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# BALLARAT ROAD TRANSPORT STRATEGY




## CONSULTANTS FINAL REPORT

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MARCH 2007

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## EXECUTIVE SUMMARY

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The Ballarat Road Transport Strategy is one of a series of transport and land use strategies to guide future planning and development of Ballarat; it specifically relates to future needs of arterial roads and major local streets.

The existing road network generally caters well for all road users in Ballarat, both for personal travel by car and for freight movement. The main deficiencies with the existing road network, as assessed by technical analysis as well as by inputs from the Ballarat community, are:

- Dana Street, between Doveton Street and Lydiard Street, is a key Central Business Area (CBA) circulation street, as well as the sole access for the Central Square multi-storey carpark; the high volume, roadside angle parking and close spaced intersections cause congestion and delay during shopping hours.
- Mair Street between Dawson Street and Princes Street; the high traffic volume, in conjunction with some angle parking and some centre-of-road parking, close spaced controlled intersections and pedestrian activity, lead to congestion and delays during shopping peak periods;
- Main Road/Geelong Road, especially from Elsworth Street to Ballarat University; the continuous property access, limited provision of localised widening for right turning traffic, partial provision of bus stops clear of passing traffic and low-capacity intersection treatments, cause extensive delays during school and university start/finish times;
- Doveton Street (Midland Highway), especially between Webster Street and Eyre Street/Grant Street; the mixture of regional through-traffic including large trucks, roadside angle parking for adjacent shops and pedestrian crossing activity cause congestion throughout the day;
- Eyre Street/Grant Street provides a link between the CBA and areas further south-east and south-west; especially south-east to Main Road and the growth areas of Mt Clear and Mt Helen it has congestion issues similar to Dana Street.

Other more localised problems, often relating to individual intersections, are in Learmonth Street, Curtis Street and Latrobe Street. Truck operators have particular problems accessing the Western Freeway along Gillies Street and, due to load limits, via McKenzie Drive.

Over the 30 year period from 2001 to 2031, the population of Ballarat is forecast to grow from 88,000 to 115,000 persons. A substantial part of that growth, namely 17,000 persons, will be in the broadacre Ballarat West Local Structure Plan growth areas of Alfredton, Delacombe and Sebastopol; other in-fill and fringe growth areas include Canadian Valley, the redeveloped Ballarat Golf Club and in older areas around the CBA. There will be a related increase in job opportunities and retail floorspace.

Traffic volumes are forecast to increase, over the period to 2031, in proportion to population, employment and retail floorspace. The biggest traffic increases will occur along Ballarat-Maryborough Road (Learmonth Road), Gillies Street, Glenelg Highway (Hertford Street), Ballarat-Burrumbeet Road (Avenue of Honour) and Midland Highway (Creswick Road).

Some parts of the Ballarat road network will be unable to cope efficiently and safely with the forecast 2031 traffic volumes. In particular:

- (a) Geelong Road at Ballarat University is already close to its 2-lane operating capacity (14,700 vehicles per day (v.p.d.) in 2005/6). A 49 percent increase to 22,000 v.p.d. in 2031 would substantially increase congestion, delays and associated risks to road users, especially along those sections where there is a complex mix of private car, bus, cycle and pedestrian usage.
- (b) Gillies Street north of Sturt Street is currently operating within its 4-lane operating capacity (21,500 v.p.d. in 2005/6). However, with a forecast increase to 37,000 v.p.d. by 2031, it will be close to its capacity, especially at the various roundabouts and signalised intersections. This will reduce the effectiveness of this important north-south truck route; it will also restrict access to the proposed Wendouree railway station.
- (c) Learmonth Road, west of Gillies Street, is forecast to experience an almost doubling of its traffic volumes, from 10,000 v.p.d. in 2005/6 to 26,000 v.p.d. in 2031. That would result in substantial congestion for people travelling to work along that route between inner residential areas and the Walsh, West Common and Airport Industrial Estates.
- (d) The Avenue of Honour, with 10,500 v.p.d. between Ring Road and the Arch of Victory in 2005/6, already has a poor safety record and its intersection at Learmonth Street is already congested. A forecast volume increase to 14,800 v.p.d. in 2031 will substantially increase the risk of run-off-road crashes and the level of congestion and delay at intersections.

The forecast 2031 traffic volumes above were predicted by network analysis provided by the Ballarat Strategic Transport Model. The model analysed existing road traffic movements in specific areas and extrapolated these movements to determine future traffic volumes. Different traffic generation methodology to that used for the modelled predictions would have resulted in even higher traffic volumes. It is recommended that traffic volumes along these routes are regularly monitored.

In order to address the identified existing and forecast future capacity and safety deficiencies, a number of new or upgraded road options were assessed using economic, road safety, social and environmental criteria. This led to the identification of required and worthwhile road projects over the period to 2031. The following list identifies the recommended projects, their benefits, likely range of cost, and actions required now to ensure that the projects are suitably planned in readiness for their implementation. A graphical summary is also provided.

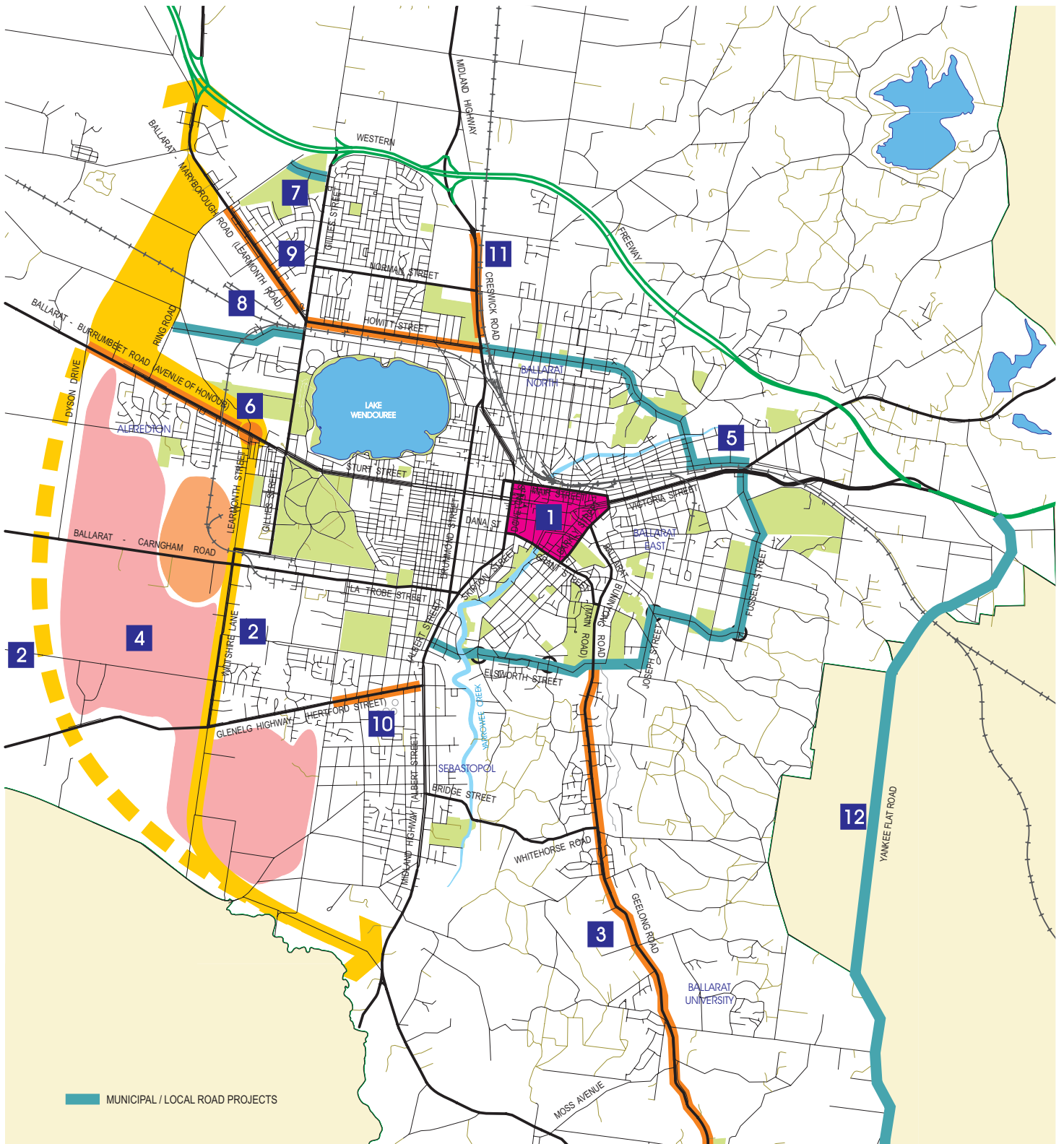
The new road seen as being most necessary by 2031 is the so-called Future Western Arterial, that being a continuous road around the western fringe of Ballarat from the Sunraysia Highway to the Midland Highway. While construction of the Future Western Arterial would not be justified for some time, it is recommended that planning activities commence immediately to ensure that a road reservation is identified and protected.

In relation to staging options for the Future Western Arterial, preliminary traffic forecasts were prepared for an “interim” route utilising upgraded sections of Ring Road (and its existing railway level crossing), Avenue of Honour, Learmonth Street, Wiltshire Lane and Bells Road (existing road plus new link). The forecasts show that existing roads could deliver interim road user benefits, but that road duplication and intersection works would be required along the interim route to achieve sufficient traffic capacity. It is likely that the optimum investment strategy would be a combination of upgrading works on the interim route (to address existing deficiencies) and first stage actions on a permanent outer route (to address longer-term needs). More detailed analysis of staging options would form an important component of route investigation for the Future Western Arterial.

**Ballarat Road Transport Strategy  
Summary of Recommended Projects and Initial Actions for Implementation**

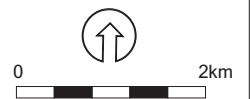
Project	Benefits	Cost (Indicative Only)	Initial Actions
1. Ballarat CBA Street Network Upgrade (Mair Street & Dana Street)	<ul style="list-style-type: none"> <li>▪ Relieve CBA traffic congestion</li> <li>▪ Improve pedestrian safety</li> <li>▪ Improve bus operations</li> <li>▪ Improve visual amenity</li> </ul>	\$5.0-10.0 million	Develop detailed proposals via CBA Traffic Management and Car Parking Strategy
2. Future Western Arterial	<ul style="list-style-type: none"> <li>▪ Provide alternative north-south route through Ballarat</li> <li>▪ Main access for Ballarat West existing and proposed (LSP) growth</li> <li>▪ Improve truck access to/from Western Freeway</li> </ul>	\$50.0 plus million	Planning investigations to identify future arterial corridor and interim/staging options
3. Geelong Road Upgrade (Elsworth Street to Ballarat University)	<ul style="list-style-type: none"> <li>▪ Relieve peak period congestion</li> <li>▪ Assist growth in Canadian Valley</li> <li>▪ Improve bus operations</li> <li>▪ Assist cyclists and pedestrian movements</li> </ul>	\$10.0-15.0 million	Traffic management review of whole corridor to identify optimum treatments

Project	Benefits	Cost (Indicative Only)	Initial Actions
4. Ballarat West Local Structure Plan	<ul style="list-style-type: none"> <li>▪ Provide timely access for growth areas</li> <li>▪ Provide basis of cycle and pedestrian network</li> </ul>	Funded via Development Contribution Plan (DCP)	Integrate with LSP/DCP implementation
5. Inner Loops via Fussell Street (Municipal Road Connector Only)	<ul style="list-style-type: none"> <li>▪ Provide priority circulation route east of CBA to relieve CBA congestion</li> <li>▪ Provide alternate local access route</li> </ul>	\$4.0-6.0 million	Review role of affected local streets in Council's hierarchy
6. Avenue of Honour and Learmonth Street Intersection	<ul style="list-style-type: none"> <li>▪ Relieve existing delays and improve safety</li> <li>▪ Complement ultimate duplication of Avenue of Honour</li> </ul>	\$0.5-1.0 million for initial civil works and intersection upgrade. \$10.0 to \$15.0 million for later duplication	Linemark southern approach as two lanes. Prepare and approve upgrade plans. Monitor traffic growth for future duplication needs.
7. McKenzie Drive Load Limit Increase	<ul style="list-style-type: none"> <li>▪ Allow heavy trucks better access to Western Freeway</li> </ul>	Nominal	Allow heavy truck use outside school access times
8. Gregory Street West Local Road Link to Ring Road (Municipal Road Connector Only)	<ul style="list-style-type: none"> <li>▪ Connect two parts across railway line</li> </ul>	\$1.0-2.0 million	Plan traffic management to protect local/access street function of Gregory Street East
9. Learmonth Road Upgrade	<ul style="list-style-type: none"> <li>▪ Extra capacity to accommodate forecast traffic growth</li> </ul>	\$10.0 to \$15.0 million	Prepare and approve upgrade plans. Monitor traffic growth for future duplication needs.
10. Hertford Road Upgrade	<ul style="list-style-type: none"> <li>▪ Extra capacity to accommodate forecast traffic growth</li> </ul>	\$10.0 to \$15.0 million	Prepare and approve upgrade plans. Monitor traffic growth for future duplication needs.
11. Creswick Road Upgrade	<ul style="list-style-type: none"> <li>▪ Extra capacity to accommodate forecast traffic growth and improve "gateway" image</li> </ul>	\$10.0 to \$15.0 million	Prepare and approve upgrade plans. Monitor traffic growth for future duplication needs.
12. Yankee Flat Road Upgrade (Municipal Road Connector Only)	<ul style="list-style-type: none"> <li>▪ Extra intersection capacity and safety</li> <li>▪ Roadside hazard reduction</li> </ul>	\$1.0 - \$2.0 million	Prepare and approve upgrade plans.



**LEGEND**

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>1. DETAIL PROPOSALS VIA COUNCIL STUDY OF CBA STREET NETWORK</li> <li>2. PLANNING INVESTIGATION FOR FUTURE WESTERN ARTERIAL AND INTERIM / STAGING OPTIONS</li> <li>3. UNDERTAKE TRAFFIC MANAGEMENT REVIEW FOR MAIN ROAD / GEELONG ROAD</li> <li>4. INTEGRATE RESULTS OF COUNCIL STUDY FOR BALLARAT WEST LSP ROAD NEEDS</li> <li>5. REVIEW ROAD HIERARCHY RE AFFECTED LOCAL STREETS</li> <li>6. UPGRADE LEARMONTH STREET LINE MARKING AS INTERIM INTERSECTION IMPROVEMENT. PREPARE PLANS FOR LATER DUPLICATION</li> </ul> | <ul style="list-style-type: none"> <li>7. LOAD LIMIT INCREASE FOR MCKENZIE DRIVE OUTSIDE SCHOOL ACCESS TIMES</li> <li>8. DEVELOP GREGORY STREET WEST LOCAL ROAD CONNECTION BETWEEN GILLIES STREET AND RING ROAD</li> <li>9. MONITOR TRAFFIC GROWTH ON LEARMONTH ROAD</li> <li>10. MONITOR TRAFFIC GROWTH ON HERTFORD STREET</li> <li>11. MONITOR TRAFFIC GROWTH ON CRESWICK ROAD</li> <li>12. YANKEE FLAT ROAD UPGRADE</li> </ul> |
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# 1 INTRODUCTION

## 1.1 RESPONSIBILITY FOR VICTORIA'S ROAD NETWORK

Responsibility for Victoria's road network is shared by VicRoads, Local Councils, Transurban and the Department of Sustainability as set out in Table 1.1.

**Table 1.1**  
**Responsibility for Roads in Victoria**

Major Type of Road	Who is Responsible
Freeways (around 790km, excluding the Melbourne CityLink tollway)	VicRoads
Arterial roads (around 21,500km): <ul style="list-style-type: none"> <li>▪ In Urban areas</li> </ul>	<p><b>Operation responsibility</b> (Including inspection, maintenance and repair of road infrastructure)</p> <ul style="list-style-type: none"> <li>▪ Through traffic lanes - VicRoads</li> <li>▪ Other (including service lanes, footpaths and roadside areas) - Councils</li> </ul> <p><b>Coordination responsibility</b> (including permits for road and infrastructure works, road closures etc) - VicRoads</p>
Arterial roads (around 21,500km): <ul style="list-style-type: none"> <li>▪ In areas other than urban areas</li> </ul>	VicRoads
Freeway tollways (approx 22 km)	Transurban
Municipal roads (approx 134,000 km) <ul style="list-style-type: none"> <li>▪ Local roads in towns suburbs and through Country Victoria</li> <li>▪ Non-arterial state roads</li> <li>▪ Mainly roads in parks and forests (approx 40,000 km)</li> </ul>	<p>Victoria's 79 local councils</p> <p>Funding comes from Federal, State and Local Government sources.</p> <p>Department of Sustainability &amp; Environment (DSE) (including Parks Victoria) and other Government organizations</p>

Funding for the shared responsibilities of VicRoads and Local Councils for the management, maintenance and improvements to the declared road and municipal road components of Victoria's road network, come from Federal, State and Local Government sources.

The majority of Victoria's traffic is carried on the declared road network of freeways and arterial roads, linking centres of activity in rural and metropolitan areas, to provide a safe, efficient and integrated road transport system for the economic and social benefit of the community.

VicRoads generally arranges for any upgrading of existing declared roads and construction of new roads that are to be added to the declared road network. Such works may be necessary to accommodate changes in the size and location of the Ballarat population, and increased road use for freight, business and private travel.

VicRoads is a statutory corporation within the infrastructure portfolio of the Victorian Government, under the responsibility of the Minister for Transport. The Transport Act 1983, Road Safety Act 1986 and Road Management Act 2004 provide VicRoads with the powers to manage Victoria's arterial road network and implement road safety programs.

The City of Ballarat has complementary responsibilities for managing the local road network in its municipal area.

## 1.2 BACKGROUND TO THE BALLARAT ROAD TRANSPORT STRATEGY

Ballarat is one of the largest inland cities in Australia, with a population of over 88,000 people. Located in the Central Highlands Region of Victoria, Ballarat is approximately 110 kilometres north-west of Melbourne.

The major regional highway servicing Ballarat is the Western Highway. In 1998, the 4-lane Western Freeway (Ballarat Bypass) was completed, meaning that east-west through-traffic along the Western Highway now travels through the northern outskirts of Ballarat.

Access to other key regional centres is via three main State arterial roads radiating from the central areas of Ballarat; these are the Midland, Glenelg and Sunraysia Highways. These highways provide access to the industrial centres of Geelong and Portland, to regional locations of Bendigo and Mildura, and to agricultural areas in the Mallee and Wimmera. The inner parts of these highways, and linking local roads, are servicing increasing volumes of regional vehicle traffic. Continuing urban development in Ballarat, especially on the south-western fringe, is further increasing traffic volumes on the highways and local roads.

## 1.3 NEED FOR A ROAD TRANSPORT STRATEGY

The City of Ballarat, in association with VicRoads, require a strategy for the development of road transport infrastructure for the city and its surrounding areas. The main requirements are:

- identify and quantify existing road system deficiencies;
- assess future road needs associated with population and employment growth to the year 2030;
- recognise trends for regional freight movements; and
- recognise the greater use of walk, cycle and public transport (bus) for travel within Ballarat.

**Most importantly, the strategy needs to be responsive to the needs and aspirations of the Ballarat community. This means that the strategy planning process needs to include full and open consultation with all stakeholders.**

At the broader level, the Road Transport Strategy will form one part of an overall strategic approach to the management and future provision of integrated transport services for Ballarat, as shown in Figure 1.1.

## 1.4 FORMULATING THE ROAD TRANSPORT STRATEGY

In December 2005, the City of Ballarat and VicRoads appointed Ratio Consultants to develop the Ballarat Road Transport Strategy. The process involved:

- an assessment of existing road/transport system conditions;
- consultation with key stakeholders;
- assessment of future traffic growth and road needs;
- development and evaluation of road network improvement options;
- identifying high priority actions, and requirements for further investigation and monitoring.

These aspects of the strategy formulation process are documented in this report.

Separate documentation has been prepared relating to technical aspects of the strategy process, namely:

- Population, Employment and Retail Floorspace Projections (Ratio Consultants, February 2006);
- Ballarat Strategic Transport Model (BSTM) Validation Report (VicRoads, Road System Management 2006);
- Ballarat Strategic Transport Model Future Scenarios (VicRoads Road System Management, 2006)
- City of Ballarat Road Hierarchy Review (2006)
- Journey to Work Travel, Ballarat (VicRoads Road System Management, 2006)
- Ballarat Origin-Destination Survey (Australasian Traffic Survey 2005)

# Ballarat Transport Strategy

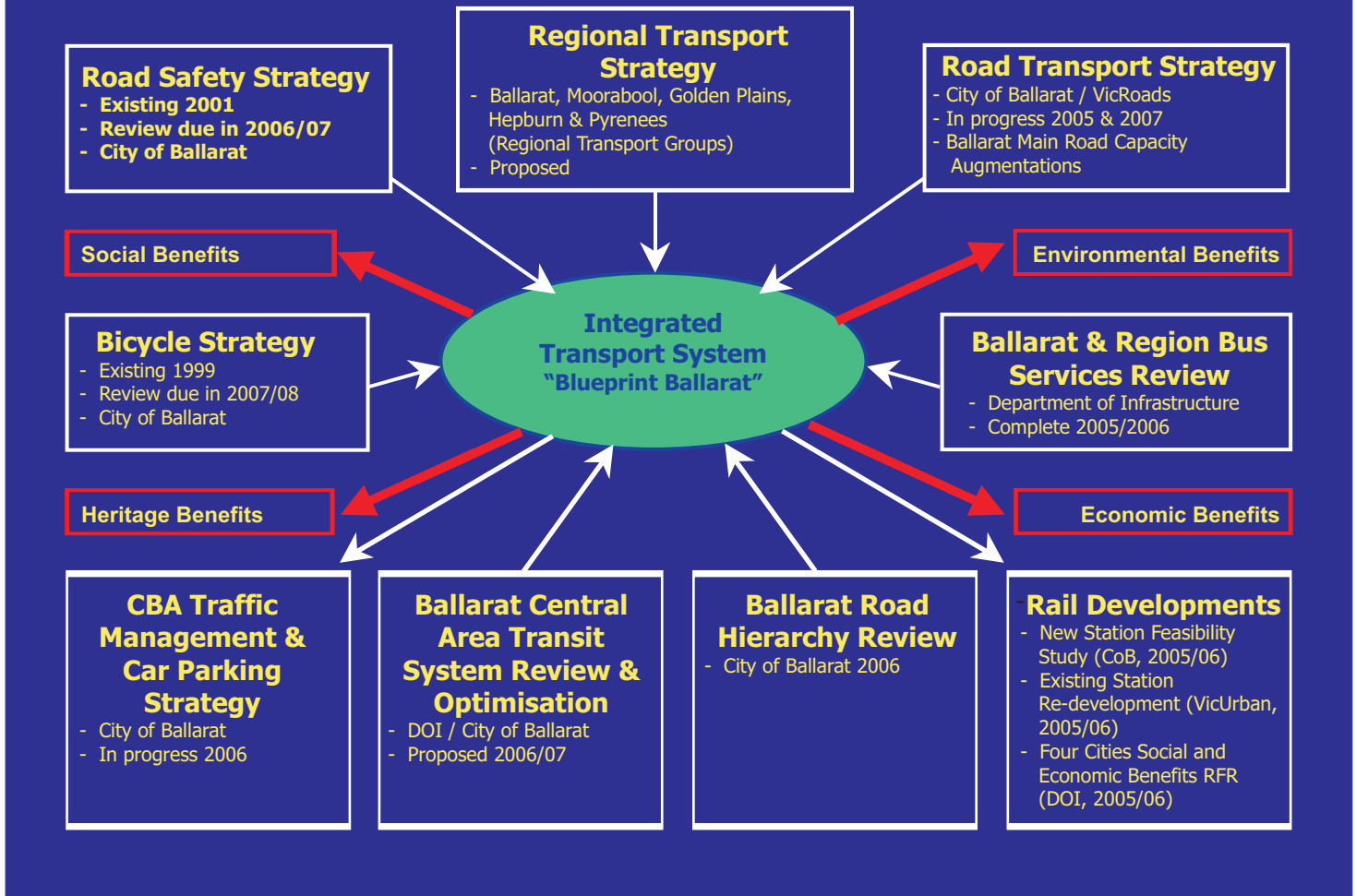


FIGURE 1.1  
ROAD TRANSPORT STRATEGY CONTEXT

## 2 EXISTING ROAD TRANSPORT SYSTEM

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### 2.1 HIGHWAYS, MAIN ROADS AND TRUCK ROUTES

The State Highways, Main Roads and designated truck routes in and around Ballarat are shown on Figure 2.1. With the exception of the Western Freeway, all are arterial roads with at-grade intersections; many have continuous frontage access into adjoining properties. In most instances, these roads have official (administrative) names as well as local names. Both sets of names are shown in Figure 2.1; for convenience, the balance of this report uses local names only.

**Sturt Street, Victoria Street and Creswick Road** have very wide, boulevard cross-sections, generally with wide central medians and extensive service road provision each side.

Other roads, where wide road reservations have allowed progressive pavement improvements and duplication, are **Howitt Street** and parts of **Mair Street, Gillies Street, Doveton Street, Skipton Street** and **Wiltshire Lane**.

**Main Road/Geelong Road** (Ballarat-Buninyong Road), and other parts of the road system of inner-Ballarat, have narrower reservations and traverse some steeper topography. This has severely limited the opportunities over time to widen or duplicate pavements.

### 2.2 LOCAL ROADS AND STREETS

Supporting the highways and other main roads in Ballarat is a network of local streets. In the northern and western areas of the city, these are typically provided in a rectangular grid pattern, with very wide reservations, narrow central pavements and mature street trees each side. In the eastern and southern areas, reservations are narrower and alignments (both horizontal and vertical) are less regular.

There are five major discontinuities or restrictions in the Ballarat local street network:

- Lake Wendouree provides a major barrier to north-south and east-west grid continuity in the western area;
- Victoria Park provides a similar barrier further south;
- Bridge Mall requires east-west streets in the Central Business Area (CBA) to deviate around it;
- the Arch of Victory and Avenue of Honour limit the width of Sturt Street West/Ballarat-Burrumbeet Road to two lanes;
- the Melbourne-Ararat Railway Line, which runs east-west through Ballarat; it prevents all vehicular access at some locations (e.g. no vehicular link between Stawell Street North and South), and creates level crossing disruption and delay at other locations.

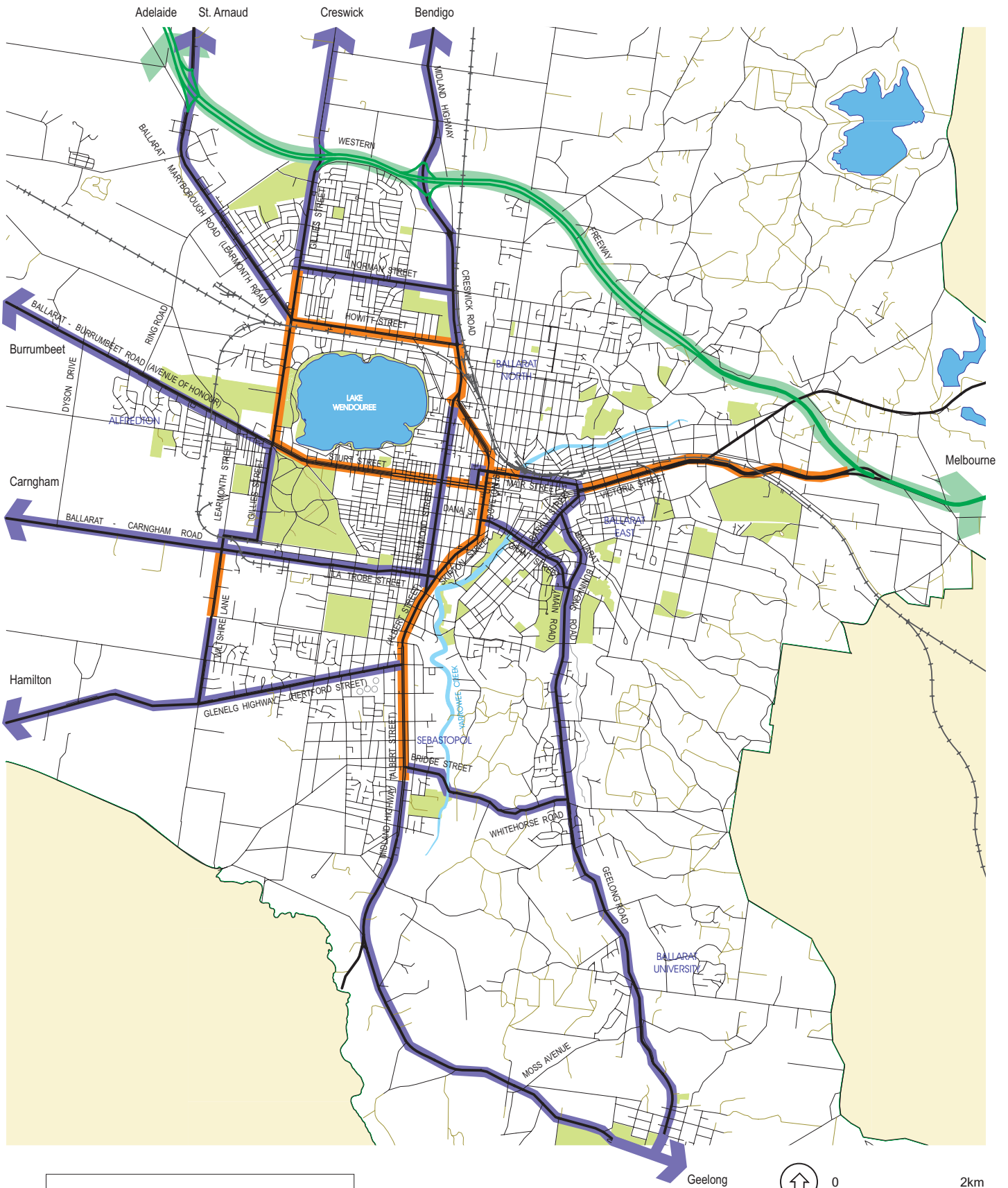


FIGURE 2.1  
HIGHWAYS AND TRUCK ROUTES

Several of the major streets providing access to/from and circulation around the CBA, such as Mair Street, Doveton Street and Dana Street, are also popular locations for on-street parking. Dana Street also provides the sole access for the Central Square multi-storey off-street public carpark. Drivers who are searching for, and manoeuvring into and out of on-street parking spaces, cause substantial delays to other vehicular traffic movements.

The City of Ballarat has established a functional classification (hierarchy) of streets for Ballarat. The hierarchy is used as a basis for:

- prioritising the improvement of the capacity of arterial (VicRoads) and link/collector (Council) roads, they being the roads intended for use by higher traffic volumes;
- implementing Local Area Traffic Management in local/residential streets, so as to protect them from intrusion by non-local traffic.

Council is currently reviewing its road hierarchy. The purpose of the review is to address a number of anomalies/inconsistencies in the previous road hierarchy, incorporate changes as a result of new developments, provide changes to reflect the actual traffic conditions and reflect the recommendations of this report.

## 2.3 TYPES OF ROAD USE

### 2.3.1 Personal Travel To and From Work

In any urban area such as Ballarat, road use is dominated by travel to and from work, especially in the morning and evening peak periods on weekdays when road usage is most intense.

VicRoads has analysed the Journey To Work characteristics of the Ballarat workforce, using data from the 2001 Census. The results are shown in Table 2.1, indicating the dominance of “car driver” as the mode of travel to work.

**Table 2.1**  
**Mode of Travel to Work in Ballarat**  
**(2001 Census)**

Travel Mode	Persons	
	Number	Percent
Car Driver	23,334	83.5
Car Passenger	2,018	7.2
Walk	1,156	4.1
Bicycle	383	1.4
Truck	275	1.0
Bus	216	0.8
Other/Unknown	573	2.0
	27,955	100.0

Directly comparable statistics are not readily available for other regional cities in Victoria but, from an analysis of the previous (1996) Census, the reliance on “car driver” as a mode of travel to work in Ballarat can be seen as similar to that of Bendigo and Geelong, refer Table 2.2.

**Table 2.2**  
**Journey to Work by Car Driver Mode**  
**Regional Cities**  
**(ABS 1996)**

Municipality	Percent Car Driver *
Ballarat	83
Greater Bendigo	79
Greater Geelong	81
* “Did not go to work” and “worked at home” were excluded from analysis, to provide maximum comparability with 2001 data.	

Work destinations in Ballarat are concentrated in several main areas:

- the retail and commercial areas of the CBA, Wendouree and Sebastopol;
- the hospital/health care precinct west of the CBA;
- the light industrial areas of Delacombe and Wendouree West;
- the Ballarat University and Technology Park;
- the Sovereign Hill tourist complex.

Most (82.6 percent) of people who live in Ballarat have local work locations; 3.8 percent work in Melbourne and other small numbers work in the rural areas around Ballarat; and

Most (81.5 percent) of jobs in Ballarat are filled by Ballarat residents; 5.9 percent commute to Ballarat from Golden Plains, 3.5 percent from Moorabool, 3.3 percent from Hepburn and smaller numbers from elsewhere.

### 2.3.2 Other Purposes of Personal Travel

In addition to travel to and from work, there are various other categories of road use in Ballarat for person trips, namely:

- travel to and from primary and secondary schools (with the morning travel time coinciding with morning commuter travel); this comprises a mixture of walk, cycle, bus and car passenger modes;
- travel for shopping and personal business purposes, which is mainly by private car mode, namely in between morning and evening peak periods;
- social and recreational travel, again dominated by private car mode, and much of it being in the evenings and on weekends.



### 2.3.3 Freight and Commercial Vehicle Movement

Commercial vehicles typically comprise about 10 percent of the usage of major roads in urban areas, as follows:

- smaller trucks are involved in the construction, servicing and maintenance of all retail, commercial and institutional areas (and to a lesser extent rural and residential areas) with deliveries of goods, collection of waste etc.
- larger trucks are involved in the haulage of freight generated by primary and secondary industries;
- buses carry commuters, school children and charter groups such as tourists.

The major freight movement on Ballarat's roads is the straight-through interstate movement along the Western Highway/Western Freeway. Other notable freight movements comprise:

- haulage of inputs and outputs for Ballarat's major manufacturing industries, such as Masterfoods, McCains, FMP (Bendix/Mintex); these industries are mainly located in Wendouree and Delacombe, generating truck movement to and from the Western Highway for linkages to Melbourne and interstate;
- haulage of livestock to the Ballarat Saleyards (in Delacombe);
- haulage of timber from harvesting areas to local and regional processing plants, along local roads such as Buninyong-Mt Mercer Road.<sup>1</sup>
- haulage of other agricultural inputs such as fuel and fertiliser, and outputs such as grain between (or through) Ballarat and major freight terminals in Melbourne and Geelong<sup>2</sup>
- haulage of containers between manufacturing/service industries throughout Ballarat and the intermodal goods yard at the Ballarat Railway Station;
- travel to and from freight forwarder depots which are located in Ballarat, such as Toll and Sargents.

The national standard gauge railway network connects Melbourne and Adelaide via Geelong; Ballarat is served by the separate and more localised broad gauge railway network. This means that nationally significant manufacturing industries which are based in Ballarat, such as Masterfoods, McCains and FMP have limited opportunities to transport inputs and outputs by rail. To ensure that their freight requirements continue to be met at competitive rates, each company needs road infrastructure which:

- is directly linked to the State and National Highway System (i.e. in particular the Western and Midland Highways);
- can accommodate the increasingly long and heavy trucks which now dominate long-distance freight activities.

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<sup>1</sup> Ratio Consultants, Timber Towns Victoria Local Roads Funding Strategy, June 2005.

<sup>2</sup> Although most grain produced in the Wimmera/Mallee is hauled to Geelong by train, some is hauled by truck, via Ballarat, with fertilizer backloaded.

With most major industries being located in the north-west and south-west areas of Ballarat, there is an increasing requirement for an efficient north-south link through the outer western area of Ballarat.

An additional commercial vehicle activity in Ballarat is the large number of tourist buses which visit Sovereign Hill. These buses, generally making one-day round trips from bases in Melbourne, require direct and uncongested local access routes so they can maintain their schedules.

## **2.4 VEHICULAR TRAFFIC VOLUMES IN BALLARAT**

The City of Ballarat and VicRoads regularly survey traffic volumes on roads throughout Ballarat, to provide a quantitative basis for road maintenance and planning of future upgrading works. Surveys at particular mid-block sites typically collect data over a one or two week period, so that “average weekday” volumes can be calculated. Average weekday volumes from recent surveys, at important and representative locations throughout the Ballarat road network, are shown in Table 2.3 and on Figure 2.2. The volumes listed are two-way travels for all vehicle classes combined (ie cars, trucks, buses).

Table 2.3 also shows the number of traffic lanes on the road at the survey site, either one lane each way (2 lanes) or two lanes each way (4 lanes).

The surveyed traffic volumes were also used as the basis for developing the Ballarat Strategic Transport Model (BSTM), that being a computer model which simulates daily traffic volumes on the road network. A full description of the BSTM and its calibration against surveyed traffic volumes, is provided in a separate report.

## **2.5 TRAFFIC TO/FROM EXTERNAL AREAS**

### **2.5.1 Regional Through-Traffic**

As previously indicated, traffic patterns in Ballarat comprise a mixture of regional and local movements. While the major regional movement (namely the east-west movement along the Western Highway) is catered for by the Western Freeway, other regional movements must be catered for by the inner-urban street system.

In order to quantify the extent and type of regional through-traffic, VicRoads appointed Australasian Traffic Surveys (ATS) to undertake a survey on Wednesday 23 March 2005. The survey recorded the number plates of vehicles crossing the outskirts of Ballarat over a four-hour period (2.00 to 6.00pm). Computer matching then allowed an accurate estimate of the number of cars and trucks driving straight through Ballarat without stopping (or stopping only for a few minutes).

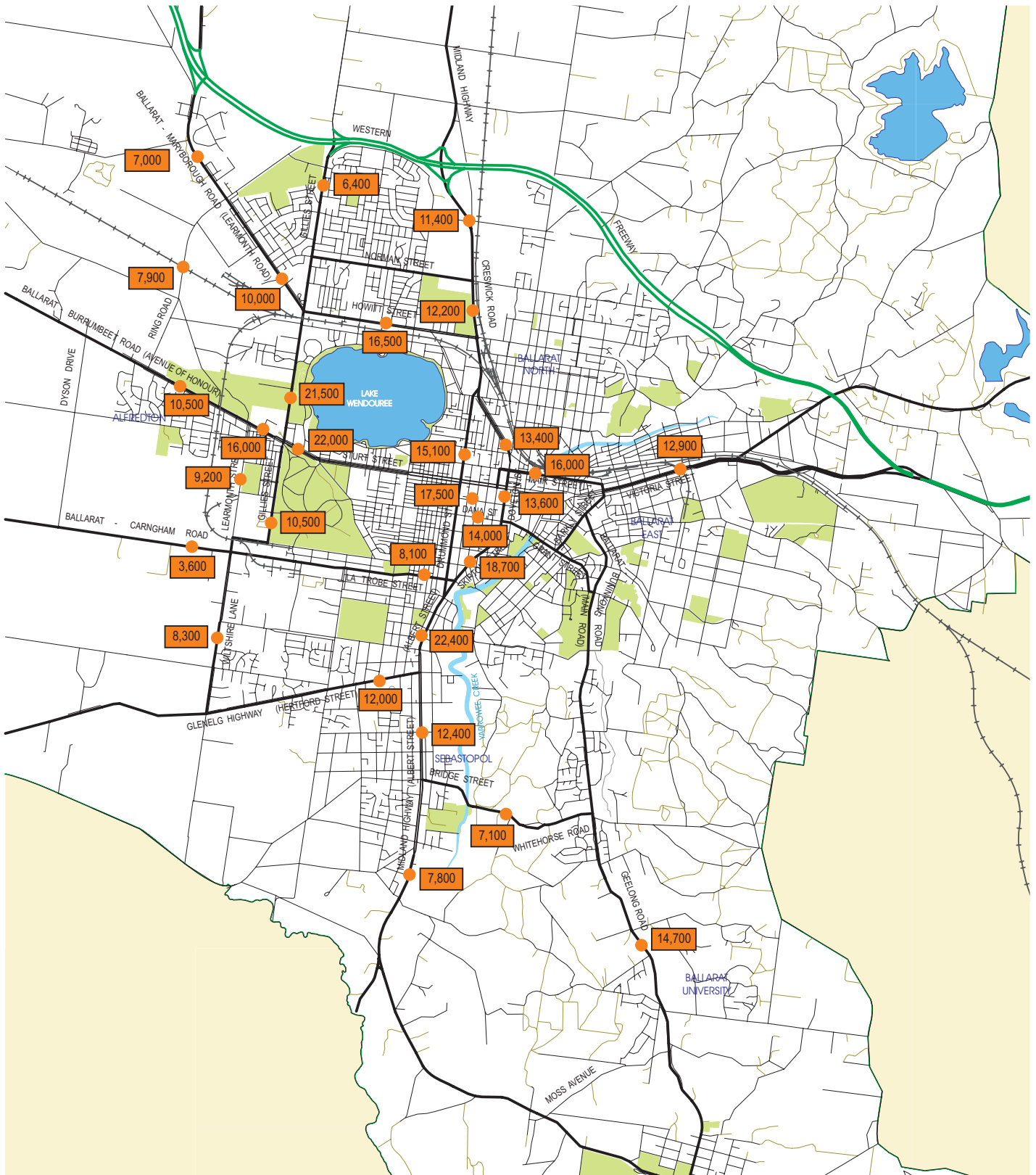


FIGURE 2.2  
CURRENT (2005 / 2006) DAILY TRAFFIC VOLUMES

Table 2.3

**Daily Traffic Volumes at Key Locations**  
(actual 2005/2006 traffic count data, two-way totals)

Road/Street	Location	Traffic Lanes	Vehicles per day
Albert Street	North of Hertford Street	4	22,400
Albert Street	South of Hertford Street	4	12,400
Albert Street	South of Bridge Street	4	7,800
Avenue of Honour	West of Gillies Street	2	16,300
Avenue of Honour	West of Arch of Victory	2	10,500
Ballarat-Carngham Road	West of Wiltshire Lane	2	3,600
Creswick Road	North of Webster Street	4	13,400
Creswick Road	North of Howitt Street	2	12,200
Creswick Road	North of Norman Street	2	11,400
Dana Street	East of Doveton Street	2	17,500
Doveton Street	South of Sturt Street	2*	13,600
Drummond Street	North of Sturt Street	4	15,100
Geelong Road	At Ballarat University	2	14,700
Gillies Street	North of Norman Street	2	6,400
Gillies Street	North of Sturt Street	4	21,500
Gillies Street	South of Sturt Street	2	10,500
Grant Street	East of Doveton Street	2	14,000
Hertford Street	At Alfred Street	2	12,000
Howitt Street	At Dowling Street	4	16,500
Learmonth Road	West of Gillies Street	2	10,000
Learmonth Road	North-West of Ring Road	2	7,000
Learmonth Street	South of Sturt Street West	2	9,200
Mair Street	At Lydiard Street	2*	16,000
Ring Road	South of Railway Line	2	7,900
Skipton Street	North of Drummond Street	4	18,700
Sturt Street	East of Gillies Street	4	22,000
Victoria Street	At Stawell Street	4	12,900
Whitehorse Road	West of Geelong Road	2	7,100
Wiltshire Lane	South of Whitelaw Street	2	8,300

\* Some parts have 4 lanes, but the narrowest parts have only 2 lanes.

The results of the ATS survey are shown in Figures 2.3 and 2.4 for cars and trucks respectively. The survey results show that, when compared to total vehicle movements, the surveyed through-movements are very low. For example, Table 2.1 shows a total daily volume of 24,000 vehicles per day along Gillies Street, while the ATS survey results (factored by 5 or 6 to convert the four-hour volumes to daily volumes) suggest no more than 200 through-traffic movements (or only one percent of total movements) along that road.

The City of Ballarat and VicRoads carried out a further survey of through-traffic of trucks, along the Midland Highway only, on Wednesday 12 April 2006. The survey covered two periods, namely 8-10am and 2-4pm. The results for the 2-4pm period closely matched those for the same period in the ATS survey; both showed 3 to 4 percent of trucks travelling straight through Ballarat. The results for the 8-10am survey showed a substantially higher proportion of trucks travelling straight through, about 8 percent; the ATS survey in 2005 did not cover this time period so no comparison is possible.

One specific through-traffic movement involving trucks is the transport of grain from the Wimmera/Mallee region to the export port facility at Geelong. Information from Wilken Grain, Warracknabeal, indicates that 9,000 tonnes of grain (plus 3,000 tonnes of backloaded fertiliser) were transported via Ballarat in 2005. Most of the grain is hauled by B-doubles with 44 tonne payloads, equivalent to an average of four loaded trucks per week. Most of the trucks use the Gillies Street/Wiltshire Lane route. The amount of grain hauled in 2006 will be higher, possibly up to 15,000 tonnes.

Discussions with Officers of Moorabool Shire Council indicate that some regional through-traffic uses its roads as a short cut between Ballarat and Geelong. Roads via Yendon are used by trucks, and via Yankee Flat by cars, in preference to the more congested route along Main Road/Geelong Road.

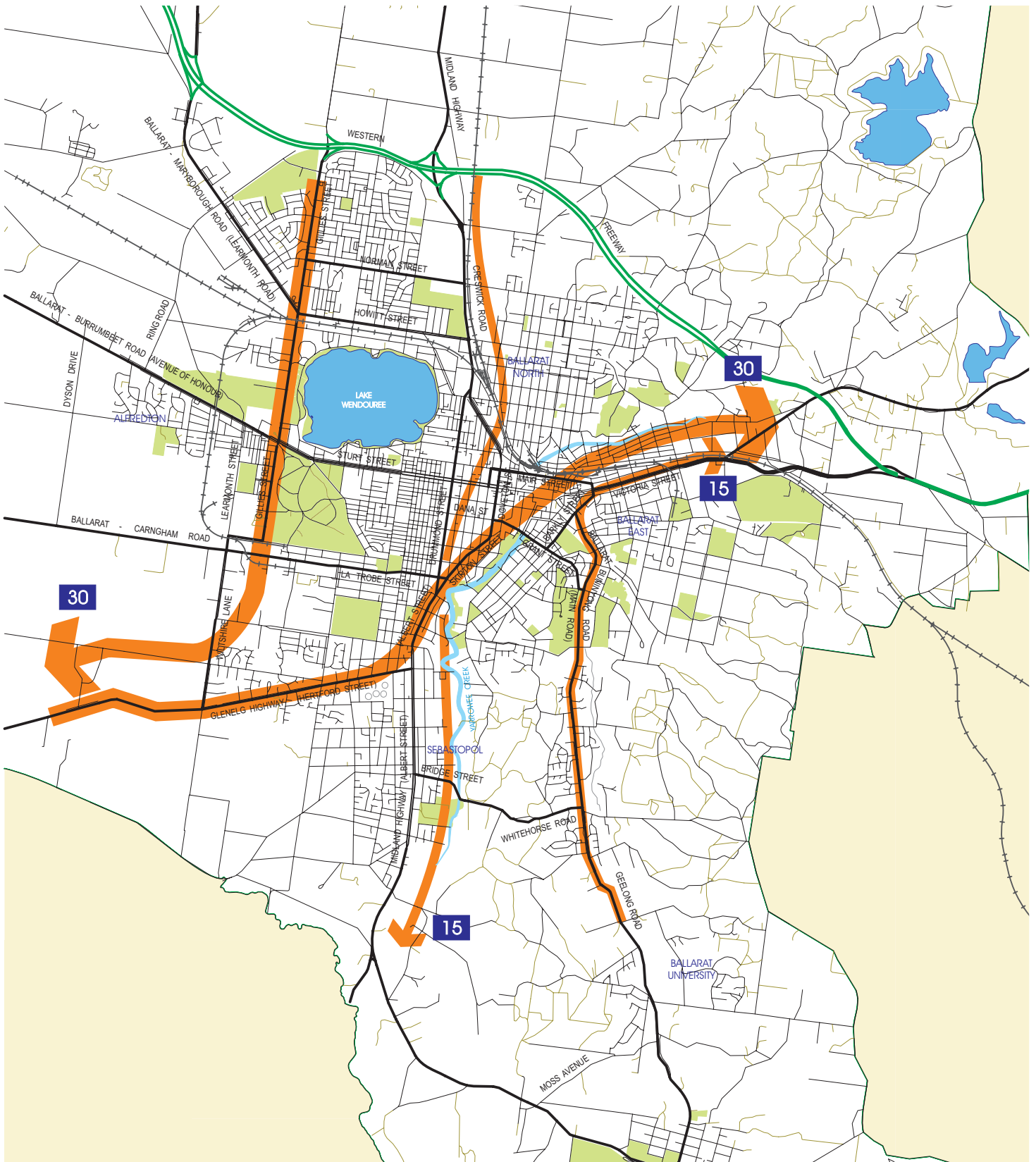
It is likely that many cars and trucks stop, for meal or other breaks, as part of a journey straight through Ballarat. Such movements would have been classified in the above surveys as a "stopping" trip rather than a "through" trip. To the extent that behaviour occurs, the surveys would under-estimate the amount of regional through-traffic.

## **2.5.2 Truck Traffic To/From External Areas**

The ATS survey also allowed the identification of car and truck traffic movements between Ballarat and surrounding rural/regional areas; that is, vehicle movements originating outside Ballarat and heading into the City along the highways and then stopping, or vice versa. Analysis of the truck component, for arriving movements only, is shown in Figure 2.5. This shows substantially greater volumes than for the through-traffic movements in Figure 2.4, emphasising the role which Ballarat plays as a regional base for commerce, industry and transport/distribution activities.

## **2.6 RAIL, BUS, CYCLE AND PEDESTRIAN FACILITIES**

Ballarat is served by passenger and freight rail services. The Ballarat Railway Station, in Lydiard Street north of Mair Street, provides terminals for both as follows:



**FIGURE 2.3**  
**ORIGIN - DESTINATION SURVEY WEDNESDAY 23/3/05**  
**THROUGH CARS 2 - 6PM**  
**(>10 MOVEMENTS)**



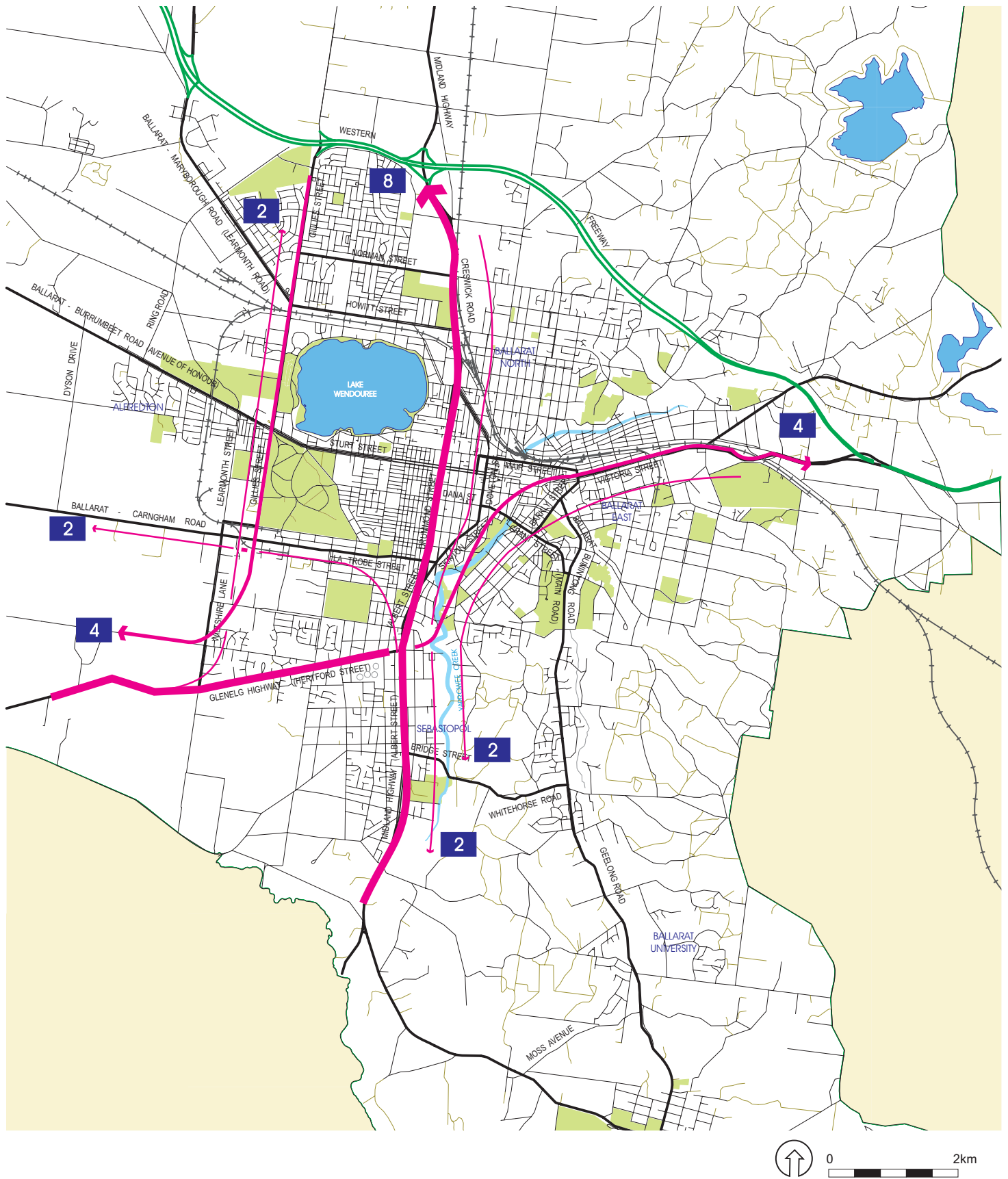


FIGURE 2.4  
 ORIGIN - DESTINATION SURVEY WEDNESDAY 23/3/05  
 THROUGH TRUCKS 2 - 6 PM  
 (>1 MOVEMENTS)

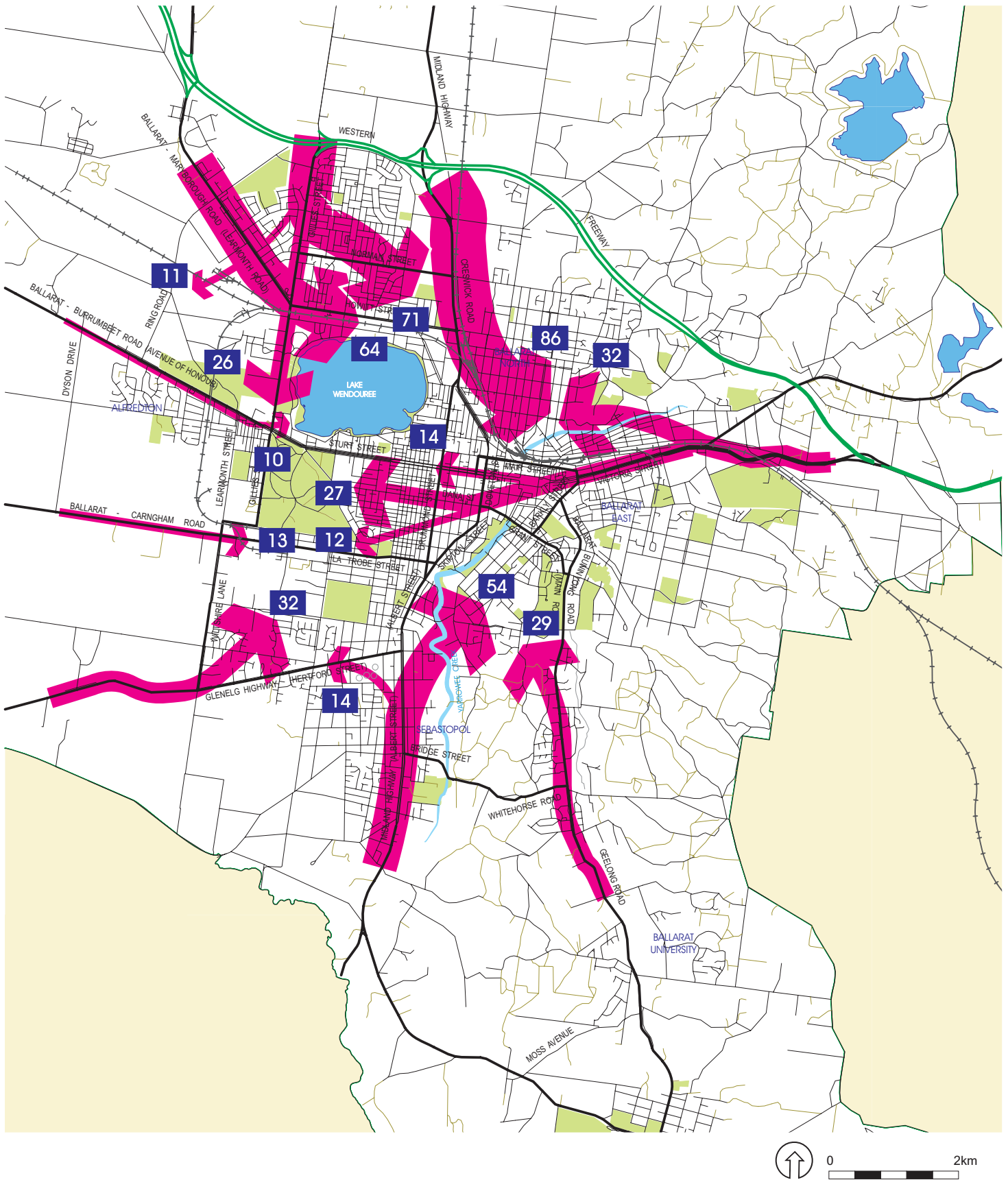


FIGURE 2.5  
 ORIGIN - DESTINATION SURVEY WEDNESDAY 23/3/05  
 ARRIVING TRUCKS 2 - 6 PM  
 (>10 MOVEMENTS)



- the proposed introduction of regional fast rail services in 2006 have passenger facilities, including an off-street interchange area for feeder bus services, south of the station;
- road/rail container (intermodal) freight services are provided in the goods yards north of the station.

The Department of Infrastructure is investigating the possibility of relocating the freight terminals to other areas of Ballarat. It should also be noted the City of Ballarat has recently completed a feasibility study that recommends a second station in the western fringe of development within Ballarat that would serve as a park and ride station facility.

An excellent bus service (including high frequency of service and extensive area coverage of the bus network) operates throughout Ballarat, with extensions into surrounding regional areas. The focal points of these services are:

- the regional Ballarat Railway Station bus/rail interchange;
- the Ballarat CBA major bus stops, located in Curtis Street and Little Bridge Street;
- various major secondary schools and Ballarat University.

Buses utilise major roads throughout the network, with bus stop and bus shelter facilities being of varying standards. An improvement in bus shelter facilities was identified as a key area of improvement in the recently completed Bus Services Review for Ballarat by the Department of Infrastructure.

Cycle and pedestrian paths and infrastructure are provided throughout Ballarat, for both commuting and recreational users. The most convenient and continuous facilities are in the western parts of the city, where flat topography and a grid pattern of wide local streets assist their provision. Recreational facilities focus on Lake Wendouree, Canadian Creek, Skipton Rail Trail and Victoria Park.

## **2.7 IDENTIFICATION OF CURRENT ROAD NETWORK DEFICIENCIES**

### **2.7.1 Road Safety Issues**

The City of Ballarat has a Road Safety Strategy which provides the strategic framework for the community and various agencies to contribute to the road safety of all road users in Ballarat. The Strategic Plan outlines a targeted set of goals to ensure continued road safety improvement using an integrated approach of engineering, educational, encouragement and enforcement initiatives. As well as the local Road Safety Advisory Committee consisting of key stakeholders within Ballarat, the City of Ballarat is a member of the RoadSafe Central Highlands Committee whose key focus is to deliver road safety programs to address local issues. It should also be noted the City of Ballarat has been the recipient of significant state and federal funding in recent years to deliver a large number of high quality road safety improvement projects. The works have resulted in significant crash reduction potential on the local road network.

Major road safety improvement projects of note for implementation in 2006/07 are:

- construction of a roundabout at the 4-way intersection of Drummond Street and Webster Street (VicRoads);
- localised widening and construction of turning lanes on Learmonth Road (VicRoads).

## 2.7.2 Road Capacity Issues

At a strategic level, road capacity deficiencies are best identified by comparing the daily volume of vehicular traffic on a section of road with the road capacity. The capacity of a section of road is determined principally by the number of lanes provided for vehicular traffic. The generally accepted capacity of a two-lane undivided urban road is 15,000 vehicles per day.<sup>3</sup>

In assessing whether a particular urban road is “deficient”, many factors are relevant in addition to its daily traffic volume, in particular:

- the proportion of the daily volume which occurs in the peak periods;
- the proportion of the peak volume which travels in the dominant direction;
- the extent of localised widening and signalisation, etc, at key intersections;
- the frequency of on-road parking and roadside property access;
- the proportion of commercial vehicles;
- horizontal and vertical alignment;
- the special needs of buses, such as for roadside stop locations;
- the ability of road users, not only drivers but also cyclists and pedestrians, to operate safely in congested traffic in peak periods.

The “threshold” capacity of 15,000 vehicles per day for a two-lane road suitably reflects the conditions which apply in Ballarat, at least for an initial, strategic level assessment of existing deficiencies.

When assessed against the 15,000 v.p.d. capacity criterion, the existing traffic volume data in Table 2.3 show that the sections of two-lane road which are operating close to, or beyond that level are:

- Dana Street, between Doveton Street and Lydiard Street (17,500 v.p.d.) is a key CBA circulation street, as well as the sole access for the Central Square multi-storey carpark; the high volume, roadside angle parking and close spaced intersections cause congestion and delay during shopping hours;

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<sup>3</sup> According to AustRoads guide to Traffic Engineering, Part 2, Roadway Capacity, an undivided urban road has a median/inner lane capacity of 900 vehicles per hour. Allowing for two-thirds of that volume (ie 600 v.p.h.) in the counter-peak direction gives an aggregate two-lane road capacity of 1,500 v.p.h. Morning and evening peak hour volumes typically cater for 10 percent each of 24-hour volumes, so the equivalent daily capacity of such a road is 15,000 vehicles per day.

- Mair Street between Dawson Street and Princes Street; the volume of up to 16,000 v.p.d. in conjunction with some angle parking and some centre-of-road parking, close spaced controlled intersections and pedestrian activity, lead to congestion and delays during shopping peak periods;
- Main Road/Geelong Road, especially from Elsworth Street to Ballarat University (14,700 v.p.d.) where the continuous property access, limited provision of localised widening for right turning traffic, partial provision of bus stops clear of passing traffic and low-capacity intersection treatments, cause extensive delays during school and university start/finish times;
- Doveton Street (Midland Highway), especially between Webster Street and Eyre Street/Grant Street (up to 14,700 v.p.d.), where the mixture of regional through-traffic, including large trucks, roadside angle parking for adjacent shops and pedestrian crossing activity cause congestion throughout the day;
- Eyre Street/Grant Street (14,000 v.p.d.) which provides a link between the CBA and areas further south-east and south-west, especially south-east to Main Road and the growth areas of Mt Clear and Mt Helen.

In the process of investigating detailed upgrading options for the above existing deficiencies, or those revealed by forecasts of future traffic volumes, much more analysis would be undertaken. That would involve detailed site-specific characteristics such as peak hour surveys, measurements of traffic queues, congestion delays and crash histories.

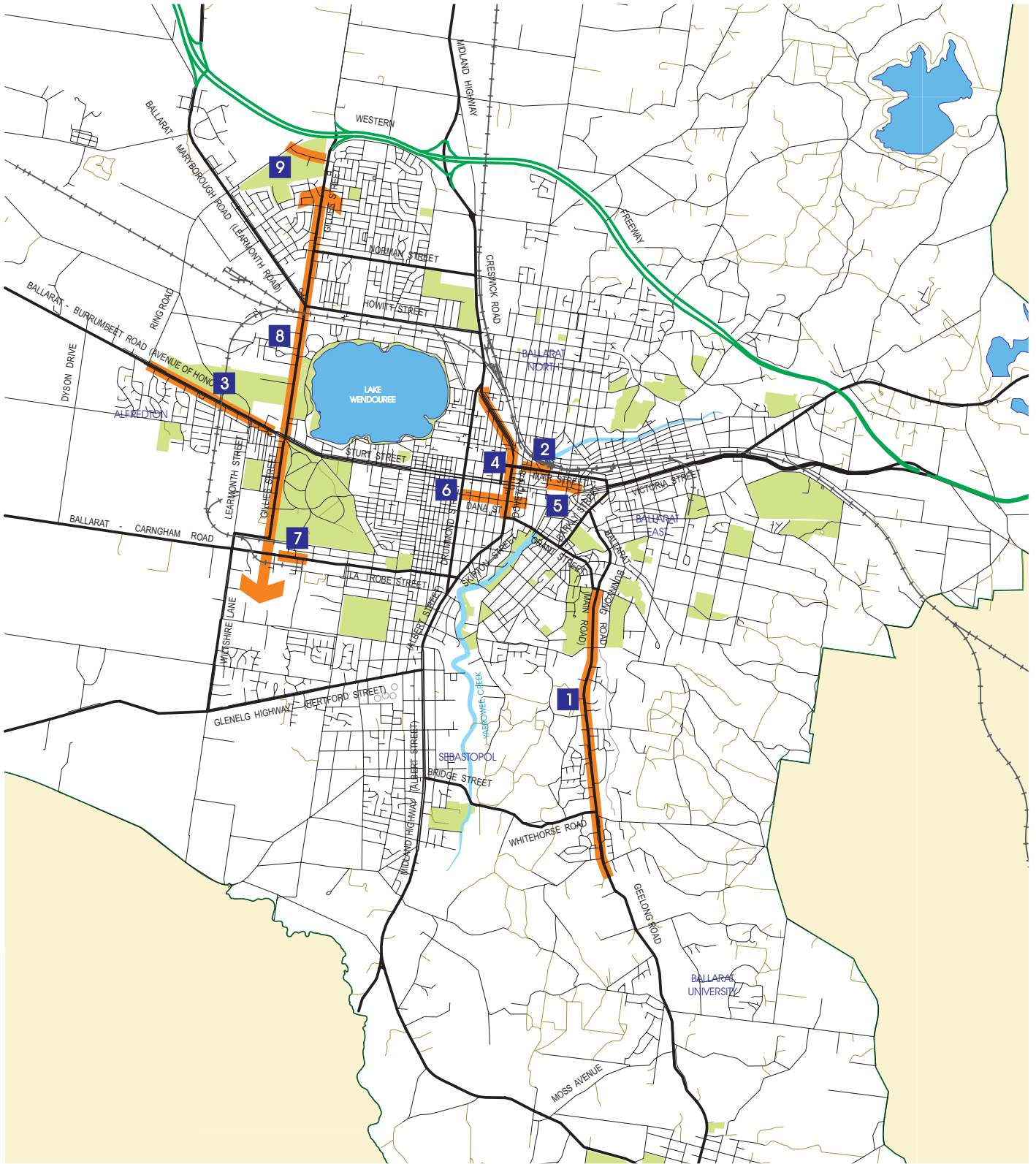
### 2.7.3 Community Perceptions and Concerns

As well as the quantitative assessment provided by volume/capacity comparisons, another important consideration in identifying deficiencies is the qualitative attitude of road users. As part of the strategy process, users of the road network in Ballarat were consulted as follows:

- a Community Survey was carried out (refer to questionnaire at Appendix A);
- a series of Stakeholder Workshops were held (refer to attendees list at Appendix B).

The consultative processes identified a series of road sections and intersections throughout Ballarat causing the greatest inconvenience and concern to those responding road users.

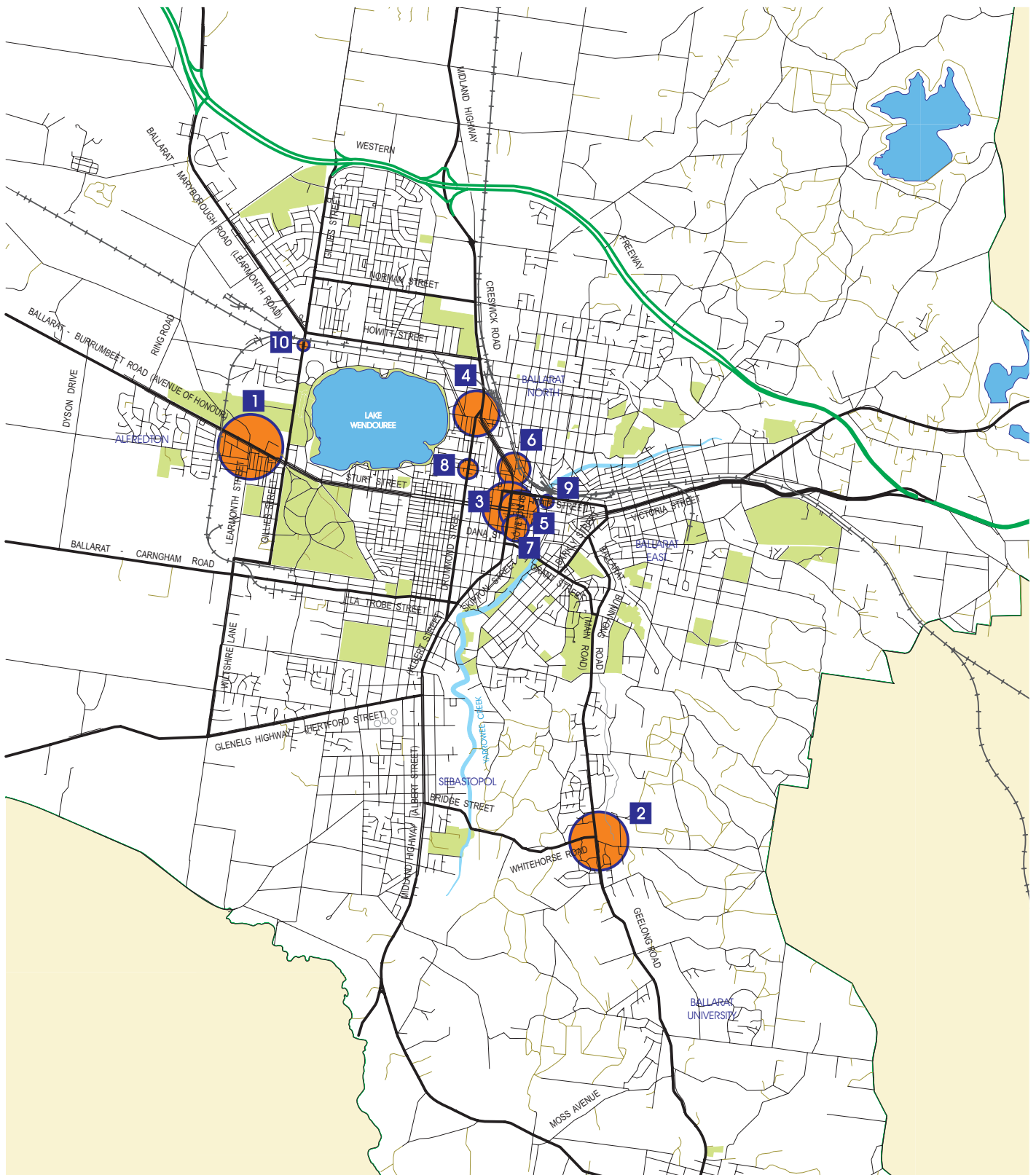
Figures 2.6 and 2.7 show the findings of those processes; they can be summarised as follows:



- LEGEND**
- 1. MAIN ROAD / GEELONG ROAD TO UNIVERSITY
  - 2. MAIR STREET THROUGH CENTRAL BUSINESS AREA
  - 3. ARCH OF VICTORY / AVENUE OF HONOUR
  - 4. DOVETON STREET / CRESWICK ROAD
  - 5. CURTIS STREET
  - 6. DANA STREET
  - 7. LATROBE STREET (SALEYARDS)
  - 8. GILLIES STREET (INEFFICIENT FOR TRUCKS)
  - 9. MCKENZIE ROAD LOAD LIMIT



**FIGURE 2.6**  
**COMMUNITY CONCERNS: ROAD / STREET SECTIONS**



**LEGEND**

- |   |   |
|---|---|
| 1. STURT STREET WEST / LEARNMOUTH STREET              | 6. CRESWICK ROAD / WEBSTER STREET                 |
| 2. GEELONG ROAD / WHITEHORSE ROAD / RECREATION ROAD   | 7. DOVETON STREET / DANA STREET                   |
| 3. DOVETON STREET / STURT STREET                      | 8. DRUMMOND STREET / WEBSTER STREET               |
| 4. CRESWICK ROAD / MACARTHUR STREET / DRUMMOND STREET | 9. STURT STREET / GREVILLE STREET / CURTIS STREET |
| 5. STURT STREET / ARMSTRONG STREET                    | 10. GILLIES STREET / GREGORY STREET               |

Size of circle reflects level of concern expressed.



1. The narrow road pavement of Main Road/Geelong Road, from the CBA out to Ballarat University, results in congestion and delays to vehicular traffic. The main reasons for this are the unrestricted access into roadside properties and the lack of opportunities for right turners to wait clear of following traffic. There is limited provision of bus stops and no on-road provision for commuter cyclists, causing further delays and danger. Restricted intersection layouts exacerbate these problems, especially in morning and afternoon commuter, university and “school” peaks. The extent of the problem is demonstrated by bus operators using Albert Street and Moss Avenue rather than Main Road/Geelong Road for travel to Ballarat University, to avoid peak period congestion and delays at the Geelong Road/Whitehorse Road/Recreation Road complex of intersections.
2. Mair Street, through the CBA, is required to play the combined roles of major road, circulation street and parking street; this causes delays to all road users. Further, the series of signalised intersections, all with pedestrian crosswalks, are congested during peak periods.
3. Learmonth Street is a convenient alternative to Gillies Street (south) for access to/from the industrial and saleyards areas of Delacombe and the new residential growth areas of Alfredton; the street is used extensively by truck traffic. The intersection with Sturt Street West is very restricted, both in pavement width and visibility, by the Arch of Victory. Further west, the pavement width of Ballarat-Burrumbeet Road is restricted by the roadside memorial trees of the Avenue of Honour.
4. Doveton Street (Midland Highway) crosses Sturt Street at a major signalised intersection. It has angle kerbside parking along both approaches, with high turnover and pedestrian crossing activity generated by the nearby Target store and other retail/commercial activity. Frequent congestion, especially in peak periods, at Sturt Street as well as the adjacent (Mair Street and Dana Street) signalised intersections, severely compromises the State Highway role of the road.
5. Curtis Street provides a one-way (eastbound) route around the northern side of Bridge Mall in the CBA, as well as being a major access route for the Big W Store. It has sharp curves at the western end, a narrow pavement, kerbside bus stops and pedestrian crossings which, in combination, cause confusion to many drivers. Similar, but lesser issues apply with Little Bridge Street (westbound) on the southern side of Bridge Mall.
6. Dana Street is the main east-west road across the southern part of the CBA. As with Mair Street, it has extensive on-street parking and closely-spaced, controlled intersections. It is also the sole access for the Central Square multi-story off-street carpark. These characteristics, together with the steep hill east of Lydiard Street, cause congestion and restrict the ability of the street to be an efficient CBA circulation route.
7. Latrobe Street, in the vicinity of Ballarat Saleyards, has a very wide road reservation, but a narrow, undivided 2-lane pavement. Informal roadside parking and uncontrolled access to frontage commercial/industrial properties cause confusion and danger to road users.

8. More generally, truck access from the south-western areas of Ballarat to the Western Freeway is restricted by narrow pavements, restricted intersection geometry and load limits. Gillies Street, between the Western Freeway and Latrobe Street is seen by truck operators as a particular problem, especially through school and shopping speed zones and at the roundabouts. The restrictive load limit on McKenzie Drive in Wendouree was an additional issue identified by stakeholders that was suggested as a major inconvenience to B-Double and High Mass vehicles entering this industrial estate for travel from and to the east (i.e. Melbourne).

The Ballarat Road Transport Strategy Project Brief listed numerous roads nominated by the Ballarat community as requiring assessment for existing and future deficiencies. The discussion in the previous paragraphs covers most of those listed roads; the remainder were considered to be of localised significance and addressed in the separate Road Hierarchy Report.

A Draft/Final Ballarat Road Transport Strategy report was placed on Public Exhibition in late 2006. Twelve submissions were received from various private and public authority stakeholders. This final report includes responses to or revisions resulting from those submissions.

## 3 STRATEGIC BASIS OF BALLARAT'S FUTURE ROAD NEEDS

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### 3.1 CONTEXT

Planning for future upgrading and extension of Ballarat's road network needs to combine four elements:

- to address and resolve the existing problems discussed in Section 2.7;
- to integrate with the proposals of the other transport-related strategies shown on Figure 1.1;
- to provide for the needs of clearly identified and quantified future growth in Ballarat's population and employment;
- to provide flexibility to accommodate possible (ie uncertain) future changes to Ballarat's land use and transport systems.

The following sections cover the last three aspects in turn.

### 3.2 VICTORIAN GOVERNMENT STRATEGIES

The key Government policies and strategies which affect development of the Ballarat road network include:

#### 1. National Highway Development Strategy

The Federal and State Government are working towards the further upgrading of the Western Highway between Melbourne and Ballarat as part of the National Highway System (AusLink), through commitments to:

- the Deer Park Bypass (linking to the Metropolitan Ring Road);
- grade-separation at Leakes Road (Rockbank);
- realignment and upgrading through Anthony's Cutting;
- upgrading to full freeway conditions from Leigh Creek to Woodmans Hill.

The highway upgrading will improve the convenience and safety of travel in the Melbourne-Ballarat corridor, to the benefit of personal and business travel (as well as freight). Within the Ballarat area, this emphasises the future importance of links to/from the Western Freeway, not only from the existing developed areas, but also from the growth areas to the west and south-east (eg Alfredton, Delacombe, Wendouree West and Canadian Valley); such links could qualify for Federal Government funding support as part of the AusLink program.



## 2. “Meeting our Transport Challenges”

In its recent Transport and Livability statement, the Victorian government made a major commitment to “... maintaining and expanding connectivity within and between regions, and providing access to affordable and appropriate transport modes.” More specifically, it committed to:

- an additional \$150 million to help to deliver first class public transport for provincial Victoria, including better regional bus and taxi services, and more night and weekend services in major regional centres;
- an additional \$2 billion to upgrade Victoria’s arterial road network, including construction of the Western Highway - Deer Park Bypass and upgrading regional arterial roads;
- a \$740 million package of improvements to boost capacity and reduce congestion on the Monash-West Gate corridor;
- new investment of \$1.1 billion in transport safety to make rail services safer and more secure, and continue to reduce the road toll;
- public transport being more accessible for people with restricted mobility, with a new program to improve access on buses and V/Line passenger services.

## 3. Growing Victoria Together

The Government’s vision for Victoria’s future including creating safer streets, growing and linking all of Victoria, promoting sustainable development, creating thriving industries, building cohesive communities, protecting the environment, promoting rights and respecting diversity.

### 4. arrive alive!

The Government’s strategy to reduce annual road deaths and serious injuries by 20 per cent by 2007. It contains a range of Safety Strategy initiatives focusing on safer road infrastructure, safer drivers and safer vehicles.

## 3.3 OTHER TRANSPORT STRATEGIES

A brief summary of the current status of the other City of Ballarat/VicRoads transport strategies, with relevance to Ballarat, is as follows:

### 1. Ballarat Road Safety Strategy.

The existing strategy was developed in 2001. The City of Ballarat was one of the first local government areas in Victoria to develop a road safety strategy. The Road Safety Strategy is being reviewed in 2006/07.

### 2. Ballarat Bicycle Strategy.

This strategy was prepared in 1999. A comprehensive network of on-road bike lanes and off-road bike parks is being developed as part of its implementation. The strategy is proposed to be reviewed in 2007/08.

### **3. CBA Traffic Management and Car Parking Strategy.**

The strategy is currently in preparation. Initial outputs confirm the main road problems as set out in Section 2.7, that is congestion on both north-south and east-west circulation routes such as Doveton Street, Mair Street, Peel Street, Dana Street and Curtis Street.

### **4. Passenger Rail Developments.**

With the recent commencement of fast rail passenger services between Melbourne and Ararat, via Ballarat, there may be an increase in the number of Ballarat residents commuting by train to work locations in Melbourne (and vice versa). This would increase the need for feeder bus services and for additional car-based park and ride facilities at Ballarat Railway Station. The Victorian Government has announced plans for a second railway station, just west of Gillies Street in Wendouree, with feeder bus and car parking facilities.

### **5. Relocation of Intermodal Freight Hub.**

The goods yard just north of Ballarat Railway Station is currently used as the local receipt and despatch depot for rail freight between Ballarat and Melbourne, as follows:

- for general freight and parcels;
- for containerised (“intermodal”) freight.

The intermodal freight sector is growing in volume, and increasingly large trucks (up to B-double size) are now used to deliver and pick-up containers. This is making the existing goods yard and its road access (directly off Lydiard Street, close to the rail passenger facilities) increasingly deficient.

The Department of Infrastructure is investigating opportunities to relocate the intermodal freight “hub” away from the Ballarat Railway Station.

If it is relocated, there will be a need for an efficient main road access system for trucks, up to B-double size, for the new intermodal freight hub.

### **6. Ballarat and Region Bus Services Review.**

This review was completed by the Department of Infrastructure in December 2005. Findings showed that the existing bus services provide well for the needs of the local and regional community with a frequent service and good coverage of urban Ballarat via the existing bus network.

The Department of Infrastructure is committed to providing improved bus services for Ballarat and its hinterland, including a new/upgraded bus terminus or number of superstops in the Ballarat CBA, to provide improved bus/rail coordination and general efficiency for passenger services with Ballarat. A move to increased frequencies or increased passenger loadings would justify:

- bus priority measures on congested routes (such as Main Road/Geelong Road), especially at intersections;
- safer and more convenient bus stop facilities and pedestrian paths/crossings for access to them.

## 7. Regional Road Transport Strategy

The City of Ballarat is a member of the Central Highlands Regional Roads Technical Committee which includes: Ballarat, Moorabool, Pyrenees, Hepburn, Golden Plains, VicRoads & Department of Infrastructure. This group has recently prepared submissions for funding under the AusLink Strategic Regional Programme. The longer term objective for the group is the development of a Central Highlands Regional Transport Strategy.

## 3.4 FUTURE LAND USE STRATEGIES

The City of Ballarat has prepared numerous strategy plans to guide the future development of Ballarat. Briefly, these comprise (refer Figure 3.1):

### 1. Ballarat West Local Structure Plan

This strategic plan envisages the extension to the west and south of the residential areas of Delacombe and Alfredton to accommodate 17,000 people by 2031 and eventually to accommodate 30,000 people, with associated retail, educational and community facilities. The plan also incorporates potential expansion of the existing industrial areas to the west. Figure 3.1 represents the Ballarat West Local Structure Plan (LSP) as it was envisaged in mid-2006.

A network of distributor roads has been planned, with substantial reliance on Ballarat-Burrumbeet and Ballarat-Carngham Road. A fully-integrated network of bicycle and pedestrian paths has also been planned.

### 2. Canadian Valley Outline Development Plan

This strategic plan covers the areas along Geelong Road, that is Canadian, Mt Clear, Mt Helen and Buninyong. It recommends limiting urban growth to land currently zoned for residential purposes, and infill development in suitable locations. The ODP report includes frequent references to the limited capacity of Geelong Road to accommodate future urban growth in Canadian Valley, but no new roads are proposed.

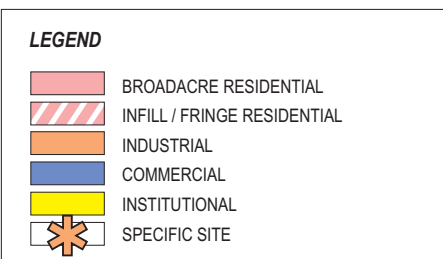
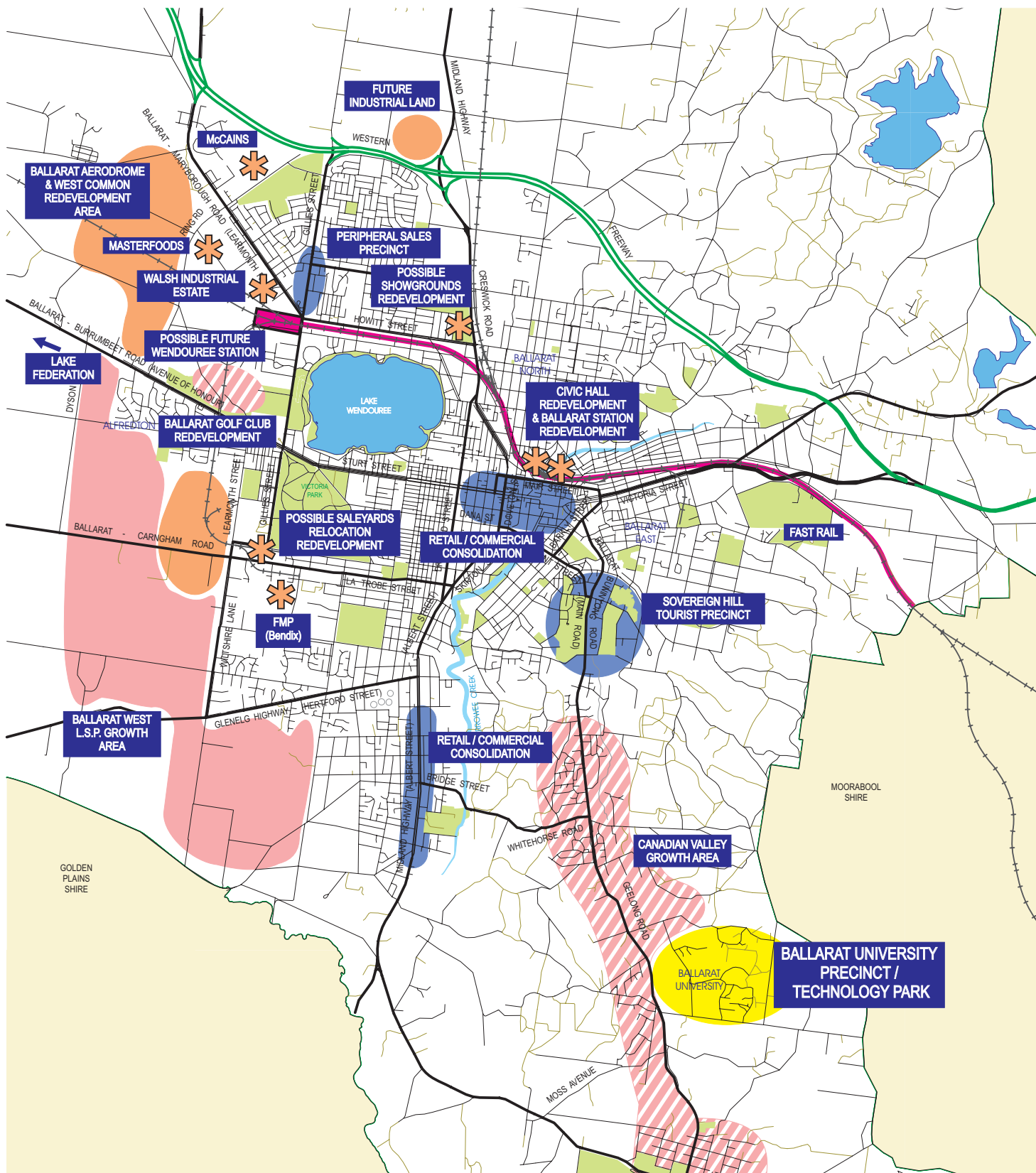
### 3. Ballarat Industrial Strategy

This strategy assesses the likely future need in Ballarat for new industrial land. It identifies the rural areas north of the Western Freeway, west of Creswick Road, as the highest priority for short-term conversion into industrial use. Longer-term proposals cover the Ballarat Aerodrome and other areas.

### 4. Ballarat Retail Development Strategy

This strategy assesses the need for future retail development in Ballarat. It recommends consolidation of the existing retail/commercial roles of the Central Business District, and Sebastopol, and the extension of the peripheral sales role of the Gillies Street area in Wendouree. It also envisages local provision of new facilities in the Ballarat West LSP growth areas.

Other strategic planning issues in progress at the time of preparing this report, having more localised or specialised coverage, include:



**FIGURE 3.1  
STRATEGIC GROWTH AREAS AND ISSUES**

- the Ballarat Aerodrome and West Common Master Plan, which addresses redevelopment options for those areas;
- the Ballarat Aerodrome Infrastructure Implementation Master Plan;
- the Ballarat Rural Areas Review, which will investigate future agricultural activity and rural living in areas surrounding Ballarat;
- the Miners Rest Outline Development Plan;
- Victoria Park Use, Management and Development Framework, and the related Precinct Outline Development Plan (the latter will assess needs and opportunities for redevelopment to provide additional community and recreational facilities);
- the proposed re-zoning of the Ballarat Golf Course to allow for residential development;
- the Ballarat Entrances Strategy, focussing on the highway “gateways” to Ballarat, especially relating to landscape and signage issues.

The above strategy plans were reviewed as part of the Ballarat Road Transport Strategy process. In particular, they were used, in combination with regional population and employment forecasts prepared by Department of Infrastructure (Victoria in Future, 2004) to prepare forecasts of population, employment and retail floorspace, throughout Ballarat, for the year 2031. These forecasts were then used as inputs to the BSTM to prepare forecasts of future traffic flows on the Ballarat road network (refer Section 4).

### 3.5 OTHER FUTURE ROAD USE INFLUENCES

In addition to the broader land use planning strategies set out above, there are a number of other possible land use developments which may influence future road use in Ballarat. These are listed below (also refer Figure 3.1):

#### 1. Relocation of Saleyards

The Ballarat Saleyards may be relocated from Delacombe to a location outside Ballarat. If that occurs, livestock transports from the surrounding region, which currently converge on Delacombe on sale days, could in future drive straight through Ballarat, or bypass it completely.

#### 2. Lake Federation

There have been various plans for development of a 3,200-lot residential development, and associated resort (including golf course and hotel) west of Alfredton. The site has recently changed hands and there are indications that the project may be re-activated. If the development does proceed, it would place major additional traffic loads on Ballarat-Burrumbeet Road, exacerbating existing problems along the Avenue of Honour/Arch of Victory corridor.

### **3. Showgrounds Redevelopment**

It is possible that the Ballarat Showgrounds, on the north-west corner of the intersection of Creswick Road and Howitt Street, will be redeveloped for some other use, possibly residential. If that occurs, and local street access is required off Creswick Road, it would accelerate the need for duplication for that section of that road.

### **4. Civic Hall Redevelopment**

The Ballarat Civic Hall, currently located north of Mair Street, is proposed for mixed use redevelopment. That could mean an increase in weekday traffic generation, exacerbating existing congestion levels along that section of Mair Street.

Each of the above developments, depending on their eventual scale and traffic intensity, could have significant effects on Ballarat's road network. It is desirable that the future network is planned with sufficient capacity, connectivity and feasibility that it can accommodate such future prospects.

## 4 FUTURE TRAVEL PATTERNS

### 4.1 FUTURE POPULATION, EMPLOYMENT AND RETAIL FLOORSPACE

The Ballarat Road Transport Strategy is required to address road needs through to year 2031. So, as well as addressing existing deficiencies of the type outlined in Section 2.7, it must address increases in traffic caused by the expected growth in the population of Ballarat and its hinterland.

As part of the strategy process, Ratio Consultants prepared forecasts of population in the various parts (Transport Zones) of Ballarat and surrounds, at 5-year intervals from 2006 to 2031. As previously indicated, the forecasts were prepared within global population forecasts for Ballarat as a whole, as previously determined by the Department of Sustainability and Environment (DSE).

Complementary forecasts were prepared for future employment and retail floorspace, at Transport Zone level, for the same future years.

The methodology and detailed results of the forecast process are set out in a separate report.

In aggregate terms, the forecasts envisage a substantial increase in Ballarat's population over the period to 2031 (32 percent). There will be even higher increases in employment (37 percent) and retail floorspace (55 percent), as Ballarat consolidates its role as the centre for work, business services and shopping within the region. The aggregate forecasts are summarised in Table 4.1.

**Table 4.1**

**Summary of Land Use Forecasts**

Parameter	Actual 2001	Forecast 2031	Percent Increase
Population	88,000	115,000	32
Employment (Jobs)	35,000	47,000	37
Retail Floorspace (square metres)	208,000	322,000	55

At the more detailed level, the growth forecasts show the following:

Population growth is expected to be concentrated in areas to the west and south-west of Ballarat, especially:

- in the residential areas of the Ballarat West Local Structure Plan (17,000 persons by 2031, with an ultimate capacity of 30,000 persons);
- in the Canadian Valley Growth Area;
- at site of the existing Ballarat Golf Club (in Alfredton);

- continued “in fill” redevelopment of the older areas around the Ballarat Central Business Area (CBA);
- continued rural-residential development in outer fringe areas of Ballarat, and in adjacent parts of Golden Plains.

**Employment growth** will occur in various areas of Ballarat, mainly:

- through retail/commercial consolidation in the Ballarat CBA (including the Civic Hall and Ballarat Station redevelopment) and at Sebastopol;
- by consolidation and expansion of Ballarat University/Technology Park;
- by possible redevelopment of the Ballarat Showgrounds;
- by further development of the Walsh Estate and Wendouree Industrial Park;
- by development of rural land (north of the Western Freeway, between Creswick Road and Forest Street and in the Ballarat West LSP areas) proposed for re-zoning to industrial use.

**Retail floorspace growth** (and associated jobs) will be concentrated in the established Ballarat CBA, but with some growth in established retail and peripheral sales areas such as Sebastopol and Wendouree. Other growth will occur in association with residential areas of the Ballarat West Local Structure Plan.

The 2031 zonal forecasts were prepared in a format suitable for use as inputs to the BSTM to forecast 2031 traffic volumes.

## 4.2 FORECASTS OF 2031 TRAFFIC

### 4.2.1 Base Network

Using the future forecasts of population, employment and retail floorspace, VicRoads used BSTM to prepare forecasts of 2031 daily traffic flows on the Ballarat road network. The initial forecasts were prepared on the basis that, apart from extensions of roads into developing areas such as Ballarat West Local Structure Plan growth areas, there would be no upgrading of the road network (ie no duplication of existing roads and no new bypass roads).

The 2031 traffic forecasts, as prepared via the BSTM, assumed a continuation of current travel patterns, that is:

- continued reliance on the private car mode for most home to work, school, shopping, personal business and social/recreational travel, with limited use of bus, cycle and walk travel modes;
- continued dominance of traffic being generated by residential, employment and retail floorspace within the developed (and developing) areas of Ballarat, with little contribution from traffic generated by the surrounding rural areas and regional towns;
- continued dominance of cars in the traffic streams along major roads and streets, with only a small proportion of trucks, except in the predominantly industrial areas to the north-west and south-west.



The major improvements which are being planned and implemented for public transport services, in and around Ballarat, will provide important accessibility improvements for many in the community; patronage of the services is likely to increase substantially. Nevertheless, even a dramatic increase in usage of buses for travel to work would only produce a slight reduction in the proportions of people using private cars. Reference to Table 2.1 shows that, for example, a five-fold increase in bus usage would only reduce the car-driver mode share from 83.5 to 80.3 percent. Accordingly, and in the strategic context in which the forecasts will be used, the BSTM assumptions are considered to be appropriate.

The initial 2031 traffic forecasts are shown graphically in Figure 4.1. When compared to the 2001 BSTM simulation volumes, there is a clear increase in volumes on major roads, particularly in northern and western areas. Table 4.2 provides a summary comparison for some of the main roads in the network.

**Table 4.2**  
**Daily Traffic Volumes at Key Locations, Base Network**  
**(from BSTM 2031 forecasts, two-way totals)**

Road/Street	Location	Vehicles Per Day <sup>4</sup> (2031 Base)
Skipton Street	At Drummond Street	31,000
Howitt Street	At Dowling Street	27,000
Gillies Street	North of Norman Street	11,000
Gillies Street	North of Sturt Street	37,000
Sturt Street	East of Gillies Street	27,000
Creswick Road	North of Webster Street	22,000
Doveton Street	South of Sturt Street	26,000
Mair Street	At Lydiard Street	22,000
Geelong Road	At Elsworth Street	19,000
Geelong Road	At Ballarat University	22,000
Hertford Street	West of Midland Hwy	24,000
Avenue of Honour	West of Gillies Street	22,000
Avenue of Honour	West of Arch of Victory	14,800
Creswick Road	North of Howitt Street	18,000
Learmonth Road	West of Gillies Street	26,000
Learmonth Road	North of Ring Road	8,000

<sup>4</sup> Further investigation using different methodology to that employed by the BSTM suggests forecast traffic volumes may be higher than stated here. The final traffic growth will depend on the type and extent of development to occur in Ballarat West and north of the Avenue of Honour, west of the Arch of Victory.



**LEGEND**

**6** THOUSANDS OF VEHICLES PER DAY  
(TWO - WAY TOTAL)

**FIGURE 4.1**  
**2031 MODELLED TRAFFIC (BASE NETWORK)**  
**TWO-WAY VOLUME IN THOUSANDS**

## 4.2.2 Implications of Doing Nothing

The traffic volume forecasts presented in Tables 2.3 and 4.2 clearly indicate that it is not acceptable to do nothing to improve Ballarat's arterial road network. For example:

- (a) Geelong Road at Ballarat University is already close to its 2-lane operating capacity (14,700 v.p.d. in 2005/6). A 49 percent increase to 22,000 v.p.d. in 2031 would substantially increase congestion, delays and associated risks to road users, especially along those sections where there is a complex mix of private car, bus, cycle and pedestrian usage.
- (b) Gillies Street north of Sturt Street is currently operating well within its 4-lane operating capacity (21,500 v.p.d. in 2005/6). However, with a base network increase to 37,000 v.p.d. by 2031, it will be close to its capacity, especially at the various roundabouts and signalised intersections. This will reduce the effectiveness of this important north-south truck route; it will also restrict access to the proposed Wendouree railway station.
- (c) Learmonth Road, west of Gillies Street, is forecast to experience an almost doubling of its traffic volumes, from 10,000 v.p.d. in 2005/6 to 26,000 v.p.d. in 2031. That would result in substantial congestion for people travelling to work along that route between inner residential areas and the Walsh, West Common and Airport Industrial Estates.
- (d) The Avenue of Honour, with 10,500 v.p.d. between Ring Road and the Arch of Victory in 2005/6, already has a poor safety record and its intersection at Learmonth Street is already congested. A volume increase to 14,800 v.p.d. in 2031 will substantially increase the risk of run-off-road crashes and the level of congestion and delay at intersections.

## 4.2.3 Improvement Networks

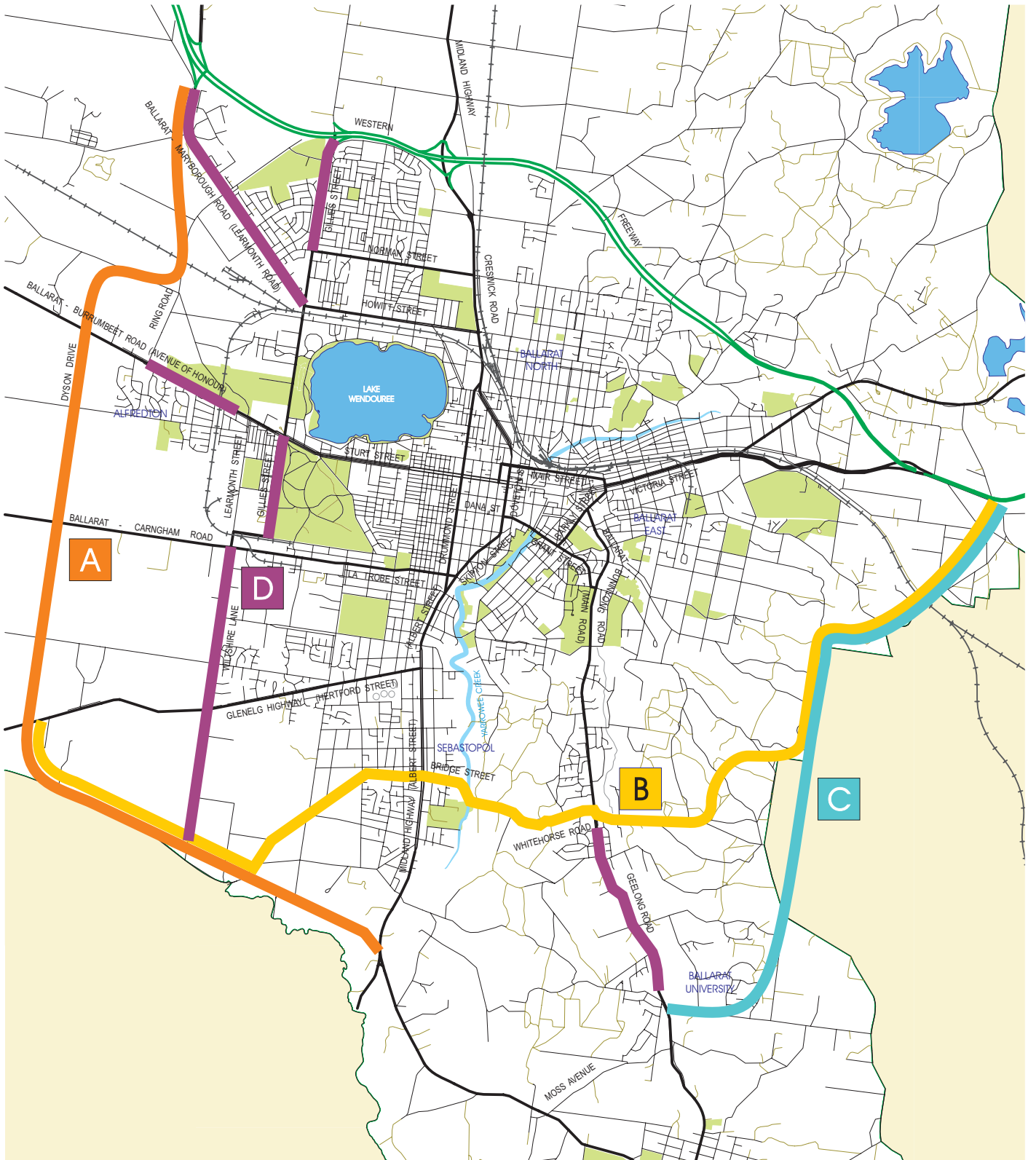
The 2031 forecasts show the need for additional road capacity to accommodate expected demand. This can be achieved in two ways:

- by providing new roads in locations which satisfy expected traffic growth;
- where existing reservations allow, by widening existing roads (eg by duplicating or widening existing pavements).

In order to test the effectiveness of various solutions to future road needs, four road improvement "options" were formulated with different geographic emphases, as follows:

**Option A** provides a new arterial route around the western outskirts of Ballarat (refer Figure 4.2). It seeks:

- to relieve the north-south demands on Gillies Street;
- to accommodate future traffic from the Ballarat West LSP growth areas;
- to provide an "outer arterial" for regional through-traffic, especially trucks, so as to take some pressure off north-south links within the CBA such as Doveton Street and Drummond Street;



- to provide a convenient alternative route for trucks between the industrial areas of Alfredton and the Western Freeway.

The modelled road was a continuous high-speed route, two lanes wide, connecting the Sunraysia Highway/Western Highway to the Midland Highway south of Sebastopol. At the northern end, the alignment would need to be responsive to future redevelopment plans of the Ballarat Aerodrome and the ecological sensitivity of Winter Swamp. Further south, it could utilise the vacant Bells Road reservation between Ross Creek Road and the Midland Highway.

**Option B** provides a new arterial route through the southern areas of Ballarat. It seeks to provide some relief to roads around the CBA and to the outer parts of Geelong Road. The modelled road was a continuous, high speed route, from Woodmans Hill, via Whitehorse Road/Bridge Road and Bells Road to the Glenelg Highway.

**Option C** provides a new arterial route around the eastern areas of Ballarat. It seeks to provide an alternative (eastern) access to the Ballarat University/Technology Park, thereby relieving Geelong Road. The modelled road was an upgrading of Yankee Flat Road and its various connections between Woodmans Hill and Geelong Road/Gear Avenue.

**Option D** involves the duplication of parts of existing arterial roads which were already heavily trafficked in 2006, namely Sturt Street West, Gillies Street (north of Norman Street and south of Sturt Street), Wiltshire Lane and Geelong Road (south). This improvement option seeks to provide sufficient capacity to accommodate future traffic needs **without** building new roads.

Each of the four options was tested, using the BSTM to forecast 2031 traffic volumes.

The only road improvement package shown by the 2031 modelling to attract a substantial volume of traffic, and as a consequence to divert a substantial amount of traffic from otherwise congested roads, was Option A (refer volumes in Figure 4.3 and Table 4.3). Specific modelling results were:

- the volume on the new Future Western Arterial was in the range 7,000 to 21,000 vehicles per day;
- the volume on Gillies Street (north) was 28,000 vehicles per day, substantially reduced from the 37,000 vehicles per day in the 2031 base network.
- the volume along the Avenue of Honour was 18,000 vehicles per day, substantially reduced from the 22,000 vehicles per day in the 2031 base network;
- the volume along Hertford Street was 20,000 vehicles per day, substantially reduced from the 24,000 vehicles per day in the 2031 base network;
- the volume along Geelong Road at Elsworth Street was 18,000 vehicles per day, slightly reduced from the 19,000 vehicles per day in the 2031 base network;

On the other hand, the Option A improvements did not achieve any traffic volume improvements, along Doveton Street, Mair Street or Learmonth Road.

**Table 4.3**  
**Daily Traffic Volumes, Option A Network**  
 (from BSTM 2031 forecasts, two-way totals)

Road/Street	Location	Vehicles Per Day	
		2031 Base	2031 Option A
Skipton Street	At Drummond Street	31,000	30,000
Howitt Street	At Dowling Street	27,000	28,000
Gillies Street	North of Norman Street	11,000	11,000
Gillies Street	South of Howitt Street	37,000	28,000
Sturt Street	East of Gillies Street	27,000	25,000
Creswick Road	North of Webster Street	22,000	21,000
Doveton Street	South of Sturt Street	26,000	26,000
Mair Street	At Lydiard Street	22,000	22,000
Geelong Road	At Elsworth Street	19,000	18,000
Geelong Road	At Ballarat University	22,000	20,000
Hertford Street	West of Midland Hwy	24,000	20,000
Avenue of Honour	West of Gillies Street	22,000	18,000
Avenue of Honour	West of Arch of Victory	14,800	12,300
Creswick Road	North of Howitt Street	18,000	16,000
Learmonth Road	West of Gillies Street	26,000	26,000
Learmonth Road	North of Ring Road	8,000	6,000

The Option A modelling was judged to produce reasonable operating conditions for the road network as a whole at year 2031, so was selected as the basis for formulating a road improvement strategy.

#### 4.2.4 Sensitivity Testing

The BSTM was used to carry out various sensitivity analyses to check the effects of some of the key modelling assumptions at 2031. These tests and their effects were as follows:

- reducing the extent of retail floorspace growth reduced some forecast traffic volumes, especially along Howitt Street (down from 25,000 to 22,000 vehicles per day);
- increasing the growth in external traffic increased some forecast traffic volumes, notably on Sturt Street West (up from 16,000 to 20,000 vehicles per day) and Creswick Road south of the Western Freeway (up from 14,000 to 17,000 vehicles per day);
- increasing the 2031 population in the Ballarat West Local Structure Plan growth areas from 17,000 to its full capacity of 30,000 persons (plus associated increases in local employment and retail floor space) lead to increases on internal roads such as Ballarat - Carngham Road (up from 6,000 to 11,000 vehicles per day).



The results of the sensitivity tests indicated that the 2031 forecasts would not be substantially affected by minor changes or inaccuracies in those key assumptions so could confidently be used for planning purposes.

A separate sensitivity test was not conducted for a major increase in public transport usage. As discussed in Section 4.2.1, even a five-fold increase in bus usage for travel to work would only cause a 3.2 percent reduction in car driver travel, so the effects of such an increase on year 2031 traffic forecasts would not be significant.

#### **4.2.5 Future Freight Flows and Truck Volumes**

As discussed in Section 2.3.3, Ballarat is not served by the national standard gauge rail network. This restricts the ability of Ballarat's major industries, both now and in future, using rail as its national freight mode. Those industries, and others in future, will therefore need to continue to rely on road freight movement.

The growth of freight flows, and resulting truck traffic, will continue to be closely linked to industrial areas in Ballarat. As previously indicated, the new industrial areas will be:

- along the Western Freeway corridor, either north of it (along Creswick Road) or south of it in the Wendouree West/Ballarat Aerodrome area;
- in the Delacombe area, including the expansion of the industrial areas of the Ballarat West LSP.

This means that growth in truck traffic to 2031 will continue the patterns identified in the 2005 survey by ATS, rather than the emergence of any new traffic patterns.

The BSTM appropriately incorporates a growth of truck traffic as a proportion of its total traffic flow forecasts for 2031.



## 5 POSSIBLE ELEMENTS OF A ROAD TRANSPORT STRATEGY

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### 5.1 CRITERIA FOR INITIAL PROJECT LIST

In selecting projects for inclusion in a strategy for Ballarat, to address road transport needs over the period to 2031, the following criteria are relevant:

- projects need to address the **existing** problems outlined in Section 2.7;
- the package of projects should support the other regional transport strategy initiatives of the City of Ballarat and VicRoads (as per Section 3.2);
- projects need to address the forecast traffic growth on major roads, as quantified by the BSTM (Section 4.2);
- where possible, the projects should be relevant to the other road use factors outlined in Section 3.4;
- projects should be capable of implementation in stages, so that scarce funding can be spread efficiently over competing works.

Bearing these factors in mind, a “long list” of projects was formulated, as set out in Table 5.1 and as shown graphically in Figure 5.1.

### 5.2 EVALUATION OF PROJECTS

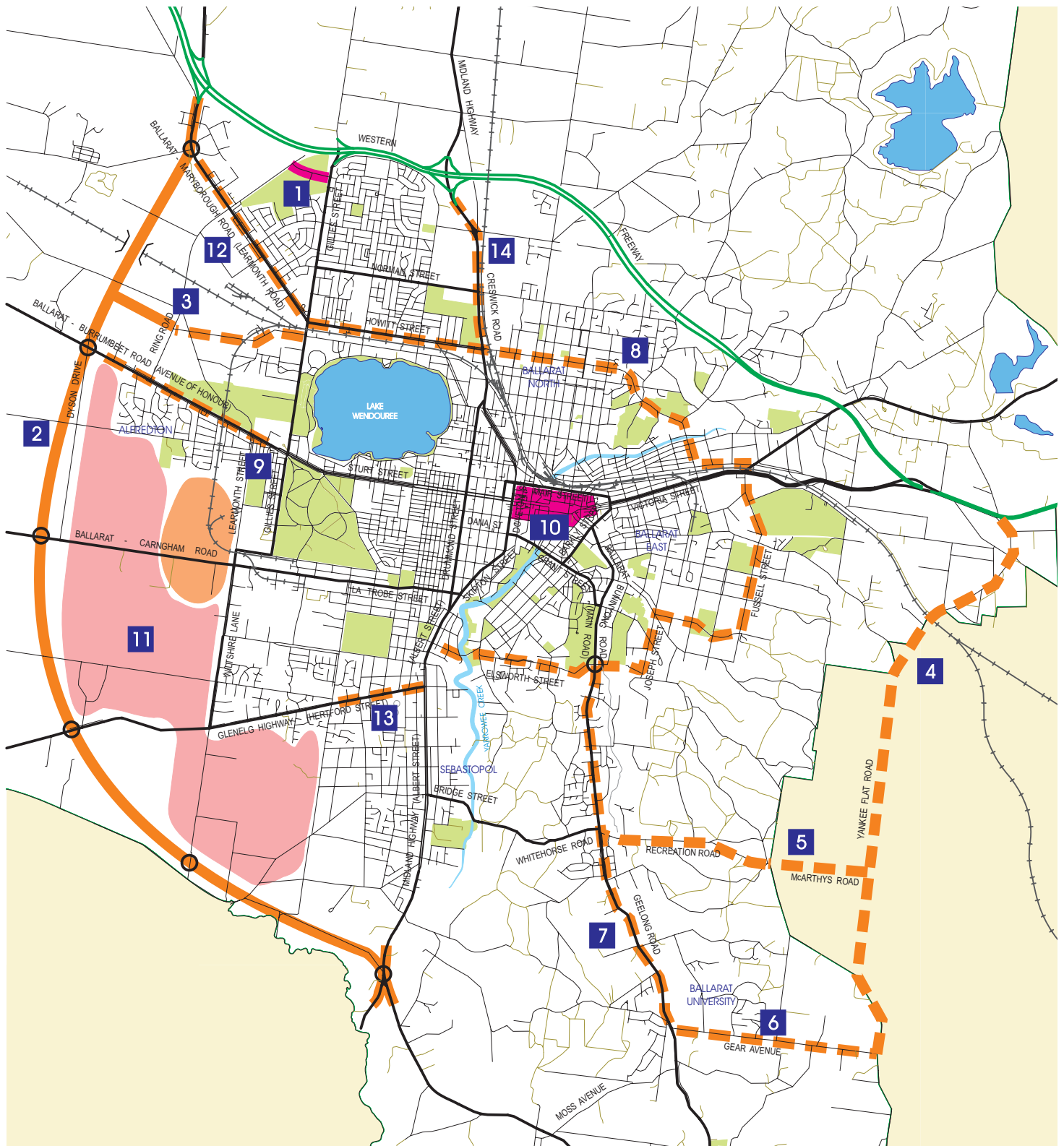
#### 5.2.1 Goal Achievement Evaluation Framework

The traditional method of evaluating road projects is to carry out detailed cost-benefit analysis, which:

- prepares functional plans in sufficient detail to provide a basis for estimating the **costs** of land acquisition, relocation of services, construction (and future maintenance) of pavements, drainage and traffic control facilities;
- computes the likely future **benefits** to road users, such as reductions in driver/occupant travel time, savings in vehicle operating costs and savings in road crash costs.

If the “net present value” of benefits minus costs is positive, or if the “benefit/cost” ratio exceeds unity, then the project is worth implementing. Competing road projects can then be ranked against one another (and against other claims on public funding such as schools and hospitals) on the basis of their cost-benefit characteristics.

This traditional evaluation approach is increasingly seen as over-emphasising the dollar-value economic aspects of road projects, and placing too little emphasis on the (less quantifiable) social and environmental aspects. Indeed, most public authorities are now required to assess proposed expenditure from an Ecologically Sustainable Development (ESD) perspective, using “triple bottom line” accounting, (that is considering the social and environmental “bottom lines”, as well as the economic one).



**LEGEND**

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>1. MCKENZIE DRIVE INCREASE OF MASS LIMIT FOR B-DOUBLES</li> <li>2. FUTURE WESTERN ARTERIAL FROM SUNRAYSA HIGHWAY TO MIDLAND HIGHWAY SOUTH OF SEBASTOPOL (INCLUDING NEW RAILWAY OVERPASS)</li> <li>3. GREGORY STREET WEST LINK, ACROSS RING ROAD TO FUTURE WESTERN ARTERIAL</li> <li>4. YANKEE FLAT UPGRADE OF THROUGH-ROUTE INTERSECTIONS</li> <li>5. RECREATION ROAD EXTENSION TO YANKEE FLAT ROAD</li> <li>6. GEAR AVENUE UPGRADE TO YANKEE FLAT ROAD</li> </ul> | <ul style="list-style-type: none"> <li>7. GEELONG ROAD UPGRADE INCLUDING WHITEHORSE ROAD / RECREATION ROAD INTERSECTION</li> <li>8. INNER LOOP VIA FUSSELL STREET</li> <li>9. AVENUE OF HONOUR / LEARMONTH STREET</li> <li>10. BALLARAT C.B.A. STREET NETWORK UPGRADE</li> <li>11. BALLARAT WEST LSP ROADS</li> <li>12. LEARMONTH ROAD UPGRADE</li> <li>13. HERTFORD STREET UPGRADE</li> <li>14. CRESWICK ROAD UPGRADE</li> </ul> |
|---|---|

- JUNCTION UPGRADE
- NEW ROAD
- UPGRADED ROAD
- TRAFFIC MANAGEMENT
- NEW OR EXTENDED LOCAL ROADS



**FIGURE 5.1 MAJOR ROAD NETWORK UPGRADE OPTIONS**

**Table 5.1**  
**List of Potential Projects**

Project	Purpose
1. McKenzie Drive increase of mass limit for B-doubles	To allow B-double trucks servicing Masterfoods, McCains and other industries to use this link between Ring Road and Gillies Street/ Western Freeway, rather than the double-back route via Learmonth Road.
2. Future Western Arterial from Learmonth Road to Midland Highway south of Sebastopol	To supplement the north-south truck route along Gillies Street/Wiltshire Lane and to provide a basis for future local access in the Ballarat West L.S.P. growth areas. Also to provide an alternative route for car and truck through-traffic along the Midland Highway (Doveton Street) through the CBA, and to assist future industrial development in the Ballarat Airport area.
3. Gregory Street West Link, across Ring Road to Future Western Arterial	<p>To link Gillies Street to Future Western Arterial, serving adjacent industries ,Toll transport depot and complement the capacity requirements of Learmonth Road to service the Walsh Industrial Estate.</p> <p>Traffic management at the Gillies Street end would need to prevent through-traffic along the local/residential section of Gregory Street East.</p> <p>To assist regional access to proposed railway station at Wendouree.</p>
4. Yankee Flat upgrade of through-route intersections	To provide alternate access to Ballarat University/Technology Park, both from Melbourne and East Ballarat and to relieve congestion on Main Road/Geelong Road.
5. Recreation Road extension to Yankee Flat Road	To provide east-west link between Yankee Flat Road and Whitehorse Road for local access and through-traffic, utilising Recreation Road and McCarthys Road (Moorabool Shire).
6. Gear Avenue upgrade to Yankee Flat Road	To complement Yankee Flat upgrade for Ballarat University access.
7. Geelong Road upgrade including Whitehorse Road/Recreation Road intersection	To address existing traffic congestion and associated problems for buses, cyclists and pedestrians. Also to cater for growth in traffic serving Canadian Valley, including Ballarat University and Buninyong.

Project	Purpose
8. Inner loop via Fussell Street	To provide a continuous route north, east and south of CBA, linking the radial arterial roads and highways, utilising available capacity along Howitt Street/Chisholm Street, Fussell Street, Spencer Street, Joseph Street and Elsworth Street. To provide for local circumferential trips by cars and light commercial vehicles, so as to allow CBA streets to be focussed on local access/circulation roles.
9. Avenue of Honour Upgrade	To provide additional capacity, initially at the Learmonth Street and Ring Road intersections, to address existing congestion and traffic growth from Ballarat West LSP and north-west industrial areas (still needed even after Future Western Arterial is constructed). Also to address on-going safety problems with lack of roadside “clear zones”.
10. Ballarat CBA Street Network Upgrade	To resolve existing congestion issues for cars, trucks and buses, and to assist safety for cyclists and pedestrians.
11. Ballarat West L.S.P Roads	To ensure suitable and timely provision of new or upgraded roads, with link/collector roads to be planned and designed well in advance of need, so that funding can be provided by a Development Contribution Plan
12. Learmonth Road Upgrade	To accommodate major growth in traffic volume (forecast 26,000 v.p.d. in 2031 between Gillies Street and Ring Road).
13. Hertford Road Upgrade (Eastern End)	To accommodate major growth in traffic volume (forecast 24,000 v.p.d. in 2031 without Future Western Arterial, 20,000 v.p.d. with Future Western Arterial).
14. Creswick Road Upgrade	To accommodate forecast traffic growth (up to 18,000 v.p.d. in 2031), especially if showgrounds development requires local street access off Creswick Road. Pavement and roadside upgrading would contribute to the Ballarat Entrances Strategy’s visual and functional objectives.

A convenient way of applying this broad-based evaluation approach is to use the Goal Achievement Method (GAM). This process involves:

- identifying a set of broad objectives and giving them a relative weighting;
- for each objective, identifying a set of criteria against which achievement (of that objective) can be gauged; those criteria are also weighted;
- assessing competing projects against the detailed criteria, resulting in a numerical score for each project;
- ranking the projects by their scores.

For the Ballarat Road Transport Strategy, a GAM evaluation framework was established through a combination of:

- experience of Ratio Consultants in other regional road transport planning contexts;
- feedback received during the Ballarat Community Survey and Stakeholder Consultation process;
- reference to a similar process recently completed for the Ballarat Regional Transport Technical Group.

The resulting set of objectives, criteria and weightings are shown in Table 5.2.

Each of the projects was then given a score out of 10 in respect of each of the criteria, on the basis that:

- the project which contributed most to achieving an objective was given 10,
- the project which contributed least to achieving an objective was given 0,
- other projects were given relative scores in between 0 and 10.

The scores for each project, for each criteria were multiplied by the criteria weightings and aggregate scores were derived for each project (refer Appendix C).

### 5.3 EVALUATION RESULTS

The projects which clearly had the **highest scores**, and which therefore were judged to be the most worthwhile for implementation, were those which made substantial contributions to most (or all) of the objectives, namely (in order of declining score/merit);

- Ballarat CBA Street Network Upgrade;
- Future Western Arterial;
- Main Road/Geelong Road upgrade.

Projects with intermediate scores were those which were relevant to only one or two objectives, namely:

- Ballarat West Local Structure Plan road network;
- Inner urban area loop via Fussell Street;
- Avenue of Honour upgrade;

**Table 5.2**  
**Goal Achievement Matrix Evaluation Framework**

<b>Objective</b>	<b>Criteria</b>	<b>Weighting</b>
<b>Economic Issues</b> <b>50%</b>	Improve the road network so that the delay of truck/freight transport can be minimised.	<b>12</b>
	Build new roads and/or upgrade existing roads to accommodate the major growth areas of Ballarat	<b>12</b>
	Improve roads in the north/south direction across the CBA, so that traffic congestion is reduced.	<b>8</b>
	Improve roads in the east/west direction across the CBA, so that traffic congestion is reduced.	<b>7</b>
	Improve the road network to provide improved efficiency for public transport.	<b>6</b>
	Improve the road network so that it is easier for tourists to find their way and reach their destination.	<b>5</b>
<b>Road Safety</b> <b>20%</b>	Modify identified accident “black spots” to improve road safety.	<b>8</b>
	Plan future roads so that the safety of vulnerable road users is taken into account.	<b>6</b>
	Manage traffic movements at existing intersections to improve safety.	<b>6</b>
<b>Social</b> <b>15%</b>	Maintain/improve accessibility by all transport modes including walking and cycling.	<b>7</b>
	Minimise negative traffic /amenity impacts on existing roads, especially in residential areas.	<b>6</b>
	Plan new road construction so that private property disruption is minimised.	<b>2</b>
<b>Environmental Issues</b> <b>15%</b>	Manage roads so that traffic noise, fuel consumption and exhaust emissions are minimised.	<b>5</b>
	Direct heavy/through traffic away from heritage and retail/commercial precincts.	<b>5</b>
	Improve visual quality of streets/roads, especially at Ballarat’s main “gateways” to the city.	<b>3</b>
	For new roads, minimise impact on areas of important natural systems/ecology.	<b>2</b>
		<b>100</b>

- McKenzie Drive increase of mass limits;
- Gregory Street West link to Ring Road;
- Learmonth Road upgrade;
- Hertford Road upgrade (east end);
- Creswick Road upgrade (Howitt Street to Western Freeway).

The lowest score was achieved by the upgrading Yankee Flat Road and its linkages to Geelong Road via Recreation Road and Gear Avenue. The implication was that, providing suitable upgrading of Main Road/Geelong Road proceeds, these projects would deliver few benefits not available with the existing road network. Yankee Flat Road does provide a valuable strategic alternative to Geelong Road for some vehicular trips so progressive improvements, particularly to upgrade traffic management at intersections and road user safety generally, should continue. The City of Ballarat and Moorabool Shire have jointly sought Federal Government funding for intersection upgrading and roadside hazard management along Yankee Flat Road, so there is a prospect of improvement occurring there independent of this Road Transport Strategy.

## 6 RECOMMENDED STRATEGY AND ITS IMPLEMENTATION

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### 6.1 RECOMMENDED PROJECTS

The Ballarat Road Transport Strategy should comprise the high and medium ranking projects set out in Section 5.3.

Each project has a different process for its implementation, as follows:

#### 1. Ballarat CBA Street Network Upgrade

With a 20 percent increase forecast for traffic volumes along Mair Street in 2031, on top of an existing situation which already exhibits congestion and delays, there would be a need to upgrade the capacity of this key CBA access/circulation street and east-west through-traffic route (refer Figure 6.1). The details of upgrading proposals will be developed by the CBA Traffic Management and Car Parking Study, but could include a mixture of:

- revised on-street parking and traffic lane management (with extra off-street parking to be provided);
- improved provision for pedestrians to cross safely at intersections and mid-block;
- improved geometry of signalised intersections;
- coordination of traffic signal timings to optimise traffic flow.

Similar, but more localised upgrading will be required:

- for Dana Street, between Doveton Street and Lydiard Street, as part of the circulation system around the CBA;
- for Eyre Street, to provide an east-west through-traffic connection to Grant Street, south of the CBA.

With a 25 percent increase in traffic in 2031, Doveton Street will also require upgrading, so that it can suitably play its triple role of (refer Figure 6.1):

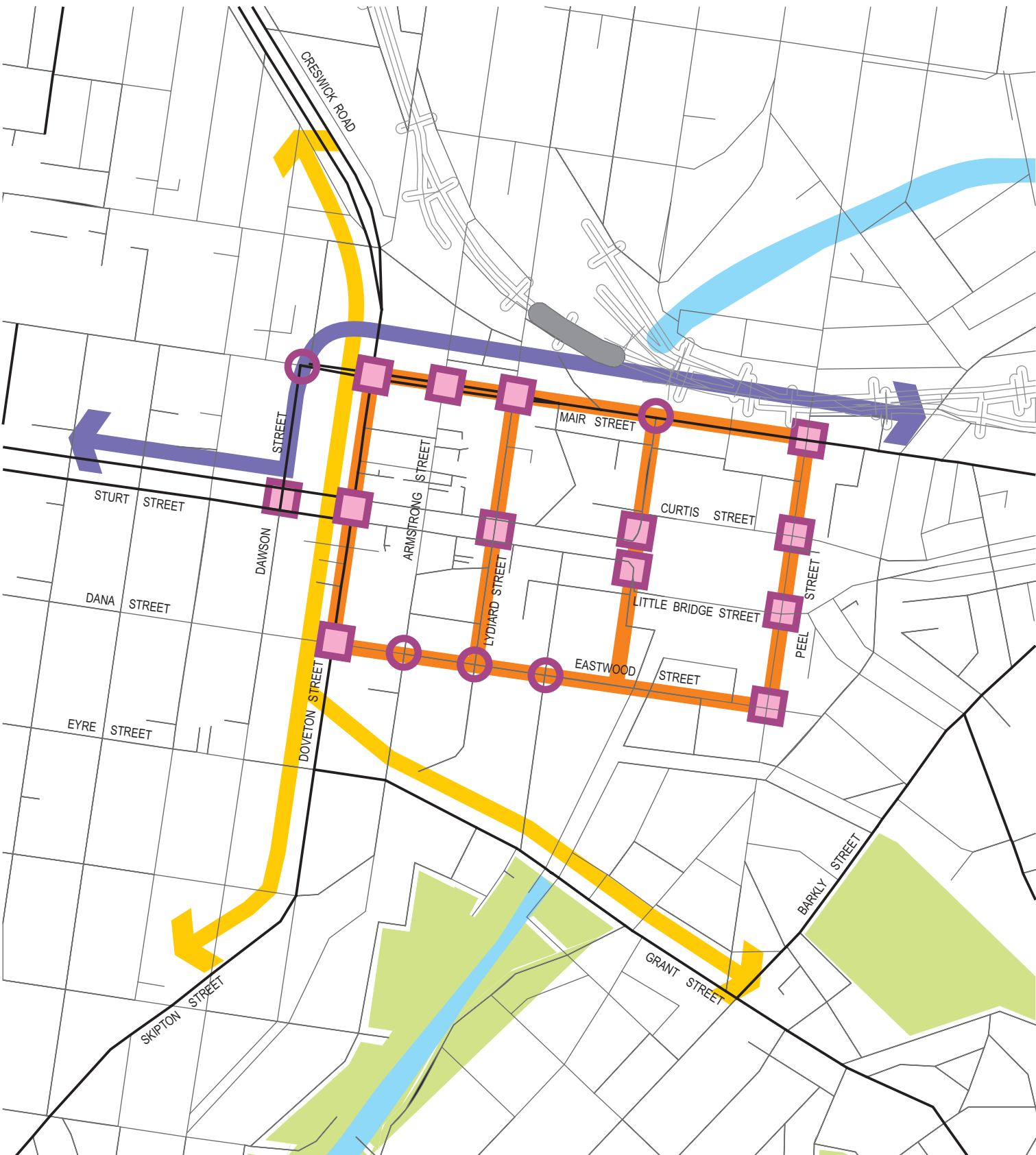
- regional highway route for long-distance through-traffic (including large trucks);
- primary north-south urban arterial road;
- key north-south link in the CBA circulation system.

As with Mair Street, revised on-street parking management, pedestrian facilities and intersection capacity/control will be the key upgrade elements for Doveton Street.

Figure 6.1 shows a proposed CBA access and circulation system comprising:

- Mair Street and Dana Street/Eastwood Street as the east-west elements;
- Doveton Street, Lydiard Street and Peel Street as the north-south elements to complement the recent opening of Grenville Street.





**LEGEND**






-  PROMOTE CBA ACCESS AND CIRCULATION SYSTEM
-  EXISTING INTERSECTION SIGNALS
-  EXISTING ROUNDABOUT
-  SUPPLEMENT NORTH / SOUTH THROUGH CAPACITY
-  SUPPLEMENT EAST / WEST THROUGH CAPACITY



FIGURE 6.1  
CBA ROAD NETWORK UPGRADE

Promoting this system for general traffic access and circulation will take pressure off the internal streets, such as Sturt Street, Curtis Street and Little Bridge Street, allowing those to play a more important role for public transport, carpark access, cyclists and pedestrians.

Without a specific upgrading proposal, it is difficult to provide a cost estimate, but there is likely to be a need for substantial reconstruction and/or modification of several kilometres of existing road and associated intersections; a budget figure of \$5 to \$10 million would be appropriate.

## 2. Future Western Arterial

A preliminary benefit/cost analysis shows that constructing a continuous arterial road around the western edge of Ballarat would be worthwhile by 2031 (refer Appendix D which shows a cost in the range \$50 million and benefit/cost ratio of 2.0). However, in the immediate future, full construction would be difficult to justify and a staged approach would be more relevant. Initial staging actions would comprise:

- planning investigations to identify opportunities (such as the unused Bells Road reservation) and the constraints such as the railway line, Ballarat Aerodrome and Winter Swamp (refer Figure 6.2);
- a detailed benefit/cost evaluation, incorporating more detailed traffic forecasts (including peak hour analysis) and costs based on preliminary functional plans;
- identifying and establishing a Public Acquisition Overlay, so that a corridor can be protected and eventually acquired (with ultimate forecasts showing volumes over 21,000 v.p.d., a corridor at least 40 metres wide would be desirable, to allow initial construction of a two-lane access-controlled road, with scope for later duplication; in areas of frontage development, frontage/service roads would also be required);
- identification of an interim route which could deliver some of the functional benefits at low cost, especially for trucks.

In relation to staging options, some preliminary traffic forecasts were prepared for an “interim” Future Western Arterial, utilising upgraded sections of existing roads; as shown on Figure 6.2, that could include existing sections of Ring Road (and its existing railway level crossing), Avenue of Honour, Learmonth Street, Wiltshire Lane and Bells Road (existing road plus new link). The forecasts are discussed in detail in Appendix E. The forecasts show that existing roads **could** deliver substantial road use benefits, but that road duplication and intersection works would be required along the interim route to achieve sufficient traffic capacity. More detailed analysis of staging options would form an important component of planning investigations for the Future Western Arterial.

The disused railway reserve has an alignment which directly connects the Avenue of Honour to Wiltshire Lane, so has some potential as an interim arterial route. However, with existing residential allotments adjoining it on both sides, it is not considered appropriate for construction of a major road (either short or long term). If used as a transport link at all, pedestrian and cycle modes would be more appropriate.

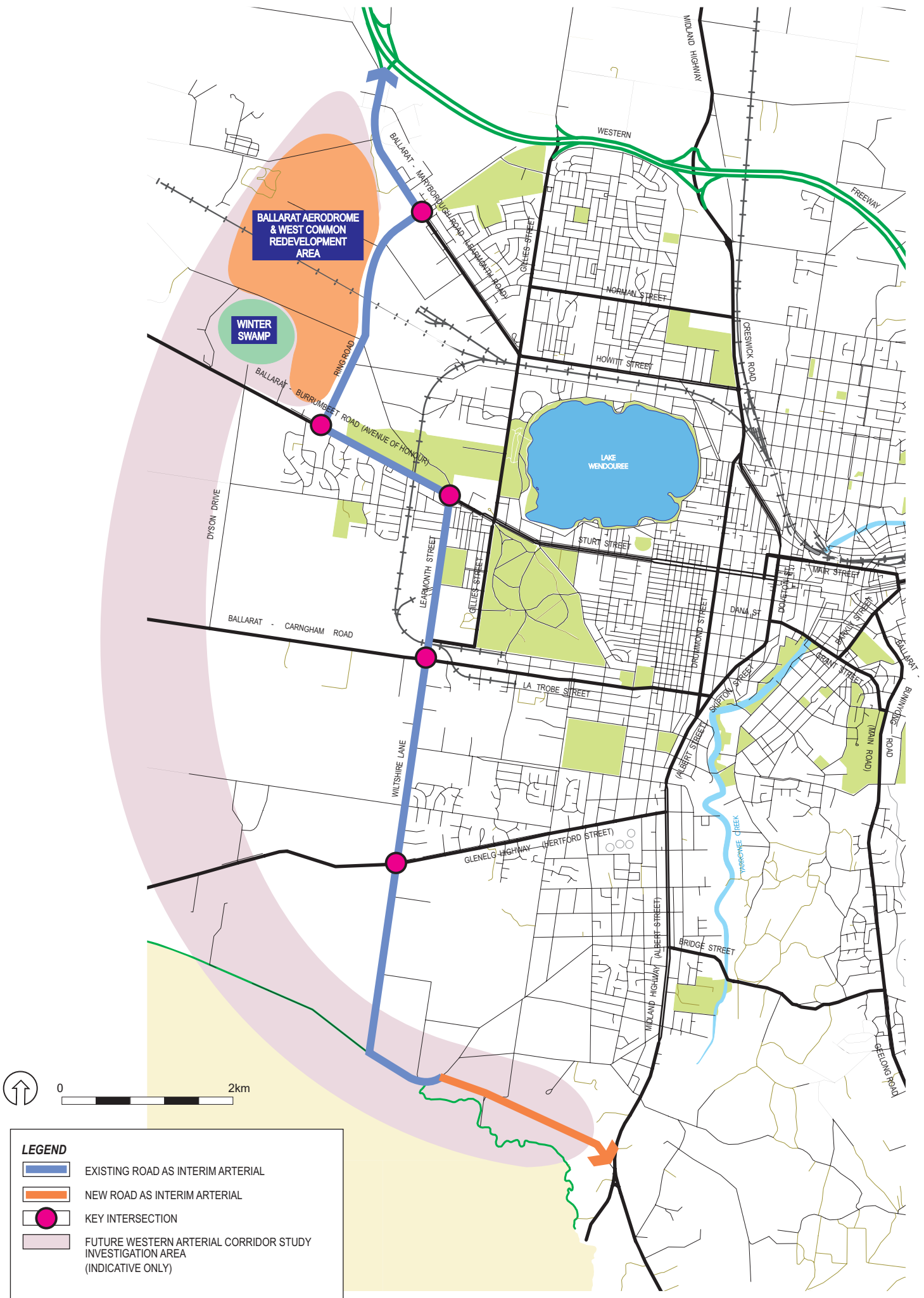


FIGURE 6.2  
**FUTURE WESTERN ARTERIAL STAGING**

### 3. Main Road/Geelong Road Upgrade

The narrow reservation of Main Road/Geelong Road provides no opportunities to duplicate the existing pavement, while continuous frontage development and/or dense roadside vegetation means that extensive reservation widening would be destructive and expensive. With the forecast volume in 2031 being “only” 22,000 v.p.d., it is likely that localised widening to assist right turns into frontage properties, plus extra widening at intersections, would be sufficient to cater for long-term future needs. The best approach would be to carry out a detailed traffic management review of the whole route (i.e. from the CBA to Gear Avenue) to formulate a plan to optimise the route within these restrictions. The review would establish:

- road reservation and pavement widths;
- roadside drainage and footpath details;
- kerbside parking restrictions;
- frontage land use and access;
- peak and off peak traffic volumes at all major intersections;
- peak and off peak travel times;
- bus routes, stop locations and delay points;
- provision for cyclists and pedestrians along and across the route;
- locations, frequencies and severities of reported crashes.

This information would provide the basis for systematic analysis of existing problems and opportunities. It is likely that the result would be a package of improvement works including (refer Figures 6.3):

- widening of the whole section from Elsworth Street to Whitehorse Road, providing one extra lane which could be used for alternating right-turn storage, painted central median and occasional raised central median refuges for crossing pedestrians;
- selective widening of the section from Whitehorse Road to Gear Avenue, subject to roadside vegetation constraints;
- selective additional pavement widening, especially on approaches to key intersections such as Elsworth Street and Whitehorse Road/Recreation Road;
- upgraded traffic management at key intersections (in particular Whitehorse Road/Recreation Road);
- upgrading of bus stops, to ensure that stopped buses can be clear of passing traffic and that safe and convenient passenger access is available;
- full construction of kerbs and footpaths and rationalisation of kerbside parking controls, possibly including parking bans at key locations in peak periods to assist total capacity or to provide priority for buses;
- resolution of bicycle usage along the road (either on or off the road).

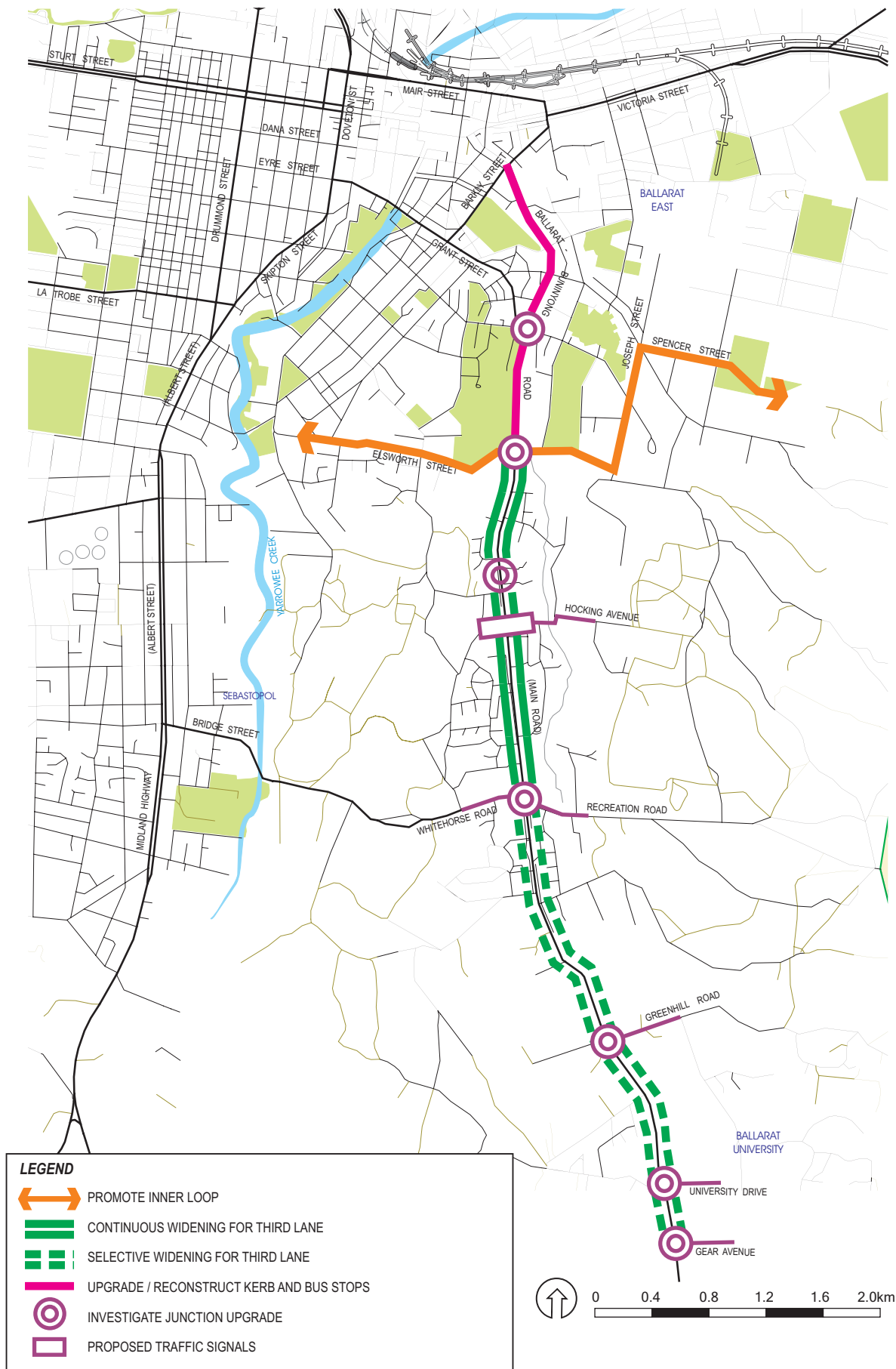


FIGURE 6.3  
**MAIN ROAD / GEELONG ROAD UPGRADE**

Between Barkly Street and Elsworth Street, the “Inner Loop” should be promoted to divert some traffic away from Main Road/Geelong Road. On that basis, and assuming widening of about 5.5 kilometres of road and major re-alignment and reconstruction of one major intersection, a realistic budget would be about \$10-15 million.

#### **4. Ballarat West Local Structure Plan Roads**

The City of Ballarat has commissioned a separate study to determine the road needs of the Ballarat West LSP growth areas. This study will identify the impacts of LSP development on arterial roads; it will also identify local road needs in sufficient detail to allow their planning and design, and to have their funding to be incorporated into a Development Contribution Plan.

It will be necessary for there to be a close matching of local and arterial road planning so that access is delivered when and where necessary. For example, local roads in Delacombe and Alfredton will need to connect with arterial roads such as Gillies Street, but closely-spaced connections should **not** be permitted with a Future Western Arterial. Also, planning arterial roads to meet VicRoads Access Management Policy will assist in maximising their long term operational effectiveness.

#### **5. Inner Loop via Fussell Street**

This project would utilise a sequence of existing roads which are currently very lightly-trafficked, to provide an inner loop route around the north-east-south part of the CBA between the radial arterial roads and highways. This would relieve the inner parts of Main Road by directing some northbound traffic:

- to the west (and north) along Elsworth Street;
- to the east (and north) along Elsworth/Joseph/Spencer and Fussell Streets.

The loop would connect under the railway line into Scott Parade and then along the underutilised Chisholm Street to Howitt Street.

Over most of the route, priority objectives could be achieved with line-marking and signage, but safety considerations suggest new roundabouts at:

- Joseph Street/Spencer Street/Clayton Street (complex intersection);
- Elsworth Street/Brittain Street (cross intersection on crest).

Ultimately, and depending on traffic usage, widening of Spencer Street (between Fussell Street and Richards Street) and reverse priority treatments at Fussell Street/Spencer Street, Elsworth Street/Joseph Street and Elsworth Street/Prest Street would be justified. An ultimate construction cost of \$4 to \$6 million would apply.

## **6 Avenue of Honour/Learmonth Street**

Plans are being prepared for the duplication of the road through the Arch of Victory and along the Avenue of Honour, incorporating access needs for the re-development at the Ballarat Golf Club. Those plans seek to resolve capacity and safety problems, consistent with the heritage requirements of the avenue of memorial trees. Depending on the final design and the extent of works (ie just to Ring Road or further) about three kilometres of duplication could be involved, plus two or three major intersections; an appropriate budget estimate is \$10 to \$15 million.

As an interim measure, a site inspection indicates that linemarking of the southern approach of this intersection into two lanes, so that delayed right turners can allow left turners to proceed, would substantially improve the capacity and safety of this intersection.

## **7. McKenzie Drive Load Limit Increase**

McKenzie Drive is a local (Council) road which links the Ring Road to Gillies Street. It is not a designated B-double route, at least partly because of its proximity to Yuille Primary School. With schools having access needs only for limited times, namely from 8-9am and 3-4pm, Monday to Friday during school term, there is no apparent reason why the road, and its intersections with Ring Road and Gillies Street, should not be used by B-doubles at all other times. Local industries such as McCains would be readily able to arrange their transport requirements to avoid those restricted times. It is expected that the school will relocate within the next two years, so a long-term solution should be achievable.

## **8. Gregory Street West Link to Ring Road**

Apart from a short section across a railway spur line, Gregory Street West is fully constructed between Gillies Street and Ring Road. The railway line is no longer operational, which means that the Gregory Street West connection could be constructed without raising the road safety issues associated with active railway level crossings. Full construction of the "missing link" in Gregory Street West would provide a convenient local link between Gillies Street and Ring Road. It would also assist access for local industries, and with bus and car access to the proposed Wendouree railway station.

There would, however, be a need to resolve the staggered T-junctions (Gregory Street East and West) at Gillies Street. The eastern part of Gregory Street has extensive residential frontage. It is therefore important that the opening of the western link is planned so as to prevent through traffic crossing Gillies Street between the two parts if the eastern part is to remain a local/access street environment. An intersection treatment on Gillies Street which allows full turning movements at Gregory Street West, but only partial movements at Gregory Street East, will be required.

To construct the short section of road across the railway line, plus modifications to the Gillies Street/Gregory Street East intersection to prevent cross-traffic infiltration, the likely cost would be \$1 to \$2 million.

**9. Learmonth Road Upgrade, and**

**10. Hertford Road Upgrade, and**

**11. Creswick Road Upgrade**

Traffic volumes on these three roads do not currently justify major upgrading (such as duplication). However, if the development of Ballarat occurs as forecast, traffic volumes will justify such upgrading by 2031. Each of these duplication projects has a scope similar to that of the Avenue of Honour duplication (ie about three kilometres of new two-lane roadway in an existing reservation, with two or three intersections) so a similar budget costing of \$10 to \$15 million would apply.

In all cases, adequate land reservations are in place, so the required implementation actions are:

- to prepare and approve plans for upgrading works;
- to monitor traffic volumes, especially growth trends, so that the required timing of upgrading works can be accurately predicted.

**12. Yankee Flat Road Upgrade**

Yankee Flat Road provides an important local route, both within the City of Ballarat and Moorabool Shire; it also provides a strategic role, supplementing Main Road/Geelong Road for eastern access to:-

- The Ballarat University Precinct and Technology Park;
- The other Canadian Valley growth areas.

The upgrading project would concentrate on intersection improvements to increase capacity and safety, and roadside hazard management/improved delineation generally along the route.

Table 6.1 provides a summary of the likely benefits of each project, estimated construction cost and actions to be taken initially to implement each of them.

## **6.2 PROGRAM FOR STRATEGY IMPLEMENTATION**

### **6.2.1 High Priority Strategic Actions**

The traffic forecasting and analysis described in Sections 4 and 5 focus on 2031. However, in many cases, action is required (and can be taken) now to resolve existing problems and to ensure orderly planning of future road needs. This is particularly the case with:

- the Ballarat CBA Street Network Upgrade (details to be addressed via the current Traffic Management and Car Parking Study);
- Main Road/Geelong Road Upgrade;
- McKenzie Drive Load Limit Increase;
- Learmonth Street/Avenue of Honour interim intersection improvements.



Table 6.1

## Ballarat Road Transport Strategy

## Summary of Recommended Projects and Initial Actions for Implementation

	Project	Benefits	Cost (Indicative Only)	Initial Actions for Implementation
1.	Ballarat CBA Street Network Upgrade (Mair Street & Dana Street)	<ul style="list-style-type: none"> <li>▪ Relieve CBA traffic congestion</li> <li>▪ Improve pedestrian safety</li> <li>▪ Improve bus operations</li> <li>▪ Improve visual amenity</li> </ul>	\$5.0-10.0 million	Develop detailed proposals via CBA Traffic Management and Car Parking Strategy
2.	Future Western Arterial	<ul style="list-style-type: none"> <li>▪ Provide alternative north-south route through Ballarat</li> <li>▪ Main access for Ballarat West existing and proposed (LSP) growth</li> <li>▪ Improve truck access to/from Western Freeway</li> </ul>	\$50.0 plus million	Planning investigations to identify future arterial corridor and interim/staging options.
3.	Main Road/Geelong Road Upgrade (Elsworth Street to Ballarat University)	<ul style="list-style-type: none"> <li>▪ Relieve peak period congestion</li> <li>▪ Assist growth in Canadian Valley</li> <li>▪ Improve bus operations</li> <li>▪ Assist cyclists and pedestrian movements</li> </ul>	\$10.0-15.0 million	Traffic management review of whole corridor to identify optimum treatments
4.	Ballarat West LSP Roads	<ul style="list-style-type: none"> <li>▪ Provide timely access for growth areas</li> <li>▪ Provide basis of cycle and pedestrian network</li> </ul>	Funded via Development Contribution Plan (DCP)	Integrate with LSP/DCP implementation
5.	Inner Loops via Fussell Street (Municipal Road Connector Only)	<ul style="list-style-type: none"> <li>▪ Provide priority circulation route east of CBA to relieve CBA congestion</li> <li>▪ Provide alternate local access route</li> </ul>	\$4.0-6.0 million	Review role of affected local streets in Council's hierarchy

	<b>Project</b>	<b>Benefits</b>	<b>Cost (Indicative Only)</b>	<b>Initial Actions for Implementation</b>
6.	Avenue of Honour Duplication and Learmonth Street Intersection	<ul style="list-style-type: none"> <li>▪ Relieve existing delays and improve safety.</li> <li>▪ Complement ultimate duplication of Avenue of Honour</li> </ul>	<p>\$0.5 to \$1.0 million for initial civil works and intersection upgrade.</p> <p>\$10.0 million to \$15.0 million for later duplication</p>	<p>Linemark southern approach as two lanes</p> <p>Prepare and approve duplication plans</p> <p>Monitor traffic growth for future duplication needs.</p>
7.	McKenzie Drive Load Limit Increase	<ul style="list-style-type: none"> <li>▪ Allow heavy trucks better access to Western Freeway</li> </ul>	Nominal	Allow heavy truck use outside school access times
8.	Gregory Street West Local Road Link to Ring Road (Municipal Road Connector Only)	<ul style="list-style-type: none"> <li>▪ Connect two parts across railway line</li> </ul>	\$1.0-2.0 million	Plan traffic management to protect local/access street function of Gregory Street East
9.	Learmonth Road Upgrade	<ul style="list-style-type: none"> <li>▪ Extra capacity to accommodate forecast traffic growth</li> </ul>	\$10.0 to \$15.0 million	<p>Prepare and approve upgrade plans.</p> <p>Monitor traffic growth for future duplication needs.</p>
10.	Hertford Road Upgrade	<ul style="list-style-type: none"> <li>▪ Extra capacity to accommodate forecast traffic growth</li> </ul>	\$10.0 to \$15.0 million	<p>Prepare and approve upgrade plans.</p> <p>Monitor traffic growth for future duplication needs.</p>
11.	Creswick Road Upgrade	<ul style="list-style-type: none"> <li>▪ Extra capacity to accommodate forecast traffic growth and improve "gateway" image</li> </ul>	\$10.0 to \$15.0 million	<p>Prepare and approve upgrade plans.</p> <p>Monitor traffic growth for future duplication needs.</p>
12.	Yankee Flat Road Upgrade (Municipal Road Connector Only)	<ul style="list-style-type: none"> <li>▪ Extra intersection capacity and safety</li> <li>▪ Roadside hazard reduction</li> </ul>	\$1.0 - \$2.0 million	Prepare and approve upgrade plans.

Other high priority projects, where action is required now to maximise planning and funding opportunities are:

- planning investigations for the Future Western Arterial;
- identifying future local road needs for the Ballarat West LSP growth area, and establishing an appropriate Development Contribution Plan.

In preparing upgrading plans for Main Road/Geelong Road, other duplications plans for existing roads and corridor plans for the Future Western Arterial, VicRoads Access Management Policy must be applied, so that appropriate capacity and safety outcomes are achieved.

### 6.2.2 Medium Priority Strategic Actions

Two actions which are desirable, but not essential immediately, are

- planning traffic management to protect Gregory Street East, in advance of proceeding with the extension of Gregory Street West to Ring Road;
- finalising the Inner Loop via Fussell Street, both in terms of planning, design and construction of intersection and other works, and in revising and approving the Road Hierarchy to suit.

Upgrading of the Avenue of Honour and Hertford Street is likely to be required in the period 2010 to 2015. Plans should be prepared and approved soon to ensure that, when traffic volumes warrant, the works can be implemented.

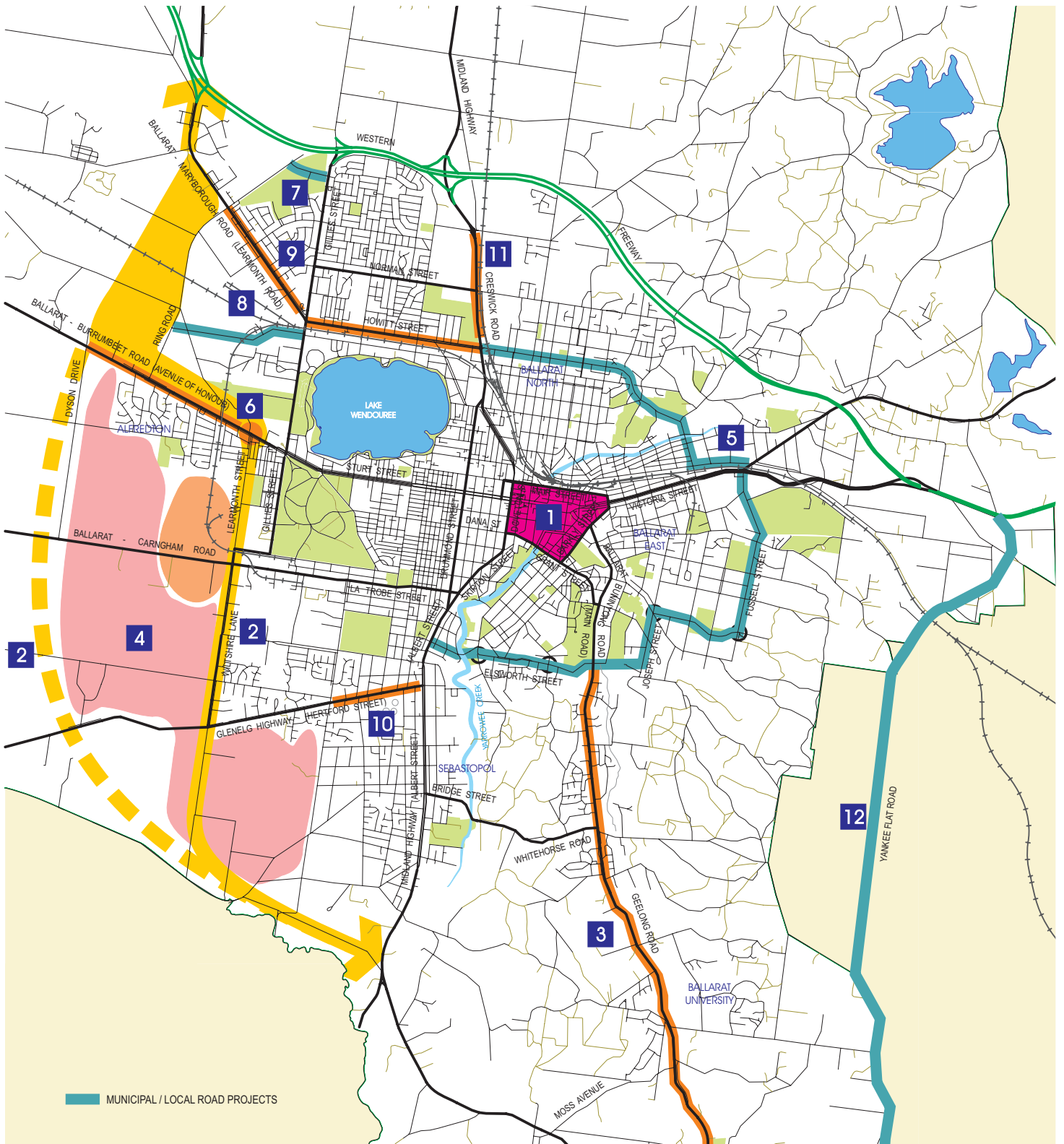
### 6.2.3 Lower Priority Strategic Actions

The timing of upgrading of Learmonth Road and Creswick Road will depend on the rate of traffic growth on those roads. Based on existing volumes and forecasts to 2031, the likely timing of duplication or other major upgrading will be:

- Learmonth Road (likely to be needed 2015-2020)
- Creswick Road (likely to be needed 2025-2030)

Upgrading Yankee Flat Road is also a lower priority action, depending on the rate of traffic volume growth and crash history along the route.

Table 6.1 and Figure 6.4 summarises the initial steps required for each component of the recommended Ballarat Road Transport Strategy. Municipal/local road projects are separately identified.



MUNICIPAL / LOCAL ROAD PROJECTS

**LEGEND**

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>1. DETAIL PROPOSALS VIA COUNCIL STUDY OF CBA STREET NETWORK</li> <li>2. PLANNING INVESTIGATION FOR FUTURE WESTERN ARTERIAL AND INTERIM / STAGING OPTIONS</li> <li>3. UNDERTAKE TRAFFIC MANAGEMENT REVIEW FOR MAIN ROAD / GEELONG ROAD</li> <li>4. INTEGRATE RESULTS OF COUNCIL STUDY FOR BALLARAT WEST LSP ROAD NEEDS</li> <li>5. REVIEW ROAD HIERARCHY RE AFFECTED LOCAL STREETS</li> <li>6. UPGRADE LEARMONTH STREET LINE MARKING AS INTERIM INTERSECTION IMPROVEMENT. PREPARE PLANS FOR LATER DUPLICATION</li> </ul> | <ul style="list-style-type: none"> <li>7. LOAD LIMIT INCREASE FOR MCKENZIE DRIVE OUTSIDE SCHOOL ACCESS TIMES</li> <li>8. DEVELOP GREGORY STREET WEST LOCAL ROAD CONNECTION BETWEEN GILLIES STREET AND RING ROAD</li> <li>9. MONITOR TRAFFIC GROWTH ON LEARMONTH ROAD</li> <li>10. MONITOR TRAFFIC GROWTH ON HERTFORD STREET</li> <li>11. MONITOR TRAFFIC GROWTH ON CRESWICK ROAD</li> <li>12. YANKEE FLAT ROAD UPGRADE</li> </ul> |
|--|---|



FIGURE 6.4

**RECOMMENDED INITIAL STRATEGY ACTIONS**

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## Appendix A. Community Survey Questionnaire

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## BALLARAT ROAD TRANSPORT STRATEGY COMMUNITY SURVEY

The City of Ballarat, in partnership with VicRoads, is preparing a Ballarat Road Transport Strategy to guide the management of Ballarat's existing roads and the construction of new roads to meet expected future needs.

Council and VicRoads believe that the community's views on road transport issues are important in preparing the Strategy. By completing this survey, you will be helping the City of Ballarat and VicRoads decide which transport issues are most important, and also help shape the direction and development of the Strategy.

The survey is being made available throughout Ballarat and everyone is encouraged to complete it. When filling it in, please consider the questions raised in each of the categories and rank the level of priority which you believe the Strategy should give to each of the issues. Number "1" will indicate your highest priority, then "2" and so on to the lowest ranked priority.

Please return completed surveys to the City of Ballarat by **Wednesday 15 February, 2006**.

Surveys can be returned in person to Council's Customer Service Centres at the Phoenix Building and Town Hall, can be completed online at [www.ballarat.vic.gov.au](http://www.ballarat.vic.gov.au), or can be posted to:

City of Ballarat  
"Road Transport Strategy Community Feedback"  
PO Box 655  
Ballarat VIC 3353

Any questions in relation to completing the survey can be directed to: Kate Mould, City of Ballarat on 5320 5829.

Copies of the survey will be available at Council's Customer Service Centres, VicRoads and online at [www.ballarat.vic.gov.au](http://www.ballarat.vic.gov.au)

<b>ECONOMIC ISSUES</b> Highest priority = 1, lowest priority = 6	<b>RANKING</b>
A. Improve the road network so that the delay of truck/freight transport can be minimised.	
B. Improve the road network so that it is easier for tourists to find their way and reach their destination.	
C. Improve roads in the north/south direction across the central activity area, so that traffic congestion is reduced.	
D. Improve roads in the east/west direction across the central activity area, so that traffic congestion is reduced.	
E. Build new roads and/or upgrade existing roads to accommodate the major growth areas of Ballarat.	
F. Improve the road network to provide improved efficiency for public transport.	

<b>ENVIRONMENTAL ISSUES</b> Highest priority = 1, lowest priority = 4	<b>RANKING</b>
A. Manage roads so that traffic noise, fuel consumption and exhaust emissions are minimised.	
B. Direct heavy/through traffic away from heritage and retail/commercial precincts.	
C. Improve visual quality of streets/roads, especially at Ballarat's main "entrances" to the city.	
D. For new roads, minimise impact on areas of important natural systems/ecology.	

<b>SOCIAL ISSUES</b> Highest priority = 1, lowest priority = 3	<b>RANKING</b>
A. Maintain/improve accessibility by all transport modes including walking and cycling.	
B. Minimise negative traffic impacts on existing roads, especially in residential areas.	
C. Plan new roads so that private property acquisition is minimised.	

<b>ROAD SAFETY ISSUES</b> Highest priority = 1, lowest priority = 3	<b>RANKING</b>
A. Modify identified accident "black spots" to improve road safety.	
B. Plan future roads so that the safety of vulnerable road users is taken into account.	
C. Manage traffic movements at existing intersections to improve safety.	

<b>ROAD CONGESTION ISSUES</b>
<i>Please note: Responses to these questions should be restricted to Ballarat's major roads only, meaning only those roads carrying the highest volumes of traffic across the city. In instances where the road is a long length and only certain sections are of concern, please try to define the specific location between major intersections.</i>
A. Major Roads: Based on your knowledge of Ballarat's existing road network, in order please list what you believe to be the five highest priority "major" roads that are in need of future improvements to facilitate better road transport.
1.....
2.....
3.....
4.....
5.....
B. Major Intersections: Based on your knowledge of Ballarat's existing road network, in order please list what you believe to be the five highest priority "intersections" that are in need of future upgrades to improve traffic congestion.
1.....
2.....
3.....
4.....
5.....

<b>GENERAL ISSUES</b>
Please indicate your primary road-user interest in completing this survey: 1. Truck/Freight    2. Motorist (Car/Motorbike)    3. Bicyclist    4. Pedestrian    5. Public Transport User    6. Other:.....
Do you have any other comment you wish to make regarding road transport issues which you think should be taken into account? If so, please outline these below.
.....
.....
.....

<b>CONTACT DETAILS:</b>
A. Required information
Age (Please tick appropriate box)    Under 25 <input type="checkbox"/> 25-39 <input type="checkbox"/> 40-59 <input type="checkbox"/> 60 and over <input type="checkbox"/>
B. Optional information
Name:.....
Postal Address:.....
Email Address:.....    Contact Phone Number:.....

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## Appendix B. Stakeholder Consultation Attendees

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**BALLARAT ROAD TRANSPORT STRATEGY  
STAKEHOLDER CONSULTATION**

Invited Organisation (Alphabetical)	Name of Representing Attendee
Alston Australia	-
Australian Industry Group	-
Ballarat Business Incubator	-
Ballarat Police	Rowe, Murray
Ballarat Taxis Co-op	Collins, Bernie
Ballarat Tourism	-
Ballarat University	Burrow, Jim
Blue Print Ballarat	Christou, Gerardine
Blueprint Ballarat Advisory Committee	Kendal, Lisa
Bridge Mall Shopping Centre	-
Buninyong Ward Residents Group	Elshaug, Robert
Buninyong Ward Residents Group	Glover, P
Chamber of Commerce	-
City of Ballarat	Haydon, Jeff
City of Ballarat	Jones, Stephen
City of Ballarat	Keenan, David
City of Ballarat	Leonard, Jim
City of Ballarat	Miller, Andrew
City of Ballarat	Mould, Kate
City of Ballarat	Schinck, Anthony
City of Ballarat	Semmel, Miriam
Davis Bus Services	Smith, David
Delacombe Streetlife Reference Group	Boatman, Andrew
Dept of Infrastructure	Ward, David
DSE	Duncan, Rod
DSE	Smelt, John
FMP (Bendix)	Kozaris, Corina
Inverway Progress Association	-
K & S Frieghters	-
Masterfoods	-
Maxitrans Manufacturing	-
McCain Foods	Falconer, Stuart
McCain Foods	Richmond, Gerard
Moorabool	Smith, Gary
North West Awareness Group	Flynn, Bill
North West Awareness Group	Kinnarsly, Reg
RACV	Hamilton, Emily
Ratio Consultants Pty Ltd	Symons, Russell
Regional Development Victoria	Roberts, Mark
Roadcon Group	Fleischman, Matthew
Roadsafe Central Highlands	Ryan, Gerard
Sargeants Transport/Committee for Ballarat	Sargeant, Jamie
Sovereign Hill	-
V/Line	Richardson, Michael
VicRoads	Carter, Allan
VicRoads	Dunlop, Chris
VicRoads	Miller, John
Victorian Farmers Federation	-
Victorian Taxi Association	-
Victorian Transport Association	-
Western Improved Passenger Service Group	Gower, Neville



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## Appendix C. Goal Achievement Matrix Results

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**APPENDIX D**  
**GOAL ACHIEVEMENT MATRIX**

PROJECT	CRITERIA (Weighting)																
	Freight Efficiency (12)	Roads in Growth Areas (12)	North-South CBD Access (8)	East-West CBD Access (7)	Public Transport Convenience (6)	Tourist Access (5)	Fix Blackspots (8)	Vulnerable Road Users (6)	Intersection Safety (6)	Minor Modes, Walk/Cycle (7)	Residential Amenity (6)	Property Integrity (2)	Minimise Noise, Fuel, Exhaust (5)	Heritage Protection (5)	Enhance Gateways (3)	Protect Natural Systems (2)	TOTAL
1 McKenzie Drive increase of mass limit for B-doubles	10	7	5	5	0	5	5	0	3	0	5	5	10	5	0	0	477
2 Western Bypass from Sunraysia Highway to Midland Highway south of Sebastopol	10	10	7	5	0	7	7	5	7	3	7	0	10	10	7	3	684
3 Gregory Street West link, across Ring Road to Western Bypass	7	7	0	0	0	0	5	5	7	0	5	5	7	5	7	5	411
4 Yankee Flat Road upgrade of through-route intersections	0	7	3	0	5	3	5	5	3	3	3	5	0	5	5	3	336
5 Recreation Road extension to Yankee Flat Road	0	7	0	0	3	3	3	5	3	3	3	5	0	5	5	3	284
6 Gear Avenue upgrade to Yankee Flat Road	0	7	0	0	3	3	3	5	3	3	3	5	0	5	5	3	284
7 Main Road upgrade including Whitehorse Road/Recreation Road intersection	5	7	3	0	10	10	10	10	10	10	5	5	7	0	10	5	663
8 Inner loops via Stawell Street Connection	5	0	5	7	5	7	7	7	7	5	5	5	7	5	7	3	516
9 Avenue of Honour Upgrade	7	9	0	0	3	5	10	7	10	3	5	5	7	5	7	3	565
10 Ballarat CBD Street Network Upgrade	7	5	10	10	10	10	10	10	10	10	5	5	7	3	5	7	793
11 Ballarat West LPS Roads	5	10	0	0	5	5	5	5	7	5	10	10	10	5	5	10	572
12 Learmonth Road Upgrade	7	9	0	0	3	5	5	5	7	3	5	0	5	3	7	5	469
13 Hertford Road Upgrade (East End)	5	7	0	0	3	5	5	8	7	5	5	0	5	5	5	3	453
14 Creswick Road Upgrade (Howitt Street to Freeway)	7	7	0	0	3	7	5	5	5	3	0	0	5	5	10	5	432

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## Appendix D. Future Western Arterial Assessment

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## APPENDIX D

### PRELIMINARY COST/BENEFIT ASSESSMENT FOR FUTURE WESTERN ARTERIAL

#### 1. Basis of Assessment

As shown in Figure 5.1, this proposal involves a new (or upgraded) route connecting:

- the Sunraysia Highway near the Ballarat Airport, to
- the Midland Highway south of Sebastopol.

Computer modelling (using the BSTM) shows that, in order to offer an attractive travel time/cost option compared to existing routes, the new route would need an operating speed of at least 80 km/h. This means that it would require:

- a high standard of horizontal and vertical alignment;
- fully-controlled access, with a minimum number of at-grade intersections (eg large radius roundabouts);
- frequent opportunities for overtaking slow-moving vehicles.

#### 2. Construction Costs

For the purposes of this preliminary analysis, it was assumed that a new 2-lane road would be constructed along the whole (about) 20 kilometres in a newly-acquired 40 metre road reserve within six large radius roundabouts and assuming an overpass of the Ararat Railway Line but no other bridges.

The major cost categories would be as follows (2006 dollars).

##### Land Acquisition

20 kilometres X 40 metres wide

= 80 hectares @ \$12,500 per hectare = \$1,000,000

##### Road Construction

20 kilometres of 2-lane road

@ \$2.0 million per kilometre = \$40,000,000

**Railway Overpass Earthworks and Bridge (allow) \$4,000,000**

##### Intersection Roundabouts

Allow six large radius roundabouts @ \$500,000 each = \$3,000,000

Contingency (allow) \$2,000,000

\$50,000,000

### 3. Road User Benefits at 2031

Modelling of 2031 traffic-volumes included an assessment of the diversion effects of various “packages” of new road works. The so-called Option A involved a package of roadworks generally the same as the Future Western Arterial route described above (refer separate BSTM report from VicRoads).

Summary data from the BSTM shows no reduction in the aggregate vehicle kilometres of travel (VKT) for Option A, when compared to the 2031 base network. However, it does show a substantial reduction in aggregate Vehicle Minutes of Travel (VMT) over the whole network as follows:

2031 base network	= 3.79 million VMT per day
2031 Option A network	= 3.70 million VMT per day

Therefore the daily travel time reduction (saving) due to Option A is 90,000 VMT.

The BSTM did not separately model different vehicle types on trip purposes, so the following assumptions were made relating to contributing proportions of daily travel time:

Private car minutes	.....	70 percent
Business car minutes	.....	20 percent
Rigid and articulated trucks minutes	.....	10 percent
		<u>100 percent</u>

At typical vehicle occupancies and the values of occupant travel time (as supplied by VicRoads Network Evaluation and Analysis Section), each average vehicle minute (VMT) has a value (in 2006 dollars) of 33 cents. So, over 300 equivalent days in year 2031, the value of the travel time saving of Option A is

$$90,000 \text{ VMT} \times 33 \text{ cents} \times 300 \text{ days} = \$8.9 \text{ million per annum.}$$

This analysis did not assess the road user benefits from reduced accident rates which would apply from the upgraded/extended road network. Such benefits would substantially add to the travel time savings estimated for Option A.

### 4. Assessment

If the Future Western Arterial was opened to traffic in year 2031, at a cost of \$50 million (2006 dollars), it would produce a benefit stream and a project life of (say) 20 more years to 2051. If that benefit stream increases at (say) two percent per year in tandem with traffic growth, and is then discounted back to 2031 at seven percent per annum, the present value of the benefits would be about \$110 million (2006 dollars). That results in:

- a benefit/cost ratio of 2.1
- a net value of \$60 million.

That indicates that the project is substantially worthwhile.

If the Future Western Arterial is constructed prior to 2031, when traffic volumes are lower, then annual benefits will be proportionately less than \$8.9 million.

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## Appendix E. Future Western Arterial Interim Route Assessment

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## APPENDIX E

### PRELIMINARY COST/BENEFIT ASSESSMENT FOR INTERIM FUTURE WESTERN ARTERIAL

#### 1. Basis of Assessment

As shown in Figure 6.2, this proposal involves an upgraded route connecting:

- the Sunraysia Highway near the Ballarat Airport, to
- the Midland Highway south of Sebastopol.

The tested route follows Ring Road, Avenue of Honour, Learmonth Street, Wiltshire Lane and Bells Road.

Computer modelling (using the BSTM) shows that, in order to offer an attractive travel time/cost option compared to other existing routes, the upgraded route would need an operating speed of at least 60 km/h. This means that it would require partially or fully-controlled access, with a minimum number of at-grade intersections.

The forecasts of traffic usage at 2031 (refer Figure E.1) show that most of the route would require duplication to 4-lane divided capacity, with the balance requiring a new (or upgraded) 2-lane road.

#### 2. Construction Costs

For the purposes of this preliminary analysis, it was assumed that a new, or second 2-lane carriageway would be constructed along the whole (about) 20 kilometres; that is, about the same length of new construction as for the outer arterial. It was assumed that the duplication works could be achieved within existing road reservations.

The major cost categories would be as follows (2006 dollars).

##### **Road Construction**

20 kilometres of 2-lane road

@ \$2.0 million per kilometre = \$40,000,000

##### **Intersection Roundabouts**

Allow six signalised intersections (or large radius roundabouts)

@ \$500,000 each = \$3,000,000

Contingency (allow) \$2,000,000

\$45,000,000



FIGURE E.1  
2031 OPTION E TRAFFIC VOLUMES



### 3. Road User Benefits at 2031

Modelling of 2031 traffic volumes included an assessment of the diversion effects and/or utilisation of various “packages” of new road works. The so-called Option E involved a package of roadworks generally the same as the interim Future Western Arterial route described above (refer separate RSM Model Report from VicRoads).

Summary data from the BSTM shows no reduction in the aggregate vehicle kilometres of travel (VKT) for Option E, when compared to the 2031 base network. However, it does show a substantial reduction in aggregate Vehicle Minutes of Travel (VMT) over the whole network as follows:

2031 base network	= 3.79 million VMT per day
2031 Option E network	= 3.71 million VMT per day

Therefore the daily travel time reduction (saving) due to Option E is 80,000 VMT.

At typical vehicle occupancies, each VMT has a value (in 2006 dollars) of 33 cents. So, over 300 equivalent days in year 2031, the value of the travel time saving of Option E is

$$80,000 \text{ VMT} \times 33 \text{ cents} \times 300 \text{ days} = \$7.9 \text{ million per annum.}$$

### 4. Assessment at 2031

If the interim Future Western Arterial was opened to traffic in year 2031, at a cost of \$45 million (2006 dollars), it would produce a benefit stream and a project life of (say) 20 more years to 2051. If that benefit stream increases at (say) two percent per year in tandem with traffic growth, and is then discounted back to 2031 at seven percent per annum, the present value of the benefits would be about \$98 million (2006 dollars). That results in:

- a benefit/cost ratio of 1.9;
- a net value of \$53 million.

That indicates that the project is substantially worthwhile.

### 5. Interim Versus Long-Term Arterial Construction

The analysis set out above shows that, when assessed against traffic forecasts for 2031, investing in an “interim” route has similar cost-effectiveness to investing in a full/outer Future Western Arterial (ie BCR of 1.9 for interim, versus 2.1 for new outer arterial in Appendix D).

In the shorter term, however, when traffic volumes will have grown less over existing volumes, an “interim” route could be achieved at much less cost, utilising the existing (2-lane) carriageways of the nominated roads. Sufficient capacity could be achieved by making improvements to intersection capacity; this could involve:

- widening of the rotary pavement at the Learmonth Road/Ring Road roundabout;
- widening the major approaches, channelisation and signalisation at Ring Road/Avenue of Honour, Avenue of Honour/Learmonth Street and Learmonth Street/LaTrobe Street/Wiltshire Lane;
- selective upgrading of other minor intersections;
- supporting linemarking, signage and upgraded road lighting.

This package of works, plus construction of a new 2-lane road in the vacant Bells Road reservation could be achieved for about \$10 million.

This low/medium cost package of works should accommodate traffic needs across the western areas of Ballarat for the next 10 years leaving, open the options beyond that time **either** to proceed with the full (outer) Future Western Arterial, or to invest further resources to produce a permanent inner route. If the Ballarat West LSP areas develop as expected, the greater strategic flexibility offered by the outer route suggests that as the more cost-effective investment in the longer term.