provide funds for city projects, it also offers the opportunity for Council to change the landscape of the CBD. As shown in Table 8.1, Wagga Wagga currently utilises approximately 13% of its footprint for off-street car parking, significantly more than other regional centres.
Facilitate Mode Shift

Parking management should be seen as part of an integrated approach to transport in the CBD. The overall aim for the CBD is to reduce reliance on cars (as clearly stated in the Guiding Principles which act as the basis for the Wagga Wagga ITS). Parking management and a parking strategy can only achieve parts of it. Reducing or restricting parking spaces without providing valid alternatives will not work. If Council’s aim is to have less cars in the CBD and consequently less demand for parking in the CBD, there is a need to improve the offers for alternative modes. This includes mainly cycling and public transport as access modes to the CBD and walking within the CBD. If these alternatives are not provided and communicated, the community will continue to see car as the only viable access mode to the CBD and parking as required facilitator for this.

Parking Survey 2016

A parking survey for selected CBD areas was undertaken by Wagga Wagga City Council in June 2016. This included a series of on-street kerb site parking spaces in along and around Baylis Street and Fitzmaurice Street. In addition, three off-street car parks in the southern CBD area off Peter Street were surveyed. The parking survey was undertaken on a Thursday and a Saturday. Spaces were recorded as ‘occupied’ or ‘available’. Parking occupancy was recorded at:

- 9.30am
- 10.30am
- 12.30pm
- 1.30pm
- 4.30pm
- 6.30pm

The survey in general confirmed the results from the 2006 survey. The on-street parking occupancy was largely similar in the southern CBD area (Best Street showed slightly less occupancy, Morgan Street slightly more occupancy). The only significant difference was seen along Gurwood Street between Fitzmaurice Street and Trail Street where full occupancy (85% and more) occurred all day. The off-street car parks in Peter Street slowed significantly less occupancy compared to the 2006 survey.

The increase in parking occupancy in Gurwood Street could be a sign of changed parking demand in the northern CBD area. The stretch of Gurwood Street between Fitzmaurice Street and Trail Street as well as the stretch of Fitzmaurice Street between Johnson Street and Kincaid Street are seen as the core parking areas of the northern CBD with high parking demand. North of Kincaid Street the parking demand on Fitzmaurice Street drops significantly. To respond to the increased demand in the core northern CBD area, existing parking facilities in the vicinity should be reviewed and parking restrictions adjusted. The off-street car parks in Barand Street currently provide all-day parking. This should be changed to restricted parking (potentially a mix of 2-hour and 4-hour parking). All-day parking can be moved to the Wagga Beach car park. In addition, the laneways between the car parks/Barand Street and Gurwood Street and Fitzmaurice Street should be upgraded (including lighting) to provide quick and safe access. Parking restrictions along the stretch of Fitzmaurice Street north of Kincaid Street should be reviewed and potentially changed to 2-hour parking.

8.4 Action Plan

- Implement the recommendations from the 2015 Car Parking Strategy Councillor Workshop, in particular:
- Upgrade pedestrian access between all-day car parks and CBD (e.g., crossing facility at Tarcutta Street outside Cross Street car park; upgrade access to Wagga Wagga Beach car park including lighting)
- Review, identify and agree high, medium and low parking value areas and adjust parking restrictions where necessary (e.g., Fitzmaurice Street north of Kincaid Street)
- Upgrade the laneways leading to Fitzmaurice Street and Gurwood Street to improve access from Barand Street
- Prepare a business case for the sale of Council owned off-street car parks in the CBD, with a focus on Peter Street assets
- Update the Wagga Wagga CBD parking inventory as a result of any changes to the parking restrictions to have detailed understanding of existing parking supply
- Repeat parking survey for weekday and Saturday to monitor parking demand changes on regular intervals (e.g., 2 years)
- Provide alternatives to car parking (e.g., public transport, bike parking) in combination with recommendations from the Active Transport Strategy and recommendations for public transport as part of this study.

8.5 Alignment with Guiding Principles

The recommendations and actions coming out of this section were assessed for their alignment with the guiding principles. The guiding principles are shown in the table below.

<table>
<thead>
<tr>
<th>Principle No</th>
<th>Guiding Principle</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Provide comfortable, safe and convenient access within and around Wagga Wagga for all ages and abilities, and emerging transport technologies</td>
</tr>
<tr>
<td>2</td>
<td>Remove access and transport barriers to social, cultural, educational, recreational activities and public facilities</td>
</tr>
<tr>
<td>3</td>
<td>Develop a transport system that supports economic development and employment</td>
</tr>
<tr>
<td>4</td>
<td>Work collaboratively with others to become leaders in universal access in Regional Australia</td>
</tr>
<tr>
<td>5</td>
<td>Integrate transport planning with land-use initiatives and developments</td>
</tr>
<tr>
<td>6</td>
<td>Reduce reliance on private cars, and instead encourage walking, cycling, public transport, healthy people and healthy places</td>
</tr>
<tr>
<td>7</td>
<td>Provide connections and ease of movement between all centres and neighbourhoods</td>
</tr>
<tr>
<td>8</td>
<td>Develop and manage an economically viable transport system based on long term usage and informed by life-cycle-costing and resource availability</td>
</tr>
</tbody>
</table>

Table 8.3 shows how the recommendations and actions of this section align with each of the guiding principles. In the final column, a recommendation is made for a timeframe for implementing the recommendation or action.
### Table 8.3: Alignment of Disability Access Actions and Recommendations with Guiding Principles

<table>
<thead>
<tr>
<th>Project</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>Timeframe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implement the recommendations from the 2015 Car Parking Strategy</td>
<td>O</td>
<td>O</td>
<td>X</td>
<td>O</td>
<td>X</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>Immediately</td>
</tr>
<tr>
<td>Councillor Workshop</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Review and Update Parking Restrictions in Northern CBD</td>
<td>O</td>
<td>O</td>
<td>X</td>
<td>O</td>
<td>X</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>Immediately</td>
</tr>
<tr>
<td>Upgrade Laneways leading to Fitzmaurice Street and Gurwood Street</td>
<td>O</td>
<td>X</td>
<td>O</td>
<td>X</td>
<td>O</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Short term</td>
</tr>
<tr>
<td>Prepare Business Case for sale of Council-owned Car Parks</td>
<td>X</td>
<td>O</td>
<td>X</td>
<td>O</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Medium term</td>
</tr>
<tr>
<td>Repeat Parking Survey regularly</td>
<td>O</td>
<td>X</td>
<td>O</td>
<td>X</td>
<td>O</td>
<td></td>
<td></td>
<td></td>
<td>Medium term</td>
</tr>
<tr>
<td>Update CBD Parking Inventory</td>
<td>O</td>
<td>X</td>
<td>O</td>
<td>X</td>
<td>O</td>
<td></td>
<td></td>
<td></td>
<td>Short term</td>
</tr>
</tbody>
</table>

X – fully aligned with the guiding principle  
O – partly aligned with the guiding principle
9. CBD Precinct

9.1 Existing Conditions

For the purposes of planning and managing the CBD, clear boundaries were set which recognise the “core” function of Baylis Street and Fitzmaurice Street. These core functions are “framed” by the surrounding street network which forms a supporting role. Figure 9.1 shows the proposed “core and frame” for the CBD. It is noted that both the core and the frame extend across the Sturt Highway to include the railway and adjacent land uses.

Figure 9.1: CBD Core and Frame

Existing conditions in the CBD vary by mode of access:

- Pedestrian conditions are generally good within the city centre of Wagga Wagga, particularly along the Baylis Street and Fitzmaurice Street corridor, where there are wide and even footpaths, compliant pram ramps, signalised crossings at intersections and some mid-block zebra crossings. Crossability, however, is a concern for many roads and intersections, particularly the Highway.
- Bicycle access to the CBD from many suburban areas is difficult, due to the lack of connected facilities, wide and relatively high speed roads, and bicycle unfriendly roundabouts.
- Public transport is centred on the CBD with all bus routes running along Baylis Street. This causes delays and service unreliability, mentioned by both passengers and the operator.
- The traffic modelling has indicated access within the CBD is generally unhindered, both now and well into the future, although delay is increasingly experienced at key entry points along the Sturt Highway such as Tarcutta Street and Docker Street.
The RMS road safety database shows clusters of crashes in and around the CBD, which is a key concern.

Parking in the CBD is a key issue and is discussed separately.

9.2 Public Consultation

The public consultation process confirmed the majority of the above existing conditions, in particular:

- There is a lack of support for those with mobility issues accessing public transport
- More planning and implementation of facilities is required to achieve universal mobility access
- Additional disabled parking is required given the aging population
- Pedestrians should be prioritised over other modes in high pedestrian activity areas. This should be reflected through improved and increased road allocation and movement controls along the associated road corridors
- Developing standard designs for active transport facilities to be progressively implemented from the CBD out and along key access routes.

9.3 Strategies

In order to resolve the existing traffic and transport issues in Wagga Wagga and ensure that future development provides a suitable level of service to all users, the following strategies within the CBD have been identified:

Key Strategies

- Prepare a CBD masterplan that integrates land-use development, street function, car parking and accessibility
- Create the CBD ‘main street’ as a public space with safe and convenient access along and across the street for pedestrians, cyclists and public transport
- Improve visual, structural and strategic connectivity between the two parts of the CBD along Fitzmaurice Street and Baylis Street
- Review The Disability Inclusion Act 2014 with respect to people using motorised scooters, wheelchairs and other people movers to determine how the requirements of the act can be met
- Work towards reducing cars and promoting walking, cycling and public transport to the CBD.

Supplementary Strategies

- Improve permeability and connectivity to and within activity centres for all ages and abilities, so they can access social, cultural, educational, recreational activities and public facilities
- Create a safe environment for all road users along Baylis Street and Fitzmaurice Street, including improved conditions for active and public transport.

9.4 Network Plan – Road Hierarchy

The Wagga Wagga road hierarchy plan proposes the adoption of Baylis Street and Fitzmaurice Street as “main streets” to recognise their prime role in the core of the CBD as a “place” with multiple functions and complexities, for all modes of transport. Pedestrians, bicycles and public
transport are prioritised in accordance with the proposed network policy framework. Safety and crossability are key decision factors.

Figure 9.2 shows the proposed pedestrian and bicycle networks in and around the CBD, with more detailed discussion in the separate Active Travel Strategy report.

**Figure 9.2: Pedestrian and Bicycle Priority Network Plans**

9.5 Recommendations and Projects

9.5.1 Road Diets

Figure 9.3 summarises the traffic pattern in the CBD as it responds to local network safety improvements and active travel initiatives. The focus is on speed reduction and "road diet" principles to reallocate excess road space to separated cycleways and improved pedestrian crossing facilities, such as median refuges and pedestrian (zebra) crossings. The model was used to test the following scenarios:

- Reduce Best Street, Trail Street, Morgan Street, Forsyth Street and Thompson Street to one lane each way.
- Reduce Tarcutta Street to one lane each way, north of Morgan Street.
- Replace the Tarcutta Street/ Morgan Street roundabout with traffic signals, including a free left turn slip lane from northbound to westbound and dual right turn lanes from eastbound to southbound.
- Reduce the capacity of all other CBD roundabouts to one lane on all approaches with slow entry and exit speeds, following the successful examples of such in Adelaide (Figure 9.3).

All upgrade works were modelled for 2045 and run simultaneously with a range of other network improvements.
The following comments are offered for consideration:

- The modelling indicates the proposed “road diets” do not affect traffic, which confirms many CBD streets could be used to provide a substantial network of safe and connected separated cycleways and improved pedestrian crossing facilities.

- Tarcutta Street is an exception and any changes here require more diligence, noting that the modelling reflects 2045 conditions with considerable increases in traffic demand generally. Also, in light of the policy framework discussion on congestion, it is further noted that a safe and connected walking and cycling network has strong potential to significantly contribute to de-congestion, the importance of which is clearly enunciated in recent Federal Government initiatives\textsuperscript{12,13}.

- Accordingly, the opportunity remains to trial “road diets” throughout the CBD, albeit probably with low cost investment in infrastructure along Tarcutta Street to allow for future modifications. All works should be planned and designed in accordance with the active travel framework.

- It may be feasible to fund low cost facilities from the maintenance budget, as suggested in the Active Travel Strategy.

- All trials require careful monitoring including safety, speed, volume, mode change and community feedback.

\textbf{Figure 9.3:} CBD “road diets” for improved road safety, crossability and safe cycling

<table>
<thead>
<tr>
<th>Existing Road Network</th>
<th>Road Diets for Selected Streets</th>
</tr>
</thead>
<tbody>
<tr>
<td>2045</td>
<td>2045</td>
</tr>
</tbody>
</table>

The Active Travel Strategy identifies Kincaid Street as an example where “road diets” could be implemented. Overall, its carriageway is 18m wide, with one traffic and bicycle lane in each direction, as well as kerbside parking. Such a width is sufficient to achieve the road cross section shown in Figure 9.4 through linemarking and bollards or planter boxes.


\textsuperscript{13} Transport and Infrastructure Council (2016). National Guidelines for Transport System Management in Australia. Stage 2 Content for Stakeholder Consultation. Mode Specific Assessment. M4 Active Travel.
9.5.2 Pedestrian and Bicycle Friendly Roundabouts

The research and consultation process has identified extensive concern about the high traffic speeds through CBD roundabouts. Research for the Queensland Government\textsuperscript{14}, indicates that a key factor in the high speeds is the Australian design process which suggests “tangential” entry and exit arrangement. Recent Adelaide-style roundabout conversions modify the design to slower “radial” entries and exits. The trial designs are relatively low cost with formal evaluation well under way. Preliminary findings indicate significant speed reductions and improved safety for bicycles and pedestrians. Similar trials could be undertaken in Wagga Wagga, including a formal monitoring program, including “test” and “control” sites, with a view to contributing to the national research data base.

Figure 9.5: Adelaide Bike Boulevard Roundabouts

9.5.3 Morrow Street

The Active Travel Strategy identifies Morrow Street as an opportunity for a shared zone. Adjacent within the CBD fronts the Wagga Wagga Art Gallery and Civic Theatre, it is a reasonably wide two-lane road that is only really used by vehicles to access the kerbside and off-street car parking. Given that all those accessing the Art Gallery and Civic Theatre need to walk from the car space, there is considered to be a significant pedestrian volume crossing Morrow Street.

Such a change has been successfully achieved in the CBD of Bendigo between Hargreaves Street and Bull Street (Figure 9.6). It was implemented in 2009 in response to a number of issues that are present in Morrow Street. In particular, Bendigo responded to the following relevant issues:

- the presence of significant through traffic
- street space allocation that prioritised motor vehicles
- lack of formalised street and pedestrian crossing designs
- high traffic speeds
- negative impacts of drive-through shopping
- cluttered streetscape design (source: Victorian Department of Transport 2012).

The Bendigo example has been highly successful in addressing these issues, namely in achieving the following outcomes:

![Figure 9.6: Bendigo CBD Shared Zone Treatment](image)

9.5.4 High Pedestrian Activity Area

High Pedestrian Activity Areas (HPAA) are widely used throughout NSW in CBDs both metropolitan and regional as well as tourist areas. Similar to neighbourhood road safety initiative and the 2km
Safe School Relates to LATM, 30k, 2k Safe and Healthy School Zone program documented elsewhere in this document, the HPAA program uses standard traffic calming tools to reduce speeds to 40km/h or less.

The program has been proven highly successful at improving road safety and provides a useful framework for the road diet, roundabout and shared zone programs discussed above. Importantly, the program provides some flexibility in the identification of pedestrian crossing locations and devices, many of which are strictly controlled by warrants. Accordingly, there might opportunities for say a formal pedestrian (zebra) crossing on Tarcutta Street for access to the Cross Street commuter carpark or signalised pedestrian crossings along the Sturt Highway.

Figure 9.7: HPAA Flow Chart for Choice of Treatments

9.5.5 CBD Place Making Officer

The CBD is a highly complex precinct that combines different functions (residential, commercial, entertainment, education, governing). The CBD is also the core of Wagga Wagga, an area that represents Wagga Wagga and showcases the city’s character.

Many of the strategies and recommendations put forward as part of the Integrated Transport Strategy are based around the CBD and require careful integration as well as a holistic view of the precinct. Council has the opportunity to lead the process of shaping the future of the CBD. However, one key challenge will be to facilitate various stakeholders, internal and external, and making sure that Council works collaboratively with all stakeholders and the community (the biggest stakeholder of all) in order to develop and implement a CBD strategy.

Council should create the role of a Place Making Officer (CBD) within their structure. This role should sit across all service departments, potentially reporting directly to the General Manager. The Place Making Officer would lead the process of developing a CBD strategy in cooperation...
with all Council service lines. The role would also include liaison with external stakeholders (RMS, TfNSW, local committees etc.) and the community.

9.5.6 End-of-Trip Facility Requirements

Along with wayfinding strategies, the provision of end-of-trip facilities is increasingly becoming an integral component of the cycleway planning and design process. CBD facilities are typically short term and in close proximity to destinations such as shops and cafes. They can be retrofitted to existing street furniture and poles, placed in groups where space is available, such as corals in parking bays (Figure 9.8). There is sufficient evidence that a bike coral can improve total customer expenditure compared to some car parking spaces.

Figure 9.8: CBD Bike Parking Examples

<table>
<thead>
<tr>
<th>Retrofitted Parking Rail</th>
<th>Parking Coral</th>
</tr>
</thead>
</table>

At bus and rail interchanges, long term, secure parking is required, ideally with swipe card access such as recently introduced in Blacktown and elsewhere in NSW (Figure 9.9).

Figure 9.9: Secure Bike Parking Cages at Railway Stations


9.6 Alignment with Guiding Principles

The recommendations and actions coming out of this section were assessed for their alignment with the guiding principles. The guiding principles are shown in the table below.
Table 9.1: Guiding Principles

<table>
<thead>
<tr>
<th>Principle No</th>
<th>Guiding Principle</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Provide comfortable, safe and convenient access within and around Wagga Wagga for all ages and abilities, and emerging transport technologies</td>
</tr>
<tr>
<td>2</td>
<td>Remove access and transport barriers to social, cultural, educational, recreational activities and public facilities</td>
</tr>
<tr>
<td>3</td>
<td>Develop a transport system that supports economic development and employment</td>
</tr>
<tr>
<td>4</td>
<td>Work collaboratively with others to become leaders in universal access in Regional Australia</td>
</tr>
<tr>
<td>5</td>
<td>Integrate transport planning with land-use initiatives and developments</td>
</tr>
<tr>
<td>6</td>
<td>Reduce reliance on private cars, and instead encourage walking, cycling, public transport, healthy people and healthy places</td>
</tr>
<tr>
<td>7</td>
<td>Provide connections and ease of movement between all centres and neighbourhoods</td>
</tr>
<tr>
<td>8</td>
<td>Develop and manage an economically viable transport system based on long term usage and informed by life-cycle-costing and resource availability</td>
</tr>
</tbody>
</table>

Table 9.2 shows how the recommendations and actions of this section align with each of the guiding principles. In the final column, a recommendation is made for a timeframe for implementing the recommendation or action.

Table 9.2: Alignment of Disability Access Actions and Recommendations with Guiding Principles

<table>
<thead>
<tr>
<th>Project</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>Timeframe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development and Implementation of Road Diets</td>
<td>X</td>
<td>O</td>
<td>X</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td></td>
<td></td>
<td>Short term</td>
</tr>
<tr>
<td>Upgrade Roundabouts to be Pedestrian and Cyclist Friendly</td>
<td>O</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>O</td>
<td></td>
<td></td>
<td>Medium term</td>
</tr>
<tr>
<td>Introduce High Pedestrian Activity Area</td>
<td>O</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>O</td>
<td></td>
<td></td>
<td>Short term</td>
</tr>
<tr>
<td>Provide CBD Place Making Officer</td>
<td>O</td>
<td>O</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>O</td>
<td></td>
<td></td>
<td>Short term</td>
</tr>
</tbody>
</table>

X – fully aligned with the guiding principle
O – partly aligned with the guiding principle
10. Health Precinct

10.1 Existing Conditions

The Health Precinct is a complex area with a large public hospital, a large private hospital, a range of related medical and non-medical services (eg food, accommodation) as well as residential development. The precinct is bisected by the Sturt Highway and the Bourke Street/Docker Street corridor.

The mix of developments puts significant strain on the area, including for example:

- Parking
- Crossability and safety of key roads such as the Sturt Highway and Docker Street
- Restricted pedestrian and disability access through missing footpaths
- Personal security at night for medical staff due to poor lighting and remote access to parking.

While parts of the new hospital are now open to the public, the building works are not yet complete which adds to the strain in the area.

The Wagga Wagga Development Control Plan (2010) allows for the establishment of a range of health related services in residential precincts, describing how parking is to be provided but not how much. Figure 10.1 shows the current mix of developments and the parking provision for the health services in the precinct. It is evident that:

- There is a range of different health services from small practices to large multi-service businesses.
- Most services provide some on-site parking, but it is not clear if these services are appropriate utilised and suitably accessible.
- The services are concentrated between the two main hospitals along the western side of Docker Street.
As indicated, the DCP does not include a numerical specification for parking supply. A high level analysis of potential parking demand indicates that there is an imbalance in parking demand and supply with an oversupply at some sites and an undersupply at others. This imbalance may have daily and weekly fluctuations, depending on the operational patterns of each site. Investing in supplementary public off-street parking could require a substantial public investment and requires further research with a view to establishing these variable patterns.

It is pertinent to update the DCP to include a quantitative requirement for on-site parking based on the outcomes of the research.

10.2 Public Consultation

The public consultation process generally confirms the above concerns, in particular:

- There are inadequate footpath facilities around the medical precinct for people with mobility issues.
- Lack of traffic lights at various locations makes it difficult for turning traffic and crossing pedestrians.
Traffic flow is a major problem and there appear to be opportunities to redirect flow along Chaston Street, Coleman Street and Brooking Avenue, noting the need for downstream traffic improvements to facilitate access, such as traffic lights at the Sturt Highway.

10.3 Strategies

Key Strategies

- Prepare a precinct masterplan that integrates land-use development, car parking and accessibility
- Prepare a parking management strategy, including consideration of:
  - Paid parking
  - Land acquisition for off street parking structure
  - Multi-storey car parking
- Provide improved signage and way finding to shopping/restaurant precinct, park and break-out spaces
- Establish connections, accessibility and ease of movement within and to the precinct including:
  - 24-hour access
  - Lighting
  - Disability compliant footpaths on both sides of all roads
  - Public transport and bus shelters

Supplementary Strategies

- Review and adjust the road hierarchy in Wagga Wagga, with a focus on improved safety for vulnerable road users
- Review layout of key intersections, including, inter alia, Sturt Highway/Docker Street
- Prepare road safety and traffic efficiency studies along key corridors, such as Bourke Street
- Improve pedestrian, cycling and vehicle access in particular, across streets such as Edward Street, Chaston Street and Docker Street
- Council, State Government and other stakeholders work together to achieve better planning and funding outcomes for the Health Precinct
- Review the Disability Inclusion Act and identify how requirements of the Act can be met.

10.4 Network Plan – Road Hierarchy

The Active Travel Strategy advocates for network improvements in the disability, walking and cycling network for the medical precinct as shown in Figure 10.2. These strategies are supported by traffic modelling and the proposed road hierarchy, which reduces the traffic function of the Bourke Street / Docker Street corridor.
10.5 Recommendations and Projects

A number of other elements of the Wagga Wagga Integrated Transport Strategy directly support improvements to accessibility, crossability and safety in the Health Precinct, including:

- **Sturt Highway Upgrade** (pending confirmation by RMS Urban Highway Study):
  - Signalise Stop/Give Way controlled intersection at Brookong Avenue (to improve Hospital access).
  - Signalise Stop/Give Way controlled intersection at Murray Street (pedestrian crossability).
  - Review operational parameters at the Docker Street intersection (reduce traffic delay).

- **Bourke Street / Docker Street corridor**
  - Reduce traffic function of the corridor to facilitate bicycle access, improve crossability and improve road safety and transfer the “Regional Road” classification to the Glenfield Road corridor.
  - The traffic modelling supports a “road diets” scheme for the corridor, including a reduction to 1 lane in each direction. In addition to cycle access, the excess space could be used to accommodate turning lanes at key intersections, pedestrian crossing facilities and/or angle parking.
  - Further investigation is required to identify the most appropriate crossing facilities. Opportunities include a wide median (noting the existing median is too narrow to meet current design standards for safe pedestrian crossings); formal pedestrian (zebra) crossings, possibly raised; signalised pedestrian crossings; and/or signalised intersections. RMS has set warrants are set for the latter three facilities, which are lowered in areas with special needs such as hospitals and schools.
  - Construct footpaths and cycleways in accordance with the Active Travel Strategy.
  - Implement the short term traffic and parking strategies developed by council in response to the opening of the new hospital [Appendix xx].
Based on the outcomes of further research on parking patterns of existing health support services in the precinct, update the DCP for the Health Precinct to include a quantitative requirement for on-site parking. The research would also support any investment in off-street public parking, if required.

10.6 Alignment with Guiding Principles

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<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>Timeframe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sturt Highway Upgrade</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>O</td>
<td>O</td>
<td></td>
<td></td>
<td>Medium term</td>
</tr>
<tr>
<td>Upgrade of Bourke Street / Docker Street Corridor in Accordance</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>O</td>
<td>O</td>
<td></td>
<td></td>
<td>Medium term</td>
</tr>
<tr>
<td>with other Modes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

X – fully aligned with the guiding principle
O – partly aligned with the guiding principle
11. Northern Growth Area

11.1 Existing Condition Summary

The Northern Growth Area (NGA) has three residential development suburbs that are being developed in different stages. Table 11.1 below shows their current development state and the final development.

Table 11.1: Northern Growth Area Suburb Development

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Boorooma</td>
<td>316</td>
<td>750</td>
<td>1066</td>
</tr>
<tr>
<td>Estella</td>
<td>760</td>
<td>900</td>
<td>1660</td>
</tr>
<tr>
<td>Gobbagombalin</td>
<td>153</td>
<td>923</td>
<td>1076</td>
</tr>
<tr>
<td>Total</td>
<td>1,229</td>
<td>2,573</td>
<td>3,802</td>
</tr>
</tbody>
</table>

Source: Map: Potential Lot Yield Wagga – Wagga Wagga City Council

Details for the development of the three suburbs are documented Council’s DCP from 2005 (Boorooma and Estella) and from 2010 (Gobbagombalin). Neighbourhood Plans have been prepared for all suburbs. Whilst these are currently not available online on Council’s website as full versions, parts of them are appendices to the DCP sections.

All suburbs will have an internal road network and are connected to the existing road network via the following links:
- Olympic Highway
- Old Narrandera Road
- Pine Gully Road
- Boorooma Street
- Estella Road
- Farrer Road

The full development of the NGA is likely to have a significant impact on the existing road network and some upgrades might be required. A strategic trip generation and distribution was undertaken to understand the additional daily vehicle demand on the network. The additional trip generation is based on the RMS ‘Guide to Traffic Generating Developments’ using the updated 2013 traffic survey data. For residential developments in regional areas a daily vehicle trip factor of 7.4 per dwelling was used.

Table 11.2 below shows the daily vehicle trips generated by each suburb.

Table 11.2: Future Vehicle Trips per Day Northern Growth Area

<table>
<thead>
<tr>
<th>Suburb</th>
<th>Full Development [Lots]</th>
<th>Vehicle Trips per Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boorooma</td>
<td>1,066</td>
<td>7,888</td>
</tr>
<tr>
<td>Estella</td>
<td>1,660</td>
<td>12,284</td>
</tr>
<tr>
<td>Gobbagombalin</td>
<td>1,076</td>
<td>7,962</td>
</tr>
<tr>
<td>Total</td>
<td>3,802</td>
<td>28,134</td>
</tr>
</tbody>
</table>
Figure 11.1 below shows the vehicle trip generation in each suburb today and under full development. Assumptions on the allocation of lots and development have been made based on land area and current development.

Figure 11.1: Northern Growth Area Trip Development per Suburb for Current and Full Development

Source: Imagery – Wagga Wagga City Council 2016

To understand the future impact on the road network, a strategic trip distribution across the network has been undertaken. This was based on the assumption that no additional roads are added to the network and that drivers use the earliest option to access the external road network outside their suburbs. Based on these assumptions, the additional daily vehicle trips on various links along the existing are shown in Figure 11.2.
Council have undertaken a number of traffic studies for the NGA including:

- URaP TTW – 2011 Boorooma/Estella Traffic Study
- URaP TTW – 2011 Gobbagombalin/Estella Rise Subdivision, Review Traffic Study

These studies are thorough assessments of the future traffic conditions on parts of the road network. Traffic demand is based on NGA development data provided by Council and the RMS Guide to Traffic Generating Developments. Clear recommendations for all discussed intersection treatments are provided in the report.

The Northern Growth Area suburbs currently have limited walking and cycling facilities in place. Connectivity between suburbs and permeability within the suburbs is restricted due to barriers (roads) and limited green corridors. Proposed and partly implemented shared paths along key roads will help to improve conditions for walking and cycling.

The Northern Growth Area currently has no dedicated and safe walking and cycling connection with the Wagga Wagga CBD as neither Olympic Highway nor Gardiner Street provide any facilities (Gardiner Street has limited road shoulder spaces marked for cycling). A potential connection between the Northern Growth Area and the CBD is discussed in Section 4.

11.2 Strategies

The following emerging strategies were developed through consultation with Council, stakeholders and the community:

- Initiate a master planning process for Northern Growth Area led by the Council
- Establish clear planning strategies in the DCP that provide substantial opportunities for Active Living across the life span: safe, accessible, well connected, green corridors for walking and cycling and user friendly public transport to destinations where people
want to gather and engage in active recreation and physical activity. This would reduce car dependency.

- Create zones to improve the connectivity between and within the residential areas – Charles Sturt University and the CBD
- Review and upgrade the road network along Olympic Highway to improve safety and accessibility.

11.3 Recommendations and Projects

The Northern Growth Area has been planned as individual suburbs with some level of traffic studies showing the future traffic demand at selected intersections. These reports provide clear recommendations but have not yet been acted on. Council also has some thoughts about interaction between NGA suburbs (e.g. Boorooma East and Boorooma West) and also about the connection between the NGA and the Wagga Wagga CBD. There is also discussion about potential further development north of the NGA, and the future of CSU is showing additional traffic demand.

Council would benefit from preparing a Northern Growth Area Masterplan that takes an integrated approach of reviewing and planning the entire NGA in one comprehensive document. This should include but not be limited to:

- An update of future residential lot numbers for each suburb.
- A staged approach of expected traffic demand to inform when certain roads and intersections require treatment and also to provide an indication for dimensions of new roads. The stages could either be in periods (i.e. Stage 1: 2016; Stage 2: 2021 etc.) or in development stages (i.e. Stage 1: 25% development; Stage 2: 50% development; or more detailed: Stage 1: Estella 50%/ Boorooma West 25%/ Boorooma East 10%/ Estella Rise 10%/ Gobbagombalin 25%).
- An NGA-wide road hierarchy and a clear plan how and where traffic should be collected. The plan should demonstrate how each suburb distributes local traffic to the collector and sub-arterial roads and strategic decisions should be made about how the road network is going to cope with the added demand. An example for this is shown in Figure 11.2.
- A strategic approach to facilities for the NGA including schools, shops, neighbourhood centres etc. This should include decisions about:
  - how facilities are serviced by different transport modes
  - how they are connected within and between suburbs
  - how the generate traffic from different suburbs (i.e. catchment)
  - how developer contributions can be used to financially support their construction
- A review of connections between the NGA and other key precincts in Wagga Wagga (CBD Precinct, Medical Precinct etc.) for all modes.
- Development of clear standards and definitions for traffic related infrastructure for inclusion in the DCP (an example is provided in Figure 11.3).

It is believed that large parts of such Masterplan already exist in various documents and plans within Council. Combining these pieces, updating the growth numbers and providing an integrated way forward will turn this into a valuable tool.
11.4 Section 94 Projects

Council’s Section 94 Contributions Plan 2006 – 2019 identifies 46 Roads and Traffic related projects (RT1 – RT46). A number of them are located within the Northern Growth Area. As the project descriptions have been high level in the document, review and assessment of the projects have been using a strategic approach and engineering principles.

11.4.1 RT 28 – Shared Path Farrer Road (Boorooma Street to Coolamon Road)

A shared path along Farrer Road would improve facilities for pedestrians and cyclists. This is strongly supported as part of the Wagga Wagga ITS. A shared path along Farrer Road would link into the proposed North Strategic Bike Route along Boorooma Street (see Section 4). With no shared path connection along Coolamon Road provided or proposed, the shared path along Farrer Road would not have to link into Coolamon Road but can connect into Boorooma East somewhere around Kingsford Smith Road.

It is recommended that this project is investigated in conjunction with RT36 to achieve an efficient design.

11.4.2 RT36 – Farrer Road improvements – road widening on the north side

Farrer Road is estimated to have an additional demand of around 4,200 vehicle trips at the eastern side near the intersection with Coolamon Road due to the full development of the Northern Growth Area. There is also some additional vehicle demand expected due to the growth of CSU, however, no specific demand data has been provided. A 2013 GHD Report (Wagga Wagga City Council Section 94 Project Briefs and Estimates) suggests a 9.0m wide carriageway formation with two 3.5 lanes and two 0.5m sealed shoulders, although an 11.0m wide carriageway formation is preferred but not feasible. An example cross section for a 9.0m wide road is shown in Figure 11.3 below.
Wagga Wagga City Council’s DCP 2005 (41.2.3 Road and Street Design) identifies ‘Main Roads’ (13m road width), ‘Link Roads’ (9m road width) and ‘Cul-de-Sacs’ (7.5m road width). Figure 3 (Road Hierarchy Plan) in the appendix of the same document classifies Farrer Road as ‘Collector Road 1’.

Given the proposed function of the road and the expected additional traffic demand, the cross section for a sub-arterial road (13m road width plus 4m median) as shown in Figure 11.4 seems to provide an appropriate option for Farrer Road.
Farrer Road is one of three key collector roads that provide access from the NGA suburbs to Olympic Highway and Central Wagga Wagga (including the CBD and the Medical Precinct). The other two roads are Pine Gully Road and Boorooma Street, the latter also carrying a large proportion of CSU traffic. Model runs of the Wagga Wagga Traffic Model for 2025, 2035 and 2045 show a significant increase in traffic demand and a drop in Level of Service to E. Based on these model runs, Boorooma Street requires additional capacity more urgently than Farrer Road. However, this can only be confirmed once Council has made a strategic assessment of decision on future traffic distribution across the NGA.
It is recommended that Wagga Wagga City Council undertakes detailed modelling to establish a better understanding of the future traffic demand within the NGA and a feasibility study to understand the road corridor options for Farrer Road and Boorooma Street including options to widen the road, potential land acquisition etc.

11.4.3 RT38 – Old Narrandera Road / Olympic Highway Roundabout

The future performance of this intersection has been assessed by URaP – TTW Pty Ltd in 2012 (Old Narrandera Road and Olympic Highway Intersection – Traffic Assessment). The study estimates future traffic volumes of 11,300 for Old Narrandera Road, consisting of 2,500 existing vehicle trips (2010 before development in Gobbagombalin started) and 8,800 additional trips. This is consistent with GTA Consultants’ strategic assessment. The report concludes that the Level of Service at the intersection will deteriorate by 2020 and appropriate treatment is required. Based on the strategic assessment, GTA Consultants can support this recommendation.

It is recommended that RT 38, RT 39, RT41 and RT42 are investigated together in order to ensure an integrated design.

11.4.4 RT39 – Pine Gully Road/ Old Narrandera Road – Intersection

The intersection of Pine Gully Road and Old Narrandera Road is currently a priority controlled intersection with ‘Stop’ control on the Pine Gully Road approach. Pine Gully Road is expected to carry an additional traffic demand of 12,500 in the future which will make it the dominant approach at this intersection, especially if a second carriageway is added (see RT42). This requires a review and potentially an upgrade of the intersection. The 2013 GHD Report (Wagga Wagga City Council Section 94 Project Briefs and Estimates) suggests a change in priority for the intersection giving the priority approach to Pine Gully Road. In addition, the report suggests a reconfiguration of the T intersection in such way that vehicles on the Pine Gully Road approach will not need to stop or slow down. Given the current demand on Old Narrandera Road of roughly 2,500 vehicles per day and the proposed additional demand of 2,300 vehicles per day, the Old Narrandera approach would require some sort of traffic control in order to allow merge with the traffic flow from Pine Gully Road.

It is recommended that Wagga Wagga City Council undertakes detailed modelling to establish a better understanding of the future traffic demand including an intersection analysis using SIDRA software before undertaking the detailed design.
It is recommended that RT 38, RT 39, RT41 and RT42 are investigated together in order to ensure an integrated design.

11.4.5 RT40 – Harris Road / Pine Gully Road – dual lane roundabout

The 2013 GHD Report (Wagga Wagga City Council Section 94 Project Briefs and Estimates) includes Project 10 – Harris Road – Conversion of Existing Road to Shared Cycleway / Footpath which suggests that the intention is to abandon the existing Harris Road and to use this corridor for recreation purposes, i.e. cycling and walking. The 2010 DCP Part E Section 16 – Gobbagombalin Urban Release Area also includes the closure of Harris Road.

Instead, a new roundabout has been proposed at the intersection of Pine Gully Road / Avocet Drive. It is expected that this roundabout would collect traffic demand from Estella Rise (via Avocet Drive), Gobbagombalin North and Estella North (via Pine Gully Road North) and Gobbagombalin South (from Cootamundra Boulevard). The URaP TTW – 2011 Gobbagombalin/Estella Rise Subdivision, Review Traffic Study provides detailed modelling of the intersection, recommending a four-arm roundabout with two approach lanes on each arm.

It is recommended that Wagga Wagga City Council reviews the total traffic demand for this intersection for significant changes. If no significant changes occur, a detailed design for this project should be prepared.

11.4.6 RT 41 – Old Narrandera Road – second carriageway for 600m

Old Narrandera Road between the intersection with Pine Gully Road and the Olympic Highway is expected to have a significant increase in traffic demand in the future to more than 12,500 vehicle trips per day (as per URaP – TTW Pty Ltd in 2012 Old Narrandera Road and Olympic Highway Intersection – Traffic Assessment). The expected demand and the proposed upgrades of the intersections with Pine Gully Road (RT39) and Olympic Highway (RT38) justify a second carriageway for Old Narrandera Road.

It is recommended to proceed with this project and prepare a detailed design.

It is recommended that RT 38, RT 39, RT41 and RT42 are investigated together in order to ensure an integrated design.

11.4.7 RT42 – Pine Gully Road – second carriageway for 1.2km

Pine Gully Road north of the intersection with Old Narrandera Road and south of the proposed Harris Road roundabout (RT40) is expected to have a significant increase in traffic demand in the future of around 12,500 vehicle trips per day. According to AUSTROADS ‘Roadway Capacity’, the mid-block capacity of a two-lane undivided road without kerb parking is 18,000 vehicles per day. Each traffic lane would carry around 6,000 vehicles per day, around 600 vehicles per peak hour. According the RMS guidelines, to achieve Level of Service C, one lane can carry up to 600 vehicles per hour. Based on this, a second carriageway on Pine Gully Road is adequate to retain a good level of service.

It is recommended that Wagga Wagga City Council undertakes detailed modelling to establish a better understanding of the future traffic demand. This should take into account strategic decisions about traffic distribution across all collector roads in the NGA.

It is recommended that RT 38, RT 39, RT41 and RT42 are investigated together in order to ensure an integrated design.
11.4.8 RT43 – Amundsen Bridge – Boorooma East to Boorooma Option 1

The project would provide a direct link between Boorooma East and Boorooma West. This would have a number of benefits, most importantly reducing travel times between suburbs and reducing traffic demand on Farrer Road.

It is recommended to proceed with this project as part of the development of Boorooma East.

11.4.9 RT44 – Pine Gully Road – bike track

A bike track along Pine Gully Road would improve facilities for cyclists. This is strongly supported as part of the Wagga Wagga ITS. The design of the bike track needs to be investigated, this could either be a shared path along Pine Gully Road or a cycleway within the Pine Gully Road corridor.

An alternative option to prioritising a cycleway or shared path along Pine Gully Road could be the upgrade of the existing foopath through Estella opposite Harris Road. This would provide a direct link from Gobbagombalin to the strategic bike route along Boorooma Street (see Section 4). The alignment is already present and requires little alteration. The existing unsealed path would require upgrade and three crossing points in the Estella Road network need to be incorporated. The alignment could then continue eastwards across Boorooma Street into Boorooma West along Durack Circuit, Gibson Street and the Amundsen Street Bridge (see RT43) into Boorooma East. This could provide an important east-west connection for active transport in the NGA.

Figure 11.6: Potential shared path between Pine Gully Road and Boorooma Street

It is recommended that RT44 be investigated in conjunction with RT42 to achieve an efficient design. It is also recommended to consider and investigate an alternative link through Estella linking Gobbagombalin to the strategic bike route along Boorooma Street.

11.4.10 RT45 – Boorooma Street Slip Lane into Boorooma West

This project seems currently not possible unless the slip lane would connect into Durack Circuit north of the college.
11.5 Alignment with Guiding Principles

The recommendations and actions coming out of this section were assessed for their alignment with the guiding principles. The guiding principles are shown in the table below.

Table 11.3: Guiding Principles

<table>
<thead>
<tr>
<th>Principle No</th>
<th>Guiding Principle</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Provide comfortable, safe and convenient access within and around Wagga Wagga for all ages and abilities, and emerging transport technologies</td>
</tr>
<tr>
<td>2</td>
<td>Remove access and transport barriers to social, cultural, educational, recreational activities and public facilities</td>
</tr>
<tr>
<td>3</td>
<td>Develop a transport system that supports economic development and employment</td>
</tr>
<tr>
<td>4</td>
<td>Work collaboratively with others to become leaders in universal access in Regional Australia</td>
</tr>
<tr>
<td>5</td>
<td>Integrate transport planning with land-use initiatives and developments</td>
</tr>
<tr>
<td>6</td>
<td>Reduce reliance on private cars, and instead encourage walking, cycling, public transport, healthy people and healthy places</td>
</tr>
<tr>
<td>7</td>
<td>Provide connections and ease of movement between all centres and neighbourhoods</td>
</tr>
<tr>
<td>8</td>
<td>Develop and manage an economically viable transport system based on long term usage and informed by life-cycle-costing and resource availability</td>
</tr>
</tbody>
</table>

Table 11.4 shows how the recommendations and actions of this section align with each of the guiding principles. In the final column, a recommendation is made for a timeframe for implementing the recommendation or action.

Table 11.4: Alignment of Disability Access Actions and Recommendations with Guiding Principles

<table>
<thead>
<tr>
<th>Project</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>Timeframe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparation of a Northern Growth Area Masterplan</td>
<td>O</td>
<td>O</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>Immediately</td>
</tr>
<tr>
<td>Implementation of Section 94 Projects as proposed</td>
<td>X</td>
<td>X</td>
<td>O</td>
<td>X</td>
<td>O</td>
<td>X</td>
<td></td>
<td></td>
<td>Immediately</td>
</tr>
</tbody>
</table>

X – fully aligned with the guiding principle
O – partly aligned with the guiding principle
12. Forest Hill Precinct

12.1 Existing Conditions

Forest Hill essentially consists of four communities, each of which have their own aspirations and requirements; each guided by separate but related planning instruments such as Development Control Plans and Master Plans:

- The main township with shops, post office and school
- The Brunslea Park residential estate
- The RAAF Base with its museum and residential barracks
- The airport with the REX pilot school.

In terms of specific transport facilities, Forest Hill is a little different from other outlying suburbs of Wagga Wagga. Some specific issues include:

- Many streets do not have footpaths, posing a significant barrier to pedestrian mobility, particularly for the elderly or people with disabilities
- There are limited crossing facilities
- Disability access is limited
- The school is located across the Sturt Highway, but has a signalised pedestrian crossing
- There are safety concerns at the intersection of the Sturt Highway and Elizabeth Avenue.

There are strong links between the Forest Hill and city centre and, to a lesser but significant extent, with southern Wagga Wagga.

12.2 Strategies

Key Strategies

- The growth of the Brunslea Park residential area requires a master planning process led by Wagga Wagga City Council
- Develop a transport system that supports the growth of the airport and Brunslea Park, including improvements to Elizabeth Avenue, and options for alternative routes to airport if appropriate
- Review the Airport Master Plan specifically to look at the location of and access to the terminal precinct
- Evaluate the disused rail corridor linkage to Wagga Wagga CBD and potential alternatives.

Supplementary Strategies

- Improve permeability and connectivity to and within neighbourhoods for all ages and abilities, so they can access social, cultural, educational, recreational activities and public facilities
- Improve crossability of major roads
- Develop a program for safe school access.
12.3 Network Plan - Road Hierarchy

Network Plan – Road Hierarchy

In recognition of the importance of the airport, the RAAF Base and desire-line between Forest Hill and southern Wagga Wagga, the road hierarchy plan proposes to include the following updates:

- Elizabeth Avenue – collector road
- Brunskill Road / Inglewood Road – collector road

The proposed changes will guide and inform the type of road and traffic facilities that are required for future management of the network.

12.4 Recommendations and Projects

12.4.1 Network development

Figure 12.1 summarises the traffic pattern in Forest Hill as it responds to local network improvements, including:

- Major upgrade of the Sturt Highway from the RAAF Base in the east to the Olympic Highway intersections in the west.
- New airport link from the corner of Elizabeth Avenue/Don Kendall Drive to the Sturt Highway near the Murray Cod Hatchery, 1 lane each way with high capacity intersections.
- Upgrade the link from the airport to Kooringal Road via Elizabeth Avenue, Inglewood Road, Mitchell Road, Brunskill Road and Lake Albert Road, 1 lane each way with high capacity intersections.

All upgrade works were modelled for 2045 and run simultaneously with a range of other network improvements.

The following comments are offered for consideration:

- The Do-Nothing option indicates people avoid the congested Highway and seek alternate routes through back streets.
- The Forest Hill Upgrades, however, do not alter this movement pattern despite removal of congestion along the length of the Highway.
- Accordingly, it appears pertinent to conclude:
  - Traffic patterns along the Inglewood Road route relate to a desire line between Forest Hill (particularly the RAAF Base) and southern Wagga Wagga (Lake Albert and beyond). This movement pattern exists in 2015 and strengthens from 2025 onwards. Currently the route is largely rural with a typical blacktop seal of about 6m wide, limited line marking and no shoulders. As volumes increase beyond normal rural patterns toward 2025, consideration should be given to safety improvements such as shoulders and linemarking which would also allow for safe walking and cycling access. Intersection controls should probably remain as is with a view to speed management.
  - The only access into the RAAF Base currently is via the Highway intersection at Newton Road. Traffic accessing the base from the south (i.e. Inglewood Road) currently is required to re-enter the Highway for a short distance. There may be opportunities to avoid this by means of a second access into the Base.
Given the desire line between Forest Hill and southern Wagga Wagga, the new link from Don Kendall Drive to the Sturt Highway is in-effective and carries too little traffic to justify further consideration.

Figure 12.1: Forest Hill Upgrades

12.4.2 Airport Gateway

In lieu of the ineffectiveness of a new airport link road, there are opportunities to enhance Elizabeth Avenue as an entry gateway to the airport. The existing road reserve is about 20m wide, which would allow for a single lane in each direction, a wide planted median, turn bays, parking lanes, a footpath and a shared path (Figure 12.2). A continuous median would affect property access and appropriate arrangements would be required such as U-turn bays or roundabouts at strategic locations. Upgrades along Elizabeth Avenue need to include safety improvements at its intersection with the Sturt Highway.
12.4.3 Walking

To facilitate pedestrian access and network permeability, kerb extensions are required along Elizabeth Avenue at all side streets and adjacent to (future) pathway linkages. The median will further assist in improved crossability, safety and speed management.

There are opportunities for pathway linkages at several locations, including:

- Teak Close – Protea Place – Boree Avenue
- Eldershaw Drive – Elizabeth Avenue
- Future cul-de-sacs at Brunsley Park Estate.
12.4.4 Cycling

The cycling strategy includes a high quality link from the CBD to Forest Hill. The preferred route is via the abandoned railway corridor. A detailed analysis of route options is reported separately in the Active Travel Strategy for Wagga Wagga.

12.5 Alignment with Guiding Principles

The recommendations and actions coming out of this section were assessed for their alignment with the guiding principles. The guiding principles are shown in the table below.

Table 12.1: Guiding Principles

<table>
<thead>
<tr>
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</tr>
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</tr>
</tbody>
</table>

Table 12.2 shows how the recommendations and actions of this section align with each of the guiding principles. In the final column, a recommendation is made for a timeframe for implementing the recommendation or action.

Table 12.2: Alignment of Disability Access Actions and Recommendations with Guiding Principles

<table>
<thead>
<tr>
<th>Project</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>Timeframe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network Development</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>O</td>
<td>X</td>
<td></td>
<td></td>
<td>Medium term</td>
</tr>
<tr>
<td>Airport Gateway</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>O</td>
<td>O</td>
<td></td>
<td>Medium term</td>
</tr>
</tbody>
</table>

X – fully aligned with the guiding principle
O – partly aligned with the guiding principle
13. Section 94 Projects

13.1 Overview

Section 94 of the Environmental Planning and Assessment Act 1979, enables local councils or other consent authorities to levy contributions for public amenities and services required as a consequence of development. Developer contributions are essential in maintaining access to the facilities and services that support the high quality of life that residents expect (from Blacktown Council, 2013).

Wagga Wagga City Council maintains a list of works which are to be completed with Section 94 contributions. Wagga Wagga City Council has divided its schedule into various categories including open space and recreation facilities, roads and traffic management facilities, civic, community and cultural facilities and car parking. Funds are allocated for future works and through recoupment. There are also funds allocated to ‘plan preparation and management’. A summary of the number and value of projects is shown below in Table 13.1.

Table 13.1: Summary of Projects

<table>
<thead>
<tr>
<th>Value of Projects</th>
<th>Future</th>
<th>Recoupment</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open Space and Recreational Facilities</td>
<td>$24,494,224</td>
<td>$3,630,774</td>
<td>-</td>
<td>$28,124,998</td>
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<tr>
<td>Roads and Traffic Management</td>
<td>$21,729,841</td>
<td>-</td>
<td>-</td>
<td>$21,729,841</td>
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<tr>
<td>Civic, Community and Cultural Facilities</td>
<td>$2,129,701</td>
<td>$7,862,357</td>
<td>-</td>
<td>$9,992,058</td>
</tr>
<tr>
<td>Car Parking</td>
<td>$9,400,000</td>
<td>-</td>
<td>-</td>
<td>$9,400,000</td>
</tr>
<tr>
<td>Contributions Plan Preparation and Management</td>
<td>-</td>
<td>-</td>
<td>$1,617,237</td>
<td>$1,617,237</td>
</tr>
<tr>
<td></td>
<td>$57,753,766</td>
<td>$11,493,131</td>
<td>$1,617,237</td>
<td>$70,864,134</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of Projects</th>
<th>Future</th>
<th>Recoupment</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open Space and Recreational Facilities</td>
<td>34</td>
<td>3</td>
<td>37</td>
</tr>
<tr>
<td>Roads and Traffic Management</td>
<td>42</td>
<td>-</td>
<td>42</td>
</tr>
<tr>
<td>Civic, Community and Cultural Facilities</td>
<td>3</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Car Parking</td>
<td>4</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td>Contributions Plan Preparation and Management</td>
<td>5</td>
<td>-</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>83</td>
<td>6</td>
<td>94</td>
</tr>
</tbody>
</table>

Given the nature of the projects, the roads and traffic management and car parking projects (RT1 to RT46) will be further examined. A separately provided document outlined the status of these projects. They were categorised according to the row data shown below.

Table 13.2: Detailed Summary of Values of Roads and Traffic Management and Car Parking Contributions

<table>
<thead>
<tr>
<th>Item for Recoupment due to funding outside S94</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>N/A</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$97,105</td>
<td>$74,964</td>
<td>$-</td>
<td>$-</td>
<td>$172,069</td>
</tr>
<tr>
<td>Proposed Cancellation</td>
<td>$-</td>
<td>$965,789</td>
<td>$18,882</td>
<td>$-</td>
<td>$984,671</td>
</tr>
<tr>
<td>Proposed bring forward to 15/16</td>
<td>$-</td>
<td>$-</td>
<td>$1,163,535</td>
<td>$-</td>
<td>$1,163,535</td>
</tr>
<tr>
<td>Not Funded</td>
<td>$-</td>
<td>$-</td>
<td>$-</td>
<td>$9,400,000</td>
<td>$9,400,000</td>
</tr>
<tr>
<td>Completed</td>
<td>$3,321,236</td>
<td>$173,969</td>
<td>$215,789</td>
<td>$-</td>
<td>$3,710,994</td>
</tr>
<tr>
<td></td>
<td>$3,835,306</td>
<td>$1,417,033</td>
<td>$16,477,502</td>
<td>$9,400,000</td>
<td>$31,129,841</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Percentage of Projects Completed of Priority Total</th>
<th>86.60%</th>
<th>12.28%</th>
<th>1.31%</th>
</tr>
</thead>
</table>

Overall, nearly $3.8 million of Section 94 projects have been completed, with a further $15.5 million worth of projects to be completed, however, these are mostly ‘C’ priority. 87% (all...
percentages shown are indicative of the value) of ‘A’ priority projects have been funded, 13% of priority B projects have been funded and 1% of priority C projects have been funded, which is indicative of appropriate funding arrangements for higher priority projects. Including the ‘not funded’ projects, 12% of Section 94 projects have been funded, if the not funded portion is excluded, 17% of projects (by value) have been funded. Nearly $1 million worth of projects have been proposed for cancellation.

Overall, the majority of traffic management Section 94 contributions support road widening and traffic control projects, whilst walking and cycling infrastructure projects are rare.

GHD Consultants conducted a review of costings for Section 94 projects in 2013 (Section 94 Projects – Project Briefs and Estimates). 20 projects were outlined in the project with Wagga Wagga City Council and GHD both providing estimates for eight (8) of the projects. Table 13.3 shows that where both organisations have provided strategic cost estimates, Council tends to estimate higher costs than GHD.

Table 13.3: Comparison of Estimates

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>GHD</th>
<th>WWCC</th>
<th>WWCC-GHD</th>
</tr>
</thead>
<tbody>
<tr>
<td>RT48</td>
<td>Boorooma St widening</td>
<td>$1,334,000</td>
<td>$2,161,000</td>
<td>$827,000</td>
</tr>
<tr>
<td>RT36</td>
<td>Farrar Road widening (GHD)</td>
<td>$950,000</td>
<td>$1,641,000</td>
<td>$691,000</td>
</tr>
<tr>
<td>RT50</td>
<td>Gregadoo Road (GHD)</td>
<td>$708,000</td>
<td>$843,000</td>
<td>$135,000</td>
</tr>
<tr>
<td>RT49</td>
<td>Harris Road Conversion</td>
<td>$434,000</td>
<td>$157,000</td>
<td>-$277,000</td>
</tr>
<tr>
<td>RT40a</td>
<td>Rainbow Drive Roundabout</td>
<td>$1,519,000</td>
<td>$1,709,000</td>
<td>$190,000</td>
</tr>
<tr>
<td>RT40b</td>
<td>Avocet Drive Roundabout</td>
<td>$1,513,000</td>
<td>$1,684,000</td>
<td>$171,000</td>
</tr>
<tr>
<td>RT40c</td>
<td>Estella Road Roundabout</td>
<td>$1,651,000</td>
<td>$1,734,000</td>
<td>$83,000</td>
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<tr>
<td>RT47</td>
<td>Dalman Parkway Roundabout</td>
<td>$1,750,000</td>
<td>$1,634,000</td>
<td>-$116,000</td>
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</table>

13.2 Projects

In this section, all 46 Section 94 projects listed in Council’s 2006 ‘Section 94 Contributions Plan’ are being reviewed and recommendations are made. Additional information used included:

- GHD 2013 Report: Section 94 Projects – Project Briefs and Estimates

When reviewing the Section 94 projects, the level of project detail was found to vary from detailed project plans to just a project name. Review of all projects was undertaken with a view to make recommendations towards feasibility and practicality. Most projects require more detailed preparation as project plans are at a strategic level. Many of the road infrastructure projects would provide significant changes to the existing road infrastructure and should be carefully considered and planned as they are associated with high development costs.

13.2.1 RT1 – Shared Path Glenfield Road; Dalmain Parkway to Red Hill Road (970m)

Project is reported to be completed but site inspection shows there is no sealed shared path on either side of Glenfield Road between Red Hill Road and Dalmain Parkway.
13.2.2 RT 2 – Shared Path; Upgrade Shared Path around Lake Albert (5km)

This project is yet to be completed, but will form part of the proposed South Cycleway Corridor and be directly linked to the off-road route around the City. As such, this project is considered to be of high importance from a network perspective, as well as providing a recreational and tourist facility that will help attract users to Lake Albert.

It is recommended that Council proceeds with detailed planning of this project in conjunction with the southern route of the strategic bike network.

13.2.3 RT3 – Glenfield Road/ Dalmain Parkway Roundabout

This project is completed.

13.2.4 RT4 – Boorooma Street/ Avocet Drive Roundabout

This project is completed.

13.2.5 RT5 – Red Hill Road Underpass and Road Works

This project is completed.

13.2.6 RT6 – Shared Path Red Hill Road; Holbrook Road to Bourke Street (Bourkelands)

This project is completed.

13.2.7 RT7 – Shared Path Holbrook Street; Red Hill Road to Clifton Drive

This project is completed.

13.2.8 RT8 – Shared Path Red Hill Road; Holbrook Road to Hudson Drive

A shared path currently exists on the north side of Red Hill Road between Glenfield Road and Yentoo Drive. Providing a shared path on both sides of Red Hill Road is justified once the Lloyd development is completed. At its current development stage, a shared path on one side of Red Hill Road appears to be sufficient if safe crossing points are provided. An existing link from Bradfield Place provides access to Red Hill Road and an informal crossing option has been provided including a simple crossing of the drainage easement (Figure 13.1).
This is neither a formal crossing point nor is it in a safe location. A safe crossing facility could be provided at the eastern approach of the Red Hill Road/ Glenfield Road/ Holbrook Road Roundabout to link into the existing shared path on the northern side of Red Hill Road. Another crossing of the southern approach would provide a link into the existing shared path along the western side of Holbrook Road. A design example for a formal and safe crossing can be found on the northern approach of the roundabout (Figure 13.2).

It is recommended to defer RT8 until the development of Lloyd is progressing. It is further recommended to investigate the option of providing safe crossing points at the eastern and southern approaches of the Red Hill Road/ Glenfield Road/ Holbrook Road roundabout and linking a formal shared path from the roundabout to Bradfield Place.
13.2.9 RT9 – Shared Path Bourke Street; Holbrook Road to Red Hill Road
This project is completed.

13.2.10 RT10 – Shared Path Mater Di High School; Plumpton Road (at Nelson Drive) – Gregadoo Road – Main Street
Has been discussed as part of the Active Transport Strategy.

13.2.11 RT11 – Shared Path Estella Road; Boorooma Street to Pine Gully Road
Project is completed between Boorooma Street and Gunn Drive. The part Gunn Drive to Pine Gully Road is currently missing.

13.2.12 RT12 – Footpaths and Bus Shelter Franklin Drive (Estella)
The project description is vague but it is assumed that the focus is on extending the existing footpath on the southern side of Franklin Drive, which currently stops opposite Dundale Crescent, to the T intersection. This would require some 110m of footpath. The current footpath is narrow at 1.2m and of average quality.

Extending the footpath makes sense and is in principle recommended. It should be considered to improve footpath width and quality along the entire length of Franklin Drive to a minimum of 1.8m. Consideration should also be given to defer the works until the residential development of the southern side of Franklin Drive is completed to avoid damages to the footpath. Alternatively, clear requirements for the developer to restore the footpath need to be drafted.

Development of a bus shelter on Franklin Drive should be deferred until the future bus network operations are decided.

13.2.13 RT 13 – Deleted After Exhibition of Draft Plan

13.2.14 RT 14 – Deleted After Exhibition of Draft Plan

13.2.15 RT15 – Glenfield Road and Fernleigh Road Intersection Upgrade
The Glenfield Road corridor has been discussed in more detail in Section 6. There are strong O-D pairings between CSU and the residential areas in south Wagga Wagga that are growing over the next 30 years. Congestion along Glenfield Road starts to increase significantly in 2025 and 2035 and becomes severe in 2045. A range of low level upgrade has been discussed and modelled as a consequence of that growth, however, model results show a negligible improvement of traffic conditions and Level of Service along Glenfield Road. Therefore, the long term solution for the Glenfield Road corridor has to include significant upgrades including intersections and mid-block treatments (i.e., duplication).

It is recommended that RT15, RT16 and RT26 are planned and prepared in conjunction to maximise the outcomes. A staged implementation program would need to be prepared, starting from the northern end of the corridor and working towards the south.
13.2.16 RT16 – Glenfield Road and Overpass; Widening or Duplication of Rail Bridge (including Drainage Work and Urana Street Intersection Upgrade)

The Glenfield Road corridor has been discussed in more detail in Section 6. There are strong O-D pairings between CSU and the residential areas in south Wagga Wagga that are growing over the next 30 years. Congestion along Glenfield Road starts to increase significantly in 2025 and 2035 and becomes severe in 2045. A range of low level upgrade has been discussed and modelled as a consequence of that growth, however, model results show a negligible improvement of traffic conditions and Level of Service along Glenfield Road. Therefore, the long term solution for the Glenfield Road corridor has to include significant upgrades including intersections and mid-block treatments (i.e. duplication).

It is recommended that RT15, RT16 and RT26 are planned and prepared in conjunction to maximise the outcomes. A staged implementation program would need to be prepared, starting from the northern end of the corridor and working towards the south.

13.2.17 RT17 – Plumpton Road: Lake Albert Road to Red Hill Road widening

The project description is vague but it is assumed that the widening of Plumpton Road includes additional traffic lanes to increase capacity. The current road corridor is 13m wide and currently consists of two traffic lanes and two parking lanes. The minimum width for a corridor with four traffic lanes is 13m but this would mean losing existing on-street parking. However, Plumpton Road could easily being widened on either side to accommodate parking.

The Wagga Wagga Traffic Model shows that Plumpton Road between Lake Albert Road and Red Hill Road operates at a Level of Service (LoS) A in 2015 and will operate at a LoS B in 2045. Based on the model results, there is no need to widen Lake Albert Road in the short term.

Figure 13.3: Wagga Wagga Traffic Model Results for 2015 and 2045 – Plumpton Road

It is recommended that the widening of Plumpton Road between Lake Albert Road and Red Hill Road is deferred with a view to re-assess in 2026.
13.2.18 RT18 – Dunn’s Road/ Lloyd Road/ Holbrook Road large Roundabout

This intersection is located approximately 3.5km south of Red Hill Road. Holbrook Road is an RMS regional with a good Level of Service. Dunn’s Road, which is in parts unsealed, will carry around 100 vehicles in 2045 according to the Wagga Wagga Traffic Model. Given the low demand on Dunn’s Road and Lloyd Road, an upgrade of the roundabout does not seem adequate.

It is recommended to defer RT18 and re-assess in 2026.

13.2.19 RT19 – Glenfield Road/ Fernleigh Road; kerb, gutter and parking at Anderson Oval

Anderson Oval currently has a small parking area along its southern end in Wren Street (approximately 25 spaces). To prevent sports associated parking along Glenfield Road and Fernleigh Road, provision of more dedicated oval parking is required, however, exact numbers should be based on the use of Anderson Oval. If Anderson Oval has a high turn-over junior sport (e.g. mini-roos football or similar), additional parking in form of a car park accessible from Wren Street could be necessary. For low turn-over senior sport (e.g. grade cricket) the current supply of parking is sufficient.

It is recommended that Council assesses the use of Anderson Oval including type of sport, users and seasonality and provide the required parking.

13.2.20 RT20 – Pedestrian Bridge over Open Drain at Western Side of Plumpton Road opposite Lansdowne Avenue

Plumpton Road has footpaths on both sides of the road from the intersection with Red Hill Road/ Kooringal Road going southbound. The footpath on the eastern side of Plumpton Road continues to the intersection with Nelson Road with plans to continue further south to Gregadoo Road (RT10). The footpath on the western side of Plumpton Road turns into Bourkelands at Barwon Place and is discontinued along Plumpton Road.

A pedestrian bridge across the open drain opposite Lansdowne Avenue makes sense to improve permeability through Bourkelands, however, there is no current existing footpath or shared path around this location on the western side of Plumpton Road.

An isolated bridge with no connection into Bourkelands and no pedestrian crossing to connect Bourkelands with Lake Albert is not recommended. Instead, it should be investigated, how the footpath can be extended southbound to provide a second connection into Bourkelands. The proposed pedestrian bridge would be incorporated. In addition, a pedestrian crossing on Plumpton Road would provide a link into Lake Albert. A potential diagram is shown in Figure 13.4. This would require more detailed planning.
13.2.21 RT21 – Urana Road Widening

This project is completed.

13.2.22 RT22 – Bourke Street and Bruce Street Traffic Lights

The intersection of Bourke Street and Bruce Street is currently priority controlled with a ‘Give Way’ sign on the Bruce Street approach. Modelled traffic demands for 2015 and 2045 show both roads operating a very good Level of Service, making the introduction of traffic lights not an obvious requirement. However, Bruce Street is a main link between Glenfield Road and Bourke Street and should be acknowledged in its importance (see SECTION). The introduction of traffic lights would be a step towards a higher classification of Bruce Street and long term divert traffic flows between Glenfield Road and Bourke Street from Awaba Avenue and Maher Street. Alternatively, a dedicated right turn lane from Bourke Street (southbound) into Bruce Street could be considered, however, this would require either significant works to widen Bourke Street around the intersection or merging southbound traffic on Bourke Street into one lane.

It is recommended to undertake intersection modelling using SIDRA software to establish any benefits of upgrading the intersection of Bourke Street and Bruce Street.

It is recommended that RT22 and RT46 are undertaken in conjunction to achieve best results for Bruce Street.

13.2.23 RT23 – Deleted After Exhibition of Draft Plan

13.2.24 RT24 – Red Hill Road Street Lighting

This is not a transport project and has not been assessed as part of this study.
13.2.25 RT25 – Red Hill Road; Widening to 4 Lanes Plumpton Road to Glenfield Road plus Widening to 4 Lanes Dalmain Parkway to Yentoo

The modelled traffic demand for 2045 (Wagga Wagga Traffic Model, run May 2016) shows Level of Service E and F along the section of Red Hill Road between Glenfield Road and Plumpton Road and Level of Service D in sections east (Kooringal Road, see RT30) and west of this. Whilst the traffic model suggests the section of Red Hill Road between Glenfield Road and Plumpton Road would be the most congested section, it only takes into account a modest development of Lloyd.

Figure 13.5: Wagga Wagga Traffic Model for 2045 – Red Hill Road

Key to the success of widening Red Hill Road is the operation of all intersections. The roundabouts at Glenfield Road, Bourke Street and Tamar Drive are developed for four lanes (note: the eastern approach at the Tamar Drive roundabout has currently only two traffic lanes) and the roundabout at Red Hill Road/ Plumpton Road/ Kooringal Road would require an upgrade. It is also important to test the operation of the current T intersections along Red Hill Road. If intersection operations and additional capacity along Red Hill Road show an improved performance, Red Hill Road between Glenfield Road and Plumpton Road should be considered for widening.

The GHD 2013 Report, section 22.1 provides a good discussion on the works requirements associated with the widening of Red Hill Road between Glenfield Road and Plumpton Road.

It is recommended to undertake intersection modelling using SIDRA software (as a network) to establish the benefits of widening Red Hill Road between Glenfield Road and Plumpton Road. It is also recommended to test a widening to four lanes in the Wagga Wagga Traffic Model for 2045.
scenarios that include different developments of Lloyd and intersection upgrades at Kooringal Road/ Sturt Highway (see RT30).

It is recommended that RT25 and RT32 are investigated in parallel to maximise benefits.

13.2.26 RT26 – Glenfield Road & Pearson Street; Widening to 4 Lanes Red Hill Road to Dobson Avenue

The Glenfield Road corridor has been discussed in more detail in Section 6. There are strong O-D pairings between CSU and the residential areas in south Wagga Wagga that are growing over the next 30 years. Congestion along Glenfield Road starts to increase significantly in 2025 and 2035 and becomes severe in 2045. A range of low level upgrade has been discussed and modelled as a consequence of that growth, however, model results show a negligible improvement of traffic conditions and Level of Service along Glenfield Road. Therefore, the long term solution for the Glenfield Road corridor has to include significant upgrades including intersections and mid-block treatments (i.e. duplication).

It is recommended that RT15, RT16 and RT26 are planned and prepared in conjunction to maximise the outcomes. A staged implementation program would need to be prepared, starting from the northern end of the corridor and working towards the south

13.2.27 RT27 – Fernleigh Road/ Pinnaroo Drive Roundabout

This project is completed.

13.2.28 RT28 – Shared Path Farrer Road; Boorooma Street to Coolamon Drive

A shared path along Farrer Road would improve facilities for pedestrians and cyclists. This is strongly supported as part of the Wagga Wagga ITS.

It is recommended that this project is investigated in conjunction with RT36 to achieve an efficient design.

13.2.29 RT29 – Deleted After Exhibition of Draft Plan

13.2.30 RT30 – Kooringal Road; Widening to 4 Lanes full Length

In its current form, Kooringal Road has two traffic lanes on its entire length between Sturt Highway and Red Hill Road. The modelled traffic demand for 2045 (Wagga Wagga Traffic Model, run May 2016) shows Level of Service D along Kooringal Road between Sturt Highway and Fay Avenue/ Vincent Road, a short section of Level of Service D between the roundabouts Plumpton Road and Lake Albert Road and a Level of Service B in all other sections of Kooringal Road as presented in Figure 13.6.
The GHD 2013 report discusses the options for widening Kooringal Road in Section 13.1 and points out a number of additional treatments (intersection upgrades, bridge replacement etc.) required to achieve the full length widening of Kooringal Road.

Widening Kooringal Road over its entire length seems to provide no significant benefit in relation to its construction costs, estimated at around $6.5m in the GHD report.

It is recommended to defer the widening of Kooringal Road and re-assess in 2026. When re-assessing, options of widening parts of Kooringal Road should be investigated. The upgrade of the intersection of Sturt Highway and Kooringal Road should also be investigated. Given the estimated high costs of this project, a business case should also be provided when next reassessed.

13.2.31 RT31 – Bourke Street and Bourkelands Drive Intersection Upgrade

13.2.32 RT32 – Red Hill Road and Hudson Drive Intersection Improvements

The intersection of Red Hill Road and Hudson Drive is currently priority controlled. The westbound lane on Red Hill Road has a short and narrow slip lane (left) into Hudson Drive and there is some space on Red Hill Road for a vehicle turning left from Hudson Drive. This intersection should be investigated in conjunction with a widening of Red Hill Road between Glenfield Road and Yentoo Drive (partly RT25) to avoid preclusion or re-doing of works. In the short term, a right turn lane on Red Hill Road (eastbound) would provide easier access to Hudson Drive.
It is recommended to investigate RT32 in conjunction with the widening of Red Hill Road between Glenfield Road and Yentoo Drive (partly RT25). It is also recommended to investigate the introduction of a right turn lane on Red Hill Road (eastbound).

13.2.33 RT33 – Bakers Lane Widening

Bakers Lane is a rural road connection between Inglewood Road and the Sturt Highway. The Wagga Wagga Traffic Model shows a good Level of Service for 2015. Bakers Lane appears to be mainly used to bypass the Sturt Highway between Forest Hill/Airport and the industrial precinct in East Wagga Wagga as well as the CBD. A future model run for 2045 shows a poor level of service on Bakers Lane between Inglewood Road and Edison Road, confirming the use of Bakers Lane as a bypass or rat run. The key issue in the area east of the Wagga Wagga CBD remains the capacity of the Sturt Highway, which should be addressed as a priority.

The widening of Bakers Lane is not recommended, however, strengthening the surface of Bakers Lane could be considered in view of potential residential development off Bakers Lane.

13.2.34 RT34 – Bakers Lane and Sturt Highway Intersection Improvements

This project needs to be viewed in conjunction with RT33. As RT33 is not recommended, the intersection upgrades at Bakers Lane and Sturt Highway are not recommended.

13.2.35 RT35 – Bakers Lane and Inglewood Road Intersection Improvements

This project needs to be viewed in conjunction with RT33. As RT33 is not recommended, the intersection upgrades at Bakers Lane and Inglewood Road are not recommended.

13.2.36 RT36 – Farrer Road improvements – road widening on the north side

Farrer Road is estimated to have an additional demand of around 4,200 vehicle trips at the eastern side near the intersection with Coolamon Road due to the full development of the Northern Growth Area. There is also some additional vehicle demand expected due to the growth of CSU, however, no specific demand data has been provided. A 2013 GHD Report (Wagga Wagga City Council Section 94 Project Briefs and Estimates) suggests a 9.0m wide carriageway formation with two 3.5 lanes and two 0.5m sealed shoulders, although an 11.0m wide carriageway formation is preferred but not feasible. An example cross section for a 9.0m wide road is shown in Figure 13.7 below.
Wagga Wagga City Council’s DCP 2005 (41.2.3 Road and Street Design) identifies ‘Main Roads’ (13m road width), ‘Link Roads’ (9m road width) and ‘Cul-de-Sacs’ (7.5m road width). Figure 3 (Road Hierarchy Plan) in the appendix of the same document classifies Farrer Road as ‘Collector Road 1’.

Given the proposed function of the road and the expected additional traffic demand, the cross section for a sub-arterial road (13m road width plus 4m median) as shown in Figure 13.8 seems to provide an appropriate option for Farrer Road.
Farrer Road is one of three key collector roads that provide access from the NGA suburbs to Olympic Highway and Central Wagga Wagga (including the CBD and the Medical Precinct). The other two roads are Pine Gully Road and Boorooma Street, the latter also carrying a large proportion of CSU traffic. Model runs of the Wagga Wagga Traffic Model for 2025, 2035 and 2045 show a significant increase in traffic demand and a drop in Level of Service to E. Based on these model runs, Boorooma Street requires additional capacity more urgently than Farrer Road. However, this can only be confirmed once Council has made a strategic assessment of decision on future traffic distribution across the NGA.
Figure 13.9: Wagga Wagga Traffic Model Results for 2025, 2035 and 2045 – Boorooma Street

2025

2035

2045

It is recommended that Wagga Wagga City Council undertakes detailed modelling to establish a better understanding of the future traffic demand within the NGA and a feasibility study to understand the road corridor options for Farrer Road and Boorooma Street including options to widen the road, potential land acquisition etc.

13.2.37 RT38 – Old Narrandera Road / Olympic Highway Roundabout

The future performance of this intersection has been assessed by URaP – TTW Pty Ltd in 2012 (Old Narrandera Road and Olympic Highway Intersection – Traffic Assessment). The study estimates future traffic volumes of 11,300 for Old Narrandera Road, consisting of 2,500 existing vehicle trips (2010 before development in Gobbagombalin started) and 8,800 additional trips. This is consistent with GTA Consultants’ strategic assessment. The report concludes that the Level of Service at the intersection will deteriorate by 2020 and appropriate treatment is required. Based on the strategic assessment, GTA Consultants can support this recommendation.

It is recommended that RT 38, RT 39, RT41 and RT42 are investigated together in order to ensure an integrated design.

13.2.38 RT39 – Pine Gully Road/ Old Narrandera Road – Intersection

The intersection of Pine Gully Road and Old Narrandera Road is currently a priority controlled intersection with ‘Stop’ control on the Pine Gully Road approach. Pine Gully Road is expected to carry an additional traffic demand of 12,500 in the future which will make it the dominant approach at this intersection, especially if a second carriageway is added (see RT42). This requires a review and potentially an upgrade of the intersection. The 2013 GHD Report (Wagga Wagga City Council Section 94 Project Briefs and Estimates) suggests a change in priority for the intersection giving the priority approach to Pine Gully Road. In addition, the report suggests a reconfiguration of the T intersection in such way that vehicles on the Pine Gully Road approach will not need to stop or slow down. Given the current demand on Old Narrandera Road of roughly 2,500 vehicles per day and the proposed additional demand of 2,300 vehicles per day, the Old Narrandera approach would require some sort of traffic control in order to allow merge with the traffic flow from Pine Gully Road.

It is recommended that Wagga Wagga City Council undertakes detailed modelling to establish a better understanding of the future traffic demand including an intersection analysis using SIDRA software before undertaking the detailed design.
It is recommended that RT 38, RT 39, RT41 and RT42 are investigated together in order to ensure an integrated design.

13.2.39 RT40 – Harris Road / Pine Gully Road – dual lane roundabout

The 2013 GHD Report (Wagga Wagga City Council Section 94 Project Briefs and Estimates) includes Project 10 – Harris Road – Conversion of Existing Road to Shared Cycleway / Footpath which suggests that the intention is to abandon the existing Harris Road and to use this corridor for recreation purposes, ie cycling and walking. The 2010 DCP Part E Section 16 – Gobbagombalin Urban Release Area also includes the closure of Harris Road.

Instead, a new roundabout has been proposed at the intersection of Pine Gully Road / Avocet Drive. It is expected that this roundabout would collect traffic demand from Estella Rise (via Avocet Drive), Gobbagombalin North and Estella North (via Pine Gully Road North) and Gobbagombalin South (from local road network). The URaP TTW – 2011 Gobbagombalin/ Estella Rise Subdivision, Review Traffic Study provides detailed modelling of the intersection, recommending a four-arm roundabout with two approach lanes on each arm.

It is recommended that Wagga Wagga City Council reviews the total traffic demand for this intersection for significant changes. If no significant changes occur, a detailed design for this project should be prepared.

13.2.40 RT 41 – Old Narrandera Road – second carriageway for 600m

Old Narrandera Road between the intersection with Pine Gully Road and the Olympic Highway is expected to have a significant increase in traffic demand in the future to more than 12,500 vehicle trips per day (as per URaP – TTW Pty Ltd in 2012 Old Narrandera Road and Olympic Highway Intersection – Traffic Assessment). The expected demand and the proposed upgrades of the intersections with Pine Gully Road (RT39) and Olympic Highway (RT38) justify a second carriageway for Old Narrandera Road.

It is recommended to proceed with this project and prepare a detailed design.

It is recommended that RT 38, RT 39, RT41 and RT42 are investigated together in order to ensure an integrated design.

13.2.41 RT42 – Pine Gully Road – second carriageway for 1.2km

Pine Gully Road north of the intersection with Old Narrandera Road and south of the proposed Harris Road roundabout (RT40) is expected to have a significant increase in traffic demand in the future of around 12,500 vehicle trips per day. According to AUSTROADS ‘Roadway Capacity’, the mid-block capacity of a two-lane undivided road without kerb parking is 18,000 vehicles per day. Each traffic lane would carry around 6,000 vehicles per day, around 600 vehicles per peak hour. According the RMS guidelines, to achieve Level of Service C, one lane can carry up to 600 vehicles per hour. Based on this, a second carriageway on Pine Gully Road is adequate to retain a good level of service.

It is recommended that Wagga Wagga City Council undertakes detailed modelling to establish a better understanding of the future traffic demand. This should take into account strategic decisions about traffic distribution across all collector roads in the NGA.

It is recommended that RT 38, RT 39, RT41 and RT42 are investigated together in order to ensure an integrated design.
13.2.42 RT43 – Amundsen Bridge – Boorooma East to Boorooma Option 1

The project would provide a direct link between Boorooma East and Boorooma West. This would have a number of benefits, most importantly reducing travel times between suburbs and reducing traffic demand on Farrer Road.

It is recommended to proceed with this project as part of the development of Boorooma East.

13.2.43 RT44 – Pine Gully Road – bike track

A bike track along Pine Gully Road would improve facilities for cyclists. This is strongly supported as part of the Wagga Wagga ITS. The design of the bike track needs to be investigated, this could either be a shared path along Pine Gully Road or a cycleway within the Pin Gully Road corridor.

An alternative option to prioritising a cycleway or shared path along Pine Gully Road could be the upgrade of the existing footpath through Estella opposite Harris Road. This would provide a direct link from Gobbagombalin to the strategic bike route along Boorooma Street (see Section 4). The alignment is already present and requires little alteration. The existing unsealed path would require upgrade and three crossing points in the Estella Road network need to be incorporated. The alignment could then continue eastwards across Boorooma Street into Boorooma West along Durack Circuit, Gibson Street and the Amundsen Street Bridge (see RT43) into Boorooma East. This could provide an important east-west connection for active transport in the NGA.

Figure 13.10: Potential shared path between Pine Gully Road and Boorooma Street

It is recommended that RT44 investigated in conjunction with RT42 to achieve an efficient design.

It is also recommended to consider and investigate an alternative link through Estella linking Gobbagombalin to the strategic bike route along Boorooma Street.

13.2.44 RT45 – Boorooma Street Slip Lane into Boorooma West

This project seems currently not possible unless the slip lane would connect into Durack Circuit north of the college.
13.2.45 RT46 – Glenfield Road/ Bruce Street Intersection Improvements

The intersection of Glenfield and Bruce Street is currently priority controlled. Modelled traffic demands for 2045 show that Glenfield Road will operate at a Level of Service E north of the intersection. There is no indication that this will impact the intersection performance. However, Bruce Street is a main link between Glenfield Road and Bourke Street and should be acknowledged in its importance (see SECTION). The introduction of traffic lights would be a step towards a higher classification of Bruce Street and long term divert traffic flows between Glenfield Road and Bourke Street from Awaba Avenue and Maher Street.

It is recommended to undertake intersection modelling using SIDRA software to establish any benefits of upgrading the intersection of Glenfield Road and Bruce Street.

It is recommended that RT22 and RT46 are undertaken in conjunction to achieve best results for Bruce Street. It is also recommended that RT46 is undertaken in conjunction with RT15, RT16, RT19 and RT26 to achieve an integrated design.
Appendix A

Road Hierarchy Maps
Appendix B

Appendix Title
Appendix C

Appendix Title