Landcom

9 September 2010

Edmondson Park South Part 3A - Concept Plan Application

Transport Management and Accessibility Plan (TMAP)

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Transport Management and Accessibility Plan (TMAP)

Prepared for

Landcom

Prepared by

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Quality Information

Document Edmondson Park South Part 3A - Concept Plan Application

Ref

Date 9 September 2010

Prepared by Isla Robertson/Roger Jeffries

Reviewed by Andy Yung

Revision History

Revision	Revision Date	Details	Authorised	
			Name/Position	Signature
A	11-Jun-2010	Draft Report for Client Review	Dan Bright Associate Director, Strategic Planning & Advisory	Original Signed
B	13-Aug-2010	Final Draft Report	Dan Bright Associate Director, Strategic Planning & Advisory	Original Signed
0	26-Aug-2010	Final Report	Dan Bright Associate Director, Strategic Planning & Advisory	Original Signed
1	09-Sep-2010	Revised Final Report	Dan Bright Associate Director, Strategic Planning & Advisory	

Table of Contents

Executive Summary

Background

AECOM has prepared a Transport Management and Accessibility Plan (TMAP) to accompany a Concept Plan Application under Part 3A of the Environmental Planning & Assessment Act, 1979 (EP&A Act) and a proposal for State Significant Site (SSS) listing under Schedule 3 of State Environmental Planning Policy Major Development 2005 (SEPP Major Development) in relation to the former Ingleburn Army Base and certain adjoining lands within the Edmondson Park Release Area of the South West Growth Centre (referred to herein as 'Edmondson Park South').

Description of project scope

Landcom is proposing to deliver a new diverse and sustainable urban community at Edmondson Park South. Once complete, the site will accommodate a mix of land uses, a diversity of housing, with a dwelling yield of up to 3,200 dwellings, a new town centre incorporating 35,000 to 45,000m^2 of retail, business and commercial floor space with employment opportunities for 1,000 people, multi-purpose community and education facilities, a new 150 hectare Regional Park, a number of other local parks and environmental conservation areas. The new urban community at Edmondson Park South will meet the State Government's objectives to increase housing supply, provide community benefits and create jobs.

The majority of the site is located within walking distance of the proposed Edmondson Park Station on the South West Rail Link (SWRL) which connects Leppington with Glenfield. The Concept Plan will integrate the new Edmondson Park Town Centre and surrounding development with the new station. The Concept Plan has placed significant emphasis on the delivery of an integrated transport and land use development that maximises the benefits of the State Government's investment in the SWRL. The SWRL and other active and public transport initiatives proposed as part of this TMAP will assist the proposed development in achieving the revised State Plan journey-to-work mode split targets relevant to the Edmondson Park South which are:

- 28% of total journeys to work by public transport in the Sydney Metropolitan Region by 2016;
- Increase of the share of commute trips made by public transport to and from the Liverpool CBD to 20% by 2016; and
- 5% for bicycle trips of less than 10km made in the Greater Sydney region by 2016.

Existing and future planned transport environment

Currently, there are limited active and public transport options available in the vicinity of Edmondson Park. The key road network including Campbelltown Road (MR177) and Camden Valley Way are operating at or approaching capacity. The SWRL and planned bus network in the South West Growth Centre (SWGC) aims to improve the existing mode share targets in South West Sydney; and reduce traffic impacts of the SWGC by encouraging public transport travel.

To accommodate an increasing population and increased travel demand in the SWGC, a number of road network improvements close to Edmondson Park South are required to address future network deficiencies due to background traffic growth. These include:

- Widening of Campbelltown Road to 2 lanes in each direction in 2016; and
- Additional capacity at the intersections of Campbelltown Road / Macdonald Road and Camden Valley Way / Croatia Avenue / Bernera Road in 2026.

In addition to the above improvements, the following infrastructure upgrades have been assumed to be completed in 2016 as part of the SWRL project:

- Delivery of Edmondson Park Station and its interchange; and
- Extension of Croatia Avenue and Macdonald Road to provide access to Edmondson Park Station from Camden Valley Way and Campbelltown Road respectively.

Concept plan

The Concept Plan road network, intersection layout and treatment, pedestrian and cycle networks as well as the public transport network are designed to provide linkages to key destination points and transport hubs, maximising accessibility between all proposed land uses in Edmondson Park South.

Campbelltown Road will provide access to the development located on both the northern and southern side of this road. Multiple access points are required from Campbelltown Road to provide safe and efficient access to the railway station and development including the Town Centre and residential areas. Access to the development is also provided via Croatia Avenue which connects to Camden Valley Way. Future development traffic can also travel to Ingleburn / Campbelltown and the M5 (via Brooks Road) using Macdonald Road.

In order to provide a vibrant, sustainable, transit orientated, walkable, high density and cohesive Town Centre, the future upgrade of Campbelltown Road (in the vicinity of Edmondson Park South) must be capable of performing a number of functions. The future road should include the following characteristics:

- A four lane road plus a kerbside parking lane on each side of the carriageway, which provides the flexibility of adding an additional through lane in each direction should traffic flows warrant in the long-term future;
- A 38.8m corridor (consistent with advice provided by the RTA in meeting dated 18th August 2010) to facilitate efficient crossing of the road by pedestrian, cyclists, buses and cars;
- A speed limit of 60km/hr to respond to a highly urbanised town centre environment;
- More frequent intersection spacing near the Town Centre to ensure viability and permeability of Edmondson Park South, the Town Centre and Station; and
- More frequent intersection spacing to facilitate safe, direct and efficient movements for all modes of transport (cars, buses, walking and cycling) to Edmondson Park South and between different parts of the site (north and south of Campbelltown Road).

A new bus service should be implemented along Macdonald Road upon opening of Stage 1 development, connecting Ingleburn Station with Liverpool Station via Edmondson Park South. This bus service will re-route via the future Edmondson Park Town Centre and Station in 2016. The proposed bus service to Liverpool will connect residents of Edmondson Park South to major employment and transport hubs. Other local intersection improvements together with priority works have also been identified to support efficient bus access and movements within the project area.

A network of off-road shared paths and on-road cycle paths are proposed within the project area. The network will link key amenities including open spaces, schools and the facilities in the Town Centre as well as the Station. A hierarchy of paths will be created providing amenity for different user groups.

Package of measures

A package of sustainable measures recommended for the successful delivery of the proposed development in Edmondson Park South include:

- Sustainable travel strategies, to include provision of marketing of public transport options and free travel pass.
- Infrastructure improvements to provide easy pedestrian and cyclist access via a safe and efficient shared path and footpath network, a Town Centre Main Street with low traffic environment, signalised crossings along Campbelltown Road and near the schools sites.
- Public transport infrastructure, including well-designed bus stops to provide safe and convenient means for the future residents to use public transport services and bus priority treatments to reduce the travel times for public transport users.
- Transport service improvements, including the implementation of a new bus service connecting the development with Liverpool via Edmondson Park Station and Town Centre.
- Road infrastructure upgrades to provide access to the site via existing and new intersections at Campbelltown Road, Croatia Avenue and Macdonald Road.

As a comprehensive package of measures, this will meet the needs of future residents of Edmondson Park South, while achieving a mode shift towards public transport.

Initiative / Services / Infrastructure	Measure
Initiative 1	Household Information Packs (HIPs) for each household in Edmondson Park South
Initiative 2	One week free public transport (MyMulti) start up discount ticket
Initiative 3	Bicycle User Group
Initiative 4	Promotion of bicycle initiatives
Initiative 5	Walking school bus program and School travel plans
Initiative 6	Car sharing scheme
Initiative 7	Sustainable home deliveries of groceries
Initiative 8	Community garden and farm
Initiative 9	Parking restraint measures
Initiative 10	'Voluntary' workplace travel plans
Service 1	Bus service from Ingleburn to Liverpool via Edmondson Park South
Infrastructure 1	Internal footpaths, cycle paths, road network and intersections
Infrastructure 2	Bus stops (x6 with seating and signage only due to temporary nature)
Infrastructure 3	Intersection of Macdonald Road / Stage 1 Development access
Infrastructure 4	Bicycle parking facilities
Infrastructure 5	Bus stops (x16 for each bus stop with shelter, seating and signage)
Infrastructure 6	Relocation of Macdonald Road
Infrastructure 7	Construction of two bridge crossings over the SWRL
Infrastructure 8	Upgrade of Campbelltown Road / Macdonald Road (Intersection 1) with an additional right turn lane (100m) on the south approach of Macdonald Road
Infrastructure 9	New signalised intersection - Macdonald Road / Stage 1 development access road / Primary School Access Road (Intersection 4)
Infrastructure 10	New bus priority signalised intersection - Campbelltown Road / Town Centre Main Street / Croatia Avenue (Intersection 5)
Infrastructure 11	New signalised intersection - Campbelltown Road / East Town Centre Street (Intersection 6)
Infrastructure 12	New signalised intersection - Croatia Avenue / Macdonald Road / Town Centre Main Street (Intersection 7)
Infrastructure 13	New priority controlled intersection - Macdonald Road / Station South Access Road (Intersection 9)
Infrastructure 14	New priority controlled intersection - Croatia Avenue / Station South Access Road (Intersection 10)
Infrastructure 15	New signalised controlled intersection - Macdonald Road / High School Access Road (Intersection 8)
Infrastructure 16	Signalisation (with bus priority) of Macdonald Road / Station South Access Road (Intersection 9)
Infrastructure 17	Signalisation (with bus priority) of Croatia Avenue / Station South Access Road (Intersection 10)

1.0 Introduction

1.1 Background

This Transport Management and Accessibility Plan (TMAP) has been prepared by AECOM to accompany a Concept Plan Application under Part 3A of the Environmental Planning & Assessment Act, 1979 (EP&A Act) and a proposal for State Significant Site (SSS) listing under Schedule 3 of State Environmental Planning Policy Major Development 2005 (SEPP Major Development) in relation to the former Ingleburn Army Base and certain adjoining lands within the Edmondson Park Release Area of the South West Growth Centre (referred to herein as 'Edmondson Park South'). The site is located partly within the Liverpool LGA and partly within the Campbelltown LGA.

Landcom is proposing to deliver a new diverse and sustainable urban community at Edmondson Park South. The majority of the site is located within walking distance of the proposed Edmondson Park Station on the South West Rail Link (SWRL) which connects Leppington with Glenfield. The Concept Plan will integrate the new Edmondson Park Town Centre and surrounding development with the new station.

Once complete, Edmondson Park South will accommodate a mix of land uses, a diversity of housing, with a dwelling yield of up to 3,200 dwellings, a new town centre incorporating 35,000 to 45,000m^2 of retail, business and commercial floor space with employment opportunities for 1,000 people, multi-purpose community and education facilities, a new 150 hectare Regional Park, a number of other local parks and environmental conservation areas.

The new urban community at Edmondson Park South will meet the State Government's objectives to increase housing supply, provide community benefits and create jobs, close to public transport.

The purpose of the Concept Plan is to secure statutory approval for the overall planning framework for the site and to further resolve a number of remaining site-wide infrastructure delivery and land use planning issues. The Project Application (submitted concurrently with the Concept Plan) for early works, infrastructure and subdivision relating to the initial phases of the development will enable site works to begin in 2010. This TMAP has been prepared to support the Concept Plan Application and the Stage 1 Project Application.

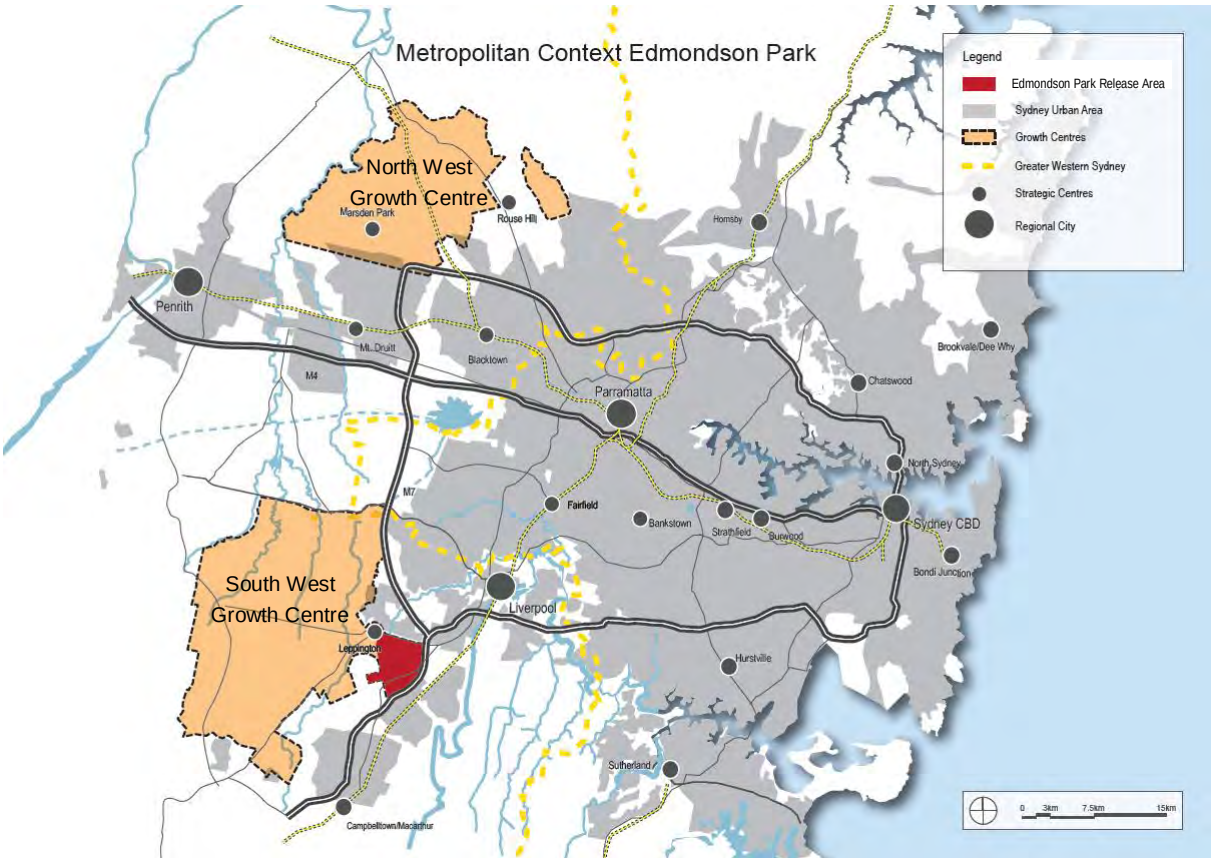
1.2 Edmondson Park Release Area

The Edmondson Park Release Area is one of the first precincts to be planned in the South West Growth Centre (SWGC). The Release Area is one of 18 areas in Sydney's south west that have been identified by the State Government for future development and has potential for approximately 7,500 new residential dwellings (including the 3,200 dwellings to be delivered as part of the Edmondson Park South project), as well as local shops, services and jobs.

The Release Area has been rezoned for urban development under Local Environmental Plans prepared by Liverpool and Campbelltown Councils. A DCP and revised Section 94 Plan have been adopted by Liverpool City Council.

The regional context of the Edmondson Park Release Area and its relationship with the SWGC and Metropolitan Sydney is shown in **Figure 1-1**.

Figure 1-1: Regional context of Edmondson Park Release Area



Source: AECOM, July 2010

1.3 The site

The subject site (Edmondson Park South) comprises an area of approximately 413 hectares and forms part of the larger Edmondson Park Release Area within the SWGC. It is located to the north-west of the M5 Motorway and lies approximately 40 km to the south west of Sydney CBD. Approximately 260 hectares of the site is located within the Liverpool LGA and approximately 153 hectares is located within the Campbelltown LGA.

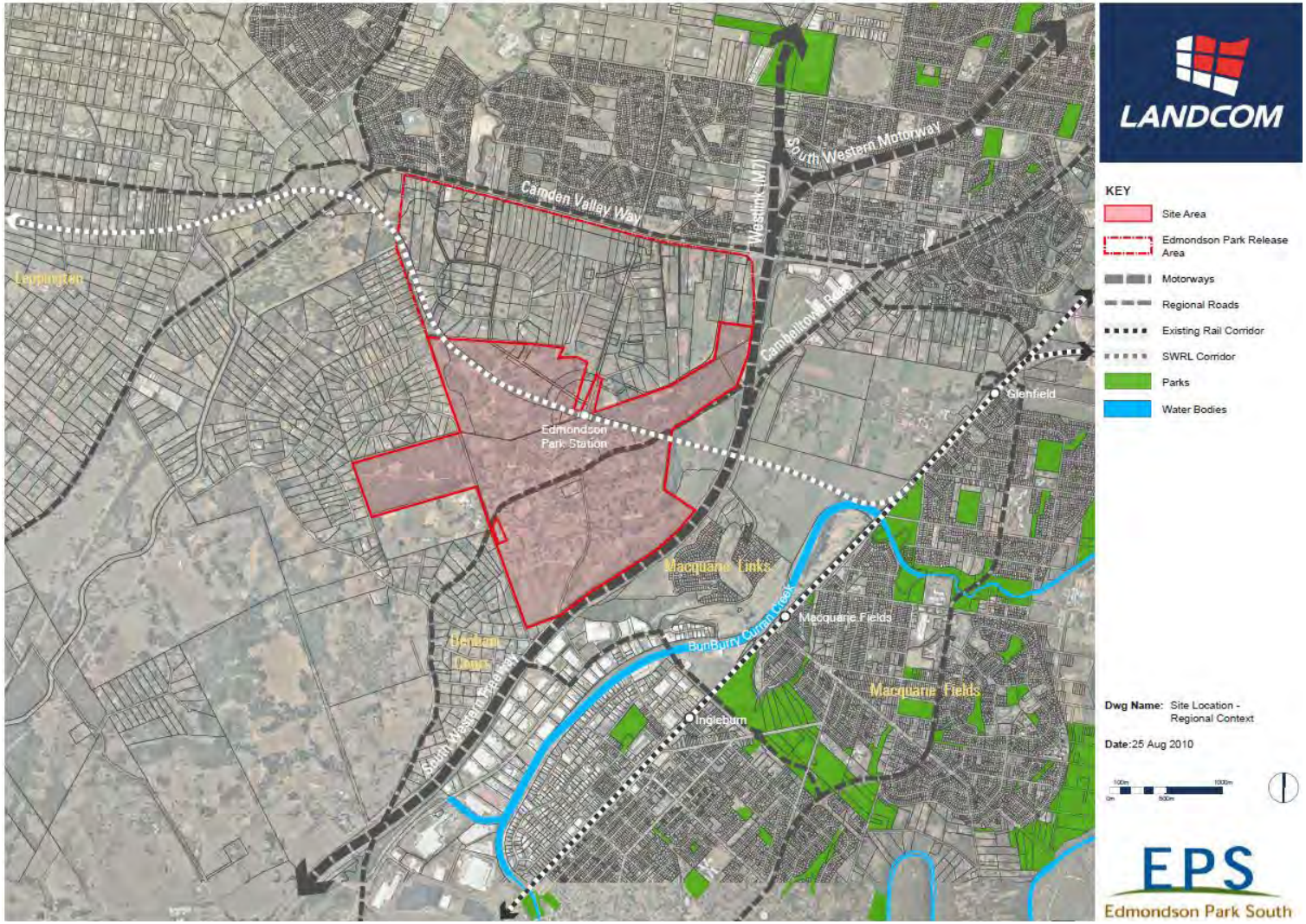
The site is irregular in shape and is generally bounded by the M5 Motorway to the south and the east, the proposed SWRL to the north and Zouch Road to the west. The site boundary and its relation to the Edmondson Park Release Area is shown in **Figure 1-2**.

The majority of the site is currently owned by the Commonwealth (Department of Defence) and was formerly used as an army camp (the Ingleburn Army Camp) up until the 1990s when it was identified as surplus to Defence requirements. Since this time it has been progressively vacated. Other land within the site is owned by Landcom, the Minister Administering the EP&A Act, the Minister for Education, Training and Youth Affairs, the RTA, along with several roads owned by Liverpool City Council and Campbelltown City Council.

The site is largely vacant. Remnants of military facilities (i.e. cottages, former building slabs, internal roads, training facilities) associated with the site's former Defence use are scattered through-out the site. There are a number of vacant cottages / houses previously used by Defence personnel in an area of the site generally referred to as the "Ingleburn Village". The Ingleburn North Public School (1.8 hectares) is located on the southern side of Campbelltown Road (MR177).

The site is undulating to steep. It slopes from its highest point (80 m Australian Height Datum (AHD)) at the intersection of Campbelltown Road / Zouch Road to its lowest point (40 m AHD) at its eastern corner and to a similar elevation adjacent to the M5 Motorway in the south-west corner. The central portion of the site along Campbelltown Road forms a ridge with gentle falls to the north and south.

Figure 1-2: Site boundary of Edmondson Park South



Source: Landcom, July 2010

1.4 Scope of study

This TMAP has been prepared to fulfil the Environmental Assessment Requirements issued by the Director General dated 28th July 2010 for the inclusion of the Edmondson Park South as a State Significant Site under SEPP Major Development, and for a Concept Plan approval for the development. Specifically, this TMAP addresses the following Director General's Requirements (DGRs):

DGR1: Identify a road layout and design which is responsive to existing and proposed land uses including providing linkages to key destination points such as centres, employment lands, and recreation areas, within and surrounding the site. In particular identify the future design of Campbelltown Road having regard to potential heritage and ecological impacts, location of utility infrastructure, urban design considerations, and impact on school sites and open space areas.

DGR2: Prepare a Traffic Management and Accessibility Plan (TMAP) in accordance with the Draft Interim Guidelines for Transport Management and Accessibility Plans (NSW Transport) to identify:

DGR2a: the cumulative regional traffic impacts associated with the development.

DGR2b: a package of traffic and transport infrastructure measures to support future development and contribute to the achievement of the NSW State Plan mode share targets.

DGR2c: regional and local intersection and road improvements together with priority works to support efficient bus access.

DGR2d: vehicular access options for adjoining sites.

DGR2e: infrastructure for walking and cycling, having regard for the NSW Bike Plan (RTA, May 2010) and Planning Guidelines for Walking and Cycling (Department of Planning, December 2004).

DGR2f: the implications of the proposed development for non-car travel modes (including public transport, walking and cycling).

DGR2g: the potential for implementation of a location specific sustainable travel plan (e.g. 'Travelsmart' or other travel behaviour change initiative) and the provision of facilities to increase the non-car mode share for travel to, from and within the site.

DGR2h: the implications and opportunities for managing car parking within the development.

DGR2i: the timing and cost of infrastructure works and funding responsibilities.

Additional assessment requirements have also been specified for Stage 1 Project Application. This TMAP addresses the following requirements for the delivery of the residential subdivision:

Provide an assessment of construction impacts of the site preparation and any other works associated with the project application, and propose appropriate mitigation measures. This should include (but is not limited to) construction noise, air quality, water quality, soil and erosion, groundwater impact, and traffic in accordance with relevant guideline.

The TMAP has also addressed ESD requirements advised in the DGRs in relation to minimisation of car dependency by implementing a Sustainable Travel Strategy for Edmondson Park South (Refer to Section 6.0).

Extensive consultation has been undertaken by AECOM and Landcom to prepare the TMAP. The following agencies have been consulted:

- Liverpool City Council;
- Campbelltown City Council;
- Transport NSW;
- Roads and Traffic Authority of NSW (RTA); and
- Transport Construction Authority (TCA).

A copy of the DGRs and AECOM's review of how the DGRs have been addressed in this TMAP can be found in **Appendix A**.

1.5 TMAP objectives

This TMAP has been prepared in accordance with the Ministry of Transport's Draft Guidelines for Transport Management and Accessibility Plans. The objectives of this TMAP are to generally:

- Meet the DGRs;
- Support the planned public transport improvements in the Metropolitan Transport Plan: Connecting the City of Cities (MTP);
- Address the revised State Plan mode share targets relevant to the Edmondson Park South;
- Deliver a sustainable transport outcome for Edmondson Park South through accessibility by public transport, walking and cycling; and
- Manage the traffic impacts associated with the proposed Edmondson Park South development.

1.6 TMAP study area

The TMAP has considered the impacts of the development on the transport network around the wider Edmondson Park Release Area. The assessment considers a public transport strategy that allows future residents of Edmondson Park South will be able to travel to major transport hubs and other regional and employment centres such as Liverpool and Parramatta in the short-term and Leppington and Oran Park in the longer-term.

For the purpose of traffic modelling, the extent of the road network over which the forecast demands and deficiencies will be assessed, has been agreed with the RTA. The intersections to be assessed as part of the Project Application include:

- Campbelltown Road / Macdonald Road (Traffic Signals);
- Campbelltown Road / Ingleburn Gardens access (Traffic Signals); and
- Macdonald Road / Stage 1 access road (new intersection).

The intersections to be assessed as part of the Concept Plan in addition to the ones listed above include:

- Camden Valley Way / Croatia Avenue (Traffic Signals);
- Two other signalised intersections along Campbelltown Road between Macdonald Road and Ingleburn Gardens access; and
- Other new key intersections internal to the proposed development (indicative only at this concept plan phase and will be reviewed and confirmed with further development of a Town Centre Masterplan).

1.7 Report structure

This report is structured to provide an assessment of the traffic impact and transport accessibility issues relating to the proposed Edmondson Park South development. This report is laid out in accordance with the TMAP Guidelines as follows:

- **Section 1** provides an overview of the project, background information and the study objectives.
- **Section 2** provides the strategic context within which the assessment has taken place. This section provides a literature review of all relevant, state, regional, local and other documents.
- **Section 3** establishes the existing transport context in the vicinity of the development site. A review and assessment of the existing road network has been undertaken to establish road network characteristics, performance criteria and any existing road network deficiencies. The chapter also provides an overview of existing travel patterns in the region as well as existing public transport, walk and cycle provisions.
- **Section 4** provides an overview of the future transport network context in terms of potential growth scenarios and road network upgrades required to cater for future background growth.
- **Section 5** provides a more detailed overview of the Concept Plan in terms of land uses, yields, road hierarchy. The chapter also describes the staging plan of the proposed development as well as the details of the Project Application plan for Stage 1 Development. The chapter also provides a snapshot of key transport planning principles for the proposed development.
- **Section 6** introduces the proposed Sustainable Travel Strategy as well as public and active transport initiatives that would assist the reduction of car dependency for the proposed development.
- **Section 7** presents the traffic and transport impact assessment for the Concept Plan and the Project Application including assessment of the road network impacts of the proposed development.
- **Section 8** documents the full package of measure to be implemented as part of the project. Timing of delivery and indicative costs for each component of the package of measures will be documented.
- **Section 9** summarises the conclusions and recommendations of the TMAP.

2.0 Strategic Context

2.1 Introduction

The strategic context of the study area is governed by three frameworks, being:

- State and regional strategic planning policies;
- Regional transport planning policies; and
- Local transport planning context.

This section provides an overview of the main aspects of each these frameworks and its relevance to the study area.

2.2 State and regional strategic planning policies

2.2.1 NSW state plan

Document	NSW State Plan (Investing in a better future)
Organisation	NSW Government
Date	March 2010
Purpose	To set priorities and targets for service delivery for NSW government, in order to: improve the transport system and create liveable cities; support jobs and business; improve education and health service provision, strengthen communities and support environmental objectives.
Assumptions	-
Content	The NSW State Plan (Priority Item E6) articulates the State's response to Housing Affordability. It acknowledges the impact of housing supply on affordability and recognises that there is a need to ensure competitive tension in the supply of land so there is a continuing flow of new properties to the market. The State Plan does not include specific goals for housing and land supply but refers to the goals set in the Metropolitan and Regional Strategies.
Relevance to Edmondson Park South	• Improvements to road network: an extra lane in each direction on the M5 motorway; upgrades to key roads in Western Sydney including the F5 Freeway, Camden Valley Way, Cowpasture Road, Richmond Road and Mulgoa Road • Construction of the SWRL and a station at Edmondson Park, making it easier for commuters to travel to Sydney, Parramatta and Liverpool CBDs for work and shopping. • Provide capacity for 640,000 new dwellings between 2004 and 2031, including 445,000 in existing urban areas and the remaining 195,000 in greenfield locations. • Achieve stocks of land zoned and serviced with trunk infrastructure with potential for development of 55,000 dwellings. • Improve the public transport system - Increase the proportion of total journeys to work by public transport in the Sydney Metropolitan Region to 28% by 2016. • Increase walking and cycling - Increase the mode share of bicycle trips made in the Greater Sydney region, at a local and district level, to 5% by 2016. • Increase number of jobs closer to home - Increase percentage of the population living within 30 minutes by public transport of a city or major centre in Metropolitan Sydney. • Speed up planning decisions - Meet planning benchmarks for timely processing of major project determinations and planning proposals.

2.2.2 State infrastructure strategy

Document	State Infrastructure Strategy
Organisation	NSW Government (Treasury)
Date	June 2008
Purpose	The State Infrastructure Strategy links the four year capital Budget contained in the Infrastructure Statement (Budget Paper No. 4) with the 25 year long term planning strategies, like the Metropolitan Strategy.
Assumptions	• NSW population is projected to grow from 7 million (2008) to 7.6 million (2018). Sydney (including the Central Coast) is expected to account for 70% of this growth. • Sydney expected to grow by 1.1 million, from 4.2 million (2004) to 5.3 million (2031). • Development in the South West metropolitan sub-region to 2031 of 155,000 additional dwellings and 89,000 additional jobs.
Content	The State Infrastructure Strategy sets out the infrastructure budget with agency plans for various government departments and agencies and regional infrastructure plans, covering areas such as strategic planning and development and public transport.
Relevance to Edmondson Park South	The Government will deliver the $1.36 billion, 13 kilometre SWRL by 2012. It will connect the existing Main South line just south of Glenfield Station to Leppington. A further extension to Bringelly is also under consideration.

2.2.3 Metropolitan strategy

Document	Sydney Metropolitan Strategy (City of Cities: A Plan for Sydney's Future)
Organisation	NSW Government (Department of Planning)
Date	December 2005
Purpose	A strategic framework to manage growth and development over the next 25 years. Planning for the sub-regions of Metropolitan Sydney including future residential development in new release and existing urban areas and strategic transport corridors and major centres best placed to focus commercial and residential growth.
Assumptions	• A population forecast to reach 6 million by 2036 - an increase of 1.7 million since 2006 • A need for 770,000 additional homes by 2036 • A need to expand Sydney's employment capacity by 760,000 to 2.89 million jobs
Content	The metropolitan strategy includes a vision and sections on employment and the economy, centres and corridors, housing, transport, environment and resources, parks and public places, governance and implementation.
Relevance to Edmondson Park South	• Delivery of homes and jobs connected to new infrastructure in Sydney's north-west and south-west growth centres • 100,000 new dwellings in the SWGC (by 2031)

2.2.4 Metropolitan transport plan

Document	The Metropolitan Transport Plan - Connecting the City of Cities
Organisation	NSW Government (Transport NSW)
Date	February 2010
Purpose	A 25 year vision for land use planning for Sydney, and a 10 year fully funded package of transport infrastructure to support it. The Metropolitan Transport Plan should be read with the Metropolitan Strategy and, following consultation and review, the two will be consolidated into one Metropolitan Plan.
Assumptions	• From 2006 to 2036, the South West sub-region is forecast to provide 179,200 additional dwellings and additional employment capacity of 105,150 jobs. • The total forecast provision required across Sydney is for 699,800 additional dwellings and additional employment capacity of 713,920 jobs. • By 2036, Sydney is expected to grow by 1.7 million to a population of 5.98 million.
Content	Vision, approach and funding guarantees to integrate transport and land use planning.
Relevance to Edmondson Park South	Constructing the SWRL: • The SWRL will connect new growth areas from Glenfield to Leppington, via Edmondson Park, by 2016. • A new express rail service for Western Sydney which will help increase the capacity across the whole rail network. • It will service the expected 110,000 new homes in the SWGC and a residential population of 300,000 people. • It will have the capacity to deliver thousands of workers to Parramatta, Sydney's second CBD. • It will serve as a significant form of access to 8,000 new jobs in the planned Leppington Major Centre.

2.2.5 Draft south west subregional strategy

Document	Draft South West Subregional Strategy
Organisation	NSW Government (Department of Planning)
Date	November 2007
Purpose	The sub-regional strategies are intended to translate the objectives of the Metropolitan Strategy's "City of Cities" long-term planning blueprint to the local level.
Assumptions	• Population growth of 1.2 million people to a total of 5.3 million by 2031 was assumed. • Average household sizes anticipated to fall from 2.65 to 2.36 persons per private dwelling by 2031, a total of 2.2 million homes will be required in Sydney. • Base employment projections provide for around 450,000 additional jobs by 2031 in Sydney. A higher end scenario assumes an increase of 500,000 jobs to a total of 2.5 million by 2031.
Content	The South West Sub-Regional Strategy aims to ensure that adequate land is available and appropriately located to sustainably accommodate the projected housing and employment needs of the region's population over the next 25 years. Subregional planning is vital to the implementation of the 2005 Metropolitan Strategy and is a crucial step in bringing the broad objectives set by the plan for all of Sydney down to a local level for Camden, Campbelltown, Liverpool and Wollondilly local government areas. One of the key directions of this subregional strategy is to provide an additional 89,000 jobs and 55,000 dwellings by 2031.

Document	Draft South West Subregional Strategy
Relevance to Edmondson Park South	Edmondson Park was the first precinct released in the SWGC and is aiming to deliver 7,500 residential lots. The SWRL will connect Edmondson Park to the rest of the SWGC and the existing rail network at Glenfield, providing direct and frequent rail services to Liverpool and the Sydney CBD. Road infrastructure upgrades are also proposed to mange traffic growth generated by the SWGC. Those one that are particular relevant to Edmondson Park South includes: Widening of Camden Valley Way to 4 lanes and F5 widening.

2.2.6 Accessibility planning

Document	Accessible Transport Action Plan for NSW Transport, Roads and Maritime Agencies
Organisation	NSW Government
Date	December 2007
Purpose	• To provide equitable access to transport services for all sections of the community. • Increased integration of delivery of accessible transport services.
Assumptions	-
Content	Agency Responsibilities, Commonwealth Disability Standards for Accessible Public Transport (the Transport Standards), Guiding Principles, Action Plan,
Relevance to Edmondson Park South	All new road related infrastructure works need to comply with the relevant disability standards. The Transport Standards indicate that passengers must also be able to: • understand information given in spoken, written, tactile or diagrammatic form; • have the capacity to use a mass transit system; • select their destinations, modes and times of travel; and • communicate their destinations where necessary.

2.2.7 Bus service planning guidelines

Document	Service Planning Guidelines
Organisation	Former NSW Ministry of Transport (now Transport NSW)
Date	June 2006
Purpose	The Guidelines are a schedule to the Metropolitan Bus System Contract and outline the planning process required under the Contract. They were developed to ensure that planning proceeds systematically and transparently, and that due account is taken of stakeholder views.
Assumptions	-
Content	The guidelines providing information on the following bus network characteristics: • Network (Area) Coverage • Network Legibility • Route Design and Section Points • Accessible Buses • Dedicated School Services • Patronage Bus services should be designed to: • Provide a well-designed bus network, operating at appropriate frequencies and with

Document	Service Planning Guidelines
	reliable trip times; • Provide integrated regional, district and local bus services that link people with regional centres and other patronage generators; and • Maximise integration between public transport modes to improve service delivery, reduce duplication and optimise the effective use of appropriate infrastructure and resources.
Relevance to Edmondson Park South	To ensure that bus services recommended in the South West Sector Bus Servicing Plan has been considered for the delivery of Edmondson Park South and subsequent changes recommended in this TMAP meet these guidelines.

2.2.8 NSW bike plan

Document	The NSW BikePlan
Organisation	Premier's Council for Active Living (PCAL)
Date	May 2010
Purpose	The NSW BikePlan is a 10-year funded plan for bicycle infrastructure including: • cross-regional missing links in the Metro Sydney Bike Network • sub-regional bike networks in the western Sydney River Cities of Parramatta, Liverpool and Penrith and • assistance for local councils across NSW to improve local cycleway networks. The NSW BikePlan includes a commitment for the NSW Government to fully fund construction of an average of 10 kilometres of new connections in the Metro Sydney Bike Network for each year of the ten year plan.
Assumptions	-
Content	The Metropolitan Strategy plans Sydney's future growth around its Major Centres with a focus on future public and private investment in urban development and major transport system improvements – including the Metro Sydney Bike Network, a regional network of high-quality cycle routes that connect the city's Major Centres and Regional Cities. The document includes a plan of the future Metro Sydney Bike Network, and sets out actions under the following key headings: to create connected cycling networks, to make bike-riding safe for all, to plan cycling-friendly neighbourhoods, to grow jobs in cycling, and to get organisations working together to support bike-riding.
Relevance to Edmondson Park South	• Complete missing links in the Metro Sydney Bike Network of low-stress regional routes, to connect all Metropolitan Strategy centres. • Provide local cycle links to new public transport interchanges through the delivery of major projects. • Ensure strategic planning for regions and sub-regions encourages cycling-friendly development concentrated in centres.

2.3 Regional transport context documents

2.3.1 SWRL environmental assessment – traffic and transport technical paper

Document	SWRL Traffic and Transport Impact Assessment
Organisation	NSW Government (TIDC)
Date	April 2010
Purpose	Traffic and transport impact assessment for the SWRL extension from Glenfield to Edmondson Park and Leppington.
Assumptions	• SWRL due to commence construction in 2010 and completion in 2016. • The 18 SWGC precincts can accommodate 115,000 homes. • 7,600 dwellings in Edmondson Park, with population forecast of 25,000 to 28,000, majority (22,000) in Liverpool City Council area. • 32,700 sq m (GFA) retail and 10,000 sq m commercial floorspace in Edmondson Park town centre. • 6% of SWGC dwellings and 25% of Edmondson Park dwellings developed by 2016. • Precinct development pattern commences with suburbs furthest from SWRL stations.
Content	Background land use and planning framework, transport planning framework, station access mode and impacts, and construction and operational traffic impacts of development.
Relevance to Edmondson Park South	• Forecast patronage (entries only) at Edmondson Park Station during AM peak hour: 690 in 2016 and 1,530 in 2026 • 2 feeder bus routes from residential areas of Edmondson Park to the proposed train station. (Ref: Liverpool City Council Contribution Plan, 2008) • 400 parking spaces for Edmondson Park station, integrated with the town centre. • Edmondson Park station interchange would need to accommodate 8 buses per hour at opening to provide for the short term bus network including 2 bus routes. • 61 bicycle parking spaces to be provided at Edmondson Park station (full development) • Provision of 18 ‘kiss and ride’ spaces and a 10 space taxi stand.

2.3.2 Growth centres road framework

Document	Growth Centres Road Framework
Organisation	Roads and Traffic Authority of New South Wales (RTA)
Date	2007 / 2008
Purpose	To create a framework to guide the development of the major road network in the North-West and South-West Growth Centres.
Assumptions	• 'Recent' forecasts of land release for residential lots in growth centre precincts – 80% developed by 2026. • One job per dwelling – reasonable self-containment of employment. • Population and employment forecasts modelled using TDC STM to predict peak period flows. • Trips imported into RTA highway network model – forecast peak 2hour flows assumed to be 15% of daily flow and using this assumption were factored to daily flows (AADT).
Content	Proposed road hierarchy and comparison to Sydney road network, relationship to local roads and public transport, road design principles and typical cross sections.
Relevance to Edmondson Park South	Proposes hierarchical road network linking Edmondson Park to the strategic road network and road classification including Campbelltown Road, Croatia Avenue, Bringelly Road and Camden Valley Way. Both Campbelltown Road and Camden Valley Way are classified as Principal arterials with an ultimate cross-section of 6 lanes. Principal arterials should have a posted speed of 80km/hr or 70km/hr. However, at areas where high pedestrian activities are expected, these roads should be posted at 60km/hr. Croatia Avenue is classified as sub-arterial with a 4-lane ultimate cross-section with a posted speed of 50km/hr.

2.3.3 South west sector bus servicing plan

Document	
Organisation	NSW Ministry of Transport (prepared by Maunsell AECOM)
Date	November 2009
Purpose	To develop a 'long-term' bus network for the SWGC for the next 20 years and beyond.
Assumptions	-
Content	This network was developed in three phases, • the first developing the 'ultimate' bus network for 20 years and beyond; • the second providing the staging strategy for the release of the precincts within the South West Growth Sector to best facilitate the implementation of the 'ultimate' network • the third being the development of a short-term network for implementation within the next five years to provide bus services for the first residents of the new developments. Objectives of the strategy are: • Provide frequent and reliable bus connections between the SWGC and Campbelltown and Liverpool City Centres; • Develop and protect corridors within the SWGC to facilitate bus servicing; • Integrate bus services with the planned SWRL; • Staging development within the SWGC to facilitate public transport servicing; and • Identify and acquire adequate depot and layover space.
Relevance to Edmondson Park South	Proposed Short-term Routes: Route 859 – operating from Carnes Hill to Liverpool via Edmondson Park, Route 858 – operating from Edmondson Park Station to Glenfield via Camden Valley Way. Proposed Long-term Routes: Route R1 – operating from Liverpool to Campbelltown via Edmondson Park Town Centre, Leppington, Narellan, and Macarthur, Route D4 – operating from Oran Park to Ingleburn via Edmondson Park and Route P4 – operating from Bringelly to Glenfield via Edmondson Park Town Centre operate through or near to the study area.

2.3.4 Draft Campbelltown LGA bicycle plan

Document	Draft Campbelltown LGA Bicycle Plan
Organisation	Campbelltown City Council (prepared by GTA Consultants)
Date	May 2009
Purpose	A recommendation from the Integrated Transport Strategy to evaluate the effectiveness of existing strategies in the Campbelltown Bike Plan (adopted in 2001) and Pedestrian Accessibility and Mobility Plan (PAMP) to ensure that Campbelltown has a comprehensive plan in place to encourage cycling as a viable alternative transport mode to replace car-based trips and support active living in the Campbelltown Local Government Area.
Assumptions	-
Content	There is strong potential for cycling to become a serious mode of transport in that the Regional, District and Local centres of Campbelltown LGA are generally contained within a 10-minute cycling radius, which makes cycling a competitive and achievable mode of transport for a range of trip purposes, including trips to railway stations, providing access for longer distance trips outside the LGA. Through review of existing Bike Plan, data collection and stakeholder consultation, a proposed cycle network for Campbelltown LGA has been developed, including connections to neighbouring LGAs.
Relevance to Edmondson Park South	Campbelltown Road has been identified as a strategic north-south route (NS1) that follows the major road spine of which runs north / south through the Campbelltown LGA. There are some facilities currently available along this route however these are generally limited to mid-block on-road lanes, with a lack of continuity or cycle treatments at intersections, particularly roundabouts. This route links with Wollondilly LGA at Appin Road in the south and with Liverpool LGA at Camden Valley Way and the M7 in the north.

2.3.5 Edmondson Park transport study

Document	Edmondson Park Transport Study
Organisation	Liverpool and Campbelltown City Councils (prepared by AECOM)
Date	February 2003
Purpose	To define the Transport and Traffic impacts and opportunities arising from the development of Edmondson Park.
Assumptions	• 10,000 dwellings • 25,000 additional residents and employees • 5,000 PM peak hour car trips
Content	Transport Principles and Performance Measures, Assessment of impacts and opportunities, package of measures to improve transport access, costing and funding.
Relevance to Edmondson Park South	Development impact and growth in background traffic generate need for highway upgrades: • Camden Valley Way widened to four lanes (two in each direction) • Macdonald Road and Campbelltown Road will need to be upgraded, but not widened • Bernera Road widened to accommodate proposed bus priority corridor. Also, a network of local bus services feeding onto the bus priority corridor, plus a trunk bus priority corridor service linking Liverpool and Ingleburn via Edmondson Park. Relatively flat topography means significant potential for high cycling mode share.

2.4 Local Planning Context

2.4.1 Liverpool DCP 2008 – Part 2.11 Edmondson Park

Document	Liverpool DCP 2008 – Part 2.11 Land and subdivision in Edmondson Park
Organisation	Liverpool City Council
Date	July 2009
Purpose	To define planning controls for land use development of the Edmondson Park precinct
Content	Controls for public domain, residential development, neighbourhood centre and enterprise / employment corridor.
Relevance to Edmondson Park South	Defines appropriate streetscape, access and parking design for residential, town centre and enterprise uses.

2.4.2 Campbelltown (Urban Area) Local Environmental Plan 2002

Document	Campbelltown (Urban Area) Local Environmental Plan 2002
Organisation	Campbelltown City Council
Date	Last Modified June 2010
Purpose	• To provide controls on development for the urban area of the City of Campbelltown in a local environmental plan which consolidates and simplifies existing controls. • To establish a broad framework of controls and allow the opportunity for more detailed provisions relating to specific types of development or specific areas to be provided by development control plans. • To maintain and enhance the amenity of the urban area of the City of Campbelltown.
Content	Controls for Division 1 for General zoning, Division 2 for Outdoor Advertising, Division 1A for urban release areas and Division 2A for Edmondson Park Urban Release Area Precinct.
Relevance to Edmondson Park South	The objectives for development within the Edmondson Park Release Area in relation to accessibility are as follows: • To integrate future transport opportunities into the planning process, and • To ensure roads, pedestrian pathways and cycleways link into and between residential areas, employment areas, and civic and cultural facilities, and • To accommodate people with disabilities throughout the Precinct.

2.4.3 Edmondson Park smart growth DCP – Locality CB masterplan (Ingleburn Gardens)

Document	Edmondson Park Smart Growth DCP - Locality CB masterplan
Organisation	Campbelltown City Council
Date	April 2007
Purpose	Provides a planning framework and detailed controls to supplement the provisions of Campbelltown (Urban Area) Local Environmental Plan 2002.
Content	General information on masterplan and specific development criteria for Ingleburn Gardens
Relevance to Edmondson Park South	Possible future road connection through to Edmondson Park and provision of a school in south of precinct (adjacent to Edmondson Park South).

3.0 Existing Transport Context

3.1 Introduction

This chapter summarises the existing travel behaviour and transport conditions in the vicinity of Edmondson Park based on published traffic, transport, statistical information and desktop reviews.

3.2 Existing travel patterns

3.2.1 Background

Travel characteristics for NSW residents travelling to work are gathered from the journey-to-work data extracted from Australian Bureau of Statistics (ABS) 2006 census data. The journey-to-work data set includes details of the origin and destination zones of trips, as well as characteristics of the journey such as mode of travel.

Edmondson Park is located within the boundaries of both Liverpool City Council and Campbelltown City Council. The key population and employment statistics for both LGAs are shown in **Table 3-1**.

Table 3-1: 2006 Key population and employment data

Area	Population	Average Dwelling Size	Employment	Employment Rate
Sydney SD	4,119,190	2.7	1,903,527	46%
Liverpool LGA	164,602	3.1	67,715	41%
Campbelltown LGA	143,077	3.0	63,253	44%

Source: 2006 ABS Census Data

Both Liverpool and Campbelltown LGAs have higher average dwelling size and lower employment rate than the Sydney average. These statistics will be used to establish the trip generation for the proposed development.

The existing South West Subregion (Liverpool, Campbelltown, Camden and Wollondilly local government areas) population generates more than 1.4 million trips on an average weekday, at a rate of 3.6 trips per person, with more than 70 per cent of these trips starting and ending within the South West Subregion. Trip containment in this region is the third highest of any region in Sydney.

3.2.2 Mode split

The existing suburb of Edmondson Park has a number of rural residential lots and the project site is largely vacant. Therefore, the mode split and travel destination data for a range of surrounding suburbs / travel zones (TZs) was analysed to establish the potential travel pattern and trip destinations for the proposed development:

Localities group 1 - Horningsea Park and Prestons (TZs 1170 to 1175)

These suburbs currently have no direct access to any train stations, but are currently connected to the rail network by bus services along Camden Valley Way. Trip patterns during the early development phases of Edmondson Park South, prior to the opening of SWRL, are expected to reflect travel patterns of these suburbs.

Localities group 2 - Localities that are separated by major roads to Glenfield, Macquarie Fields, Ingleburn and Minto Stations (TZs 1230, 1234, 1237, 1242, 1244, 1248, 1257 and 1279)

These suburbs are within walking distance of a train station, but are separated from the train station by a major road (located approximately 700m to 1.5km from a station). The proposed development located south of Campbelltown Road is expected to have similar travel characteristics to these suburbs after the opening of SWRL.

Localities group 3 - Localities adjacent to Glenfield, Macquarie Fields, Ingleburn and Minto Stations (TZs 1233, 1236, 1240, 1241, 1256, 1283 and 1284)

These suburbs are located adjacent to a train station along the South Railway Line (within up to 700m of a station). The completed development of Edmondson Park South will include an accessible network of streets

serving the Edmondson Park Station. Therefore, the completed development is expected to have similar travel characteristics to these suburbs, after the opening of SWRL.

The mode splits for Liverpool LGA, Campbelltown LGA and the selected neighbouring TZs are illustrated in **Table 3-2**.

Table 3-2: Journey-to-work mode split data

Area	Total JTW Trips	Vehicle Driver	Vehicle Passenger	Train	Bus	Others *	Did not Travel
Liverpool LGA	62,988	60%	7%	16%	1%	4%	12%
Campbelltown LGA	67,237	65%	7%	10%	2%	6%	11%
Localities group 1	7,805	70%	6%	9%	2%	3%	10%
Localities group 2	9,448	60%	6%	19%	1%	3%	11%
Localities group 3	4,573	50%	5%	27%	1%	6%	12%

*- including walking, cycling and travel modes not stated

Source: 2006 ABS Census Data

Based on the 2006 census data, there is a high reliance (approximately 75%) on private vehicle for journey-to-work trips from suburbs that are not within the catchment of a railway station. Public and active transport trips account for approximately 12% of the daily trips from these suburbs.

Non-car modes increase to up to 30% of the total trips for localities that are close to railway stations along the South Rail Line.

3.2.3 Journey-to-work destinations

The journey-to-work destinations for Liverpool LGA, Campbelltown LGA and the selected neighbouring TZs are illustrated in **Table 3-3**.

Table 3-3: Journey-to-work destinations data

Liverpool LGA		Campbelltown LGA		Neighbouring TZs	
Destinations (LGA)	Proportion	Destinations (LGA)	Proportion	Destinations (LGA)	Proportion
Campbelltown	33%	Liverpool	28%	Liverpool	30%
Sydney	10%	Sydney	9%	Sydney	10%
Liverpool	10%	Fairfield	8%	Fairfield	10%
Bankstown	5%	Bankstown	8%	Bankstown	8%
Camden	4%	Parramatta	4%	Parramatta	5%
Fairfield	4%	Campbelltown	4%	Campbelltown	5%
Parramatta	3%	Holroyd	3%	Blacktown	3%
Others	31%	Others	36%	Others	29%

Source: 2006 ABS Census Data

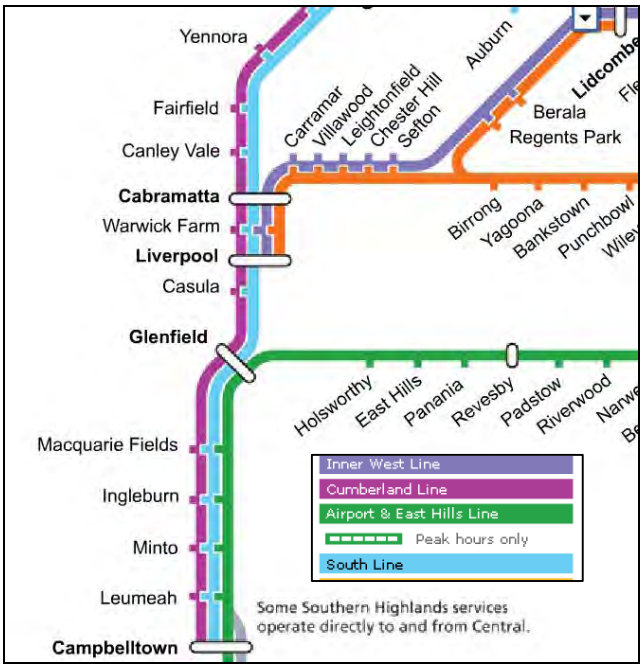
The 2006 Journey-to-Work Data shows that in the suburbs near Edmondson Park, there was approximately 30% of travel to the Liverpool LGA. Other major journey-to-work destinations include Sydney LGA (10%) and Fairfield LGAs (10%), Bankstown (8%), Parramatta LGA (5%) and Campbelltown LGA (5%). Based on the location of the LGAs, the majority (94%) of trips made from Edmondson Park and its neighbouring suburbs travel north, with the rest (6%) travels south. However, the pattern is likely to change over time when employment opportunities grown in the SWGC.

3.3 Existing public transport provision

3.3.1 Rail infrastructure and services

The nearest train stations to Edmondson Park study area are Ingleburn, Macquarie Fields and Glenfield Stations. These stations are located approximately between four to eight kilometres from the site. The site is currently outside the walking catchment for both stations (typically 1km), but is within a reasonable cycling distance. The existing rail network is shown in **Figure 3-1**.

Figure 3-1: Existing rail network



Source: Cityrail, June 2010

The Inner West, Cumberland, Airport & East Hills and South Railway Lines operate via Ingleburn and Glenfield Stations providing connectivity to key employment areas Sydney CBD, Fairfield, Bankstown, Parramatta and Campbelltown. The number of railway services operating during the peak hours is shown in **Table 3-4**.

Table 3-4: Railway services to key destinations

Railway Line	Key Destinations	AM Peak Headway from Glenfield (7:00-9:00am)	PM Peak Headway to Glenfield (5:00-7:00pm)
Airport and East Hills	Sydney CBD	8 minutes	15 minutes
	Campbelltown	20 minutes	10 minutes
Inner West and South	Fairfield and Bankstown	10 minutes	8 minutes
	Campbelltown	20 minutes	15 minutes
Cumberland	Parramatta	30 minutes*	30 minutes**

*2 services, **3 services

Source: Cityrail, June 2010

Bus connections to Glenfield Station are provided by bus routes currently operating along Camden Valley Way (See **Figure 3-2**). According to the 2008 Compendium of CityRail Travel Statistics, approximately 11% of passengers access Glenfield Station by bus during the AM peak hours.

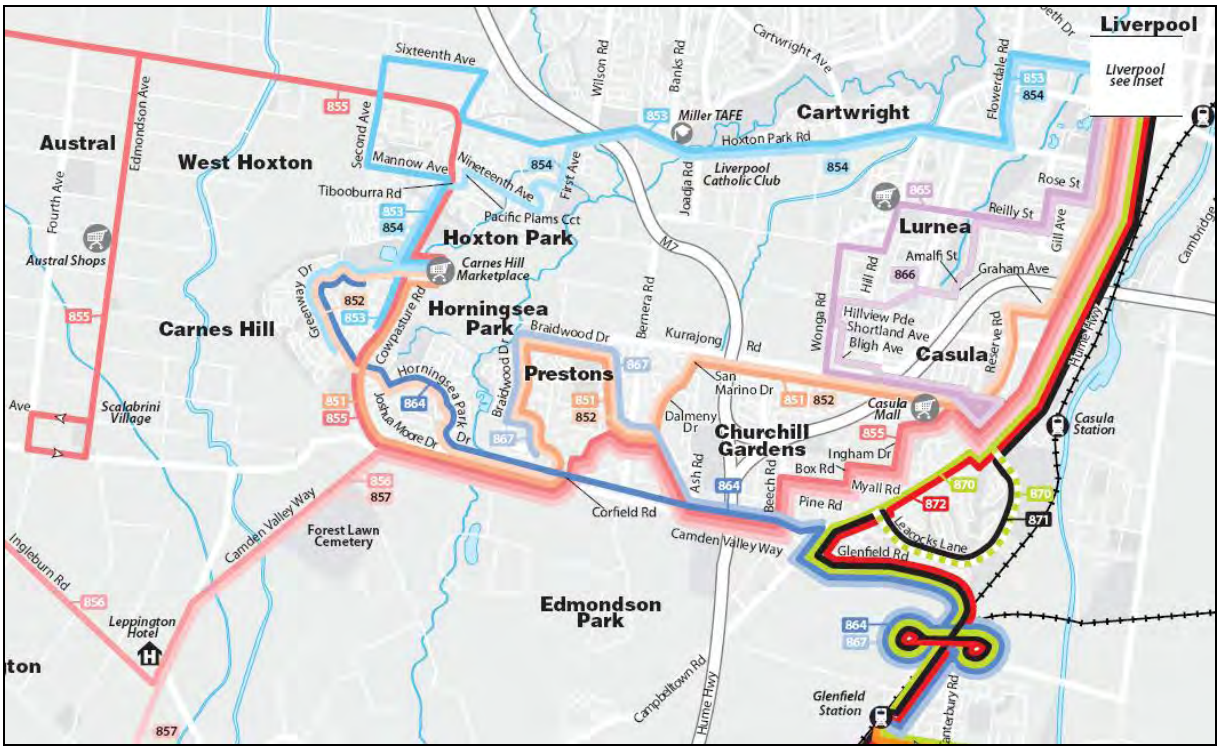
According to the 2004 surveys, approximately 64% of passengers access Glenfield Station by private car, with 33% of them as car passengers and 31% parking their car near the station. On the other hand, approximately 44% of passengers walking to Ingleburn Station and 42% of them using private vehicles to access the station. There are commuter parking spaces available at both stations.

3.3.2 Bus services

No bus routes currently serve Campbelltown Road or Macdonald Road. The nearest bus corridor to Edmondson Park is Camden Valley Way. Busabout operates four regular bus routes and school bus routes. These bus routes are shown in **Figure 3-2**. The regular bus services that operate on this corridor are:

- Route 855 Austral - Liverpool via Prestons and Churchill Gardens;
- Route 856 Bringelly - Liverpool via Prestons and Churchill Gardens;
- Route 857 Narellan - Liverpool via Prestons and Churchill Gardens; and
- Route 864 Carnes Hill - Glenfield via Horningsea Park.

Figure 3-2: Bus services in the vicinity of Edmondson Park



Source: Busabout, June 2010

The frequencies of the bus services along Camden Valley Way are shown in **Table 3-5**.

Table 3-5: Frequency of bus services on Camden Valley Way

Route	Description	Weekday – approximate time between services			Weekend
		AM Peak	Off Peak	PM Peak	
855	Austral - Liverpool via Prestons and Churchill Gardens;	30 minutes	>120 minutes	120 minutes	180 minutes
856	Bringelly - Liverpool via Prestons and Churchill Gardens	45 minutes	180 minutes	90 minutes	>120 minutes
857	Narellan - Liverpool via Prestons and Churchill Gardens; and	45 minutes	60 minutes	>180 minutes	>120 minutes
864	Carnes Hill - Glenfield via Horningsea Park.	30 minutes to 7am	No service	30 minutes	No service

Source: Busabout website, accessed June 2010.

3.4 Existing active transport provision

3.4.1 Walking and cycling

There are limited cyclist facilities in the study area; however there is an on-road cycle lane on sections of Campbelltown Road.

Campbelltown Road has been identified in the Draft Campbelltown LGA Bicycle Plan as a strategic north-south cycle route (NS1) that follows the major road spine of which runs north / south through the Campbelltown LGA. There are some facilities currently available along this route however these are generally limited to mid-block on-road lanes, with a lack of continuity or cycle treatments at intersections, particularly roundabouts. This route links with Wollondilly LGA at Appin Road in the south and with Liverpool LGA at Camden Valley Way and the M7 in the north.

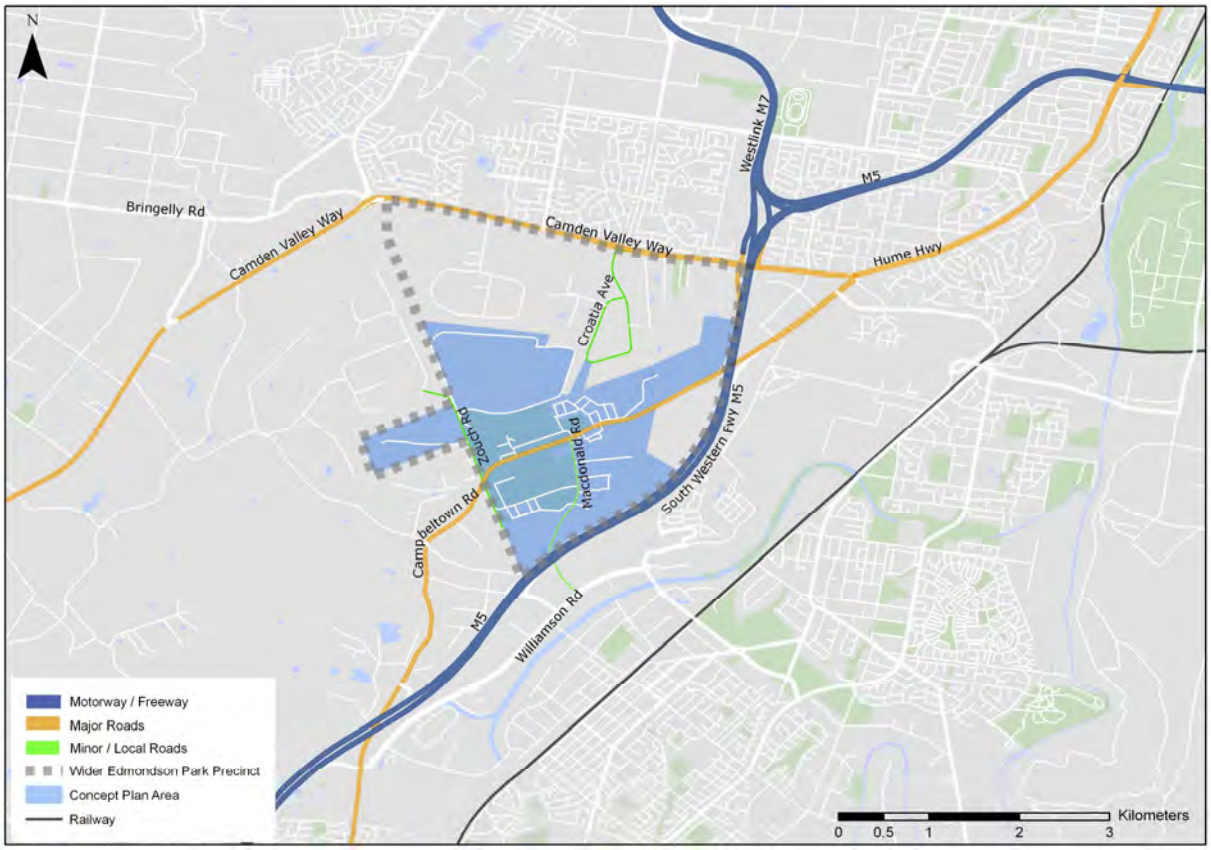
There are currently limited pedestrian facilities in the study area. Signalised pedestrian crossings are provided at the intersections of Macdonald Road and Ingleburn Garden access at Campbelltown Road. There is no continuous footpath network within the study area.

3.5 Existing road infrastructure

3.5.1 Road hierarchy

Edmondson Park is located adjacent to the Sydney Motorway network including the M5 Motorway and the Westlink M7 Motorway. The nearest access to the Sydney Motorway network is located at Camden Valley Way. An alternative major road to the M5 and M7 Motorways is the Hume Highway, which connects Liverpool with Parramatta and the rest of Sydney. Other major road network links surrounding Edmondson Park include Camden Valley Way, Campbelltown Road. Other local roads providing access to the study area includes Croatia Avenue, Macdonald Road and Zouch Road. The major road network surrounding Edmondson Park and its hierarchy is shown in **Figure 3-3**.

Figure 3-3: Existing road hierarchy



Source: AECOM, July 2010

3.5.2 Road network description

Westlink M7

The Westlink M7 is a 40km motorway linking the M2, M4 and M5 motorways. It links the M5 at Prestons in the south, with the M4 at Eastern Creek and the M2 at West Baulkham Hills in the north. The Westlink M7 provides access to the study area from western and north-western Sydney via Camden Valley Way. The motorway has two lanes in each direction, separated by a wide median and speed limits of up to 100km/hr.

South Western Freeway (F5)

The F5 is located to the southern boundary of the study area and connects the Westlink M7 to the north with the Hume Highway to the south. The F5 has four lanes in both direction between Brooks Road and Camden Valley Way. It has a posted speed limit of 100km/hr.

There is no direct access from the F5 to the study area. The nearest southbound freeway access can be made via Campbelltown Road near Bow Bowing. The nearest northbound access on to the freeway can be made via the Brooks Road Interchange or Camden Valley Way Interchange.

The freeway is currently being upgraded between Brooks Road and Narellan Road from two lanes to three lanes in each direction with an additional northbound on-ramp from Raby Road.

Hume Highway

The Hume Highway connects Camden Valley Way and Campbelltown Road with Parramatta Road, travelling through Sydney's western suburbs. South of Campbelltown Road and Camden Valley Way, the Hume Highway becomes the F5, before resuming itself as the main road link to the Southern Highlands and Canberra. The section of the Hume Highway to the east of the study area consists of three lanes in each direction, with a posted speed limit of 70km/hr.

Camden Valley Way

Camden Valley Way is a major arterial road linking the Hume Highway, M7 and M5 near Liverpool with the town of Camden. It is primarily a two lane carriageway with one lane in each direction for most of its length. The section of Camden Valley Way between Croatia Avenue and the M5 has recently been upgraded to two lanes in each direction including bus priority measures at intersections. The section between Bernera Road to Cowpasture Road is currently being upgraded. Camden Valley Way has speed limits of between 60 and 80km/hr.

The signalised intersection at Bernera Road and Croatia Avenue with Camden Valley Way will provide an alternative access to the Edmondson Park Station and the proposed Town Centre with the completion of the SWRL.

Campbelltown Road (MR177)

Campbelltown Road connects Campbelltown to the south of the study area with the Hume Highway to the north at the Crossroads. It is an undivided road with one lane in each direction and a posted speed limit of 70km/hr south of the Hume Highway on-ramp.

Signal-controlled intersections are currently located at Macdonald Road and Ingleburn Garden access road. There is also a marked on-road cycleway along Campbelltown Road.

Macdonald Road

Macdonald Road is a local road with one lane in each direction. It connects Campbelltown Road with the industrial area of Ingleburn to the south and has a posted speed limit varying between 60km/hr and 70km/hr. There is a 40km/hr school zone outside the existing Ingleburn North Public School.

Macdonald Road is connected to Brooks Road which provides direct access to the F5 in northbound direction.

Croatia Avenue

Croatia Avenue is a local road that provides access to existing residents living in the northern part of the Edmondson Park. It is an undivided, sealed road with one lane in each direction and has a posted speed limit of 60km/hr. Croatia Avenue currently does not connect to Campbelltown Road.

Zouch Road

Zouch Road is a local (cul-de-sac) road with 60km/hr speed limit located on the western edge of the study area. It currently provides access to the Defence homes on the eastern side of Zouch Road and other rural residential lots on the western side of Zouch Road. The road is a sealed, undivided road with one lane in each direction. It intersects with Campbelltown Road at a priority controlled intersection with very poor sight distances for traffic on Zouch Road.

3.5.3 Historical traffic growth

The historical annual average daily traffic (AADT) growth patterns at selected RTA survey locations in the vicinity of Edmondson Park are presented in **Table 3-6**. The location of the RTA traffic count stations is shown in **Figure 3-4**.

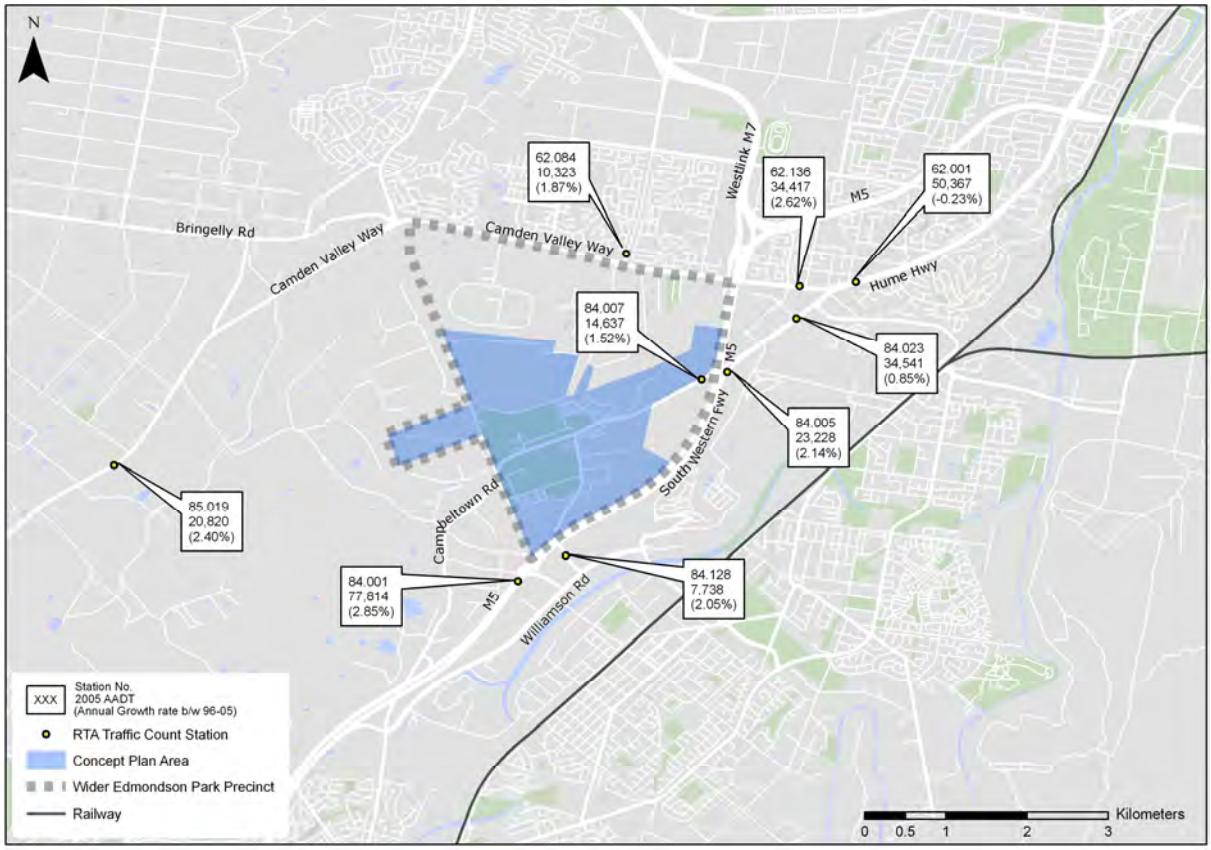
Table 3-6: Historical AADT growth trends in the vicinity of Edmondson Park

Station	Location	1991	1993	1996	1999	2002	2005	% growth p.a. (1996-2005)
62.001*	Hume Hwy, east of Box Road	72,294	78,450	51,441	52,881	52,310	50,367	-0.23%
84.001*	M5 Motorway, south of Brooks Road	45,423	51,037	60,410	67,700	73,802	77,814	2.85%
85.019*	Camden Valley Way, south of Heath Road			16,820	19,428	21,023	20,820	2.40%
84.007	Campbelltown Road, south of F5 underpass	21,426		12,784	12,624	12,892	14,637	1.52%
84.023	Campbelltown Road, south of Glenfield Road		43,072	32,012	33,941	33,588	34,541	0.85%
84.005	M5 Motorway southbound onramp at Campbelltown Road			19,205	21,900	22,051	23,228	2.14%
84.128	Macdonald Road, north of Williamson Road		7,011	6,447	7,015	6,953	7,738	2.05%
62.136	Camden Valley Way, west of Cedar Road			27,262	30,866	32,339	34,417	2.62%
62.084	Bernera Road, north of Camden Valley Way			8,735	8,888	8,936	10,323	1.87%

*- Stations 62.001, 84.001 and 85.019 are permanent count stations and the AADT shown are in vehicles. All other AADT estimates are based on a 1-2 week sample and represent axle pairs.

Source: RTA Traffic Data, 2005

Figure 3-4: Location of RTA traffic count stations



Source: RTA traffic volume data, 2005

The table shows that AADT on a number of major roads in the vicinity of the study area has decreased between 1993 and 1996. This is mainly due to the staged opening of the M5 / F5 and subsequent redistribution of traffic from the Hume Highway and Campbelltown Road onto M5 / F5. Traffic on the Hume Highway has been constant at approximately 50,000 vehicles per day since 1999.

The M5 Motorway has seen a gradual increase of vehicles per year between 1991 and 2005 (an average of 2.5%). AADT on Camden Valley Way (south of Heath Road) increased between 1996 and 2002, before decreasing between 2002 and 2005. However, the section of Camden Valley Way west of Cedar Road has seen a steady increase in AADT between 1996 and 2005 (2.62% per annum).

On Campbelltown Road there has been a minimal increase in AADT between 1996 and 2005. AADT on Macdonald Road has fluctuated between 1993 and 2005, however the highest AADT volumes were seen in 2005 and AADT volumes of Bernera Road have increased between 1996 and 2005.

The average AADT growth per annum across all sites in the vicinity of the study area was approximately 1.78% between 1996 and 2005.

The latest (2009) peak hour traffic count data on Campbelltown Road (immediately west of the M5) was obtained from the RTA. The data shows a count of approximately 1,160 vehicles in the northbound direction in the AM peak hour and 1,150 vehicles in the southbound direction in the PM peak hour. The recent traffic data at Campbelltown Road has demonstrated that there has been a reduction of approximately 20% in the AM peak hour traffic between 2005 and 2009 as shown in **Table 3-7**.

Table 3-7: 2009 Peak hour traffic volumes at Campbelltown Road

Station 84.007 – Campbelltown Road south of F5 underpass	2005 AM	2005 PM	2009 AM	2009 PM
Northbound	1,530 (7-8 AM)	506 (3-4 PM)	1,164 (7-8 AM)	595 (3-4 PM)
Southbound	323 (7-8 AM)	1,188 (5-6 PM)	288 (8-9 AM)	1,151 (5-6 PM)
Two-way total	1,853	1,694	1,452	1,746
Comparison to 2005 traffic flow			-22%	+3%

Source: RTA traffic volume data, 2009

3.5.4 Peak hour traffic flows and road network capacity

SCATS traffic data has been obtained from the RTA at the following key intersections for 24th June 2010:

- Campbelltown Road / Macdonald Road;
- Campbelltown Road / Ingleburn Gardens access; and
- Camden Valley Way / Croatia Avenue / Bernera Road.

Table 3-8 shows the peak hour traffic flow (typically at 8-9 AM during the morning peak and 4-5PM in the afternoon peak hour) at certain locations along Campbelltown Road, Macdonald Road and Camden Valley Way in the vicinity of Edmondson Park.

Table 3-8: 2010 peak hour traffic flow on major road network in the vicinity of Edmondson Park

Road / Location	Lanes per direction	Direction	2010 AM	2010 PM
Campbelltown Road (west of Macdonald Road)	1	EB	1,030	440
		WB	230	860
		Total	**1,260**	**1,300**
Campbelltown Road (east of Ingleburn Gardens access)	1	WB	1,110	550
		EB	300	1,190
		Total	**1,410**	**1,740**
Macdonald Road (south of Campbelltown Road)	1	NB	330	360
		SB	345	520
		Total	**675**	**880**
Camden Valley Way (east of Croatia Avenue)	2	WB	1,450	970
		EB	980	1,600
		Total	**2,430**	**2,570**

Source: RTA, June 2010

The table shows that Campbelltown Road is operating at capacity for a single lane road (approximately 1,000 vehicles per lane) in the peak hour directions. Macdonald Road currently has spare capacity as a two lane road. However, Camden Valley Way is approaching capacity during the peak hours, especially to the west of Croatia Avenue where Camden Valley Way is being upgraded from 1 lane to 2 lanes in each direction.

3.5.5 Intersection controls and performance

The existing key intersections in the vicinity of Edmondson Park are:

- Campbelltown Road / Macdonald Road (Traffic Signals);
- Campbelltown Road / Ingleburn Gardens access (Traffic Signals); and
- Camden Valley Way / Croatia Avenue / Bernera Road (Traffic Signals).

Both intersections at Campbelltown Road are T-intersections with a single through lane and short turning lanes on all approaches. Pedestrian crossings are provided on all approaches of both intersections, except on the eastern approach of Campbelltown Road / MacDonald Road intersection.

The intersection of Camden Valley Way / Croatia Avenue / Bernera Road has two through lanes and a short bus-jump start on the Camden Valley Way approaches, a short dedicated right turn lane and a left turn slip lane. The Bernera Road approach has one through lane into Edmondson Park, a short left turn slip lane and two short right turn lanes to the west. Croatia Avenue forms a “dog-leg” approach to the intersection with a left turn slip lane and a short right turn lane. Pedestrian crossings are provided on all approaches of the intersection. A bus stop is located on the downstream side of the eastern and western approaches of the intersection.

The peak hour turning volumes derived from the SCATS data for the three signalised intersections in the vicinity of the study area is included in **Appendix B**.

Using details of the geometry of the key intersections and the traffic data provided, existing intersection performance was assessed using SIDRA Intersection 3.2. SIDRA output data used in this study includes:

- Degree of Saturation – a measure of the ratio between traffic volumes and capacity of the intersection;
- Level of Service – a measure of the overall performance of the intersection; and
- Average Delay – the average time in seconds that vehicles wait at the intersection.

Table 3-9 and **Table 3-10** summarise the performances of the key intersections during the weekday AM and PM peak hours respectively. The detailed results of the intersection performance are presented in **Appendix B**. The existing intersection signal phasing and timings used in the analysis were provided by the RTA.

Table 3-9: Existing Intersection performance (2010 AM Peak)

Intersection	Volumes (veh/hr)	Degree of Saturation (DoS)	Ave Delay (sec)	Overall Level of Service (LoS)	95% Back of Queue (m)
Campbelltown Road / Macdonald Road	1,675	0.724	14.8	B	123
Campbelltown Road / Ingleburn Gardens access	1,421	0.789	2.0	A	81
Camden Valley Way / Croatia Avenue / Bernera Road	2,830	0.765	31.9	C	213

Source: AECOM, June 2010

Table 3-10: Existing Intersection performance (2010 PM Peak)

Intersection	Volumes (veh/hr)	Degree of Saturation (DoS)	Ave Delay (sec)	Overall Level of Service (LoS)	95% Back of Queue (m)
Campbelltown Road / Macdonald Road	2,002	0.716	14.1	A	127
Campbelltown Road / Ingleburn Gardens access	1,744	0.819	1.8	A	103
Camden Valley Way / Croatia Avenue / Bernera Road	2,921	0.773	34.4	C	245

Source: AECOM, June 2010

The results indicate that the Campbelltown Road / Macdonald Road intersection operates at a satisfactory level of service (LoS B and A) and with spare capacity in both the AM and PM peak hour.

The intersection of Campbelltown Road / Ingleburn Gardens access also operates at a satisfactory LoS A in the AM and PM peak hour; with approximately 18% spare capacity in the PM peak hour.

The results indicate that the Camden Valley Way / Croatia Avenue / Bernera Road intersection operates at LoS C in the AM and PM peak hours and with approximately 20% spare capacity in both peak hours. Results also indicate that queuing on Camden Valley Way exceeds 200m in the peak traffic direction.

4.0 Future Transport Context

4.1 Introduction

In December 2004, the NSW Government announced that a new land release strategy for Sydney's South West and North West Growth Centres as part of the Government strategy to respond to Sydney's growing population. The release of this land is underpinned by a commitment of early provision of transport services and road infrastructure upgrades in these areas. During the next 30 years, it is estimated that 110,000 homes will be built in the SWGC.

The SWGC is expected to generate significant interaction with the existing urban areas and town / regional centres in Liverpool and Campbelltown and new centres in Oran Park and Leppington. The draft South West Subregional Strategy identified the need for transport linkages such as the SWRL and extensions of strategic bus corridors as well as road network upgrades to cater for the expected traffic and transport demand generated by the new urban areas in the SWGC.

This section summarises the expected growth in the SWGC and the subregion, the potential increase in traffic and public transport demand as well as the planned provision of transport services and infrastructure upgrades to cater for these future development.

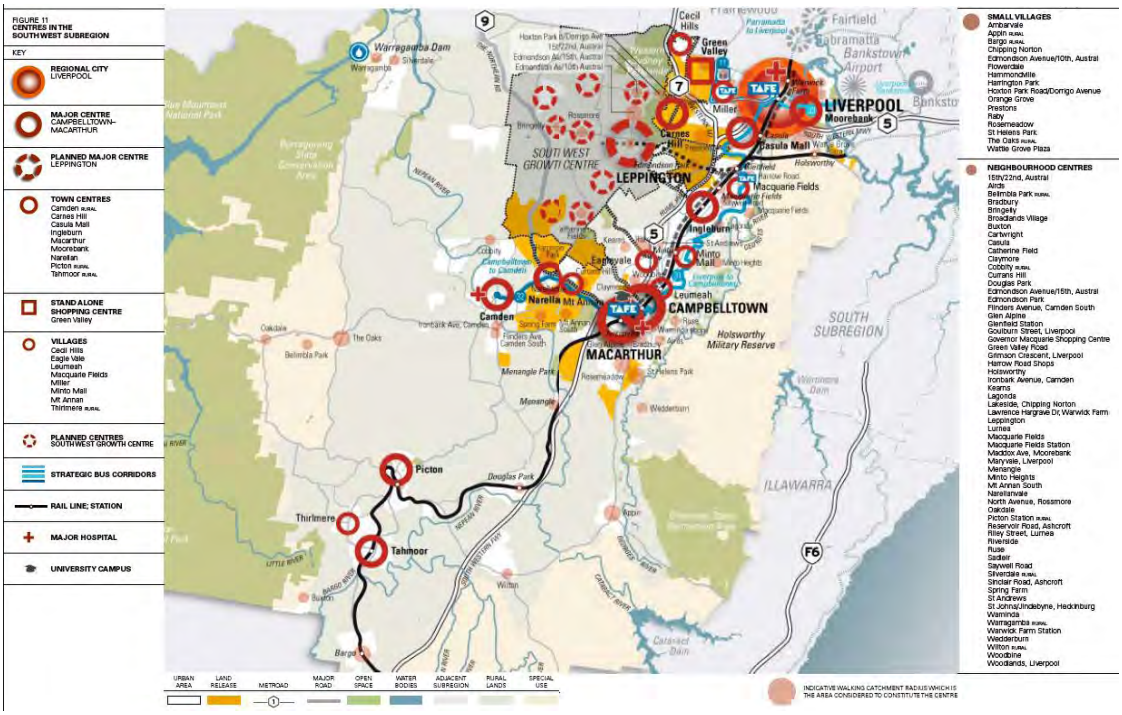
4.2 Future urban growth

4.2.1 South west subregion and the South West Growth Centre

The Metropolitan Strategy (NSW Government, 2005) identified a need to plan for 770,000 new homes in Sydney between 2006 and 2036, with up to 230,000 of these in new release areas, including 100,000 dwellings in the SWGC. The NSW State Plan (NSW Government, 2010) revised the headline target to 640,000 dwellings to be delivered by 2031.

The Sydney metropolitan region is divided into 10 Subregions for strategic planning purposes. The South West Subregion covers Liverpool, Campbelltown, Camden and Wollondilly local government areas (LGAs) and includes the SWGC. The relationship between the South West Subregion and the SWGC are shown in **Figure 4-1**.

Figure 4-1: Context of south west subregion and SWGC



Source: Department of Planning, South West Subregional Strategy, 2007

The SWGC comprises 18 precincts, which include approximately 17,000 hectares of land and a planned capacity of 110,000 new dwellings or approximately 300,000 people. Over 65% of the future residential dwelling supply estimated in the South West Subregion will be provided in the SWGC. Other growth areas are scattered throughout Camden, Campbelltown, Liverpool and Wollondilly LGAs with approximately 32,000 additional infill dwellings and 21,000 greenfield dwellings.

Five precincts in the SWGC have been released for development. The remaining 13 precincts will be released for Precinct Planning progressively. Latest staging of land releases suggests that approximately 6% of dwellings are expected to be developed by 2016, with early development in Oran Park and Edmondson Park Release Area. The location of the released precincts and their relation to Edmondson Park Release Area is shown in **Figure 4-2**.

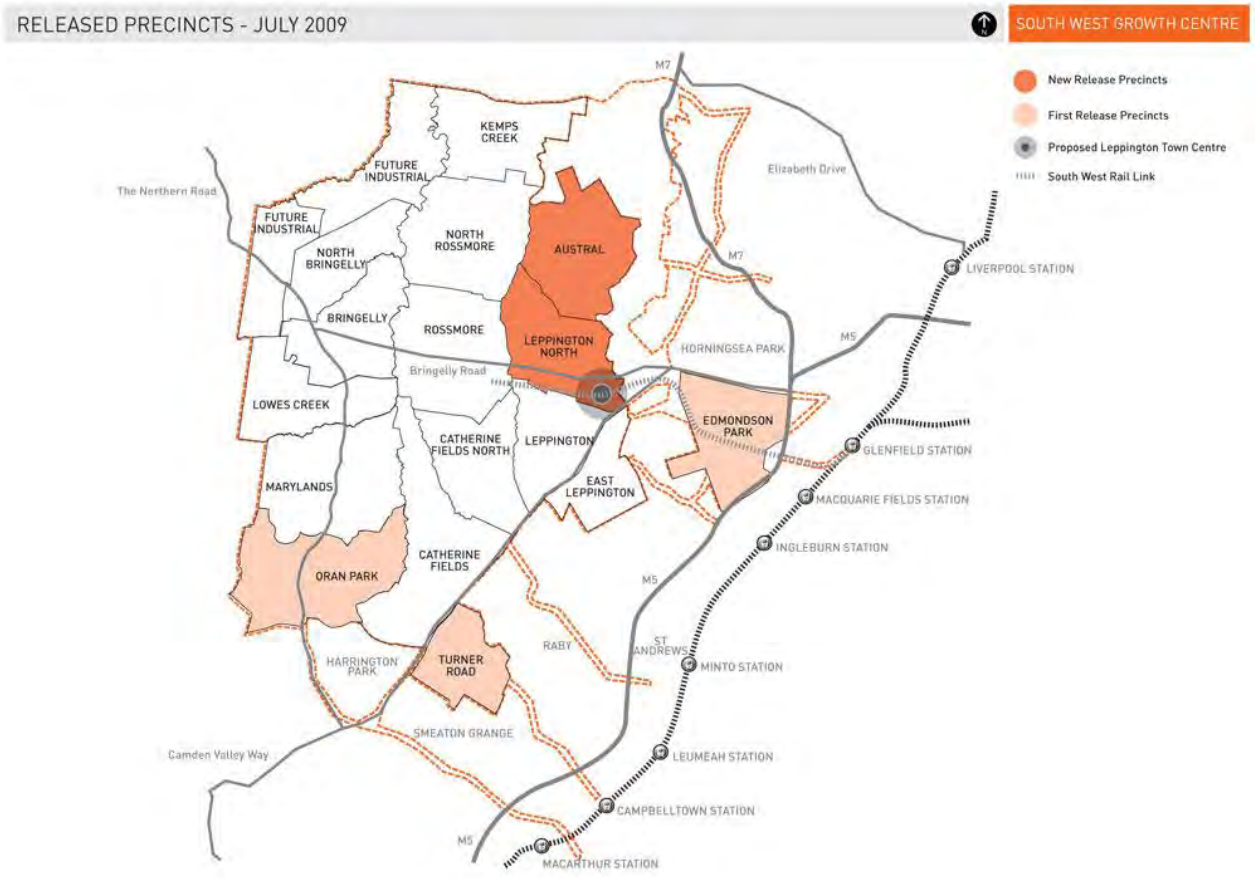
The latest released precincts and the associated land use breakdown for these precincts are shown in **Table 4-1**.

Table 4-1: SWGC released precincts and associated land use

Precinct	Dwelling Target	Population Target	Employment Capacity
Edmondson Park (Release Area)	7,500	25,000	1,000
Oran Park	7,540	22,000	4,120
Turner Road	4,020	12,000	5,000
Austral	8,000	22,000	n/a
Leppington North	12,000	30,000	9,000 (Leppington Major Centre)

Source: Department of Planning, July 2010

Figure 4-2: South West Growth Centre - released precincts



Source: Department of Planning, July 2010

The major employment centres and additional jobs forecast in the South West Subregion and the SWGC are described in **Table 4-2**. This table also shows Penrith, in the North West subregion, which is a significant regional destination.

Table 4-2: Major centres and forecast employment in the south west subregion

Centre	Centre Type	Proposed Additional Employment Targets
Campbelltown-Macarthur	Major Centre	4,000 by 2031
Leppington	Planned Major Centre	9,000
Liverpool	Regional City	14,500 jobs by 2031
Penrith	Regional City	11,000 jobs by 2031
Total		38,500

Source: South West and North West Sub Regional Strategies, Department of Planning, 2007

The proposed residential and employment growth in the South West Subregion and the SWGC will put pressure on the existing road and transport infrastructure / network that are approaching or are already at capacity, especially during the peak hours. Extra road network capacity and new public transport services will be needed to move people within and out of the subregion efficiently.

The intention for the South West Subregion is to at least maintain or even increase the level of self containment to reduce the number of additional trips outside the subregion. The delivery of the proposed employment targets in major centres near the SWGC and the subregion will assist in achieving this policy objective.

4.2.2 Other infill growth

Although the majority of additional dwellings in the South West Subregion are proposed for the SWGC, other infill and greenfield growth in the Subregion will provide 55,000 new homes in the next 20-25 years. Some of these committed greenfield sites include developments in Appin, Currans Hill, Elderslie, Harrington Park / Grove, Mater Dei, Middleton Grange, Mt Annan, Narellan Vale, Spring Farm, Warragamba and Wilton. There will also be additional infill residential developments in the vicinity of Campbelltown-Macarthur, Ingleburn, Leumeah, Liverpool and Narellan. **Table 4-3** highlights some of the major planned housing developments in the South West Subregion.

Table 4-3: Planned infill developments in vicinity of Edmondson Park

Development	Indicative number of lots
Talana (Edmondson Park Release Area)	170
Greenway Views (West Hoxton)	280
Ingleburn Gardens	256 (estimated completion 2013-2014)
Parkbridge (Middleton Grange)	700
Middleton Grange (ex. Parkbridge)	1,800

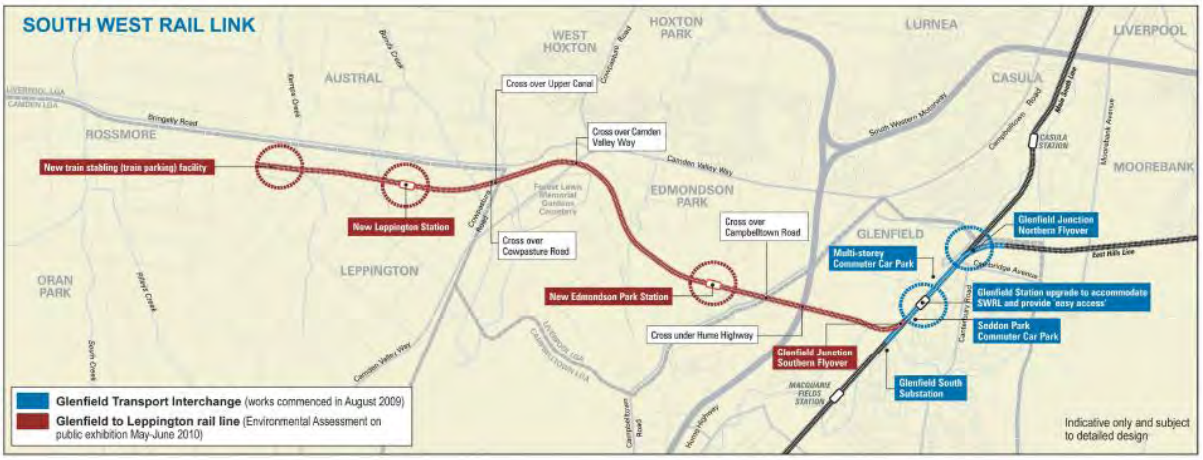
Source: Landcom and Gregory Hills websites, July 2010

4.3 Public transport upgrades

4.3.1 South West Rail Link

In 2009, the NSW Government announced the construction of a new 11 kilometre rail line – South West Rail Link (SWRL) from Glenfield to Leppington in South West Sydney. The project includes two new stations at Edmondson Park and Leppington. The delivery of the two new stations includes bus interchanges, pedestrian and cyclist facilities as well as kiss and ride zones and commuter car parking. Construction of the SWRL will commence in 2010 and be due for completion in 2016. A map of the SWRL project is shown in **Figure 4-3**.

Figure 4-3: Proposed South West Rail Link



Source: Transport Construction Authority, July 2010

The SWRL will offer a heavy rail transport option for the future residents of SWGC by providing frequent train services to Glenfield and the rest of the CityRail network. The SWRL will provide two new stations at Leppington and Edmondson Park, which provide a major opportunity for transit-oriented and sustainable development servicing the new communities and the broader SWGC.

RailCorp proposes an initial four services per hour throughout the day with up to 12 trains per hour in peak periods. Capacity is available for additional rail services should population increases warrant additional services in the future. Options for a potential future extension of the project beyond Rossmore have been investigated by the NSW Government.

The opening of the SWRL in 2016 would coincide with less than 10% development of the SWGC dwellings, with the majority of the development located in Oran Park and Edmondson Park. Patronage estimates (PB, 2009) for the morning peak hour indicate 690 station entries and 30 exits in 2016 and 1,530 entries at Edmondson Park Station.

The SWRL will provide a significant opportunity to develop Edmondson Park South into a sustainable development. The majority of the Edmondson Park South development proposed by Landcom is located within a 1km or 15 minute walking catchment of the proposed station. The provision of bus interchange and efficient bus services as well as walking and cycling facilities at the proposed station will assist Edmondson Park South in achieving the revised State Plan mode share targets of 28% of total journeys to work being undertaken by public transport in the Sydney Metropolitan Region by 2016.

4.3.2 South west sector bus servicing plan

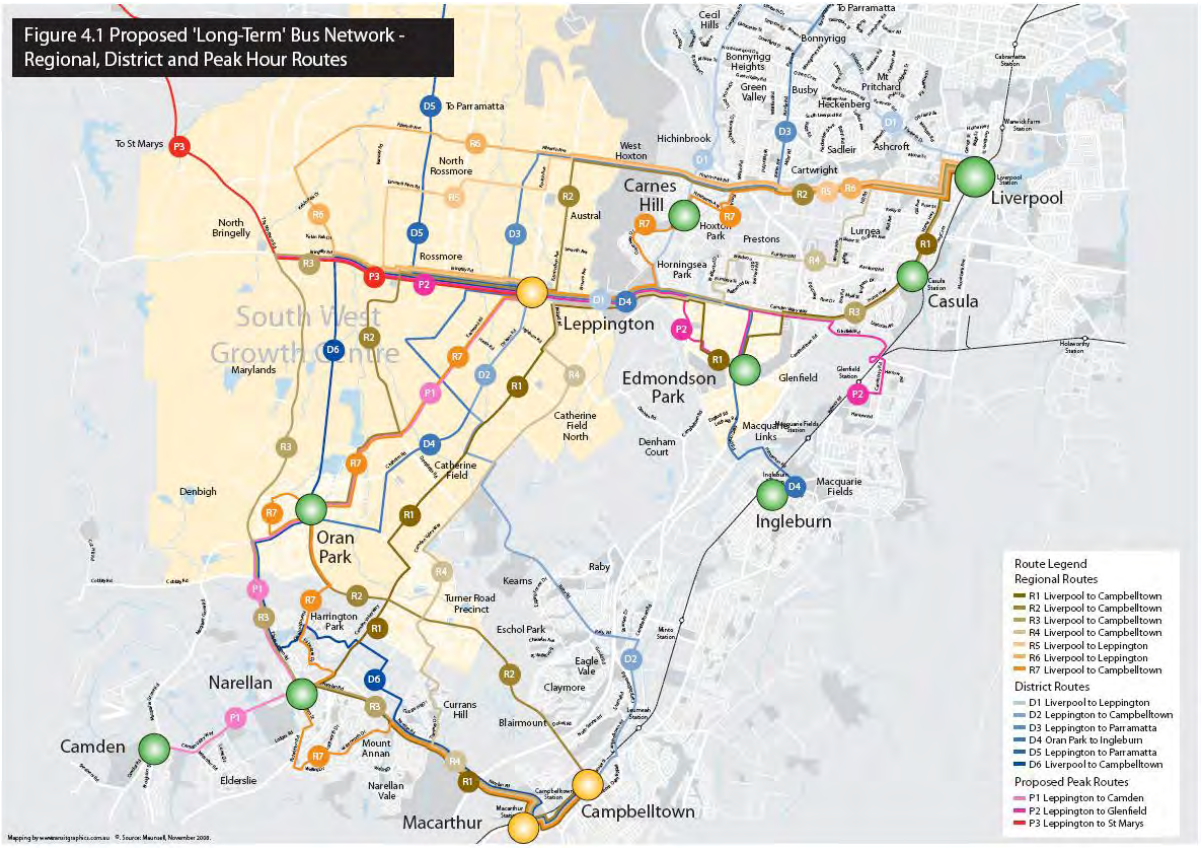
The South West Sector Bus Servicing Plan (AECOM, 2009) provides a long-term bus servicing strategy to cater for the future urban growth in the SWGC. This strategy is developed for three phases:

- Design of a long-term (2030+) integrated bus network (for implementation upon full development of the SWGC);
- Design of a short-term (< 5 years) bus network; and
- Prioritisation of intermediate bus networks together with an appropriate land release strategy to achieve easy implementation of the long-term bus network.

The aim of the strategy is to ensure that new residents moving into the area have a travel choice that includes public transport and that the orderly staging of precinct releases is consistent from a public transport efficiency perspective, in line with priority D1.2.1 of the NSW Government's Metropolitan Strategy. The study focuses on the SWGC but also gives consideration to suburbs and centres which are located adjacent and beyond in order to ensure integration of the bus networks within the wider South Western Sydney area.

The 'long-term' bus network proposal consists of seven regional, six district and three peak hour only bus routes to provide a network that links the proposed major centres (Liverpool, Campbelltown, Parramatta, Oran Park and Leppington) and supports accessibility to each of the SWGC precincts. Three of these services operate via Edmondson Park, one regional and two district services. The 'long-term' bus network plan is shown in **Figure 4-4**.

Figure 4-4 'Long-term' South west sector bus servicing plan



Source: AECOM, 2009

The South West Sector Bus Servicing Plan provides a guide to the potential bus networks that would be operating in the vicinity of Edmondson Park. The Bus Servicing Plan will be used to develop the short, medium and long-term bus route network serving the proposed Edmondson Park South development with the aim to connect the future residents to the nearest transport hubs and regional centres.

4.4 Road network upgrades

To cater for continuous employment and population growth in South Western Sydney, a number of road upgrades have recently been completed or commenced planning. Recent completed road network upgrades in the vicinity of Edmondson Park include:

- Camden Valley Way upgraded to four lanes between M5 and Bernera Road including the upgrade of the intersection at Bernera Road and Croatia Avenue to a signalised intersection; and
- F5 upgraded to four lanes in each direction between Camden Valley Way and Brooks Road.

The SWGC Structure Plan proposes upgrades to major road network including:

- Camden Valley Way (between Narellan Road and Bernera Road);
- Bringelly Road (between The Northern Road and Camden Valley Way); and
- Campbelltown Road (between St Andrews Road and M5).

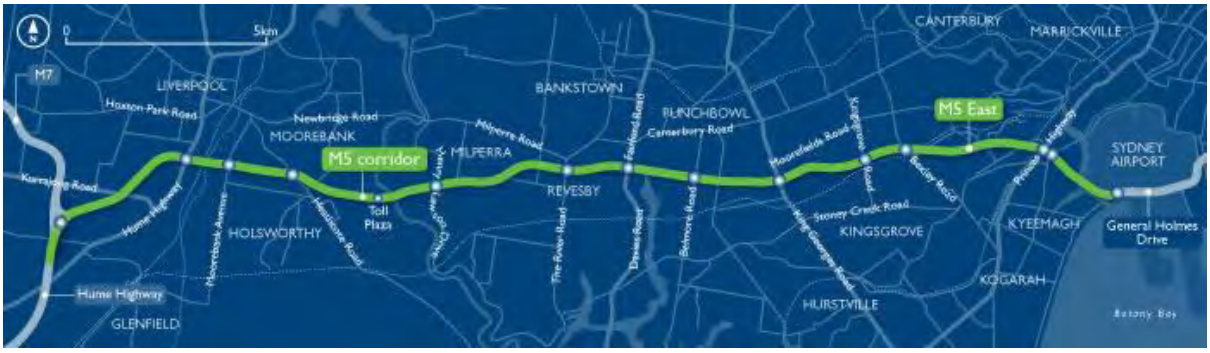
The proposed infrastructure upgrades will cater for forecast traffic growth as a result of development in the SWGC, Liverpool Regional Centre, Western Sydney Employment Hub, employment lands in the M5 Corridor and at Sydney Airport and Port Botany. The Camden Valley Way section between Cowpasture Road and Bernera Road is currently being upgraded to 4 lanes and construction is expected to be completed by mid-2011.

The RTA has also proposed and commenced planning a number of road upgrades in the vicinity to Edmondson Park including M5 West widening, Camden Valley Way upgrade between Cobbitty Road and Cowpasture Road as well as Campbelltown Road upgrade. None of these projects have committed funding from the RTA.

4.4.1 F5 widening / M5 west widening

The M5 West Widening, Preliminary Environmental Assessment (PEA) (NSW RTA, March 2010) notes that the M5 corridor is one of Sydney's key east-west corridors. It not only serves as a corridor within Sydney but also forms a key part of the wider link between Sydney, Canberra and Melbourne. The M5 Corridor connects the economic centres of Sydney CBD, Sydney Airport and Port Botany with Greater Western Sydney. The M5 corridor is shown in **Figure 4-5**.

Figure 4-5: M5 corridor



Source: RTA, July 2010.

The F5 Freeway (Hume Highway) extends south from the M5 / M7 interchange at Prestons to Narellan Road at Campbelltown. To cater for traffic growth the RTA has widened the freeway to 8 lanes between Camden Valley Way, Prestons and Brooks Road, Ingleburn.

Construction has also commenced in February 2009 on the widening of the 11 kilometre section of the F5 between Brooks Road and Narellan Road. This project widens the freeway to 8 lanes between Raby Road and Brooks Road and to 6 lanes between Raby Road and Narellan Road. Improved access to the F5 will be facilitated through a new northbound on-ramp from Raby Road to the F5 and an improved exit ramp to Campbelltown Road. The widening work at the F5 is scheduled for completion in late 2011.

The M5 West widening proposal includes provision of an additional lane to 3 lanes in each direction. Additional project benefits for the SWGC include the installation of 22 variable message signs on the M5 and local roads

around the motorway. It is noted the M5 West widening project is not approved and does not have allocated funding.

4.4.2 Camden Valley Way

The RTA is proposing to upgrade Camden Valley Way between Cobbitty Road at Harrington Park and Cowpasture Road at Horningsea Park. An overall plan of the Camden Valley Way upgrade is shown in **Figure 4-6**.

Figure 4-6: Camden Valley Way upgrade

Source: RTA, July 2010.

An access strategy for the 14 kilometres of Camden Valley Way between Cowpasture Road and Narellan Road has been prepared. Detailed design has been completed for the section between Narellan Road to Cobbitty Road with construction anticipated to commence in late 2010. Concept design for the remaining 10.7 kilometres of Camden Valley Way between Cobbitty Road and Cowpasture Road has been prepared by the RTA.

The proposed upgrade of Camden Valley Way will provide:

- Four lanes in total, two lanes in each direction;
- A 3 metre wide off-road shared pedestrian / cycle path on the western side of the road;
- Re-alignment of Denham Court Road and Ingleburn Road to form a four-way signalised intersection; and
- A wide central median allowing capacity for future widening to six lanes if required.

4.4.3 Campbelltown Road

The RTA has recently started planning for a proposal to widen Campbelltown Road to a 6-lane corridor with a posted limit of 80km/hr in its ultimate form. The initial development will be a four-lane dual carriageway, with a wide central median allowing for the future two additional lanes.

The Department of Planning has requested that Government agencies involved in the delivery of Edmondson Park South and transport infrastructure work together to determine the appropriate future design for Campbelltown Road that allows for management of future traffic flows as well as being responsive to the needs of all road users and surrounding town centre land uses.

Landcom has undertaken consultation with a number of government agencies including the RTA and Transport NSW on the future design for the upgrade of Campbelltown Road. In order to provide a vibrant, sustainable, transit orientated, walkable, high density and cohesive Town Centre, Campbelltown Road (in the vicinity of Edmondson Park South and the Town Centre) must function as a lower order road with the following characteristics:

- A four lane road plus a kerbside parking lane on each side of the carriageway, which provides the flexibility of adding an additional through lane in each direction should traffic flows warrant in the long-term future;
- A 38.8m cross-section (consistent with advice provided by the RTA dated 18th August 2010) to facilitate efficient crossing of the road by pedestrian, cyclists, buses and cars;
- Reduced speed limit of 60km/hr to adapt to a highly urbanised town centre environment;
- More frequent intersection spacing near the Town Centre to ensure viability and permeability of Edmondson Park South, the Town Centre and Station; and
- More frequent intersection spacing to facilitate safe, direct and efficient movements for all modes of transport (cars, buses, walking and cycling) to Edmondson Park South and between different parts of Edmondson Park South (north and south of Campbelltown Road).

Landcom is undertaking on-going consultation with RTA and Transport NSW to achieve a better design outcome of Campbelltown Road that is responsive to the future Edmondson Park Town Centre.

4.5 Future base traffic demand

4.5.1 Background traffic growth

In order to determine future traffic demand and identify road infrastructure upgrades to address future network capacity deficiencies, regional traffic growth has been determined through assessment of:

- Historical traffic growth rates on the major road network in the vicinity of Edmondson Park, such as Campbelltown Road and Camden Valley Way (refer to **Table 3-6**); and
- Regional traffic growth rates derived from the RTA Sydney-wide EMME/2 strategic traffic model developed for 2016 and 2026. The model makes allowance for planned development of the SWGC and the influence of SWRL.

Growth rate to 2016

Historical traffic growth in the area surrounding Edmondson Park has been identified as 1.78% per annum (as discussed in **Section 3.5.3**). This growth rate has accounted for recent significant growth in the South West Subregion such as Harrington Park, Narellan, Campbelltown and Hoxton Park. It is expected that the same trend will continue until 2016 with continuous infill growth and development of approximately 10% of the SWGC. Therefore, **an annual growth rate of 1.78% has been adopted to account for future background regional traffic growth until 2016**.

Growth rate from 2016 to 2026

Based on the current expected rate of land releases in the SWGC, it is expected another 20% will be developed from 2016 to 2026 (next 10 years). The opening of the SWRL in 2016 will provide an opportunity to reduce car use in South Western Sydney and it is expected that there will be a reduction of growth in car trips in the region.

These factors are likely to result in regional background traffic growth rate beyond 2016 that is different to the historical trend. For the purpose of this study, regional traffic growth rate has been derived from the RTA Sydney-wide EMME/2 strategic traffic model. **The annual growth rate on Campbelltown Road and Camden Valley Way is approximately 1.8% per annum during the peak hours between 2016 and 2026**.

The annual growth rate for 2016 to 2026 is based on the following assumptions:

- RTA Sydney-wide EMME/2 strategic traffic model data in the vicinity of Edmondson Park in the AM peak period (7am to 9am) and the PM peak period (4pm to 6pm);
- Confidential forecasts of residential land releases supplied by the Land Release Section of the Department of Planning;
- Employment forecasts are based on forecasts supplied by the Transport Data Centre (Transport NSW), with adjustments made by the RTA based on latest precinct development information; and
- Reduction of car trips due to the opening of SWRL in 2016.

4.5.2 Future base intersection performance

This section reviews the likely impacts of changes to the traffic flows and network improvements recommended to address future base deficiencies before any proposed development occurs in Edmondson Park South. Future year assessment will be undertaken for the following years:

- 2012 – when Stage 1 development is expected to be completed. The impacts of the opening of SWRL is not considered as the rail link is expected to be open in 2016 only;
- 2016 – when the SWRL is expected to be open. Car trips (kiss and ride and park and ride trips) that are expected to be generated by the SWRL have been added onto the network for this future year assessment; and
- 2026 – when the site is expected to be fully completed.

The peak hour turning volumes for 2012, 2016 and 2026 have been derived by applying the annual growth factor to the existing peak hour traffic at Campbelltown Road, Camden Valley Way and Macdonald Road. Additional kiss and ride and park and ride traffic that is expected to be generated by the SWRL in the 2016 and 2026 scenarios have also been accounted in the future year base case assessment.

It is also assumed that some redistribution of local traffic would occur with the extension of Croatia Avenue and Macdonald Road to connect Campbelltown Road with Camden Valley Way after the opening of SWRL in 2016. It is assumed the local redistribution of trips would be minimal in 2016 and increase gradually to 2026.

The 2012, 2016 and 2026 future base network modelling traffic flows (without proposed development) are included in **Appendix C**.

For the purpose of intersection assessment, the existing intersection layouts have been modelled in 2012.

Due to the opening of SWRL in 2016, the following infrastructure upgrades were assumed to be completed and therefore modelled in the future base intersection modelling for 2016 and 2026:

- Intersection of Campbelltown Road / Macdonald Road will be a four way intersection, incorporating a northern approach which connects to the proposed Edmondson Park Station;
- Croatia Avenue will be extended towards the south to provide a connection to the proposed Edmondson Park Station; and
- Up to two bridge crossings over the SWRL will be constructed to provide connection between Campbelltown Road and Camden Valley Way as well as connecting both sides of Edmondson Park Release Area.

Intersection modelling indicates that upgrades to the intersections and local road network are necessary in order to accommodate background future traffic growth before development in Edmondson Park South occurs. The recommended future network improvements recommended are shown in **Table 4-4**.

Table 4-4: Proposed road network improvements to address future base deficiencies

Year	Location	Type of upgrade	Proposed improvements
2016	Campbelltown Road	Road link upgrade	Increase road capacity to two lanes in each direction
2026	Campbelltown Road / Macdonald Road	Intersection upgrade	Additional short right turn lane on the north approach of Macdonald Road Additional through lane on both approaches of Macdonald Road
2026	Camden Valley Way / Croatia Avenue / Bernera Road	Intersection upgrade	Additional one (total of three) through lanes on Camden Valley Way Additional one (total of two) through lanes on Croatia Avenue and Bernera Road Additional short right turn lane on Croatia Avenue Additional short right turn lane on both east and west approaches of Camden Valley Way, Lengthening of left turn slip lane on Croatia Avenue

Source: AECOM, July 2010.

The AM and PM peak hour intersection modelling results for the future base scenarios of 2012, 2016 and 2026 are presented in **Table 4-5** and **Table 4-6** respectively, including the recommended upgrades. The detailed results of the intersection performance are presented in **Appendix C**.

Table 4-5: Future year base case intersection performance (AM peak hour without development)

Intersection	Year	Volumes (veh/hr)	Degree of Saturation (DoS)	Ave Delay (sec)	Overall Level of Service (LoS)	95% Back of Queue (m)
Campbelltown Road / Macdonald Road	2012	1,730	0.750	15.7	B	137
	2016	1,987	0.785	29.6	C	118
	2026	2,464	0.820	48.3	D	222
Campbelltown Road / Ingleburn Gardens access	2012	1,672	0.818	5.6	A	93
	2016	1,779	0.406	7.5	A	100
	2026	1,496	0.337	8.1	A	79
Camden Valley Way / Croatia Avenue / Bernera Road	2012	2,951	0.793	32.5	C	226
	2016	3,452	0.857	37.6	C	330
	2026	4,943	0.824	39.2	C	218

Source: AECOM, July 2010.

The results indicate that the Campbelltown Road / Macdonald Road intersection performs with an acceptable level of service in the 2012 AM peak and with approximately 25% spare capacity. However, the intersection performance will deteriorate as traffic continues to increase and extra capacity is required on Campbelltown Road. In 2016, the intersection performs at LoS C and operates with approximately 22% spare capacity, assuming that Campbelltown Road has two through lanes in each direction. Without the upgrade of Campbelltown Road, the performance of the intersection and approaches is unacceptable with significant queueing and delays. In 2026,

the intersection performs at LoS D and with approximately 18% spare capacity with the identified intersection upgrades and the redistribution of local traffic from Campbelltown Road to Croatia Avenue.

The intersection of Campbelltown Road / Ingleburn Gardens access will perform satisfactorily at LoS A in the 2012 AM peak and with approximately 19% spare capacity. In 2016, the intersection will perform at LoS A and with significant spare capacity (approximately 60%); assuming Campbelltown Road is upgraded to two lanes in each direction. In 2026, the intersection will continue to perform adequately at LoS A, with minimal average delays and approximately 67% spare capacity.

The intersection of Camden Valley Way / Croatia Avenue / Bernera Road performs at an acceptable level of service (LoS C) in the 2012 and 2016 AM peak and will operate with approximately 15% spare capacity in 2016. In 2026, with the recommended upgrades to the intersection, the intersection performs at LoS C and with approximately 18% spare capacity in the AM peak hour.

Table 4-6: Future year base case intersection performance (PM peak hour without development)

Intersection	Year	Volumes (veh/hr)	Degree of Saturation (DoS)	Ave Delay (sec)	Overall Level of Service (LoS)	95% Back of Queue (m)
Campbelltown Road / Macdonald Road	2012	2,073	0.742	14.6	B	136
	2016	2,301	0.831	29.2	C	187
	2026	2,874	0.875	43.6	D	205
Campbelltown Road / Ingleburn Gardens access	2012	2,006	0.867	5.9	A	171
	2016	2,138	0.494	9.8	A	150
	2026	1,858	0.422	10	A	119
Camden Valley Way / Croatia Avenue / Bernera Road	2012	3,026	0.620	30.1	C	202
	2016	3,532	0.711	32.6	C	226
	2026	5,211	0.800	39.8	C	221

Source: AECOM, July 2010.

The results indicate that during the PM peak, the Campbelltown Road / Macdonald Road intersection performs at an acceptable level of service (LoS B) in the 2012 and will operate with approximately 26% spare capacity. In 2016 the intersection performs at LoS C and operates with approximately 17% spare capacity, assuming that Campbelltown Road has two through lanes in each direction. In 2026, the intersection performs at LoS D and with approximately 13% spare capacity with the identified intersection upgrades and the redistribution of local traffic from Campbelltown Road to Croatia Avenue.

The intersection of Campbelltown Road / Ingleburn Gardens access will perform satisfactorily at LoS A and with approximately 16% spare capacity in the PM peak hour of 2012. In 2016 and 2026 PM peak hour, the intersection performs at LoS A and with significant spare capacity, with two lanes in each direction on Campbelltown Road.

The intersection of Camden Valley Way / Croatia Avenue / Bernera Road performs at LoS C in the 2012 and 2016 PM peak hour and is operating with approximately 29% spare capacity in 2016. With the recommended intersection upgrades required in 2026, the intersection performs acceptably at LoS C and operates with approximately 20% spare capacity in the PM peak hour.

In summary, the modelling results show that:

- Two lanes in each direction are required on Campbelltown Road by 2016 to accommodate future background traffic growth;
- Upgrade of Campbelltown Road / Macdonald Road intersection is required with an additional right turn lane on the northern approach of Macdonald Road as well as a through lane on both approaches of Macdonald Road in 2026, before development in Edmondson Park South occurs.
- Upgrade of Camden Valley Way / Croatia Avenue / Bernera Road intersection with significant additional capacity in 2026 to accommodate future background traffic growth.

5.0 The Edmondson Park South Project

5.1 Introduction

This section provides a brief description of the development proposal, road hierarchy and access arrangements, public and active transport networks.

5.2 Concept plan

The Edmondson Park South proposal is for a master planned community development with a mix of residential, employment, retail, education, conservation and open space uses. The concept plan is shown in **Figure 5-1**.

The Concept Plan establishes the overall planning framework for the site, including:

- Land use type and distribution;
- A mix of housing types and densities (approximately 3,200 dwellings);
- Concept location of and approximately 35,000 – 45,000m^2 of retail / business / commercial floor space within the new Edmondson Park Town Centre;
- Identification and location of open space and drainage corridors, environmental conservation lands (to form the new Regional Park), and local active and passive recreation facilities, including levels of embellishment;
- Expanded Ingleburn North Primary School and new combined Primary/High School to the north of the site;
- Road network layout;
- Pedestrian and cycleway network layout;
- Pedestrian bridge over the south western railway;
- Campbelltown Road corridor including the establishment of key intersection locations and configuration;
- Construction of the southern end of Zouch Road (two lane) to the existing turning facility, reconstruction of turning facility and provision of an emergency access from the turning facility to the southern edge of the environmental living zone within the southern portion of the site;
- Utilities (including power, telecommunications and gas), infrastructure strategy, potable water strategy, sewer concept plan and water cycle management plan;
- Location and dimensions of Bushfire Asset Protection Zones;
- Appropriate interpretation of European and Aboriginal heritage located on the site;
- Erection of signage and billboards;
- Remediation works;
- Decommissioning of the existing Sewerage Treatment Plant (STP); and
- Demolition.

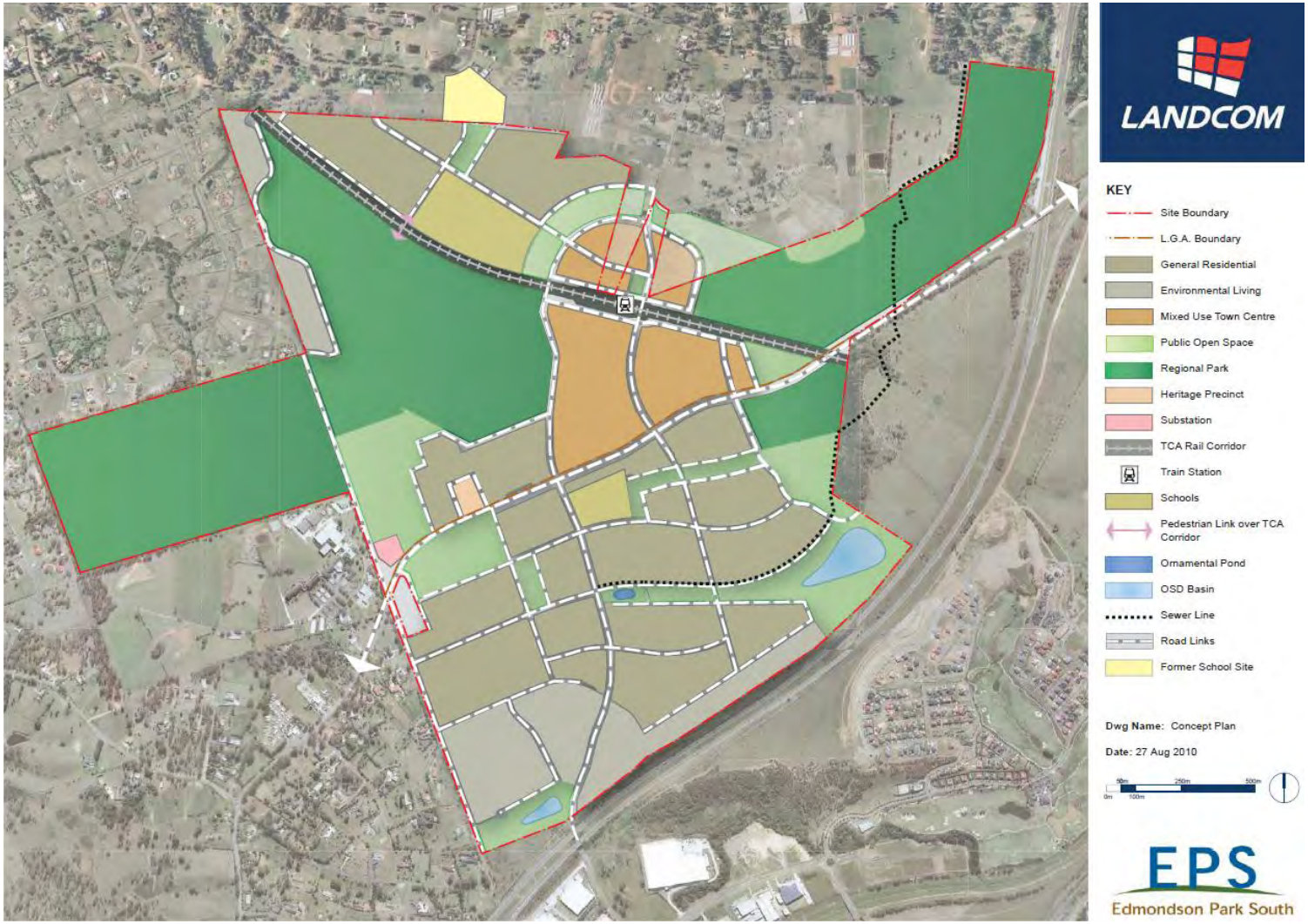
The Concept Plan also sets out an approval framework that will enable the carrying out of the works necessary to remediate the site in accordance with a Remediation Strategy without the need for undertaking further environmental assessment.

A variety of housing types is proposed to be delivered in Edmondson Park South. The range of densities will enable a mix of dwelling types, allow for social / demographic diversity and provide a proportion of dwellings at affordable price points. The project will also include a specific component of moderate income housing and seniors living.

It is proposed to develop the site progressively in stages over a 15-20 year period. The Concept Plan will address the staging and delivery of the overall development having regard to the progressive delivery of necessary infrastructure, services and facilities; and market demand.

The Concept Plan is accompanied by a proposal with respect to the future developer contributions framework for the provision of local facilities and services within the Liverpool and Campbelltown LGAs as well as State Infrastructure.

Figure 5-1: Edmondson Park South Concept Plan

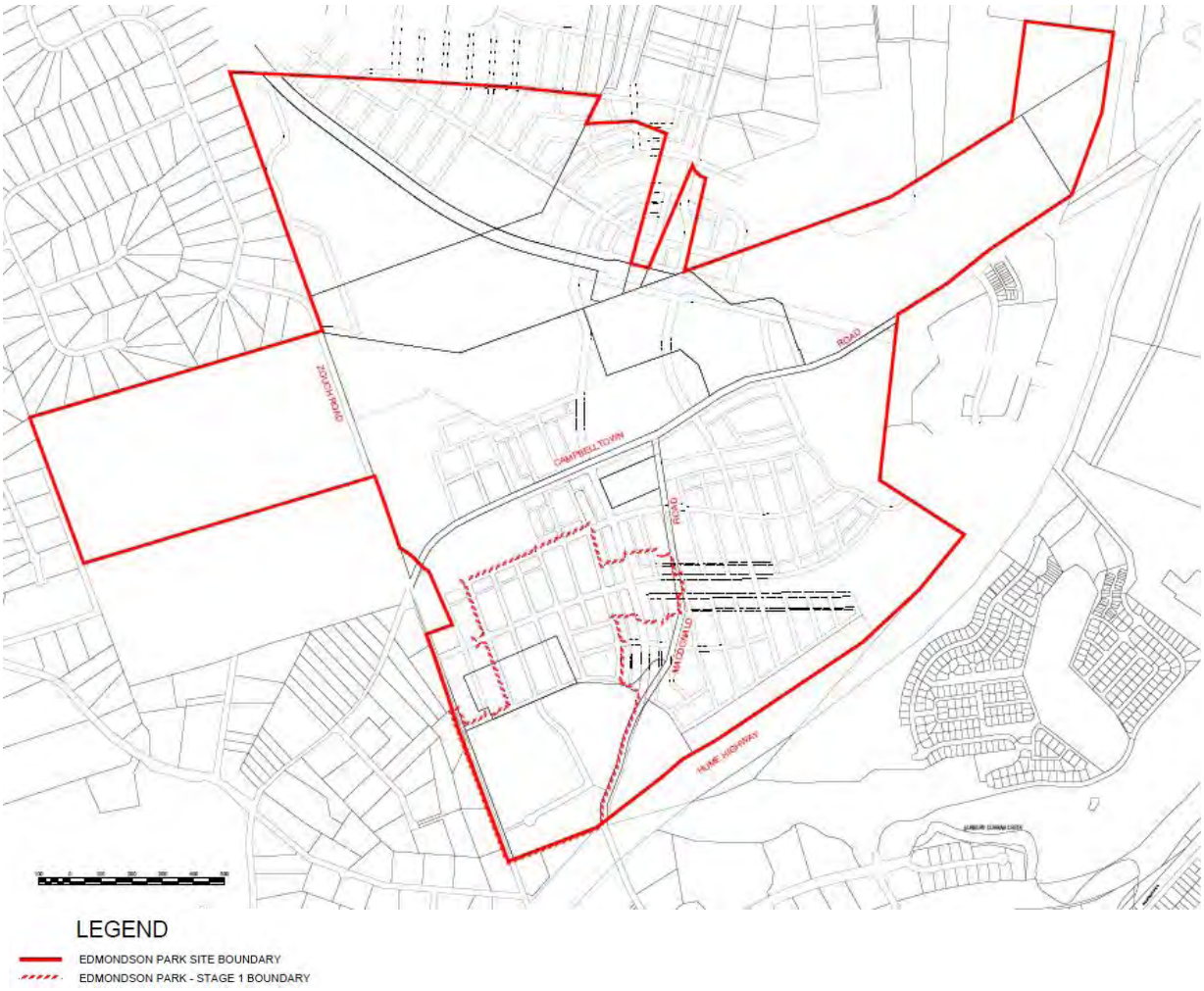


Source: Landcom, July 2010

5.3 Project application - stage 1 development

In order to enable site works to begin at the earliest opportunity, Stage 1 of the development will comprise the creation of 206 residential lots, 8 super lots for future subdivision 15 Environmental Living lots (as shown in **Figure 5-2**). It is expected that construction of Stage 1 development will commence by the end of 2010 and be completed by 2012.

Figure 5-2: Edmondson Park South Stage 1 Development Plan



Source: Landcom, July 2010

The Stage 1 Project Application site comprises an area of approximately 40 hectares and forms part of the larger Edmondson Park Release Area within the South West Growth Centre. It is located within the southernmost portion of the larger development site to the north of the M5 Motorway and to the east of Zouch Road and is approximately 40 km to the south west of Sydney CBD. The site is wholly located within the Campbelltown LGA. A new access is proposed at Macdonald Road to access the new development.

5.4 Development staging

The proposed development is forecast to occur at a rate of 200 dwellings per year with first dwellings to be completed in 2012. It is also assumed that the retail and commercial development associated with the town centre will be completed in stages with approximately 50% expected to be opened by 2016 and completion by 2026. **Table 5-1** summarises the development yield assumptions that have been made for the purpose of the transport assessment.

Table 5-1: Development yield assumptions

Year	Development Yield	
	Residential	Town Centre
2012 (Opening Year)	221 lots	-
2016	~1,100 lots	50%
2026	3,200 lots	100%

Source: Landcom, July 2010

5.5 Road hierarchy and site access arrangements

The Concept Plan road network, intersection layout and treatment, pedestrian and cycle networks as well as the public transport network are designed to provide linkages to key destination points and transport hubs, maximising accessibility between all proposed land uses in Edmondson Park South. An indicative road network layout and hierarchy has been developed for assessment of the Concept Plan and is presented in **Figure 5-3**.

5.5.1 Site access arrangements

Campbelltown Road will provide access to the development located on both the northern and southern side of this road. Multiple access points are required from Campbelltown Road to provide safe and efficient access to the railway station and development including the Town Centre and residential areas. Multiple access points are also required to ensure adequate emergency vehicle access / egress. Three signal-controlled vehicular accesses on Campbelltown Road are proposed at the following locations:

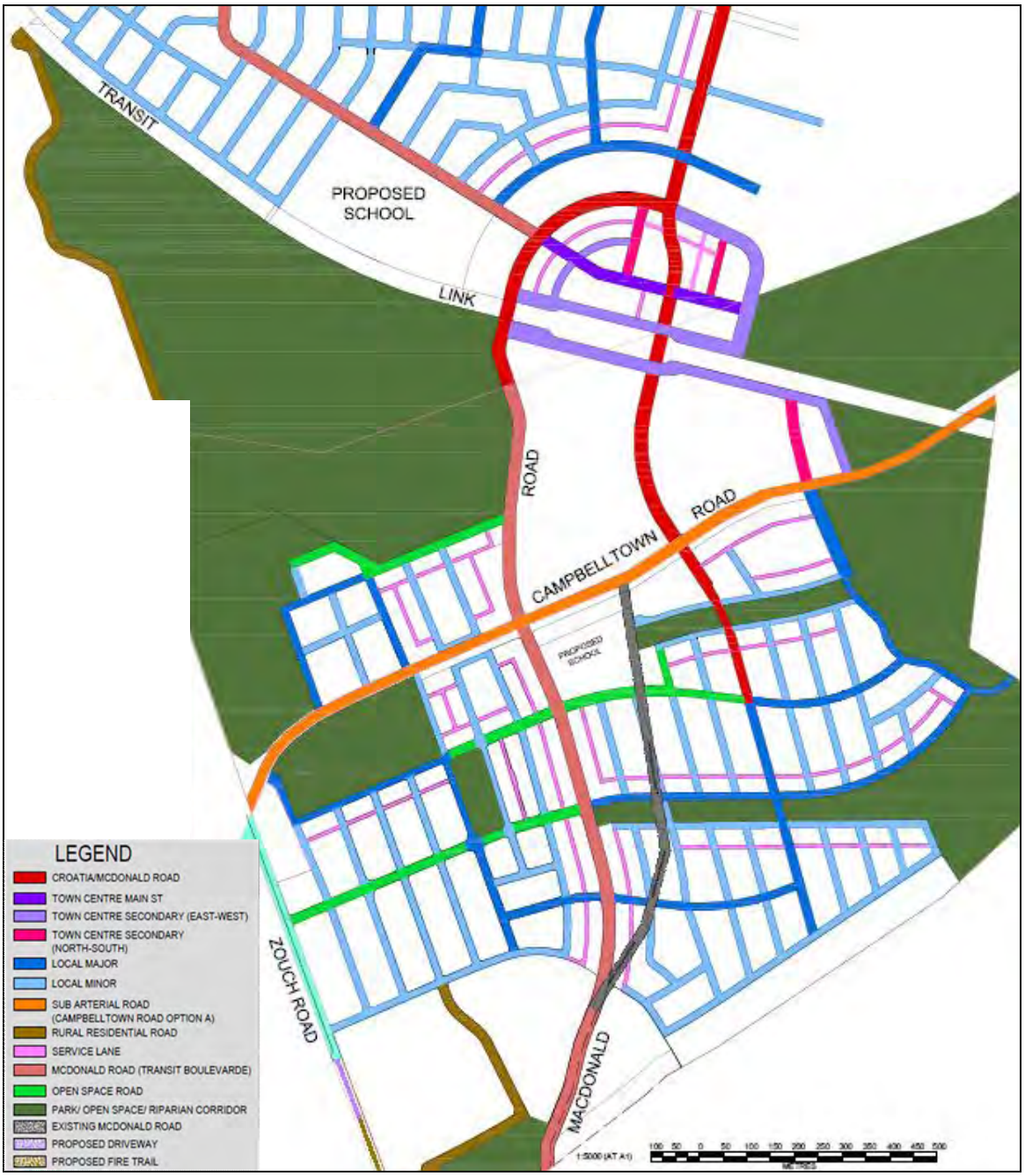
- The eastern Town Centre access road;
- The Town Centre Main Street (with restricted right turn movements from all approaches); and
- The realigned Macdonald Road intersection (Note that Macdonald Road will be realigned approximately 200m to the west as part of the Concept Plan).

Access to the development is also provided via Croatia Avenue which connects to Camden Valley Way. Future development traffic can also travel to Ingleburn / Campbelltown and the M5 (via Brooks Road) using Macdonald Road. Gateway treatments such as welcoming signage or public arts could be installed at Campbelltown Road near the eastern Town Centre access road and near Zouch Road as well as Macdonald Road, north of the M5 overpass. These gateway treatments will signify a change in road conditions from a rural to an urban environment.

The Concept Plan also provides vehicular access options for other neighbouring development by connecting:

- Ingleburn Gardens to Campbelltown Road via a road connection south of the Maxwell Creek South Conservation Area;
- Denham Court (south of Campbelltown Road) to Campbelltown Road via the new road network between Zouch Road and Macdonald Road; and
- Future Edmondson Park North to Campbelltown Road via the new SWRL bridge crossings at Croatia Avenue and Macdonald Road.

Figure 5-3: Proposed Edmondson Park South road hierarchy



Source: JWP, July 2010

5.5.2 Road hierarchy

Campbelltown Road (MR177)

Campbelltown Road is the main east-west connection through the development. It connects the major centre at Campbelltown (to the south) and regional centre at Liverpool (to the north). The gazetted zoning plan for Edmondson Park locates the future Town Centre in the heart of the release area, immediate north of Campbelltown Road with high density mixed use development surrounding the Town Centre extending to the south of Campbelltown Road.

The Town Centre and the surrounding mixed use development is expected to generate high level of pedestrian activity and a demand for crossing Campbelltown Road in a number of locations. The majority of the residential development situated on the southern side of Campbelltown Road is within the walking catchment of the Edmondson Park Station. To facilitate access to the town centre and station, it is important that Campbelltown Road is permeable and capable of providing an efficient trafficable route for local access and through traffic.

The RTA has proposed the upgrade of Campbelltown Road to a 6-lane main road corridor. Landcom has undertaken consultation with a number of government agencies including the RTA and Transport NSW on the future design for the upgrade of Campbelltown Road. In order to provide a vibrant, sustainable, transit orientated, walkable, high density and cohesive Town Centre, Campbelltown Road (in the vicinity of Edmondson Park South and the Town Centre) must function as a lower order road with the following characteristics:

- A four lane road plus a kerbside parking lane on each side of the carriageway, which provides the flexibility of adding an additional through lane in each direction should traffic flows warrant in the long-term future;
- A 38.8m cross-section (consistent with advice provided by the RTA dated 18th August 2010) to facilitate efficient crossing of the road by pedestrian, cyclists, buses and cars;
- Reduced speed limit of 60km/hr to adapt to a highly urbanised town centre environment;
- More frequent intersection spacing near the Town Centre to ensure viability and permeability of Edmondson Park South, the Town Centre and Station; and
- More frequent intersection spacing to facilitate safe, direct and efficient movements for all modes of transport (cars, buses, walking and cycling) to Edmondson Park South and between different parts of Edmondson Park South (north and south of Campbelltown Road).

Macdonald Road

The realigned Macdonald Road (south of Campbelltown Road) and the extension to the north over the SWRL overpass will become the main north-south road that connects Croatia Avenue, Campbelltown Road and Williamson Road at Ingleburn.

Croatia Avenue / Town Centre Main Street

Croatia Avenue will provide an alternative access to the development from Camden Valley Way and will connect to the future Edmondson Park North development.

A secondary north-south road is also provided across the SWRL corridor that connects Croatia Avenue and Campbelltown Road. This is the Town Centre Main Street which will be a low-traffic environment as well as a link for safe and efficient movement by buses, pedestrians and cyclists.

Other major streets

A range of town centre streets have been designed to distribute traffic across the proposed Town Centre and the station interchange. Open spaces road with wide verge has been designed next to parks and riparian corridors.

5.6 Public transport network and facilities

The road network and intersection treatments proposed in the Concept Plan have been designed o accommodate bus movements between the development and regional centres as well as other transport hubs. Early consultation with Transport NSW has been undertaken to develop an indicative bus network in Edmondson Park South. The staged bus routes for the development are shown in **Figure 5-4**. The 400m catchment from each of the bus stops (excluding the short-term ones) is also highlighted.

5.6.1 Short-term / medium-term bus route

A new bus service should be implemented along Macdonald Road upon opening of Stage 1 development. It is recognised that the number of lots in Stage 1 will not fully justify a new bus service; however, it is critical to establish a pattern of bus use early in the development process. Landcom will work with Transport NSW and the local bus service provider to deliver a service prior to the opening of the SWRL and Edmondson Park Station.

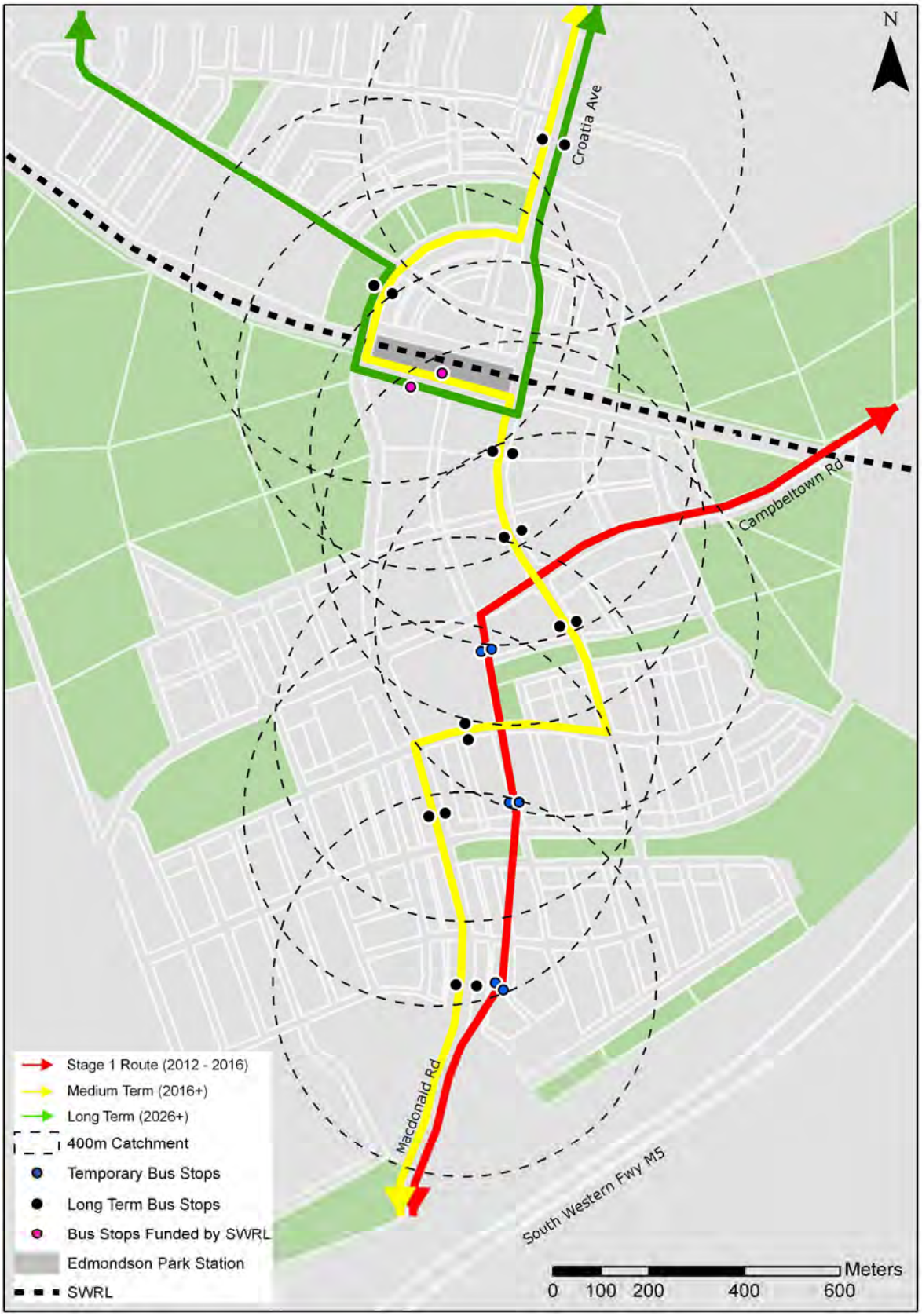
The bus route will connect Ingleburn Station with Liverpool Station via Edmondson Park South. According to the 2006 Census, approximately 30% of residents in the surrounding suburbs are travelling to Liverpool to work or for transfer to frequent rail and bus services to other destinations. The proposed bus service to Liverpool will connect residents of Edmondson Park South to major employment and transport hubs.

The SWRL and Edmondson Park Station are not expected to be open until 2016 and Croatia Avenue will not be connected to Campbelltown Road prior to the opening of SWRL. Pre- opening of SWRL in the early development phase of Edmondson Park South, the bus route will operate along Macdonald Road and Campbelltown Road. With the opening of the SWRL, the short-term bus route will be re-routed to travel through the Edmondson Park Town Centre and Station and continue to Liverpool via Croatia Avenue and Camden Valley Way. This bus service will become an important feeder service to the SWRL for future residents in Edmondson Park South during peak and off-peak hours.

5.6.2 Long-term bus route

An additional long-term bus service will be operated between Liverpool and Campbelltown via Edmondson Park Town Centre and Station, Leppington, Narellan, and Macarthur, as identified by the South West Bus Servicing Plan (Refer to **Figure 4-4**). The proposed ‘long-term’ bus service is proposed to be in operation from 2036 and beyond.

Figure 5-4: Proposed Bus Routes for Edmondson Park South



Source: AECOM, July 2010

5.6.3 Station interchange facilities

SWRL has proposed a conceptual layout of the station interchange at Edmondson Park Station including the following facilities on both sides of the station entrance:

- Bus stops;
- Taxi ranks;
- Bike parking spaces;
- Kiss and ride spaces;
- Signalised pedestrian crossing;
- Accessible parking spaces; and
- Approximately 120 and 280 commuter parking spaces to the north and south of the station respectively.

When considering the development of Edmondson Park South, it is proposed that all the bus services will stop at the southern side of the station interchange to maximise accessibility to the future Town Centre. Additional bike racks (in addition to the 10 bike parking spaces recommended by SWRL) are recommended at the station interchange or the Town Centre to encourage cycling.

5.7 Walking and cycling network

The Edmondson Park South walking and cycling networks have been developed with reference to a range of published guidelines and policies including the *Planning Guidelines for Walking and Cycling (Department of Planning, 2004)*. The network is intended to provide safe and efficient routes that present a viable alternative to car travel for journey-to-work trips as well as recreational trips. The proposed walking and cycling network is shown in **Figure 5-5**.

A network of off-road shared paths and on-road cycle paths are proposed within the project area. The network will link key amenities including open spaces, schools and the facilities in the Town Centre as well as the Station. A hierarchy of paths will be created providing amenity for different user groups (recreational, commuter) and facilities that adequately serve the need of pedestrians and cyclists.

The path network will make extensive use of the open space and conservation areas, linkage corridors (including the linear riparian corridors), collector and arterial roads, and pedestrian priority streets such as the Town Centre Main Street.

5.7.1 Crossings over SWRL

Three pedestrian / cyclist crossing opportunities are provided over the SWRL in the Concept Plan at the following location:

- Macdonald Road bridge crossing (to the west of the station);
- Croatia Avenue / Town Centre Main Street bridge crossing (to the east of the station); and
- Bridge Crossing connecting Ingleburn Conservation Area and the co-located primary and high school situated to the northwest of the station.

These crossings will facilitate pedestrian / cyclist movements between the station, the Town Centre, the schools and the regional park.

Figure 5-5: Proposed walking and cycling network for Edmondson Park South

Source: JWP, July 2010

5.7.2 North-south networks

There are four main north-south walking / cycling corridors across the project area. These links are served by signalised crossings to ensure safe crossings points are provided for both pedestrians and cyclists at Campbelltown Road.

Off-road (2.5m) shared paths are provided along Croatia Avenue and the realigned Macdonald Road. This link will convert to an on-road cycle path along the Town Centre Main Street. A recreational cycle path is also proposed to the east of the Town Centre connecting the riparian parks to the south of Campbelltown Road with Maxwell Creek Conservation Areas.

Another recreational path is provided to the west of the Town Centre connecting the Ingleburn Conservation Area with the co-located primary and high school situated to the northwest of the station via a bridge crossing over the SWRL.

5.7.3 East-west networks

An off-road (2.5m) shared path and an on-road cycleway (1.2) are provided on both sides of Campbelltown Road along a 1.5km section of the main road. Opportunities exist at each of the three proposed signalised crossings along Campbelltown Road to access the Town Centre and the Station on the northern side of Campbelltown Road. The cycleways on Campbelltown Road will connect with the regional cycle network in Campbelltown.

Two 3.0m recreational cycle paths are proposed – one to the north of the project area connecting Ingleburn Conservation Area through the northern edge of the Town Centre into the Maxwell Creek North Conservation Area. The southern one extends along the riparian park and connects into the Maxwell Creek South Conservation Area

5.8 Proposed road cross-sections

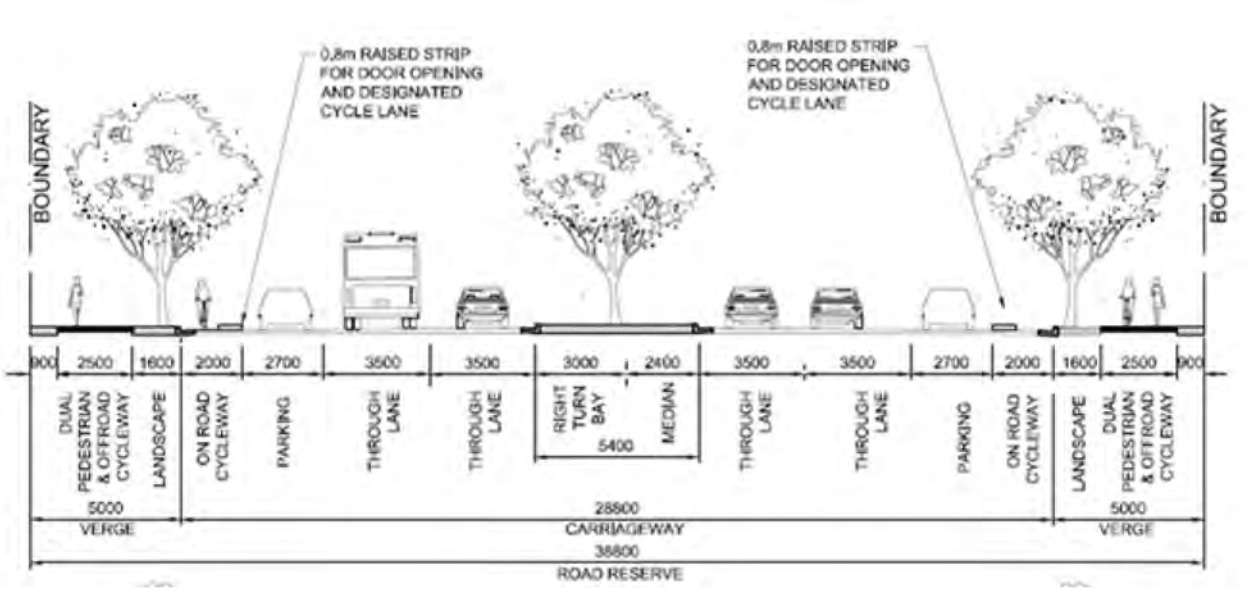
Cross-sections have been designed in conjunction with urban designers, landscape architects and road designers to ensure that all road users (such as pedestrians, cyclists, buses and cars) are catered for within the road reserve (Refer to **Figure 5-3**). Cross-section of all roads within the proposed development are included in **Appendix D**.

All cross-sections are designed according to relevant guidelines including Council development control plans, bus servicing guidelines and the RTA Road Design Guide.

In particular, the proposed 38.8m cross-section for Campbelltown Road (as shown in **Figure 5-6**) at an intersection has allowed for the following:

- A 2.5m shared path on a 5m verge on both sides of Campbelltown Road;
- Three 3.5m traffic lanes in each direction (with the third lane reserved for future widening if traffic demand warrants);
- A 1.2m on-road cycle lane on both sides of Campbelltown Road; and
- A 5.4m central median that would cater for a 3.0m right turn lane and a 2.4m raised kerb for pedestrian to stop and wait at the central median, if necessary.

Figure 5-6: Cross-section of Campbelltown Road (at an intersection)



Source: AECOM, August 2010 (N.T.S)

Intersection analysis (refer to **Section 7.3.6**) suggest that two through lanes (including a shared left turn at the kerbside lane) and a single right turn lane are required in each direction to cater for forecast traffic up to 2026 at the intersections of Macdonald Road and East Town Centre Street with Macdonald Road. Sensitivity test (refer to **Section 7.3.7**) was then undertaken to confirm that the reserved third lane in the proposed cross-section of Campbelltown Road will cater for traffic growth (generated by further development of SWGC) up to at least 2036.

6.0 Sustainable Travel Measures to Reduce Car Dependency

6.1 Introduction

Sustainable Transport and Travel Demand Management (TDM) strategies involve the application of policies, objectives, measures and targets to influence travel behaviour, to encourage uptake of sustainable forms of transport, i.e. non-car modes, wherever possible and to reduce the need to travel and hence reduce overall transport and travel demand and the impacts of new development.

A large number of rigorous empirical studies link urban development and travel patterns and show that, even after accounting for socioeconomic and demographic differences, residents of communities with frequent, reliable, easily accessible public transport services and well designed pedestrian and bicycle networks drive significantly less, and walk, bicycle and ride public transport more than their counterparts in 'traditional' communities (Arrington and Cervero 2008, Cervero et al. 2004, Ewing et al. 2008, and Feigon et al. 2003).

Evidence shows that the uptake of alternative modes and level of vehicle trip reduction is highly dependent on local and regional conditions e.g. urban form, accessibility, permeability etc. (Ewing et al. 2003, Feigon et al. 2003, Ewing et al. 2008, and Bartholomew 2007). This is mostly attributed to shorter distances between destinations – allowing people to live within easy walking or cycling distance of some of their destinations e.g. work, school, shops, and parks, and easy access to transit to reach farther destinations. Hence, vehicle ownership is lower, vehicular trips are shorter and less frequent, and non-motorized and public transportation have a larger share of the overall travel demand (Arrington and Cervero 2008). In addition, factors like footpath and bicycle path connectivity significantly increase the likelihood of rail commuters accessing stations by foot or bicycle (Cervero 2001).

Alternatives to the private vehicle claim a larger share of all trips in higher density developments and in areas where land use is mixed. Walking can rise significantly in high-density, mixed-use neighbourhoods. Edmondson Park South, proposed to be a transit-oriented development, allows residents to conduct their daily tasks close to home, and multiple tasks in one trip, travel by alternative modes, and reduce automobile trips and trip lengths.

6.2 Sustainable Travel Strategy for Edmondson Park South

A Sustainable Travel Strategy (STS) for Edmondson Park South is designed to encourage the use of public transport, walking, cycling wherever possible for all journey purposes. Where alternatives to the car are not viable, options to encourage car sharing can be promoted to minimise the need for single occupancy vehicle travel. The benefits of similar strategies are now widely understood and include:

- Reducing air and noise pollution and other types of negative environmental impact;
- Improving fitness, health and wellbeing due to increased physical activity;
- Reducing traffic congestion and associated road network delays and costs;
- Reducing the need for costly road infrastructure upgrades (which research has shown only serves to attract additional vehicle traffic, necessitating future highway upgrades);
- Helping residents save money by reducing their need to own and operate motor vehicles;
- Improving travel options, particularly for non-drivers or non-car owners;
- Reducing the need for parking provision and maximising land opportunity for other uses;
- Supporting strategic land use planning objectives, such as reduced urban sprawl; and
- Improving local environmental quality and community cohesion.

Implementing a STS will assist Edmondson Park South in achieving its strategic direction of becoming a liveable precinct which provides for healthy and active lifestyles, does not negatively adversely impact on the environment, seeks to address sustainability and climate change objectives, and does not lead to unnecessary vehicle trip generation and highway network congestion.

The role of the STS for Edmondson Park South is to encourage local trips by bus, bicycle and walking wherever possible and longer distance trips by bus and rail, by making these modes viable and realistic alternatives. This is facilitated through the design of the built form of Edmondson Park South to accommodate public transport

penetration into residential areas which link to the town centre and rail station and good quality, highly permeable pedestrian and bicycle networks throughout Edmondson Park South, including crossing facilities where appropriate and end-of-trip facilities such as bicycle parking.

The DGRs recommend that this TMAP should address the potential for implementation of a location specific sustainable travel plan and the provision of facilities to increase the non-car mode share for travel to, from and within the site. This section highlights how this will be achieved in Edmondson Park South through the implementation of a STS.

6.3 High level objectives

The high level objectives for Edmondson Park South aim to deliver public transport, walking and cycling journeys in line with NSW government state targets which fit within the overall sustainability and active transport principles set out above. Through the sustainable transport and travel demand management strategy, Edmondson Park South will be a sustainable, liveable precinct from day one which delivers the following high level objectives:

- **30% non-car mode share for journeys to/ from work**
- **50% combined walk and cycle mode share for all school travel**
- **50% combined walk and cycle mode share for all town centre trips**
- **50% combined walk and cycle mode share as access mode for Edmondson Park Station (SWRL)**

These high level objectives dovetail with the following NSW state government transport targets for Metropolitan Sydney, which apply to Edmondson Park South. The relevant state government targets for transport are as follows:

- 28% public transport mode share for journeys to work;
- 20% public transport mode share for journey to work into Liverpool CBD; and
- 5% bicycle mode share for trips of less than 10km.

6.4 Proposed sustainable travel measures

The measures support delivery of the high level transport and travel demand management objectives and support the wider principles discussed. This is how the precinct planning process will deliver a sustainable precinct, in which travel by car is not the only option for residents and visitors to make the journeys they wish to make.

The measures include a range of different types of initiatives which together reinforce the principles and objectives of the sustainable travel strategy. These measures include:

1) Travel behaviour measures – Initiatives to encourage sustainable travel.
2) Service measures – Service delivery standards to maximise potential uptake of sustainable modes.
3) Infrastructure measures – Provision of infrastructure designed to facilitate sustainable travel.

6.4.1 Travel behaviour measures

1) Household Information Packs (HIPs) for each household in Edmondson Park South

Each household would be provided with a household information pack (HIP) which would be a sustainable travel kit. This would be delivered to each new residence upon completion to set out the sustainable travel options available to residents and the specific local initiatives available to encourage sustainable travel.

This would incorporate public transport leaflets, route maps and timetables (including direction to the 131500 travel information line and website and bus, train and fare information), pedestrian and cycle network maps including leisure maps, and information on sustainable community initiatives, such as Bicycle User Groups, Car Sharing Schemes, the Community Farm/ Garden and Sydney Connect scheme, and other local community projects to reduce travel or encourage uptake of sustainable modes.

The household-based personalised journey planning (PJP) approach is an effective emerging methodology to encourage sustainable travel used in Europe to great effect, as well as in Western Australia and South Australia. A recent PJP pilot project in Woy Woy, on the Central Coast, also significantly reduced residents' vehicle travel.

There is an opportunity to use this measure, with proven effectiveness in encouraging sustainable travel in other locations, to embed the desired sustainable travel principles in Edmondson Park South.

2) One week free public transport (MyMulti) start up discount tickets for each household

In addition to the HIP, each household would be provided a free weekly travel passes - to encourage uptake of public transport by new residents from day one, aimed to influence future resident's travel behaviour of reducing car uses.

6.4.2 Public transport measures

3) Integration of public transport services – bus and rail connectivity and interchange

The bus route network for Edmondson Park South has been designed to maximise integration with train services provided by SWRL at the new Edmondson Park Station (Refer to **Figure 5-4**).

Bus services link residential areas with the planned South West Rail Link at Edmondson Park Station, and a dedicated bus-rail interchange designed to minimise interchange disruption and encourage onward travel by public transport. Bus services also provide onward connections to regional centres of employment, retail and commerce at Liverpool.

Bus timetables should also be designed to coordinate with the SWRL rail timetables to minimise transfer time and overall journey time.

4) Bus service coverage

The proposed bus routes to service Edmondson Park South have been designed to maximise coverage of the development and to provide connections for residents to major services such as schools, recreational facilities and the town centre.

According to the Bus Service Planning Guidelines, bus services should cover 90% of the proposed development that is within 400m of a bus route. The proposed bus network should be designed to maximise the coverage of the proposed Edmondson Park South development throughout the different stages of the development. However, circuitous routes should be avoided that provide inefficient and indirect bus service to passengers.

Figure 6-1 shows the 400m coverage of the proposed Stage1 and Concept Plan bus service networks in Edmondson Park South.

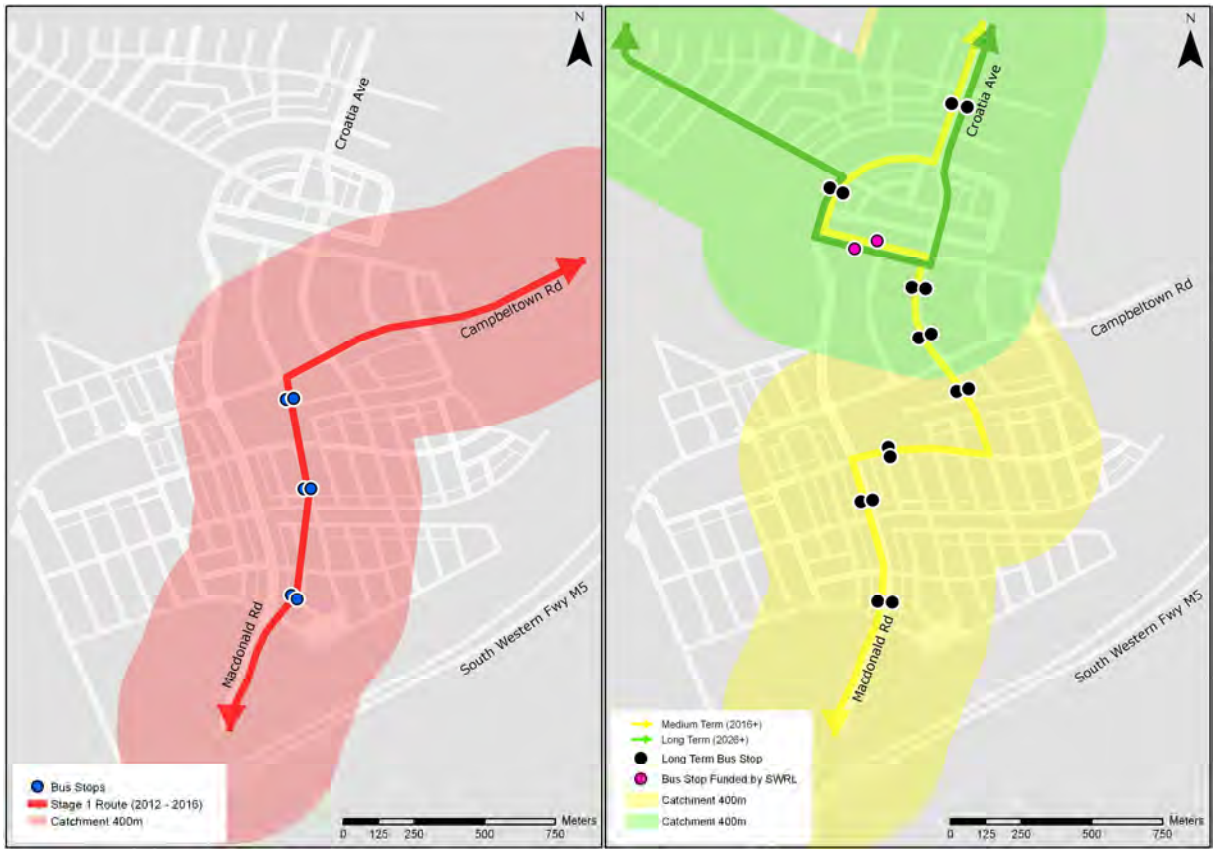
5) Timing of bus services and development staging – early 'Start up' buses

In order to reduce car dependency for Edmondson Park South, it is recommended that a bus service should be established from "Day of opening" in 2012 to encourage the use of public transport by the residents. The bus routes will connect Edmondson Park South with Edmondson Park Station and Town Centre, as well as regional destinations such as Liverpool and Campbelltown.

Precedence has been set for implementing early bus services for new release areas. At Oran Park a new service has been implemented that links Oran Park Town with Minto. This is a regular hourly day-time bus service operating on weekdays between 7am and 5pm and on Saturdays between 8am and 3pm. This is operated under contract by Transport NSW and funded by the developer of Oran Park.

Landcom will work with Transport NSW and the local bus service provider to deliver a service prior to the opening of the SWRL and Edmondson Park Station.

Figure 6-1: 400m catchment for the bus networks in Edmondson Park South



Source: AECOM, July 2010

6) Bus service frequencies to Service Planning Guidelines

The public transport network is designed to meet or exceed the criteria for service levels outlined in **Table 6-1**, which are based on the Transport NSW bus planning guidelines.

Table 6-1: Proposed Bus Network Level of Service

Service	Route Classification	Transport NSW Service Planning Guidelines (Headway)	Proposed Service Level (Headway)	Comments
Route 859 Ingleburn to Liverpool via Edmondson Park South(Short Term)	District Route	Weekdays Peaks 60 mins Inter Peak: 60 mins Weekends Saturday daytime 60 mins Sunday daytime 60 mins	Weekdays Peaks 60 mins Inter Peak: 60 mins Weekends Saturday daytime 60 mins – limited service Sunday daytime – no service	Landcom proposes an early start up of a base level of service on weekdays during peak periods and inter peak periods linking the catchment area with major centres. Provides a limited service on weekends, with a Saturday daytime service. No Saturday evening or Sunday service.
Route 859 Ingleburn to Liverpool via Edmondson Park South (Medium – Long Term)	District Route	Weekdays Peaks 60 mins Inter Peak 60 mins Weekends Saturday daytime 60 mins Sunday daytime 60 mins	Weekdays Pre Peak 60 mins Peak 30 mins Inter-peak 60 mins Night 60 mins Weekends Saturday 60 mins Sunday 60 mins	The bus frequencies proposed by the South West Bus Servicing Plan exceeds standards during peak periods to facilitate easier transfers and multipurpose trips at Liverpool, Edmondson Park and Ingleburn Railway Stations. Provides a base level of service throughout the day and on weekends linking the catchment area with major centres. Exceeds standards in the pre-peak and evening periods, where a service is generally not provided on a District Service.
Proposed Route R1 between Campbelltown and Liverpool via Leppington and Edmondson Park South (Long Term)	Regional Route	Weekdays Pre Peak 30 mins Peak 20 mins Inter-peak 30 mins Night 60 mins Weekends Saturday 30 mins Sunday 30 mins	Weekdays Pre Peak 30 mins Peak 15 mins Inter-peak 30 mins Night 60 mins Weekends Saturday 30 mins Sunday 30 mins	The bus frequencies proposed by the South West Bus Servicing Plan exceeds standards in the peak periods. Provides a base level of service throughout the day linking large catchment area with major centres. Provides a base level of service on Saturdays with late night transport option. Sunday service provides base level of service.

Source: AECOM with reference to Transport NSW bus planning guidelines and South West Bus Servicing Plan, July 2010

7) Good quality bus stops with coverage throughout Edmondson Park South

Bus stops will be provided on bus routes at regular intervals, at approximately 400 metres between stops, throughout residential areas, to provide good access to public transport networks and in the town centre. Stops will be strategically placed adjacent to major trip attractors, in the town centre, at schools and leisure facilities, and a dedicated bus-rail interchange facility will be provided at Edmondson Park Station (Refer to **Figure 5-4**).

Bus stops within Edmondson Park South will be designed with high standards of infrastructure, to provide shelter, seating, information such as timetable and network map. The facilities provided at each bus stop will be determined by surrounding land uses, account for service frequency and potential patronage.

8) Design for bus priority

In order to develop and protect bus corridors within Edmondson Park South to facilitate bus permeability, the site has been designed to accommodate bus movements, with minimal impediment to bus flow and to maximise journey time reliability.

Signalised intersections on bus routes within the Edmondson Park South will be provided with bus priority where appropriate. Priority works has also been identified at the following locations to support efficient bus access:

- Traffic signals with bus priority are proposed at Campbelltown Road / Main Street intersection to facilitate efficient bus movements between the Edmondson Park South development on the southern side of Campbelltown Road and the proposed Town Centre as well as the proposed Edmondson Park Station; and
- Traffic signals with bus priority are proposed at intersections on both ends of the Edmondson Park Station bus interchange to facilitate efficient bus movements to and from the station to maximise public transport patronage.

6.4.3 Bicycle measures

9) Dedicated, high quality cycle routes throughout Edmondson Park South

Cycle routes are to be provided throughout Edmondson Park South to connect between residential areas, the Town Centre, rail station, schools, leisure and other facilities. Therefore these routes will provide for connections for all journey purposes for employment and education, as well as leisure and recreation. The routes will be a dedicated bicycle network which provides high quality infrastructure designed to make bicycle travel attractive, convenient, safe and efficient. In this way bicycle travel can be a realistic alternative, especially for local travel i.e. trips under 5kms.

10) Bicycle facilities

To maximise cycle usage throughout the site and the wider precinct, the provision of sufficient end of trip facilities, such as bicycle parking, at key locations is essential. Bicycle parking is therefore proposed to be provided in close proximity to schools and sports facilities, in the Town Centre and at the rail station and will also be encouraged as part of the development of employment and other commercial uses. Other areas of key open space will also have bicycle parking for leisure and recreational use.

In summary key locations for bicycle parking provision will be at:

- Edmondson Park Station;
- Edmondson Park Town Centre;
- Local schools;
- Sport, leisure and open space facilities; and
- Employment and commercial areas.

Additional 50 bike racks (in addition to the 10 bike parking spaces recommended by SWRL) are recommended at the station interchange or the Town Centre to encourage cycling.

11) Encourage local Bicycle User Group (BUG) for Edmondson Park South

The local community could be encouraged to set up a dedicated Bicycle User Group (BUG) for Edmondson Park South, or join an existing BUG which is active in the local vicinity and which works to encourage bicycle use and promotes bicycle rides and initiatives.

12) Promotion of bicycle initiatives – NSW bicycle week, cycle to work day

In addition to a local BUG to promote and encourage cycling in the precinct, local schools, businesses and councils should actively participate in recognised NSW government bicycle initiatives such as bicycle week and cycle to work day.

6.4.4 Pedestrian Measures

13) A highly permeable and safe pedestrian network throughout Edmondson Park South

A high quality pedestrian network will be provided throughout Edmondson Park South through continuous pedestrian footpaths and pedestrian crossing facilities at key locations. The design of a high quality, highly permeable pedestrian network with limited delays to walk trips and which is pleasant, convenient, direct and integrated with land uses will encourage and facilitate pedestrian accessibility.

In addition to the factors described above, the pedestrian network will consider safety in design to provide well-lit pedestrian links which can be observed from local land uses and as such provide pedestrians with a perception of safety and ambience which can encourage pedestrian travel.

14) Walking school bus program

Schools in Edmondson Park South will be encouraged to implement a walking bus. The walking school bus is a simple concept whereby a group of children walk to school with one or more adults. This can overcome parents' safety fears, often cited as their primary cause of reluctance to allow their children to walk to school. These types of programs can also lead to a mindset which encourages active travel throughout life for both children and parents for other journeys, and is as educational and supportive of behavioural change as it is practical.

6.4.5 Parking restraint measures

15) Restrained parking rates for town centre high density residential development

The high density residential development in the town centre will have very good access by public transport, as well as good quality pedestrian and cycle networks, and a good range of local shops, services and facilities in close proximity, thereby reducing residents need to own and operate a car.

Therefore, parking requirements for the high density residential should be restrained to account for the availability of other travel options, as well as accessibility to local services. This will lead to reduced car dependence and encourage uptake of other modes. The implementation of this measure will require further discussion with relevant Councils and may need to revise the DCP, if appropriate.

16) Town Centre co-sharing parking provision

The provision of parking in the town centre should be co-ordinated and where possible shared across multiple land uses or shared between retail and commuter parking that do not have similar peak parking demands.

This will create a more walkable, liveable centre, which is not car dominated and ensure balanced access across all modes. Dedicated parking for individual land uses should not be provided and general parking areas should be made available to provide access to town centre employment, retail and services and the rail station, but without encouraging unnecessary vehicle travel.

Parking provision should encourage short stay trips, with some limited long stay parking for commuters around the rail station and on the fringe of the city centre. Any on-street parking should be limited to short term, disabled and taxi parking.

6.4.6 Travel planning measures

17) School travel plans

School travel plans should be mandatory for all schools In Edmondson Park South. Local schools should have predominantly local catchments so should therefore aim for high levels of travel by sustainable modes, and especially active modes.

Access by walk and cycle will be facilitated by a series of continuous, high quality pedestrian and bicycle paths, and complimentary end of trip facilities should be provided through the detailed planning of individual school sites. A range of additional initiatives ranging from the walking school bus to award and encouragement to those who travel actively will help develop a healthy, active culture and meet travel targets.

18) 'Voluntary' workplace travel plans

Workplace travel plans should be encouraged for new businesses in the Town Centre, which could be implemented through the provision of shared area-based initiatives and facilities wherever possible, as Edmondson Park Town Centre is unlikely to be a location for major employers.

6.4.7 Travel demand management measures

19) Car sharing scheme

Liverpool and Campbelltown Councils should consider extending the provision of established car share schemes using an established provider (such as GoGet) to set up a car sharing network for Edmondson Park South. This would reduce residents need to own and operate their own vehicle, safe in the knowledge that there can get access to a vehicle if they require one.

20) Encourage sustainable home deliveries of groceries (Food Connect Sydney) using local producers

Additional measures which can be encouraged through promotion in the Household Information Packs and support through local community organisation are to adopt sustainable practices for deliveries and sustainable principles in local food production. Creating and utilising a local food production network can reduce peoples' need to travel (for shopping) and hence reduce travel demand for residents, whilst also reducing the transport of food produce.

21) Establish a community garden and farm – run by local community within Edmondson Park South

A local community garden and farm can also help create social cohesion and a local community focal point as well as ensuring local produce is available for residents. Food Connect Sydney, part of the umbrella Food Connect organisation which originated in SE Queensland, is an organisation which operates to coordinate local food producers and buyers.

Landcom will work with local councils to investigate the establishment of a local community garden and farm to create social cohesion and a local community focal point as well as ensuring local produce is available for residents.

Table 6-2 provides a summary of the proposed Sustainable Travel Strategy measures.

Table 6-2: Summary of Sustainable Travel Strategy measures

Reference	Description
Household Travel Behaviour Measures	
1	Household Information Packs (HIPs) for each household in Edmondson Park South
2	One week free public transport (MyMulti) start up discount ticket
Public Transport Measures	
3	Integration of public transport services
4	Bus service coverage
5	Timing of bus services and development staging – early 'Start up' buses
6	Bus service frequencies to Service Planning Guidelines
7	Good quality bus stops with coverage throughout Edmondson Park South
8	Design for bus priority
Bicycle Measures	
9	Dedicated, high quality cycle routes
10	Bicycle parking at key locations
11	Bicycle User Group
12	Promotion of bicycle initiatives
Pedestrian Measures	
13	Highly permeable and safe pedestrian network
14	Walking school bus program
Parking Restraint Measures	
15	Restrained parking for high density residential
16	Town centre co-sharing parking provision
Travel Planning Measures	
17	School travel plans
18	'Voluntary' workplace travel plans
Travel Demand Management Measures	
19	Car sharing scheme
20	Sustainable home deliveries of groceries
21	Community garden and farm

Source: AECOM, July 2010

7.0 Traffic Impact Assessment

7.1 Introduction

Regardless of the initiatives to improve public transport and active transport use, the development of Edmondson Park South will result in increased vehicular trips and increased usage of the road system in the vicinity. Forecasts of increases in traffic flows have been estimated using a spreadsheet model and assessed through detailed intersection modelling.

This section assesses the likely traffic impacts of the proposed Stage 1 development and Concept Plan on the local road network. Assessment for the Stage 1 Development has been undertaken for a future year of 2012, when it is assumed to be completed.

The Concept Plan assesses the combined impacts of Stage 1 and subsequent stages of development. Two scenarios for the Concept Plan have been assessed:

- 2016 – with SWRL opens and an assumed development of 1,100 residential lots (refer to staging plan in Section 5.4) and 50% of the town centre being completed.
- 2026 – with SWRL and full development of the residential and town centre components.

A sensitivity test has also been undertaken (requested by the RTA) to determine whether the reserved third lane in the proposed cross-section of Campbelltown Road will cater for traffic growth (generated by further development of SWGC) up to 2036.

7.2 Road network impact assessment – stage 1 development

7.2.1 Trip generation

The methodology adopted for trip generation in Stage 1 is based on a first principles approach. The basic approach is outlined below.

The number of residents per household and the percentage of employed residents in the study area has been determined from 2006 census data and applied to the number of dwellings proposed as part of the Stage 1 development.

As Stage 1 is expected to be completed by 2012, before the SWRL opens. A mode split for the neighbouring suburbs such as Prestons and Horningsea Park (Refer to **Table 3-2**) has been derived and applied to the number of generated trips to determine the number of car driver trips. Trip generation for the Stage 1 development is shown in **Table 7-1**.

Table 7-1: Stage 1 development trip generation

No of dwellings (Stage 1)	No of residents per household	No of employed residents	Mode Split					
			Car	Car Passenger	Train	Bus	Worked at home	Other
	3.0	45%	70%	6%	9%	2%	10%	3%
222	666	300	210	18	27	6	30	9

Source: AECOM, 2010

The table shows that approximately 210 car trips will be generated by the Stage 1 development. It is also estimated 35 trips will be made by train and it has been assumed that 50% of these train trips will be undertaken by car to a railway station, with the remainder 50% catching a connecting bus to Liverpool.

A total of 245 car trips are forecast to be generated by the development. This is equivalent to a generation rate of approximately 1.0 trip per dwelling during the peak hours. This rate is considered to be more conservative than the rate proposed by the RTA Guide to Trip Generating Development for the same type of dwelling. This approach of trip generation is considered to be robust, accurate and represents a worst case scenario assessment.

7.2.2 Trip distribution and assignment

Trip distribution has been based on existing journey-to-work patterns as described in **Section 3.2.3**. The trip pattern of neighbouring suburbs of Prestons and Horningsea Park has been adopted for the proposed Stage 1 development. Key distribution assumptions for the Stage 1 assessment are:

- 94% of development generated trips will travel to / from the north via Campbelltown Road;
- 6% of trips will travel to / from the south via Campbelltown Road and Macdonald Road; and
- 90% of trips will leave and 10% will return to the development in the AM peak with the reverse occurring in the PM peak.

7.2.3 Network modelling

As stated above, approximately 6% of trips will travel to / from the south via Campbelltown Road and Macdonald Road. Therefore, it is estimated that approximately 10 additional trips will be experienced at Campbelltown Road and Macdonald Road south of the study area, which is less than 1% and 2% of existing traffic on Campbelltown Road and Macdonald Road respectively. Therefore, it is considered that the Stage 1 development will have a negligible impact on Campbelltown Road and Macdonald Road south of the study area.

As the majority of the Stage 1 traffic will travel to / from the north via Campbelltown Road, the following key intersections associated with the Stage 1 development have been modelled:

- Campbelltown Road / Macdonald Road (signals);
- Campbelltown Road / Ingleburn Gardens access (signals); and
- Macdonald Road / Stage 1 development access road (priority controlled).

The intersection of Camden Valley Way / Croatia Avenue / Bernera Road has not been considered as part of the Stage 1 development assessment as Croatia Avenue will not be connected to Campbelltown Road before the opening of SWRL in 2016.

7.2.4 Stage 1 with development intersection performance

The Stage 1 development generated car trips have been added to the network to assess performance of key intersections in 2012. The 2012 peak hour network modelling traffic flows with Stage 1 development are included in **Appendix E**.

Table 7-2 shows the intersection performance results with development generated traffic present in the 2012 AM and PM peak hours. The proposed intersection layout and detailed results of the intersection performance are also presented in **Appendix E**.

Table 7-2: 2012 intersection performance with Stage 1 development traffic

Intersection	Peak	Volumes (veh/hr)	Degree of Saturation (DoS)	Ave Delay (sec)	Overall Level of Service (LoS)	95% Back of Queue (m)
Campbelltown Road / Macdonald Road	AM	1,730	0.750	15.7	B	137
	AM with dev	2,012	0.882	29.7	C	237
	PM	2,073	0.742	14.6	B	136
	PM with dev	2,352	0.851	16.1	B	139
Campbelltown Road / Ingleburn Gardens access	AM	1,672	0.818	5.8	A	93
	AM with dev	1,940	0.891	8.5	A	202
	PM	2,006	0.867	5.6	A	171
	PM with dev	2,276	0.920	4.5	A	295
Stage 1 development access road / Macdonald Road	AM with dev	989	0.307	3.1	N/A	12
	PM with dev	1,195	0.283	2.4	N/A	8

Source: AECOM, 2010

The modelling results indicate that the Campbelltown Road / Macdonald Road intersection perform at satisfactory levels of service and with acceptable average delays in the AM and PM peak hours with Stage 1 development traffic on the road network. It should also be noted that this intersection will be relocated in 2016 when SWRL opens.

The results show that the intersection of Campbelltown Road / Ingleburn Gardens access will perform at LoS A in both peak hours with development traffic. The intersection has limited reserve capacity in the AM and PM peak hour largely due to future traffic volumes on Campbelltown Road during the peak hours. Our approach for Stage 1 analysis has been conservative in terms of trip generation; therefore the modelling represents a worst case scenario.

The new Stage 1 development access road intersection with Macdonald Road will perform satisfactorily as a give-way intersection with minimal average delays and significant spare capacity in both the 2012 AM and PM peak hours.

In summary, the intersection performance with Stage 1 development traffic is adequate without the need for upgrades to existing intersection layouts in the 2012 AM and PM peak hours. The intersections along Campbelltown Road are approaching capacity, however this is due increases in background traffic flows. The development is considered to have a negligible impact on existing intersection performance.

7.2.5 Car parking provision

The car park provision for the 222 residential dwellings in Stage 1 will comply and determined based on the relevant Council DCP guidelines and RTA guide to trip generating developments.

7.2.6 Construction traffic impacts

Details associated with construction traffic volumes and routes for Stage 1 are not yet available, however, a similar scale of residential development in Rouse Hill (Eastern Precinct) forecasts construction traffic volumes of 50 trucks per day or up to 10 trucks per hour. This amount of traffic is less than that of the Stage 1 development generated traffic. Therefore, construction traffic generated by Stage 1 is considered to have a negligible impact on the local road network.

A more detailed construction management plan will be developed as part of future DA submissions.

7.3 Road network impact assessment – Concept Plan

7.3.1 Modelling approach and key assumptions

To assess traffic impacts of the Concept Plan on the local road network and to provide a guide on future intersection types and layouts within Edmondson Park South, a spreadsheet model has been created to determine future traffic flows of the overall road network of the Concept Plan. A spreadsheet model has been developed for the AM and PM peak hours of 2016 and 2026. The 2016 and 2026 peak hour network modelling traffic flows with development traffic flows are included in **Appendix E**.

A number of assumptions have been made as part of the assessment, related to road network changes / improvements associated with the delivery of the SWRL. Key assumptions of the spreadsheet model include:

- Realignment of Macdonald Road approximately 200m of its current alignment. This facilitates connection to the proposed Edmondson Park Station by 2016;
- The opening of the SWRL in 2016 (with mode shift to increased rail use);
- Construction of an access from the intersection of Campbelltown Road / Macdonald Road, incorporating a northern approach which connects to the proposed Edmondson Park Station in 2016;
- Extension of Croatia Avenue to the south to provide a connection to the proposed Edmondson Park Station in 2016; and
- Construction of two bridge crossings the SWRL corridor providing connections between Campbelltown Road and Camden Valley Way as well as connecting both sides of Edmondson Park Release Area in 2016.

7.3.2 Traffic generation

Residential trips

Similar to the Stage 1 Development, a 'first principles' approach has been used to forecast the number of vehicle trips generated by the residential land use. Assumptions have been made on the number of residents that will occupy in different types of dwellings proposed in Edmondson Park South:

- Detached housing – 3.0 residents per dwelling
- Attached housing – 2.7 residents per dwelling
- High density housing – 2.2 residents per dwelling

In light of changing travel behaviour due to the opening of the SWRL, the mode split of the proposed development has been estimated based on 2006 journey-to-work data for travel zones in South West Sydney that include residential with access to a local train station.

Development of Edmondson Park South up to 2016 will be located to the south of Campbelltown Road. Therefore, the mode splits for the proposed development are expected to have similar travel characteristics to suburbs that are currently within walking distance of a train station, but are separated from the train station by major roads. Travel patterns at Glenfield, Macquarie Fields, Ingleburn and Minto Stations have been reviewed and these have an average train mode share of approximately 20% (an increase of 11% from existing train share). A further 5% mode shift to train use has been assumed in 2026 as more development occurs closer to the new Edmondson Park Station. The proposed mode splits for Edmondson Park South in 2016 and 2026 are shown in **Table 7-3**.

Table 7-3: Proposed mode split in 2016 and 2026

Area	Vehicle Driver	Vehicle Passenger	Train	Bus	Others *	Did not Travel
2016	56%	6%	20%	2%	6%	10%
2026	51%	6%	25%	2%	6%	10%

*- including walking, cycling and travel modes not stated

Source: AECOM, 2010

The mode splits proposed for Edmondson Park South in 2026 are similar to the journey-to-work data estimated from travel zones which are located immediate to a local railway station along the South Rail Line (Refer to **Table**

3-2). The proposed mode share targets for Edmondson Park South also meet the revised State Plan journey-to-work mode split targets. These are:

- 28% of total journeys to work by public transport in the Sydney Metropolitan Region by 2016;
- Increase of the share of commute trips made by public transport to and from the Liverpool CBD to 20% by 2016; and
- 5% for bicycle trips of less than 10km made in the Greater Sydney region by 2016.

The proposed mode splits are then applied to the total number of generated trips to determine the number of car driver trips in 2016 and 2026. **Table 7-4** and **Table 7-5** show the traffic generated by the residential component of Edmondson Park South in 2016 and 2026 respectively by each mode of transport.

Table 7-4: 2016 residential trip generation

Dwelling type	No of lots / dwellings	No of employed residents	Mode Split					
			Car	Car Passenger	Train	Bus	Worked at home	Other
Detached	637	860	482	52	172	17	86	52
Attached	333	405	227	24	81	8	40	24
High density	155	154	86	9	31	3	15	9
Rural	17	26	14	2	5	1	3	2
Total	**1,142***	**1,445**	**809**	**87**	**289**	**29**	**144**	**87**

* Edmondson Park South will deliver approximately 200 dwelling per year. See Section 5.4 for Staging Plan.

Source: AECOM, 2010

Table 7-5: 2026 residential trip generation

Dwelling type	No of lots / dwellings	No of employed residents	Mode Split					
			Car	Car Passenger	Train	Bus	Worked at home	Other
Detached	1,375	1856	947	111	464	37	186	111
Attached	660	802	409	48	200	16	80	48
High density	1,265	1,252	639	75	313	25	125	75
Rural	17	26	14	2	5	1	3	2
Total	**3,317**	**3,937**	**2,008**	**236**	**984**	**79**	**394**	**236**

Source: AECOM, 2010

The tables show that 875 car trips will be generated by the residential component of the development in 2016 and 2,135 car trips will be generated by the residential component of the development in 2026.

Of the expected train users in 2016, there are approximately 50 (~20%) of them would be driving to the station (park and ride) or dropped off at the station (kiss and ride). In 2026, there are approximately 110 (~10%) of them would be driving to the station (park and ride) or dropped off at the station (kiss and ride). This is less than kiss and ride / park and ride access mode to Edmondson Park Station as forecast by the SWRL EA – approximately 40% in total for the overall catchment of the station. However, it is expected that the car access mode for this development should be lower given the proximity of the development to the proposed Edmondson Park Station.

Including the car trips related to the kiss and ride / park and ride access mode to Edmondson Park Station, the proposed development will generate approximately 0.75 trips per dwelling in 2016 and 0.64 trips per dwelling in 2026. These indicative rates are considered to be similar to that of medium density housing assumed by the RTA Guide to Trip Generating Development for the same type of dwelling.

Town centre trips

The town centre will consist of approximately 35,000 to 45,000m^2 Gross Floor Area (GFA) of retail and employment (business and commercial) floor space. At this stage, exact details of land use within the town centre are unknown and will be subjected to more detailed planning and assessment. Retail and commercial rate has been adopted from the RTA Guide to Traffic Generating Developments:

- Commercial – AM and PM peak hour – 2 trips / 100m² GFA;
- Retail (Thursday PM peak hour) – 5.9 trips / 100m² Gross Leasable Floor Area (GLFA); and
- Retail (AM peak hour) – 2 trips / 100m² GFLA (generally much lower than the PM rate and would normally be trips for staff).

The number of trips generated by the Town Centre component of Edmondson Park South is shown in **Table 7-6**.

Table 7-6: Town centre generated trips

Land use	Area	AM peak hour		PM peak hour	
		Trip rates	No of trips	Trip rates	No of trips
Retail	18,750m² GFLA*	2 trips / 100m² GFLA	375	5.9 trips / 100m² GFLA	1,106
Commercial	15,000m² GFA	2 trips / 100m² GFA	300	2 trips / 100m² GFA	300

*- Assuming GLFA is approximately 75% of GFA

Source: AECOM, 2010

Assumptions have been made to take account of the proposed sustainable travel strategy, active and public transport initiatives proposed in **Section 6** of this TMAP to reduce car dependency of town centre related trips.

- 50% of town centre trips to / from residential zones adjacent to the town centre (approximately within 400m) will be made on foot;
- 100% of town centre trips to / from the high density residential near the town centre will be made on foot; and
- 20% of PM peak hour town centre trips are considered to be linked trips (referenced from the RTA Guide to Traffic Generating Developments).

Educational trips

One high school and two primary schools including the existing Ingleburn North Public School are proposed within the Concept Plan of Edmondson Park South. The total number of enrolments proposed for the high school is 1,000 students and for the two proposed primary schools are further 500 students each. Based on a trip rate of one trip per two students, it is expected that the schools will generate 1,000 trips in the AM peak hour.

However, the majority of these trips are expected to be generated within Edmondson Park South, especially the primary schools as they are intended to cater for a local catchment. The locations of the schools have been selected based on accessibility to the local communities and public transport facilities. This will encourage students to walk and cycle or catch public transport to and from schools reducing the potential traffic impacts around school sites. It has been assumed that 50% of the school trips will be made by active transport (walking and cycling) or by public transport.

Due to the development pattern and forecast population growth in Edmondson Park South and the wider precinct, the co-located high school and primary school situated at the north of the SWRL will only be opened after 2016.

Traffic generated by the schools during the afternoon will occur before the typical PM peak hour (5-6PM) and have therefore not been assessed on the PM peak scenario.

7.3.3 Trip distribution and assignment

The assignment of external trips in 2016 has been based on existing journey-to-work patterns as described in **Section 3.2.3**. A small proportion (10%) of traffic has been assumed to divert from Campbelltown Road (towards the northeast) to Macdonald Road, Croatia Avenue and Camden Valley Way.

With the development of SWGC and the increase in employment opportunities in Oran Park and Leppington in the long-term, the travel patterns in particular the journey-to-work destinations for Edmondson Park South will be different to existing patterns. The assignment of external trips for the 2026 scenario is based on future employment forecasts of LGAs with major employment centres in south western and western Sydney and include; Blacktown, Bankstown, Penrith, Fairfield, Liverpool, Parramatta, Campbelltown and Camden LGAs. Employment forecasts indicate that a majority (86%) of employment will be located to the north and east of Edmondson Park (Blacktown, Bankstown, Penrith, Fairfield, Liverpool, Parramatta), with the remainder (14%) located to the south and west of Edmondson Park (Campbelltown and Camden).

Table 7-7 shows the existing and forecast proportion of trip distribution assigned to the external road network.

Table 7-7: Edmondson Park South trip distribution

External	Location	Trip Distribution		
		2006	2016	2026
1	Via Croatia Avenue and Camden Valley Way	0%	10%	27%
2	Via Campbelltown Road (eastbound)	94%	84%	59%
3	Via Macdonald Road (southbound)	3%	3%	9%
4	Via Campbelltown Road (westbound)	3%	3%	5%

Source: AECOM, 2010

7.3.4 Network modelling

The following key intersections associated with the Concept Plan have been modelled:

- Campbelltown Road / Macdonald Road (Intersection 1);
- Campbelltown Road / Ingleburn Gardens access (Intersection 2);
- Camden Valley Way / Croatia Avenue / Bernera Road (Intersection 3);
- Campbelltown Road / Town Centre Main Street / Croatia Avenue (Intersection 5); and
- Campbelltown Road / East Town Centre Street (Intersection 6);

The following key intersections internal to Edmondson Park South have also been modelled. Their locations are shown in **Figure 7-1**. Detailed intersection layouts for 2016 and 2026 are included as **Appendix E**.

- Macdonald Road / Stage 1 development access road / Primary School Access Road (Intersection 4);
- Croatia Avenue / Macdonald Road / Town Centre Main Street (Intersection 7);
- Macdonald Road / High School Access Road (Intersection 8);
- Macdonald Road / Station South Access Road (Intersection 9); and
- Croatia Avenue / Station South Access Road (Intersection 10).

It should be noted that the location, layout and control of these key internal intersections in the vicinity of the Town Centre will be reviewed and confirmed with further development of the Town Centre Masterplan.

Figure 7-1: Location of analysed intersections

Source: AECOM, 2010

7.3.5 Comparison of 2016 and 2026 traffic forecasts

The generated car trips associated with the Concept Plan have been added to the network. The 2016 and 2026 forecast traffic estimated based on the spreadsheet models have been compared with the RTA EMME/2 forecasts. The comparison of peak hour forecasts is shown in **Table 7-8**.

Table 7-8: Comparison of AECOM and RTA traffic forecasts (2016 and 2026 peak hours)

Location		2016 flows (2-way)		2026 flows (2-way)	
		AM	PM	AM	PM
Macdonald Road (south of Campbelltown Road)	RTA	845	745	1,443	1,323
	AECOM	1,117	1,214	1,512	1,633
Campbelltown Road (south of Glenfield Road)	RTA	2,199	2,676	2,836	3,165
	AECOM	2,354	2,717	2,628	2,734
Camden Valley Way (east of Bernera Road)	RTA	2,629	2,732	3,034	2,883
	AECOM	3,050	3,013	4,382	4,305
Croatia Avenue (south of Camden Valley Way)	RTA	162	218	1,422	1,573
	AECOM	392	423	1,683	1,803

Source: AECOM and RTA Traffic Forecasts, 2010

In general, the AECOM 2016 forecasts are higher than the RTA forecasts at the corresponding locations surrounding Edmondson Park, potentially due to lower development rate for Edmondson Park and regional

background traffic growth assumed by the RTA EMME/2 model. The AECOM forecasts are also higher than the RTA forecasts, except at Campbelltown Road. Our lower traffic flow in Campbelltown Road is offset by the higher traffic flows at Croatia Avenue as we have assumed a redistribution of traffic from Campbelltown Road to Croatia Avenue.

7.3.6 2016 and 2026 with development intersection performance

The performance of intersections as highlighted in **Section 7.3.4** have been assessed in 2016 and 2026 and the results are discussed in the following sections. All the signalised intersections have been modelled with full pedestrian crossing on each approach and pedestrian phasings will be called every cycle.

2016 Intersection performance results

Table 7-9 shows the intersection performance results of the key intersections in the 2016 AM and PM peak hour with development traffic and **Table 7-10** shows the intersection performance results of the new internal intersections in the 2016 AM and PM peak hour with development traffic. The proposed layout of the analysed intersections is shown in **Figure 7-2**.

Table 7-9: 2016 AM and PM peak hour key intersection performance results with development

Intersection	Peak hour	Volumes (veh/hr)	Degree of Saturation (DoS)	Ave Delay (sec)	Overall Level of Service (LoS)	95% Back of Queue (m)
Intersection 1: Campbelltown Road / Macdonald Road (signals)	AM Base	1,987	0.785	29.6	C	118
	AM with dev	2,281	0.800	47.7	D	182
	PM Base	2,301	0.831	29.2	C	187
	PM with dev	2,520	0.812	36.8	C	263
Intersection 2: Campbelltown Road / Ingleburn Gardens access (signals)	AM Base	1,779	0.406	7.5	A	100
	AM with dev	2,409	0.546	7.6	A	153
	PM Base	2,138	0.494	9.8	A	150
	PM with dev	2,772	0.670	10.7	A	252
Intersection 3: Camden Valley Way / Croatia Avenue / Bernera Road (signals)	AM Base	3,452	0.857	37.6	C	330
	AM with dev	3,514	0.827	36.6	C	293
	PM Base	3,532	0.711	32.6	C	226
	PM with dev	3,593	0.812	35.9	C	264
Intersection 5 (signals)	AM	1,991	0.527	5.7	A	32
	PM	2,678	0.627	7.8	A	73
Intersection 6 (signals)	AM	2,205	0.743	40.3	C	238
	PM	2,685	0.698	9.1	A	139

Note: Campbelltown Road is assumed to have two lanes in each direction to cater for the background growth in 2016 and 2026.

Source: AECOM, 2010

The results indicate that in the 2016 AM peak hour, the intersection of Campbelltown Road / Macdonald Road performs at LoS D and operates with approximately 20% spare capacity. However, to accommodate development traffic in the AM peak hour, an additional short right turn lane is required on the southern approach of Macdonald Road. In the PM peak hour the intersection performs at LoS C and with approximately 19% spare capacity.

The intersection of Campbelltown Road / Ingleburn Gardens access performs satisfactorily in 2016 during the AM and PM peak hours at LoS A, with minimal average delays and with significant spare capacity.

The Camden Valley / Croatia Avenue / Bernera Road intersection (under its existing layout) operates satisfactorily at LoS C and with approximately 18% spare capacity in the AM peak hour and with approximately 19% spare

capacity in the PM peak hour, with development traffic. The assessment assumes a small proportion (10%) of development traffic will use this intersection in 2016.

In summary, the proposed development is considered to have a negligible impact on existing intersections on the surrounding road network, with the exception of an additional short right turn lane on the southern approach of Macdonald Road. It is assumed that the major upgrade to Campbelltown Road, implementation of an additional two lanes is required, regardless of development and will have been completed by 2016.

Two new intersections are proposed along Campbelltown Road in 2016. Intersections 5 and 6 (Campbelltown Road with Town Centre Main Street and East Town Centre Street respectively) require signalisation to accommodate turning movements and traffic accessing the proposed Town Centre and Station to / from Campbelltown Road. These signals also provide safe crossing points across Campbelltown Road and at Town Centre Main Street allows bus services to cross Campbelltown Road and serve the Town Centre and station.

The length of turning bays (inclusive of storage length, deceleration lane and taper length) on both Campbelltown Road approaches at Macdonald Road intersection do not extend beyond the neighbouring signalised intersections. The length of turning bays on both Campbelltown Road approaches at East Town Centre Street intersection also do not extend beyond the neighbouring signalised intersections and the SWRL bridge.

The proposed signalised intersection of Campbelltown Road/Town Centre Main Street is modelled with no right turn movements allowed from Campbelltown Road into the Town Centre. The proposed cross-section of Campbelltown Road (refer to **Figure 5-6**) allows for the provision of a right turn bay at this intersection if required.

Table 7-10: 2016 AM and PM peak hour new internal intersection performance results with development

Intersection	Peak hour	Volumes (veh/hr)	Degree of Saturation (DoS)	Ave Delay (sec)	Overall Level of Service (LoS)	95% Back of Queue (m)
Intersection 4 (signals)	AM	1,049	0.455	11.7	A	61
	PM	1,291	0.549	10.2	A	89
Intersection 7 (priority controlled)	AM	82	0.036	4.0	N/A	1
	PM	82	0.019	3.2	N/A	1
Intersection 9 (priority controlled)	AM	49	0.021	0.7	N/A	0
	PM	37	0.014	0.9	N/A	0
Intersection 10 (priority controlled)	AM	140	0.093	5.5	N/A	3
	PM	218	0.145	5.5	N/A	5

Source: AECOM, 2010

The table indicates that Intersection 4 (along Macdonald Road), 5 and 6 (along Campbelltown Road) are required to be upgraded to signals by 2016, with the assumed development pattern and rate.

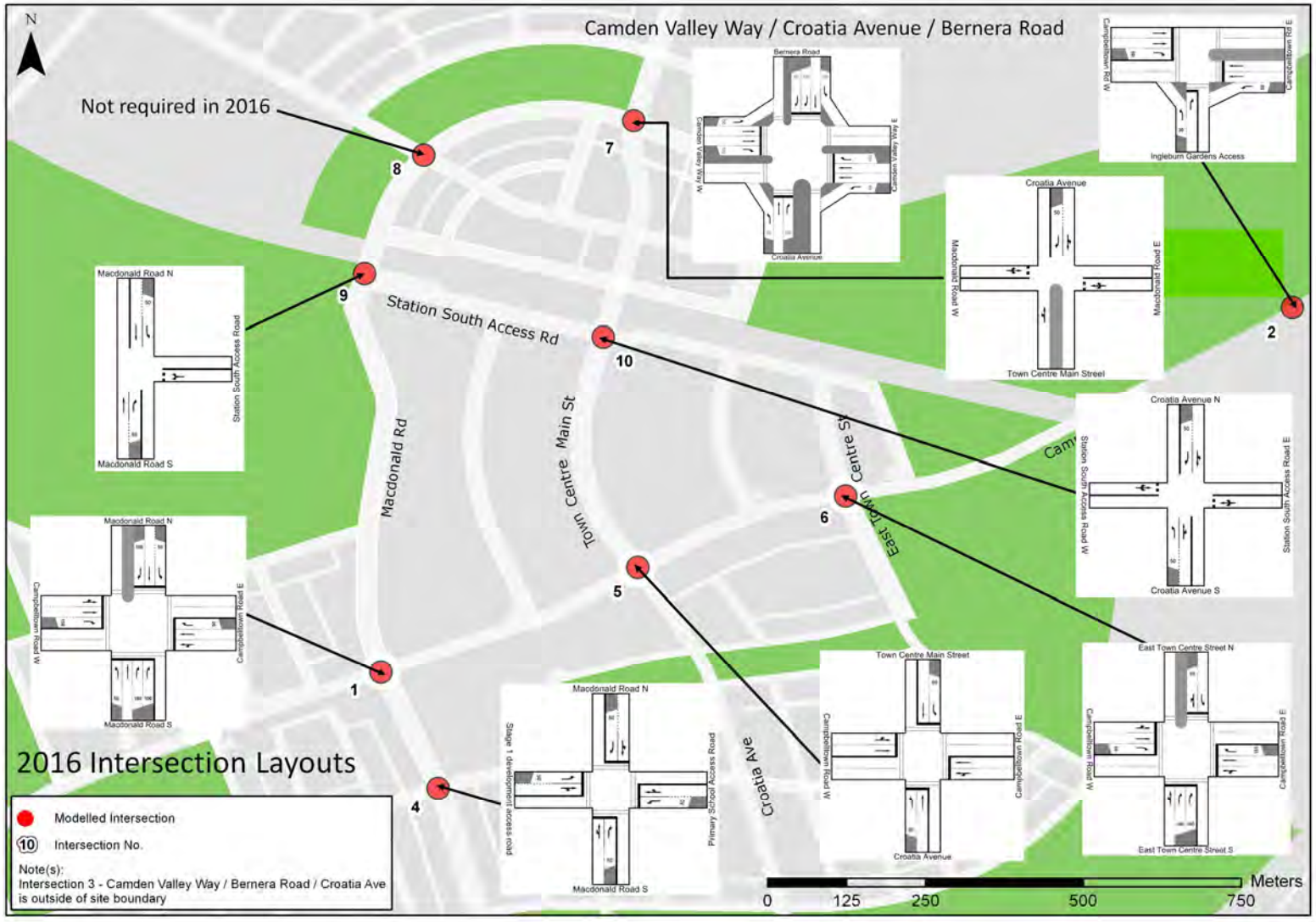
Intersection 4 (Macdonald Road / Stage 1 access / Primary School access) requires signalisation due to the increased flows on Macdonald Road and to accommodate development traffic generated by the southern sections of Edmondson Park South. It is also required to provide safe crossing opportunities for students crossing Macdonald Road.

Intersection 8 (near the future high school) is not required as no development to the west of the intersection is expected in 2016.

The remaining internal intersections perform very acceptably as priority controlled intersections in the AM and PM peak hours, with minimal average delays and significant spare capacity.

In summary, the intersections on the internal road network operate with spare capacity as they are designed specifically to meet the needs of the development in terms of both traffic and sustainable mode movements.

Figure 7-2: Proposed layout of intersections in 2016



Source: AECOM, 2010

2026 Intersection performance results

Table 7-11 shows the intersection performance results of the key intersections in the 2026 AM and PM peak hour with development traffic and **Table 7-12** shows the intersection performance results of the internal intersections in the 2026 AM and PM peak hour with development traffic. Analysis shows that the internal intersections will require signalisation in 2026 and have therefore been modelled as signalised intersections. The proposed layout of the analysed intersections is shown in **Figure 7-3**.

Table 7-11: 2026 AM and PM peak hour key intersection performance results with development

Intersection	Peak hour	Volumes (veh/hr)	Degree of Saturation (DoS)	Ave Delay (sec)	Overall Level of Service (LoS)	95% Back of Queue (m)
Intersection 1: Campbelltown Road / Macdonald Road (signals)	AM Base	2,464	0.820	48.3	D	222
	AM with dev	3,149	0.874	54.7	D	271
	PM Base	2,874	0.875	43.6	D	205
	PM with dev	3,356	0.806	45.6	D	227
Intersection 2: Campbelltown Road / Ingleburn Gardens access (signals)	AM Base	1,496	0.337	8.1	A	79
	AM with dev	2,685	0.598	8.1	A	178
	PM Base	1,858	0.422	10.0	A	119
	PM with dev	2,792	0.695	11.2	A	270
Intersection 3: Camden Valley Way / Croatia Avenue / Bernera Road (signals)	AM Base	4,943	0.824	39.2	C	218
	AM with dev	5,403	0.901	46.9	D	256
	PM Base	5,211	0.800	39.8	C	221
	PM with dev	5,581	0.837	45.9	D	261
Intersection 5 (signals)	AM	1,872	0.492	8.3	A	42
	PM	2,505	0.681	10.8	A	88
Intersection 6 (signals)	AM	2,514	0.812	50.0	D	262
	PM	2,630	0.612	21.6	B	132

Note: Campbelltown Road is assumed to have two lanes in each direction to cater for the background growth in 2016 and 2026.

Source: AECOM, 2010

The table indicates that in 2026 with full development traffic assigned to the road network, the intersection of Campbelltown Road / Macdonald Road performs at LoS D and with spare capacity in both the AM and PM peak hours. The results do not indicate the need for any upgrades at this intersection to cater for the development traffic.

The intersection of Campbelltown Road / Ingleburn Gardens Access Road performs satisfactorily at LoS A in the AM and PM peak hour. It operates with minimal average delays and spare capacity when development traffic is present on the road network.

The intersection of Camden Valley Way / Croatia Avenue / Bernera Road performs at LoS D in the AM and PM peak hour once development traffic is added to the road network. However, the intersection operates with acceptable intersection delays during both peak hours and no upgrades are considered necessary to cater for development traffic.

The full development in 2026 is not forecast to have a major impact on the key intersections on the surrounding road network. The upgrade of Campbelltown Road is required to accommodate background traffic growth and it has been assumed that this would have been implemented by 2016 as part of the regional infrastructure improvements. The forecast flows in 2026 on Campbelltown Road do not suggest the need for any further upgrades on Capacity to be provided. It has also been assumed that additional capacity is required to cater for background traffic flows at the intersection of Camden Valley Way / Croatia Avenue / Bernera Road.

Table 7-12: 2026 AM and PM peak hour new internal intersection performance results with development

Intersection	Peak hour	Volumes (veh/hr)	Degree of Saturation (DoS)	Ave Delay (sec)	Overall Level of Service (LoS)	95% Back of Queue (m)
Intersection 4 (signals)	AM	1,429	0.534	11.3	A	85
	PM	1,644	0.586	9.6	A	118
Intersection 7 (signals)	AM	1,558	0.627	10.4	A	68
	PM	1,736	0.820	20.8	B	144
Intersection 8 (signals)	AM	1,529	0.891	27.1	B	141
	PM	1,157	0.626	10.9	A	89
Intersection 9 (signals)	AM	1,784	0.704	17.1	B	121
	PM	1,294	0.642	13.5	A	89
Intersection 10 (signals)	AM	866	0.358	13.8	A	34
	PM	745	0.446	17.2	B	35

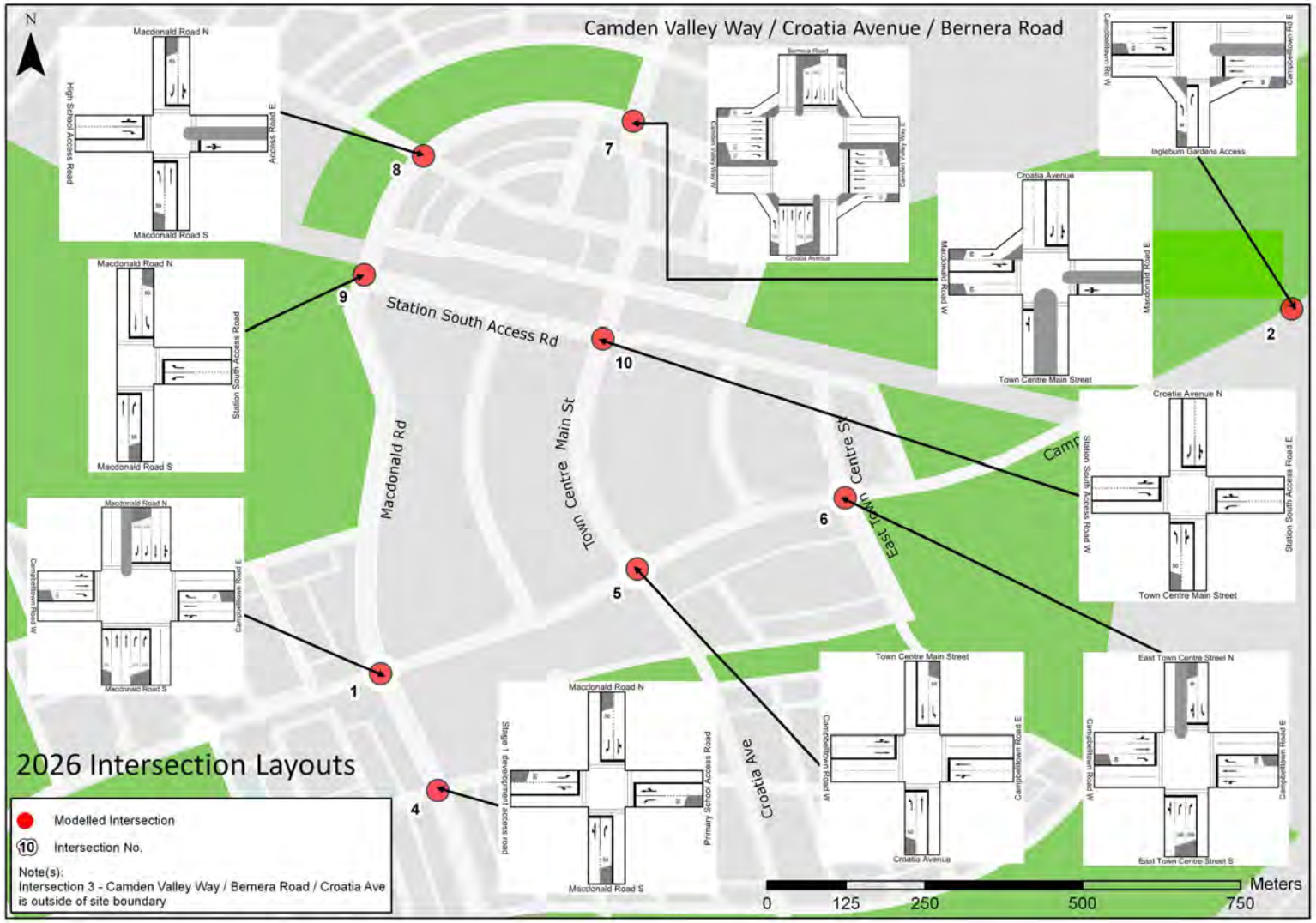
Source: AECOM, 2010

The table shows that when all internal intersections are signalised, they will perform with acceptable levels of service (LoS equal or better than LoS C) in the AM and PM peak hours in 2026.

The length of turning bays (inclusive of storage length, deceleration lane and taper length) on both Campbelltown Road approaches at Macdonald Road intersection do not extend beyond the neighbouring signalised intersections. The length of turning bays on both Campbelltown Road approaches at East Town Centre Street intersection also do not extend beyond the neighbouring signalised intersections and the SWRL bridge.

The proposed signalised intersection of Campbelltown Road/Town Centre Main Street is modelled with no right turn movements allowed from Campbelltown Road into the Town Centre. The proposed cross-section of Campbelltown Road (refer to **Figure 5-6**) allows for the provision of a right turn bay at this intersection if required.

Figure 7-3: Proposed layout of intersections in 2026



Source: AECOM, 2010

7.3.7 2036 with development intersection performance (Campbelltown Road intersections only)

Intersection analysis (refer to **Section 7.3.6**) suggest that two through lanes (including a shared left turn at the kerbside lane) and a single right turn lane are required in each direction to cater for forecast traffic up to 2026 at the intersections of Macdonald Road and East Town Centre Street with Macdonald Road. A sensitivity test has been undertaken (requested by the RTA) to determine whether the reserved third lane in the proposed cross-section of Campbelltown Road will cater for traffic growth (generated by further development of SWGC) up to 2036.

In order to estimate the growth of traffic between 2026 and 2036, the RTA EMME/2 traffic forecasts for 2036 (supplied to AECOM dated 18th August, 2010) were compared to the 2026 forecasts at Campbelltown Road and Macdonald Road in the vicinity of Edmondson Park. **The annual growth rate on Campbelltown Road is approximately 1.1% per annum during the peak hours between 2026 and 2036**.

The 2036 intersection turning flows at the proposed signalised intersections along Campbelltown Road has been derived by increasing the 2026 respective turning flows by a total of 11.0% over the ten year period.

Table 7-13 shows the intersection performance results of the proposed intersections along Campbelltown Road in the 2036 AM and PM peak hour with development traffic and the forecast background traffic growth according to the RTA EMME/2 models. The intersection modelling for 2036 has been undertaken assuming that there are three through lanes and a single right turn lane on Campbelltown Road. The proposed layout of the analysed intersections is shown in **Figure 7-4**Figure 7-3.

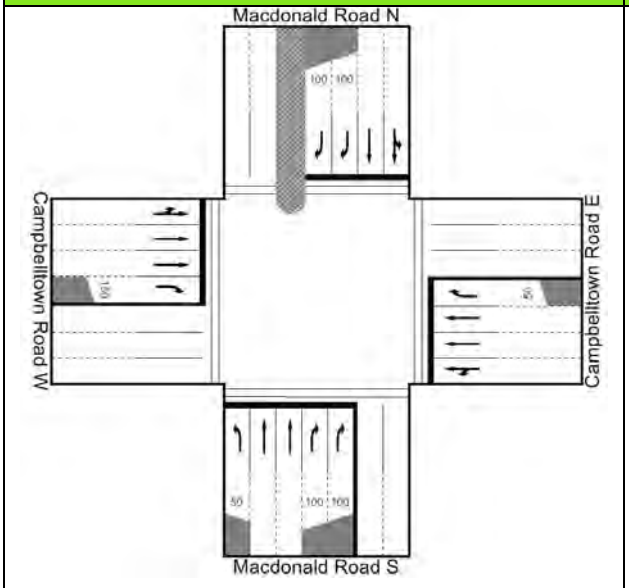
Table 7-13: 2036 AM and PM peak hour Campbelltown Road intersection performance results with development

Intersection	Peak hour	Volumes (veh/hr)	Degree of Saturation (DoS)	Ave Delay (sec)	Overall Level of Service (LoS)	95% Back of Queue (m)
Intersection 1: Campbelltown Road / Macdonald Road (signals)	AM with dev	3,496	0.802	51.1	D	217
	PM with dev	3,725	0.784	43.3	D	163
Intersection 5: Campbelltown Road / Town Centre Main Street (signals)	AM with dev	2,079	0.530	12.3	A	68
	PM with dev	2,780	0.769	16.3	B	95
Intersection 6: Campbelltown Road / East Town Centre Street (signals)	AM with dev	2,790	0.808	54.6	D	290
	PM with dev	2,918	0.852	35.7	C	160

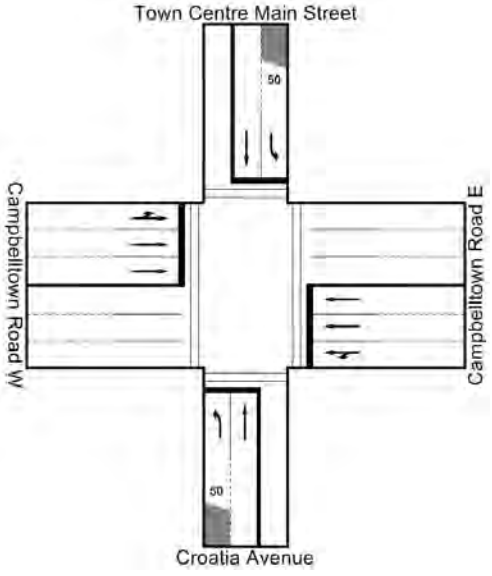
Source: AECOM, 2010

Figure 7-4: Proposed layout of Campbelltown Road intersections in 2036

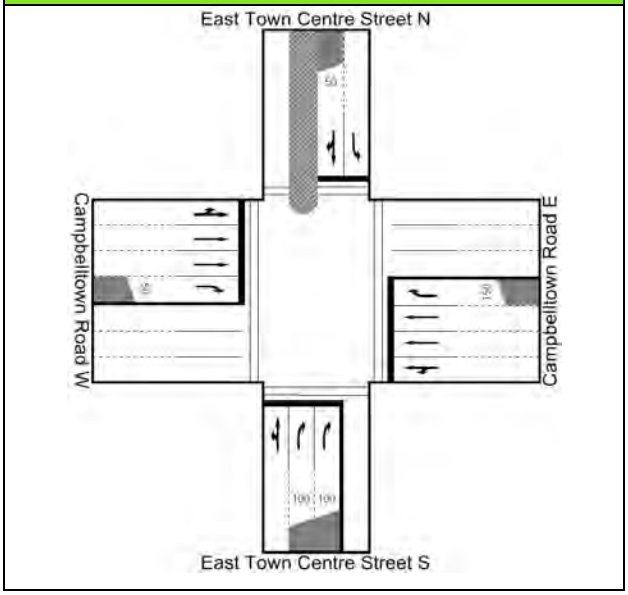
Intersection 1: Campbelltown Road / Macdonald Road



Intersection 5: Campbelltown Road / Town Centre Main Street



Intersection 6: Campbelltown Road / East Town Centre Street



Source: AECOM, 2010

Sensitivity test has confirmed that the reserved third lane in the proposed cross-section of Campbelltown Road will cater for traffic growth (generated by further development of SWGC) up to 2036, with acceptable level of service and average delays at these intersections along Campbelltown Road. Among the three intersections, the intersection of Campbelltown Road / Macdonald Road has the worst level of service in 2036. The intersection will operate at LoS E from 2040 and up to 2050 under the three through lane and a single right turn lane configuration assuming the same growth rate of 1.1% p.a.

The length of turning bays (inclusive of storage length, deceleration lane and taper length) on both Campbelltown Road approaches at Macdonald Road intersection do not extend beyond the neighbouring signalised intersections. The length of turning bays on both Campbelltown Road approaches at East Town Centre Street intersection also do not extend beyond the neighbouring signalised intersections and the SWRL bridge.

The proposed signalised intersection of Campbelltown Road/Town Centre Main Street is modelled with no right turn movements allowed from Campbelltown Road into the Town Centre. The proposed cross-section of Campbelltown Road (refer to **Figure 5-6**) allows for the provision of a right turn bay at this intersection if required.

7.3.8 Car parking provision

The car park provision for the residential component of the development will comply and determined based on the relevant Council DCP guidelines and RTA guide to trip generating developments. As proposed in the Sustainable Transport Strategy (Refer to Section 6.4.5), restrained parking rates can be established for the high density residential development located in close proximity to the town centre and the station to encourage the use of public and active transport. The implementation of this measure will need to be further discussed with Councils and the RTA and may need to revise the DCP, if appropriate.

The car park requirements for the retail/commercial component of the Concept Plan will also be determined based on Council and RTA requirements at a later stage when the town centre master plan is completed with confirmed land use and floor areas within the town centre. Opportunities for co-sharing town centre parking with commuter parking will be further pursued during the development of the town centre masterplan.

Further consultation for the implications and opportunities for managing car parking within the proposed development will be undertaken with all relevant stakeholders including Liverpool City Council, Campbelltown City Council, RTA, Transport NSW, RailCorp and TCA.

7.3.9 Road infrastructure upgrades summary

The following road infrastructure upgrades are required as a result of the proposed development including:

Stage 1 road infrastructure improvements (2012)

- Construction of a new priority-controlled intersection – Macdonald Road / Stage 1 development access.

Concept Plan road infrastructure improvements (2016)

- Relocation of Macdonald Road;
- Construction of two bridge crossings over the SWRL;
- Upgrade of Campbelltown Road / Macdonald Road (Intersection 1) with an additional right turn lane (100m) on the south approach of Macdonald Road;
- Construction of a new signalised intersection – realigned Macdonald Road / Stage 1 development access road / Primary School Access Road (Intersection 4);
- Construction of a new bus priority signalised intersection – Campbelltown Road / Town Centre Main Street / Croatia Avenue (Intersection 5);
- Construction of a new signalised intersection – Campbelltown Road / East Town Centre Street (Intersection 6);
- Construction of a new signalised intersection – Croatia Avenue / Macdonald Road / Town Centre Main Street (Intersection 7);
- Construction of a new priority controlled intersection – Macdonald Road / Station South Access Road (Intersection 9); and
- Construction of a new priority controlled intersection – Croatia Avenue / Station South Access Road (Intersection 10).

Concept Plan road infrastructure improvements (2026)

- Construction of a new signalised controlled intersection – Macdonald Road / High School Access Road (Intersection 8);
- Signalisation (with bus priority) of Macdonald Road / Station South Access Road (Intersection 9); and
- Signalisation (with bus priority) of Croatia Avenue / Station South Access Road (Intersection 10).

Intersection analysis (refer to **Section 7.3.6**) suggest that two through lanes (including a shared left turn at the kerbside lane) and a single right turn lane are required in each direction to cater for forecast traffic up to 2026 at

the intersections of Macdonald Road and East Town Centre Street with Macdonald Road. Sensitivity test has then confirmed that the reserved third lane in the proposed cross-section of Campbelltown Road will cater for traffic growth (generated by further development of SWGC) up to at least 2036.

8.0 Package of Measures

8.1 Introduction

This section provides a summary of the package of measures recommended for the successful delivery of the proposed development at Edmondson Park South. One of the key elements of the package is the implementation of sustainable travel strategy for the future residents to encourage mode shift and to reduce the dependency on motor vehicles. This mode shift will be enabled by supporting initiatives, addressing:

- Infrastructure needs – including measures to improve walking, cycling and public transport opportunities, while maintaining private vehicle access; and
- Service needs – providing sufficient services to promote a higher public transport mode split.

8.2 Package of measures

An integrated package of measures has been identified for the Stage 1 development and the Concept Plan to deliver the proposed development while satisfying the revised State Plan mode share target relevant to Edmondson Park South.

A number of key road and infrastructure improvements required to serve the region are linked to Edmondson Park South but are not the responsibility of Landcom to provide. These include:

- Delivery of Edmondson Park Station and its interchange;
- Extension of Croatia Avenue and Macdonald Road to provide access to Edmondson Park Station from Camden Valley Way and Campbelltown Road respectively;
- Upgrade of Campbelltown Road to two lanes in each direction; and
- Upgrade of intersections at Campbelltown Road / Macdonald Road and Camden Valley Way / Bernera Road / Croatia Avenue.

Table 8-1 provides a summary of the recommended measures responsible by Landcom as part of the proposed Edmondson Park South development.

8.3 Timing

The likely timing for each of the elements of the package is also shown in **Table 8-1**. The timing has been developed with consideration of the following factors:

- Residents are likely to begin to occupy the site (Stage 1 Development) in 2012;
- Certain measures / services need to be in place prior to occupation in an effort to encourage sustainable travel habits; and
- Opening of SWRL in 2016.

8.4 Cost summary

A range of infrastructure, service and sustainable travel strategy has been identified to meet forecast travel demands associated with the development over time. This section outlines an opinion of strategic costs identified for each item in the package of measures.

For the sustainable travel, bus and cycle-related measures, AECOM has formed an opinion of probable cost[1]. J. Wyndham Prince has provided costs for the civil and infrastructure upgrade works.

Table 8-1 also includes costs for items within the package of measures that are expected to be funded by Landcom.

[1] Opinion of probable costs are made on the basis of best judgment as an experienced and qualified engineering consultant, familiar with the construction industry As AECOM is not a qualified Quantity Surveyor, nor does it employ quantity surveyors, AECOM cannot and will not guarantee that any tenders or actual costs will not vary from this opinion of probable cost.

Table 8-1: Edmondson Park South proposed package of measures

Initiative / Services / Infrastructure	Measure	Timing	Cost Assumptions	Probable Cost (Funding by Landcom)
Initiative 1	Household Information Packs (HIPs) for each household in Edmondson Park South	2012 (ongoing)	$20 per household	$64,000
Initiative 2	One week free public transport (MyMulti) start up discount ticket	2012 (ongoing)	$60 per household	$192,000
Initiative 3	Bicycle User Group	2012 (ongoing)	No funding required – community based	N/A
Initiative 4	Promotion of bicycle initiatives	2012 (ongoing)	No funding required – community based	N/A
Initiative 5	Walking school bus program and School travel plans	2012 (ongoing)	No funding required –schools to undertake	N/A
Initiative 6	Car sharing scheme	2012 (ongoing)	No funding required – if existing provider is used	N/A
Initiative 7	Sustainable home deliveries of groceries	2012 (ongoing)	No funding required – information provided through Initiative 1	N/A
Initiative 8	Community garden and farm	2012 (ongoing)	No funding required – information provided through Initiative 1	N/A
Initiative 9	Parking restraint measures	2016 (ongoing)	No funding required – enacted through planning system	N/A
Initiative 10	'Voluntary' workplace travel plans	2016 (ongoing)	No funding required	N/A
Service 1	Bus service from Ingleburn to Liverpool via Edmondson Park South	2012 to 2016	Landcom to work with Transport NSW and the local bus service provider to deliver a service	N/A
Infrastructure 1	Internal footpaths, cycle paths, road network and intersections	2012 (ongoing)	Inclusive of Stage 1 infrastructure	$80,800,000
Infrastructure 2	Bus stops (x6 with seating and signage only due to temporary nature)	2012	$2,000 for each bus stop with seating and signage only	$12,000
Infrastructure 3	Intersection of Macdonald Road / Stage 1 Development access	2012		$250,000
Infrastructure 4	Bicycle parking facilities (50 bike racks at station and town centre)	2016	$1,000 for each bike rack	$50,000
Infrastructure 5	Bus stops (x16 for each bus stop with shelter, seating and signage)	2016	$20,000 for each bus stop with shelter, seating and signage	$320,000

Initiative / Services / Infrastructure	Measure	Timing	Cost Assumptions	Probable Cost (Funding by Landcom)
Infrastructure 6	Relocation of Macdonald Road	2016	Excluding remediation of existing Macdonald Road. Including drainage and landscape for the new road.	$5,900,000
Infrastructure 7	Construction of two bridge crossings over the SWRL	2016	To be constructed by Landcom and offset against s94 Levy under VPA	N/A
Infrastructure 8	Upgrade of Campbelltown Road / Macdonald Road (Intersection 1) with an additional right turn lane (100m) on the south approach of Macdonald Road	2016	To be funded by State Infrastructure Contribution (SIC) Levy	N/A
Infrastructure 9	New signalised intersection - Macdonald Road / Stage 1 development access road / Primary School Access Road (Intersection 4)	2016		$1,750,000
Infrastructure 10	New bus priority signalised intersection - Campbelltown Road / Town Centre Main Street / Croatia Avenue (Intersection 5)	2016	To be funded by State Infrastructure Contribution (SIC) Levy	$2,800,000
Infrastructure 11	New signalised intersection - Campbelltown Road / East Town Centre Street (Intersection 6)	2016	To be funded by State Infrastructure Contribution (SIC) Levy	$3,150,000
Infrastructure 12	New signalised intersection - Croatia Avenue / Macdonald Road / Town Centre Main Street (Intersection 7)	2016	To be constructed by Landcom and offset against s94 Levy under VPA	$3,850,000
Infrastructure 13	New priority controlled intersection - Macdonald Road / Station South Access Road (Intersection 9)	2016	To be constructed by Landcom and offset against s94 Levy under VPA	$400,000
Infrastructure 14	New priority controlled intersection - Croatia Avenue / Station South Access Road (Intersection 10)	2016	To be constructed by Landcom and offset against s94 Levy under VPA	$1,450,000
Infrastructure 15	New signalised controlled intersection - Macdonald Road / High School Access Road (Intersection 8)	2026	To be constructed by Landcom and offset against s94 Levy under VPA	$1,750,000
Infrastructure 16	Signalisation (with bus priority) of Macdonald Road / Station South Access Road (Intersection 9)	2026	To be constructed by Landcom and offset against s94 Levy under VPA	$730,000
Infrastructure 17	Signalisation (with bus priority) of Croatia Avenue / Station South Access Road (Intersection 10)	2026	To be constructed by Landcom and offset against s94 Levy under VPA	$590,000

Source: AECOM and J. Wyndham Prince, 2010.

Notes:

- All costs exclude GST.
- All costs are current year costs, no time function has been applied.
- Preliminary cost only, no design undertaken.
- Inclusive of traffic lights, pavement/drainage, landscaping, 100m coverage on road section in all directions.
- Exclusive of excavation in rock, street lighting, project management & design costs and fee/charges.

9.0 Summary and Conclusions

9.1 Introduction

Edmondson Park South is well located within the walking / cycling catchment of a new railway station of the SWRL and there are community facilities such as schools, recreational facilities and the new Town Centre located within walking / cycling distance from the majority of the residential development. An early start-up of a new bus service is also recommended for Edmondson Park South to connect future residents with the nearest transport hub and / or urban centre. The development also has a strong potential for implementation of a series sustainable travel strategies for promotion of alternatives to the car travel. These transport initiatives will assist Edmondson Park South to meet the revised State Plan journey-to-work mode share targets which are:

- 28% of total journeys to work by public transport in the Sydney Metropolitan Region by 2016;
- Increase of the share of commute trips made by public transport to and from the Liverpool CBD to 20% by 2016; and
- 5% for bicycle trips of less than 10km made in the Greater Sydney region by 2016.

The project also requires the delivery of a number of road network and intersection improvements to cater for the traffic generated by the development. New intersections are expected to be constructed along Campbelltown Road, Macdonald Road and Croatia Avenue to provide vehicular traffic to different parts of the development and the Town Centre. These infrastructure upgrades will also facilitate safe and efficient pedestrian, cyclist and bus movements between the development and regional centres as well as other transport hubs.

9.2 Key recommendations

The recommendations of this study are reflected in the package of measures developed for the project discussed in **Section 8**.

Key points of this package include:

- Sustainable travel strategies, to include provision of marketing of public transport options and free travel pass.
- Infrastructure improvements to provide easy pedestrian and cyclist access via a safe and efficient shared path and footpath network, a Town Centre Main Street with low traffic environment, signalised crossings along Campbelltown Road and near the schools sites.
- Public transport infrastructure, including well-designed bus stops to provide safe and convenient means for the future residents to use public transport services and bus priority treatments to reduce the travel times for public transport users.
- Transport service improvements, including the implementation of a new bus service connecting the development with Liverpool via Edmondson Park Station and Town Centre.
- Road infrastructure upgrades to provide access to the site via existing and new intersections at Campbelltown Road, Croatia Avenue and Macdonald Road.

As a comprehensive package of measures, this will meet the needs of future residents of Edmondson Park South, while achieving a mode shift towards public transport.

AECOM

Appendix A

Director-General's Requirements

EDMONDSON PARK CONCEPT PLAN AND PROJECT APPLICATIONS
ENVIRONMENTAL ASSESSMENT REQUIREMENTS UNDER PART 3A OF THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

Project Description	**Concept Plan for:** A mixed use residential, commercial and retail development within the Edmondson Park site, with a dwelling yield of up to 3,300 dwellings, and retail/commercial development with up to 35,000-40,000 sqm of floor space within the planned Edmondson Park town centre. **Project Applications for:** Stage 1: being subdivision to create approximately 270 residential and 17 rural residential lots, associated earthworks and infrastructure, a building and possible temporary use as a sales and information centre, and construction of a sewer lead in from the Sydney Water carrier main to Ash Road.
Site	The Edmondson Park site (the site) comprises approximately 413 hectares of land within the larger Edmondson Park Precinct of the South West Growth Centre.
Proponent	Landcom
Date of Issue	28 July 2010
Date of Expiration	2 years from date of issue
General requirements	The Environmental Assessments (EA) for the Concept Plan and Project Applications must include: (1) an executive summary; (2) a description of the project including: (a) need for the project; (b) various components and staging of the project (including relevant maps); and. (3) a thorough site analysis and description of the existing environment; (4) justification of the project, taking into consideration the environmental impacts of the proposal, the suitability of the site and whether or not the project is in the public interest; (5) a consideration of all relevant statutory and non-statutory provisions and identification of any non-compliance with such provisions (especially the *SEPP (Major Development) 2005, SEPP 44, SEPP 55, SEPP (Infrastructure) 2007, SEPP (Sydney Region Growth Centres) 2006, Liverpool Local Environmental Plan 2008, Campbelltown (Urban Area) Local Environmental Plan 2002, Metropolitan Strategy, and draft South West Subregional Strategy*; (6) a draft Statement of Commitments outlining commitments to public benefits, environmental management, mitigation and monitoring measures to be established on site and clear identification of the timing and responsibility for these measures; (7) a signed statement from the author of the EA certifying that the information contained in the report is neither false nor misleading; and (8) a report from a quantity surveyor identifying the capital investment value of the Concept Plan and Project Applications including the estimated cost of future development.
Key Assessment Requirements	**Urban Design, development controls and land uses** (1) Assess the consistency of the proposal with relevant planning documents including local environmental plans and existing and draft development control plans. Provide justification for any new or amended development controls and land uses, including in consultation with the relevant council. (2) Identify estimated floor space yield for commercial and retail uses for land within the Edmondson Park town centre, and justify in the context of the expected yields for the town centre as outlined in the *draft South West Subregional Strategy*. (3) Identify how the aspects of the proposal relating to the town centre will be integrated with areas of the town centre that do not form part of the proposal.

(4) Identify how the proposal integrates with the proposed station and rail corridor on the South West Rail Link. The proposal should be developed with regard to the proposed development footprint for the station, through consultation with Transport Construction Authority.

(5) Assess the visual impact of the proposed development, when viewed from the surrounding areas.

(6) Identify school sites, both new and existing, and justify their appropriateness in accordance with the Department of Education and Training's requirements for new school sites.

Biodiversity

(1) Assess the consistency of the proposal with the Biodiversity Certification Order (dated 11 December 2007) conferred on the *State Environmental Planning Policy (Sydney Region Growth Centres) 2006.* Any clearing of existing native vegetation within the non-certified areas should be offset in accordance with the relevant biodiversity measures of the Biodiversity Certification.

(2) Provide an assessment of biodiversity impacts of the proposed development in accordance with *draft Guidelines for Threatened Species Assessment* (DEC July 2005). For certified areas under the Biodiversity Certification, the assessment undertaken in the *draft Growth Centres Conservation Plan* (GCC February 2007) and the offsets established in the Biodiversity Certification can be referenced for the proposal.

(3) Assess the consistency of the proposal with the Edmondson Park Conservation Agreement (dated 20 August 2009), in particular with the requirements of the Biodiversity Conservation Plan (Schedule 4). Any proposed variation to the Conservation Agreement would need to be justified (including consideration of alternative options) on ecological grounds.

Regional Park

(1) Identify measures to mitigate interface impacts (both construction and operational) on the ecological values of the Regional Park from adjoining urban areas.

(2) Assess the consistency of the proposal with the Statement of Interim Management Intent for the Regional Park. Outline and justify any variations and provide an appropriate assessment of any potential impacts.

Traffic/Transport

(1) Identify a road layout and design which is responsive to existing and proposed land uses including providing linkages to key destination points such as centres, employment lands, and recreation areas, within and surrounding the site. In particular identify the future design of Campbelltown Road having regard to potential heritage and ecological impacts, location of utility infrastructure, urban design considerations, and impact on school sites and open space areas.

(2) Prepare a Traffic Management and Accessibility Plan (TMAP) in accordance with the *Draft Interim Guidelines for Transport Management and Accessibility Plans* (NSW Transport) to identify:

- (a) the cumulative regional traffic impacts associated with the development,
- (b) a package of traffic and transport infrastructure measures to support future development and contribute to the achievement of the NSW State Plan mode share targets;
- (c) regional and local intersection and road improvements together with priority works to support efficient bus access;
- (d) vehicular access options for adjoining sites;
- (e) infrastructure for walking and cycling, having regard for the *NSW Bike Plan* (RTA, May 2010) and *Planning Guidelines for Walking and Cycling* (Department of Planning, December 2004);
- (f) the implications of the proposed development for non-car travel modes (including public transport, walking and cycling);
- (g) the potential for implementation of a location specific sustainable travel plan (eg 'Travelsmart' or other travel behaviour change initiative) and the provision of facilities to increase the non-car mode share for travel to, from and within the site;
- (h) the implications and opportunities for managing car parking within the development; and

	(i) the timing and cost of infrastructure works and funding responsibilities. **Staging of Development** (1) Provide details of the staging of development including a Staging Plan. (2) Identify the staging process for infrastructure provision commensurate with proposed staging of development, through consultation with relevant agencies. **Heritage** (1) Identify and assess the impacts of the proposal on the heritage significance of the area in accordance with *Assessing Heritage Significance* (NSW Heritage Office 2001), including on the Ingleburn Army Camp, prefabricated cottages, and Mont St Quentin Oval and entry gates. Identify opportunities for adaptive re-use of heritage items. (2) Identify and assess the impacts of the proposal on Aboriginal heritage significance in accordance with the draft *Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation (DEC, July 2005).* Consultation requirements are to be informed by the *Interim Aboriginal Community Consultation Guidelines.* (3) Assess the proposal against the Aboriginal Heritage Management Plan prepared for the Edmondson Park Precinct. **Surface water, groundwater quality and riparian corridors** (1) Assess any potential impacts of proposed development on hydrology and hydrogeology of the site and adjacent areas in terms of impact on water quality having regard to environmental targets for new urban development set out in *Managing urban stormwater: environmental targets – Consultant draft* (DECC in association with the Sydney Metropolitan CMA, October 2007). In particular, identify how any potential water quality impacts on wetlands both within and adjoining the site, and the ecological values of the Regional Park, will be avoided, mitigated or managed. (2) Identify any potential impacts on groundwater and groundwater dependant ecosystems, and how impacts will be avoided mitigated or managed. (3) Identify drainage and stormwater management infrastructure, including: on site detention of stormwater; water sensitive urban design (WSUD); and drainage infrastructure. Identify the future management and ownership arrangements for stormwater infrastructure, and identify how any requirements of the future owner will be met. (4) Assess any proposed variation to riparian corridors and associated buffers in accordance with the Riparian Corridor Management Study approach applied to the Growth Centres, and provide justification for any changes. Details of any rehabilitation works for corridors should be provided. **Flooding** (1) Identify any flood risk associated with the site and demonstrate that the proposed development is suitable in terms of flooding and is consistent with the *NSW Floodplain Development Manual: the management of flood liable land (2005).* **Bushfire Risk Assessment** (1) Provide an assessment against the current version of *Planning for Bush Fire Protection 2006*, including the proposed location of, and ongoing management arrangements for Asset Protection Zones. **Noise** (1) Demonstrate that the proposal will be designed, constructed, operated and maintained so that there are no unacceptable impacts from noise. In particular assess the noise impact from the proposed rail line and existing and proposed roads having regard for increased traffic generated by the proposal. This should be assessed in accordance with the *Environmental Criteria for Road Traffic Noise* (EPA 1999), and *Development Near Rail Corridors and Busy Roads – Interim Guideline* (Department of Planning). **Geotechnical and contamination** (1) Demonstrate the suitability of the land for the proposed development including with respect to erosion potential, salinity and the presence of potential and actual acid sulphate soils if any. Outline measures to avoid or reduce adverse impacts. This should be carried out in accordance with relevant guidelines, such as NSW

	Local Government Salinity Initiatives booklets and the *Western Sydney Code of Practice 2003*. (2) Outline actions, management and mitigation measures required, including protocols to address unexpected finds, and assess contamination issues associated with the proposal (if any) in accordance with *SEPP 55* and other relevant legislation and guidelines. **Topography and site preparation** (1) Identify expected extent of cut and fill required to achieve the proposed development, and outline strategies to minimise excavation works, both for site preparation works and individual dwellings. **Ownership/Maintenance of Public Domain** (1) Provide details of the proposed ownership and management arrangements for publicly accessible land including roads, parks, and riparian areas. In particular, detail management arrangements for open space areas that are identified under the Edmondson Park Conservation Agreement. **Utilities** (1) Prepare a utility and infrastructure servicing report and plan for the site in consultation with relevant utilities providers to: (a) identify existing utilities and infrastructure such as the supply of water, sewerage, stormwater, gas, electricity and telephone services. (b) assess the capacity of utility infrastructure to service the proposed development in conjunction with existing uses, proposed uses and potential future uses (including fire suppression). (c) demonstrate compliance with the requirements of any public authorities in regard to the connection to, relocation and/or adjustment of services affected by the development proposal. (d) Detail technologies which may reduce the demand or need for servicing or provide for the supply of sustainable services (such as water sensitive urban design measures and sediment control measures). (e) Justify any staging of proposed infrastructure works. (2) Clearly identify the proposed location of any new utilities and infrastructure and justify any changes to Sydney Water's existing trunk servicing scheme. (3) Prepare an Integrated Water Management Plan to identify any alternative water supply, water sensitive urban design, and any other water conservation measures. **Social infrastructure / contributions** (1) Outline the likely scope of developer contributions between the Proponent and Liverpool and Campbelltown Councils, to deliver an adequate level of local infrastructure to meet the needs of the future population arising from the proposed development. This should be informed by consultation with the relevant councils. Note: development within the site will also be subject to the Growth Centres Special Infrastructure Contribution. **Ecologically Sustainable Development (ESD)** (1) The EA should demonstrate that all aspects of the concept plan satisfy the principles of ESD including compliance with BASIX. (2) The EA should outline commitments to sustainability including water reuse, waste minimisation, the minimisation of energy use and car dependency.
Additional assessment requirements (project application)	**Stage 1 Project Application** (residential subdivision) - the following assessment requirements <u>also</u> apply: **Site preparation works** (1) Provide a report that includes (but is not limited to): a. a detailed survey showing existing and proposed levels and quantities of fill necessary for site preparation works, and b. details on the source of fill including types of materials and their source, and c. details on whether contaminated soils are likely to be disturbed during the proposed works and what measures are to be adopted to protect human health and the environment, and if necessary remediate or dispose of the

	contaminated material. **Subdivision** (1) Provide proposed plans of subdivision that identify all covenants, easements and notations proposed for each land title and, if relevant, how the subdivision is to be staged. **Construction impacts** (1) Provide an assessment of construction impacts of the site preparation and any other works associated with the project application, and propose appropriate mitigation measures. This should include (but is not limited to) construction noise, air quality, water quality, soil and erosion, groundwater impact, and traffic in accordance with relevant guideline. (2) Identify strategies to minimise impacts on the ecological values of the regional park and open space areas, as well as to minimise the extent of vegetation clearing within the development area. **Public Domain** (1) Outline the proposed treatment and future management arrangements for all aspects of the public domain, through consultation with the Campbelltown Council.
Consultation Requirements	During the preparation of the EA, the proponent must undertake an appropriate and justified level of consultation with relevant parties. The Strategy should include timing for the carrying out of proposed consultation processes. If consultation has already been undertaken or will be undertaken during exhibition, this needs to be documented. Relevant agencies must include, but not be limited to: • Campbelltown Council • Liverpool Council • Department of Environment, Climate Change and Water • NSW Office of Water • NSW Transport • Roads and Traffic Authority • Department of Education and Training • Transport Construction Authority • Railcorp • Commonwealth Department of Environment, Water, Heritage and the Arts • Rural Fire Service • Utility and infrastructure providers • Local Aboriginal Land Councils
Deemed refusal period	60 days (see Clause 8E of the Environmental Planning & Assessment Regulation)

AECOM's review of final traffic and transport DGRs (issued dated 28/07/2010)

Concept Plan

DGR1: Identify a road layout and design which is responsive to existing and proposed land uses including providing linkages to key destination points such as centres, employment lands, and recreation areas, within and surrounding the site. In particular identify the future design of Campbelltown Road having regard to potential heritage and ecological impacts, location of utility infrastructure, urban design considerations, and impact on school sites and open space areas.

- The Concept Plan road network, intersection layout and treatment, pedestrian and cycle networks as well as the public transport network are designed to provide linkages to key destination points and transport hubs, maximising accessibility between all proposed land uses in Edmondson Park South. (Refer to Section 5.5, 5.6 and 5.7 of Concept Plan TMAP)

DGR2: Prepare a Traffic Management and Accessibility Plan (TMAP) in accordance with the Draft Interim Guidelines for Transport Management and Accessibility Plans (NSW Transport).

DGR2a: To identify the cumulative regional traffic impacts associated with the development.

- Regional traffic growth has been determined through assessment of:
  - Historical traffic growth rates on the major road network in the vicinity of Edmondson Park, such as Campbelltown Road and Camden Valley Way (refer to **Table 3.6** of Concept Plan TMAP); and
  - Regional traffic growth rates derived from the RTA Sydney-wide EMME/2 strategic traffic model developed for 2016 and 2026. The model makes allowance for planned development of the SWGC and the influence of SWRL.
- The annual growth rate on Campbelltown Road and Camden Valley Way is approximately 1.8% per annum during the peak hours between 2016 and 2026 (Refer to Section 4.5.1 of Concept Plan TMAP).
- The AECOM traffic forecasts with the Edmondson Park South development are comparable to the RTA traffic forecasts for 2016 and 2026 (Refer to Section 7.3.5 of Concept Plan TMAP).

DGR2b: To identify a package of traffic and transport infrastructure measures to support future development and contribute to the achievement of the NSW State Plan mode share targets.

- The trip generation of the proposed development are determined based on 2006 journey-to-work data for travel zones in South West Sydney that include residential with access to a local train station (Refer to Section 7.3.2 of Concept Plan TMAP).
- The mode share targets for the proposed development are:

Year	Car	Car passenger	Train	Bus	Worked at home	Others (inc. Walking and cycling)
2016	56%	6%	20%	2%	10%	6%
2026	51%	6%	25%	2%	10%	6%

- The proposed mode share targets for Edmondson Park South fulfil the revised State Plan targets that :
  - 28% of total journeys to work by public transport in the Sydney Metropolitan Region by 2016;
  - Increase of the share of commute trips made by public transport to and from the Liverpool CBD to 20% by 2016; and
  - 5% for bicycle trips of less than 10km made in the Greater Sydney region by 2016.
- In this way, the package of traffic and transport infrastructure measures identified will cater for the future development in a sustainable manner while achieving the NSW State Plan mode share targets.

DGR2c: To identify regional and local intersection and road improvements together with priority works to support efficient bus access.

- The road network and intersection treatments proposed in the Concept Plan have been designed o accommodate bus movements between the development and regional centres as well as other transport hubs. Early consultation with Transport NSW has been undertaken to develop an indicative bus network in Edmondson Park South (Refer to Section 5.6 of Concept Plan TMAP).
- Traffic signals with bus priority are proposed at Campbelltown Road / Main Street intersection to facilitate efficient bus movements between the Edmondson Park South development south of Campbelltown Road and the proposed Town Centre as well as the proposed Edmondson Park Station;
- Traffic signals with bus priority are proposed at intersections on both ends of the Edmondson Park Station bus interchange to facilitate efficient bus movements to and from the station to maximise public transport patronage; and
- Cross-sections along proposed bus routes are designed with appropriate road widths for safe and efficient bus movements.

DGR2d: To identify vehicular access options for adjoining sites.

- The Concept Plan also provides vehicular access options for other neighbouring development by connecting:
  - Ingleburn Gardens to Campbelltown Road via a road connection south of the Maxwell Creek South Conservation Area;
  - Denham Court (south of Campbelltown Road) to Campbelltown Road via the new road network between Zouch Road and Macdonald Road; and
  - Future Edmondson Park North to Campbelltown Road via the new SWRL bridge crossings at Croatia Avenue and Macdonald Road.

DGR2e: To identify infrastructure for walking and cycling, having regard for the NSW Bike Plan (RTA, May 2010) and Planning Guidelines for Walking and Cycling (Department of Planning, December 2004).

- The Edmondson Park South walking and cycling networks have been developed with reference to a range of published guidelines and policies. The network is intended to provide safe and efficient routes that present a viable alternative to car travel for journey-to-work trips as well as recreational trips (Refer to Section 5.7 of Concept Plan TMAP).

DGR2f: To identify the implications of the proposed development for non-car travel modes (including public transport, walking and cycling).

- A package of measures for active and public transport has been identified to cater for the non-car travel demands generated by the proposed development (Refer to Section 8.2 of Concept Plan TMAP).

DGR2g: To identify the potential for implementation of a location specific sustainable travel plan (eg 'Travelsmart' or other travel behaviour change initiative) and the provision of facilities to increase the non-car mode share for travel to, from and within the site.

- A sustainable travel strategy for Edmondson Park South is designed to encourage the use of public transport, walking, cycling wherever possible for all journey purposes. Where alternatives to the car are not viable, options to encourage car sharing can be promoted to minimise the need for single occupancy vehicle travel (Refer to Section 7 of Concept Plan TMAP).

DGR2h: To identify the implications and opportunities for managing car parking within the development.

- The car park requirements for the residential component of the development will be determined / specified based on the relevant DCP guidelines and RTA guide to trip generating developments during the DA stage (refer to Section 7.2.5 and 7.3.7 of Concept Plan TMAP).
- The car park requirements for the retail/commercial component of the development will be developed during the development of the town centre masterplan at the next phase of the project (refer to Section 7.3.7 of Concept Plan TMAP).
- Opportunities for co-sharing commuter car parks with the town centre and restrained parking rates for town centre high density residential development are proposed as parking restraint measures of part of the sustainable travel strategy (refer to Section 7.3.7 of Concept Plan TMAP).
- Further consultation for the implications and opportunities for managing car parking within the proposed development will be undertaken with all relevant stakeholders including Liverpool City Council, Campbelltown City Council, RTA, Transport NSW, TCA.

DGR2i: To identify the timing and cost of infrastructure works and funding responsibilities.

- The proposed timing, costing and finding responsibilities for the required package of measures are summarised in Section 8.0.

Project Application (for residential subdivision only)

DGR 3: Construction Impacts

DGR3a: Provide an assessment of construction impacts of the site preparation and any other works associated with the project application, and propose appropriate mitigation measures. This should include (but is not limited to) construction noise, air quality, water quality, soil and erosion, groundwater impact, and traffic in accordance with relevant guideline.

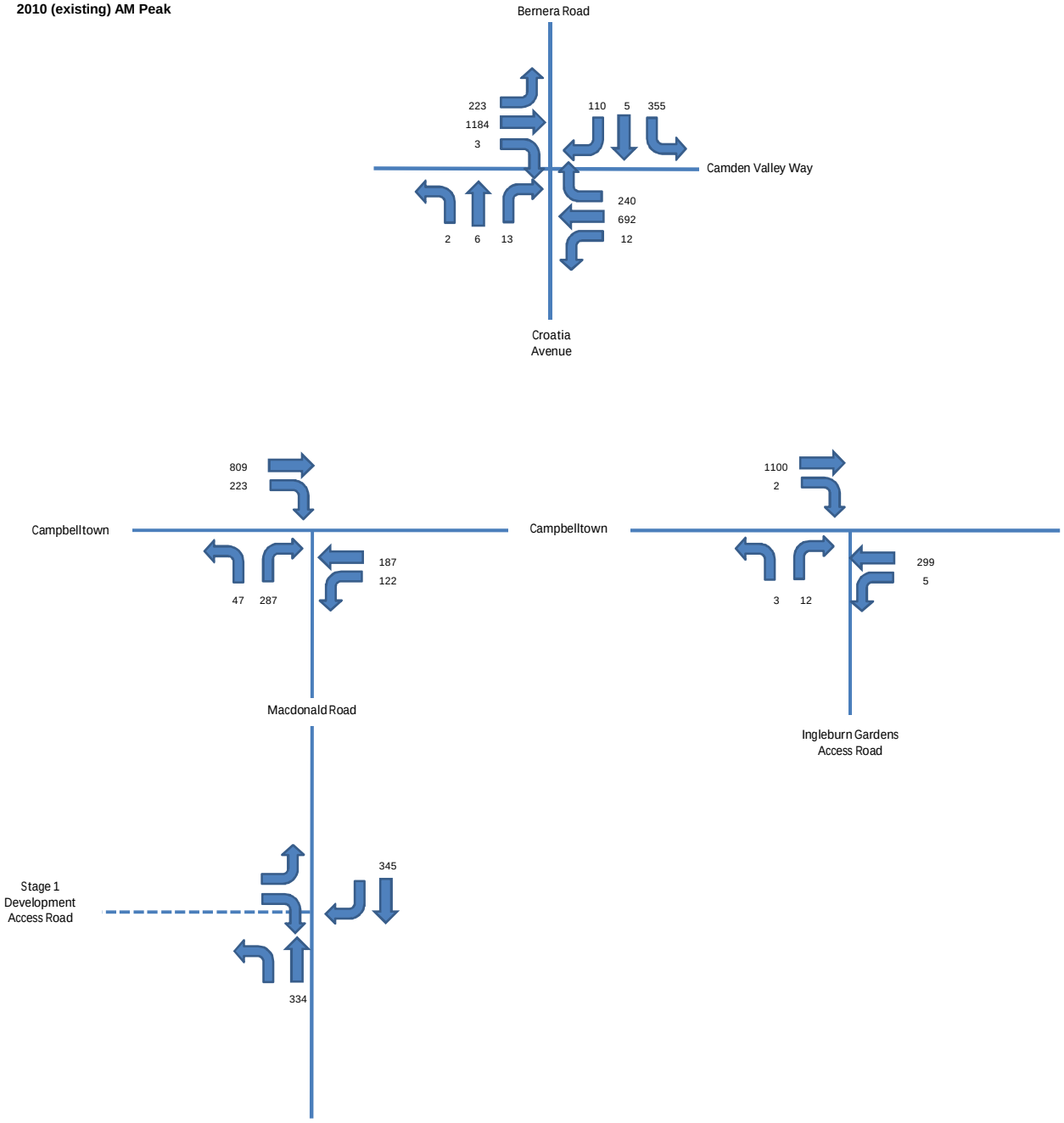
- A high-level construction traffic impact statement for Stage 1 development has been included in Section 7.2.6 of the Concept Plan TMAP.

AECOM

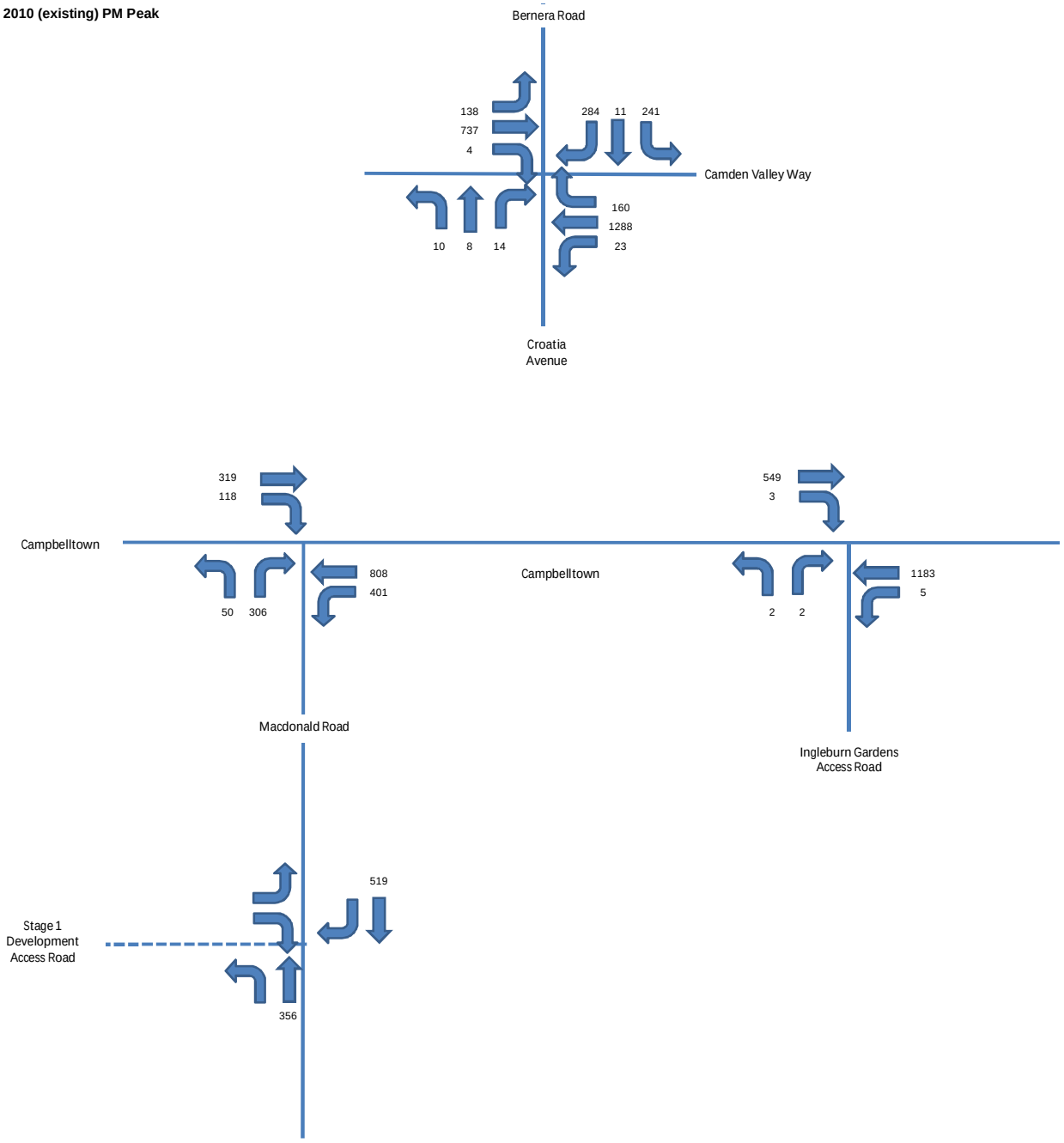
Appendix B

Existing (2010) Traffic Volumes and Intersection Performance

2010 (existing) AM Peak



2010 (existing) PM Peak



SIDRA INTERSECTION

Movement Summary

Campbelltown Road / Macdonald Road

2010 AM Peak

Signalised - Fixed time Cycle Time = 60 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Macdonald Road										
1	L	47	2.1	0.193	32.4	LOS C	14	0.92	0.73	26.7
3	R	287	2.1	0.724	32.5	LOS C	73	0.98	0.93	26.6
Approach		334	2.1	0.724	32.5	LOS C	73	0.97	0.90	26.7
Campbelltown Road E										
4	L	122	4.1	0.156	10.3	LOS A	7	0.28	0.72	51.5
5	T	187	3.7	0.159	5.2	LOS A	24	0.45	0.37	60.5
Approach		309	3.9	0.159	7.2	LOS A	24	0.38	0.51	56.9
Campbelltown Road W										
11	T	809	4.0	0.690	8.3	LOS A	123	0.72	0.65	56.0
12	R	223	4.0	0.703	22.2	LOS B	42	0.63	0.86	39.5
Approach		1032	4.0	0.702	11.3	LOS A	123	0.70	0.70	51.9
All Vehicles		1675	3.6	0.724	14.8	LOS B	123	0.70	0.70	44.1

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	7.0	LOS A	0	0.48	0.48
P7	50	23.4	LOS C	0	0.88	0.88
All Peds	100	15.2	LOS B	0	0.68	0.68

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

SIDRA INTERSECTION

Movement Summary

Campbelltown Road / Macdonald Road

2010 PM Peak

Signalised - Fixed time Cycle Time = 60 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Macdonald Road										
1	L	50	2.0	0.217	31.3	LOS C	14	0.91	0.73	27.1
3	R	306	2.0	0.716	31.5	LOS C	76	0.98	0.92	27.0
Approach		356	2.0	0.716	31.5	LOS C	76	0.97	0.89	27.0
Campbelltown Road E										
4	L	401	4.0	0.514	10.6	LOS A	26	0.34	0.74	51.2
5	T	808	4.0	0.708	9.1	LOS A	127	0.75	0.68	55.0
Approach		1209	4.0	0.708	9.6	LOS A	127	0.62	0.70	53.8
Campbelltown Road W										
11	T	319	4.1	0.280	6.2	LOS A	43	0.51	0.44	59.0
12	R	118	4.2	0.604	29.6	LOS C	32	0.85	0.84	34.4
Approach		437	4.1	0.604	12.5	LOS A	43	0.60	0.55	50.4
All Vehicles		2002	3.6	0.716	14.1	LOS A	127	0.68	0.70	45.0

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	7.5	LOS A	0	0.50	0.50
P7	50	22.5	LOS C	0	0.87	0.87
All Peds	100	15.0	LOS B	0	0.68	0.68

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

SIDRA INTERSECTION

Movement Summary

Campbelltown Road / Ingleburn Gardens

2010 AM Peak

Signalised - Fixed time Cycle Time = 90 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Ingleburn Gardens Access										
1	L	3	0.0	0.004	6.1	LOS A	0	0.14	0.55	39.9
3	R	12	0.0	0.048	43.4	LOS D	5	0.90	0.68	24.8
Approach		15	0.0	0.048	35.9	LOS C	5	0.75	0.66	26.8
Campbelltown Rd E										
4	L	5	0.0	0.004	10.7	LOS A	0	0.14	0.67	57.1
5	T	299	4.0	0.215	0.9	LOS A	9	0.07	0.06	77.8
Approach		304	3.9	0.215	1.0	LOS A	9	0.07	0.07	77.5
Campbelltown Rd W										
11	T	1100	4.0	0.789	1.7	LOS A	81	0.22	0.18	74.9
12	R	2	0.0	0.004	14.4	LOS A	0	0.27	0.72	52.4
Approach		1102	4.0	0.789	1.8	LOS A	81	0.22	0.18	74.8
All Vehicles		1421	3.9	0.789	2.0	LOS A	81	0.19	0.16	74.0

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	4.0	LOS A	0	0.30	0.30
P3	50	36.5	LOS D	0	0.90	0.90
P7	50	39.2	LOS D	0	0.93	0.93
All Peds	150	26.6	LOS B	0	0.71	0.71

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS

SIDRA INTERSECTION

Movement Summary

Campbelltown Road / Ingleburn Gardens

2010 PM Peak

Signalised - Fixed time Cycle Time = 100 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Ingleburn Gardens Access										
1	L	2	0.0	0.011	8.2	LOS A	0	0.27	0.57	38.7
3	R	2	0.0	0.009	47.9	LOS D	1	0.90	0.62	23.7
Approach		4	0.0	0.011	28.1	LOS B	1	0.58	0.60	29.4
Campbelltown Rd E										
4	L	5	0.0	0.004	10.7	LOS A	0	0.12	0.67	57.2
5	T	1183	4.0	0.819	1.9	LOS A	103	0.25	0.20	74.2
Approach		1188	4.0	0.819	2.0	LOS A	103	0.25	0.20	74.2
Campbelltown Rd W										
11	T	549	4.0	0.380	1.0	LOS A	22	0.08	0.08	77.5
12	R	3	0.0	0.017	16.1	LOS B	1	0.31	0.73	50.1
Approach		552	4.0	0.380	1.1	LOS A	22	0.09	0.08	77.3
All Vehicles		1744	4.0	0.819	1.8	LOS A	103	0.20	0.16	74.9

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	3.6	LOS A	0	0.27	0.27
P3	50	41.4	LOS E	0	0.91	0.91
P7	50	44.2	LOS E	0	0.94	0.94
All Peds	150	29.7	LOS C	0	0.71	0.71

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS

SIDRA INTERSECTION

Movement Summary

Camden Valley Way / Croatia Avenue / Bernera Road

2010 AM Peak

Signalised - Fixed time Cycle Time = 120 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Croatia Avenue										
1	L	2	33.3	0.014	11.2	LOS A	1	0.26	0.64	47.5
2	T	6	14.3	0.025	45.9	LOS D	4	0.87	0.59	26.5
3	R	13	7.7	0.183	71.2	LOS F	9	0.99	0.68	21.3
Approach		23	13.0	0.183	55.7	LOS D	9	0.86	0.65	24.5
Camden Valley Way E										
4	L	12	8.3	0.010	9.0	LOS A	0	0.10	0.64	53.4
5	T	692	5.1	0.440	26.6	LOS B	114	0.76	0.66	38.8
6	R	240	5.0	0.765	63.5	LOS E	113	1.00	0.90	23.0
Approach		944	5.1	0.765	35.8	LOS C	114	0.82	0.72	33.4
Bernera Road										
7	L	335	5.1	0.462	18.5	LOS B	82	0.57	0.77	41.4
8	T	5	16.7	0.022	45.8	LOS D	4	0.87	0.58	26.6
9	R	110	5.4	0.621	74.4	LOS F	35	1.00	0.78	20.7
Approach		452	5.3	0.621	32.6	LOS C	82	0.68	0.77	33.1
Camden Valley Way W										
10	L	223	4.9	0.240	11.2	LOS A	28	0.28	0.69	50.8
11	T	1184	5.0	0.752	31.8	LOS C	213	0.92	0.82	35.8
12	R	3	25.0	0.015	53.0	LOS D	3	0.85	0.66	25.8
Approach		1411	5.0	0.752	28.6	LOS C	213	0.81	0.80	37.4
All Vehicles		2830	5.2	0.765	31.9	LOS C	213	0.79	0.77	35.1

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	24.7	LOS C	0	0.64	0.64
P3	50	54.2	LOS E	0	0.95	0.95
P5	50	26.7	LOS C	0	0.67	0.67

P7	50	54.2	LOS E	0	0.95	0.95
All Peds	200	39.9	LOS C	0	0.80	0.80

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

Site: 2010 AM
K:\60159516_Edmondson\4. Tech work area\4.5. Planning\Stage 1 TIA\SIDRA analysis\Existing and 2012\3_Camden VW_Croatia_Bernera_existing.aap
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SIDRA INTERSECTION

Movement Summary

Camden Valley Way / Croatia Avenue / Bernera Road

2010 PM Peak

Signalised - Fixed time Cycle Time = 130 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Croatia Avenue										
1	L	10	9.1	0.079	20.3	LOS B	3	0.47	0.66	40.2
2	T	8	11.1	0.034	51.2	LOS D	6	0.88	0.61	24.9
3	R	14	7.1	0.191	66.0	LOS E	9	0.93	0.68	22.4
Approach		34	8.8	0.191	47.3	LOS D	9	0.77	0.66	27.0
Camden Valley Way E										
4	L	23	4.3	0.019	9.0	LOS A	1	0.10	0.64	53.4
5	T	1288	5.0	0.764	32.2	LOS C	245	0.91	0.82	35.5
6	R	160	5.0	0.773	74.2	LOS F	89	1.00	0.89	20.7
Approach		1471	5.0	0.773	36.4	LOS C	245	0.90	0.82	33.2
Bernera Road										
7	L	241	5.0	0.349	11.6	LOS A	35	0.30	0.70	47.3
8	T	11	9.1	0.041	51.3	LOS D	7	0.89	0.61	24.9
9	R	284	4.9	0.735	73.6	LOS F	80	1.00	0.87	20.8
Approach		536	5.0	0.735	45.3	LOS D	80	0.68	0.79	28.0
Camden Valley Way W										
10	L	138	5.1	0.129	10.2	LOS A	14	0.20	0.67	52.0
11	T	737	5.0	0.437	26.3	LOS B	124	0.74	0.64	39.1
12	R	4	20.0	0.027	64.5	LOS E	4	0.91	0.66	22.7
Approach		880	5.1	0.437	24.0	LOS B	124	0.65	0.65	40.4
All Vehicles		2921	5.1	0.773	34.4	LOS C	245	0.79	0.76	33.8

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	24.0	LOS C	0	0.61	0.61
P3	50	59.1	LOS E	0	0.95	0.95
P5	50	25.9	LOS C	0	0.63	0.63

P7	50	59.1	LOS E	0	0.95	0.95
All Peds	200	42.0	LOS C	0	0.79	0.79

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

Site: 2010 PM
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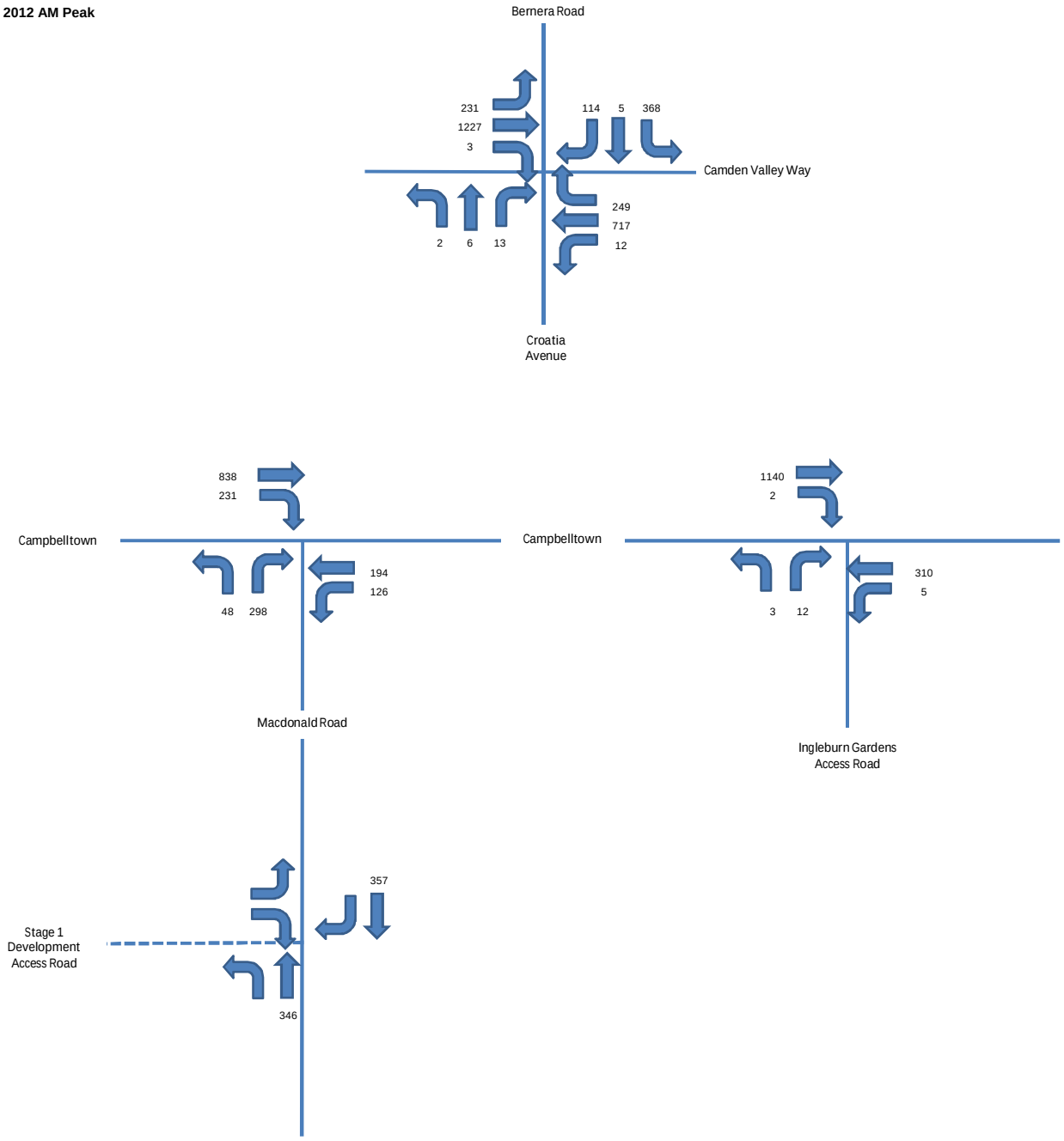
AECOM

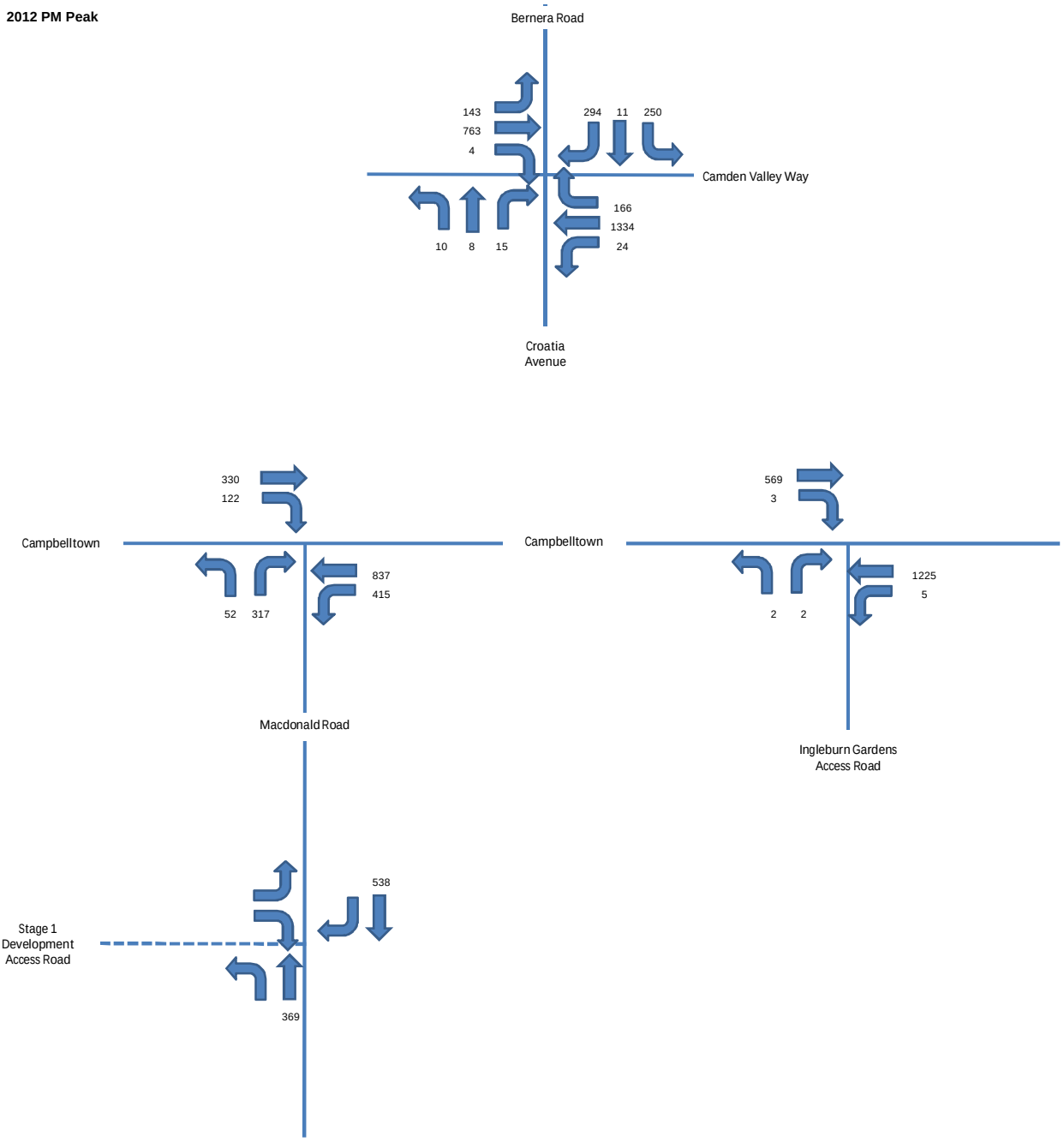
Appendix C

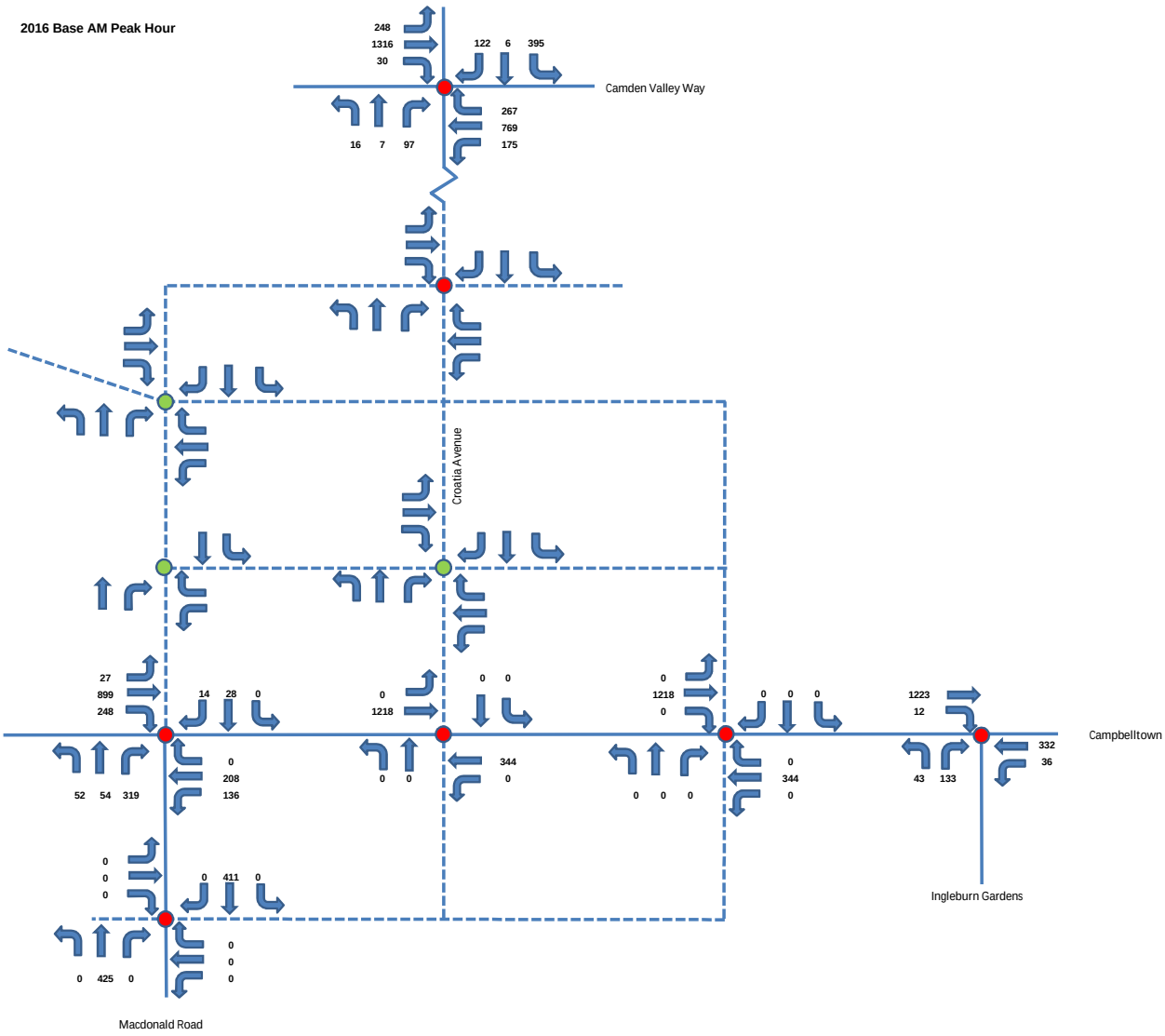
Future Base (2012, 2016 and 2026) Traffic Volumes and Intersection Performance

2012 AM Peak

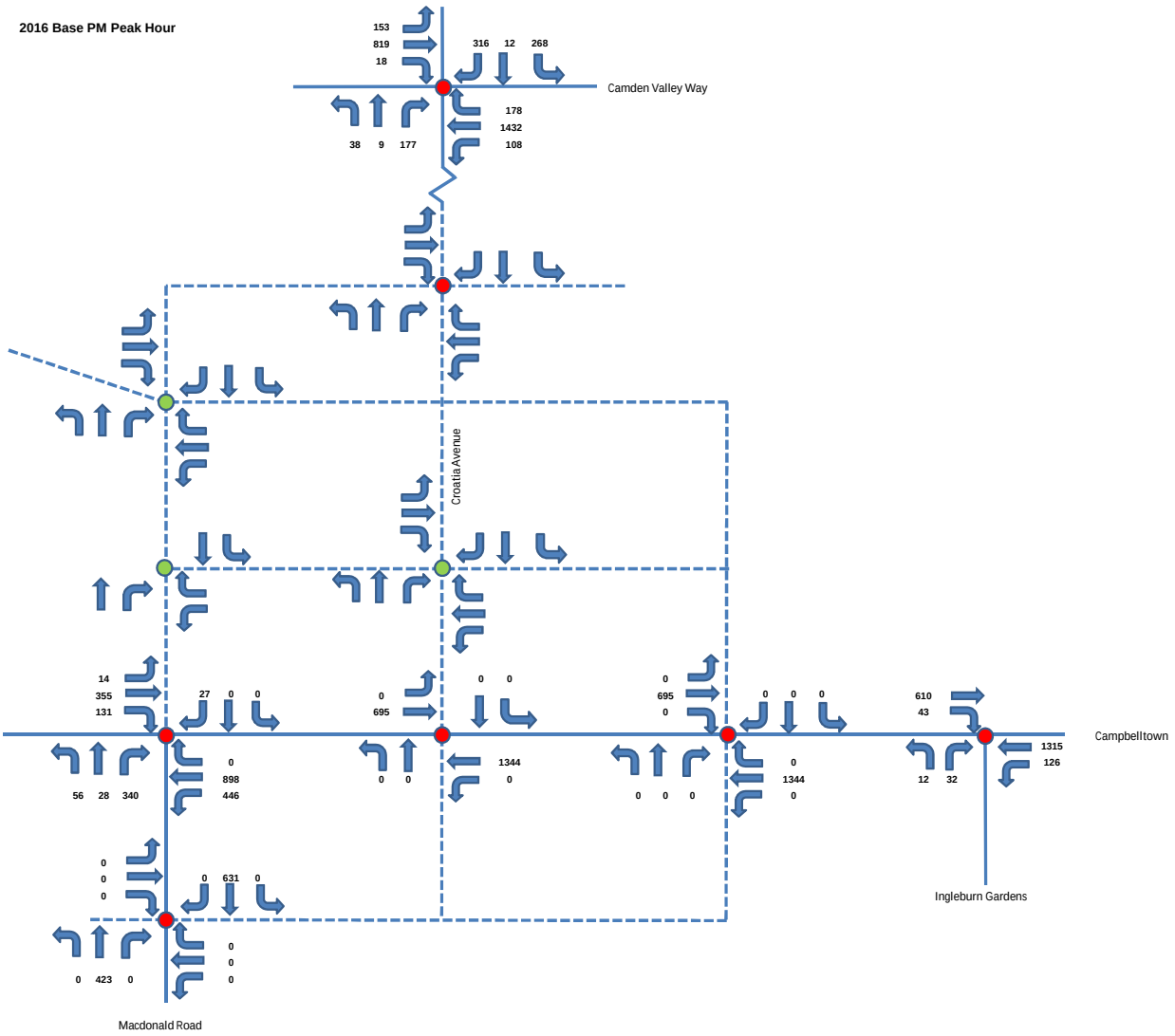

Bernera Road
231
1227
3
114
5
368
Camden Valley Way
249
717
12
2
6
13
Croatia Avenue
838
231
Campbelltown
194
126
48
298
Macdonald Road
Campbelltown
1140
2
310
5
3
12
Ingleburn Gardens Access Road
357
Stage 1 Development Access Road
346

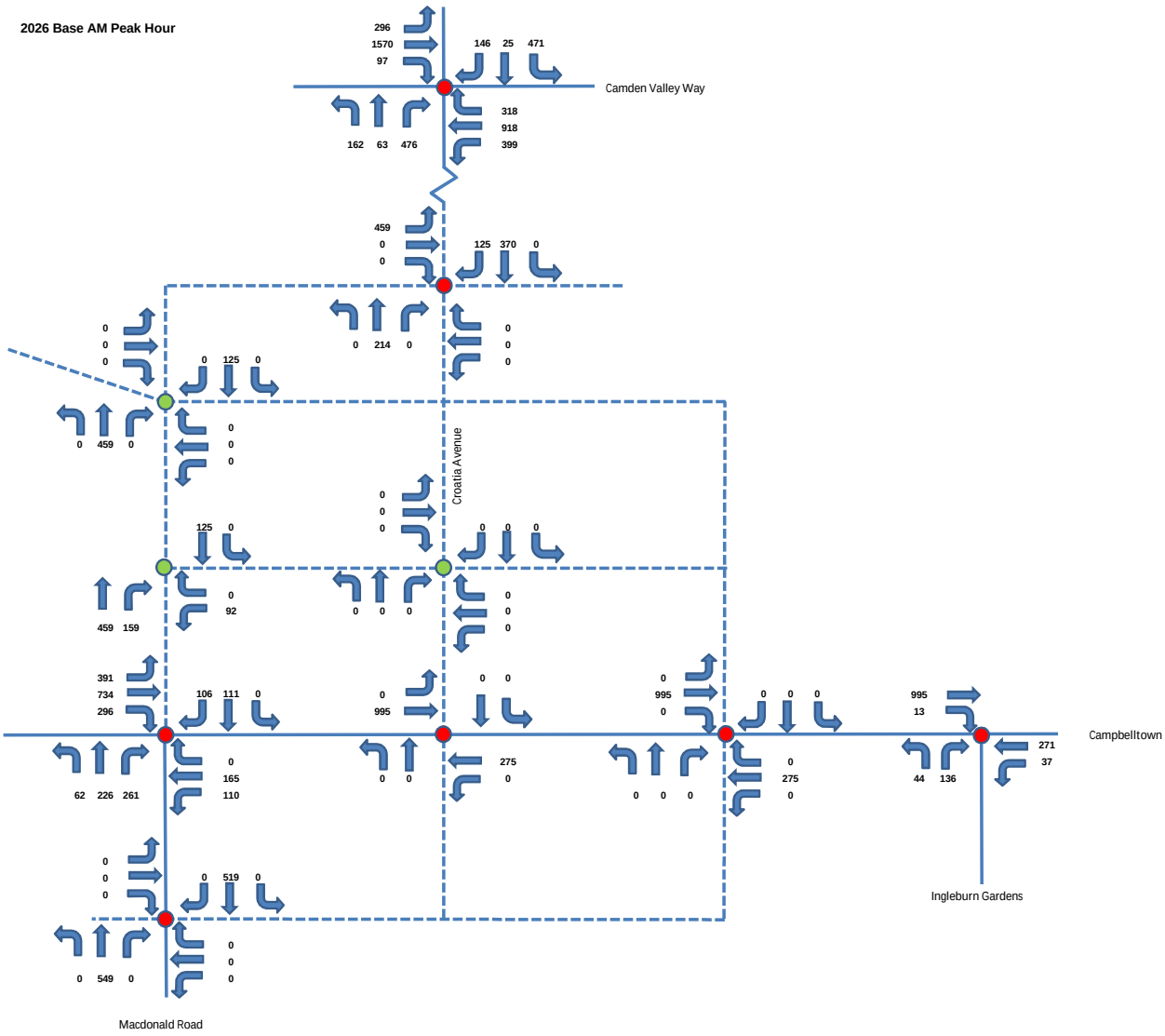
2012 PM Peak

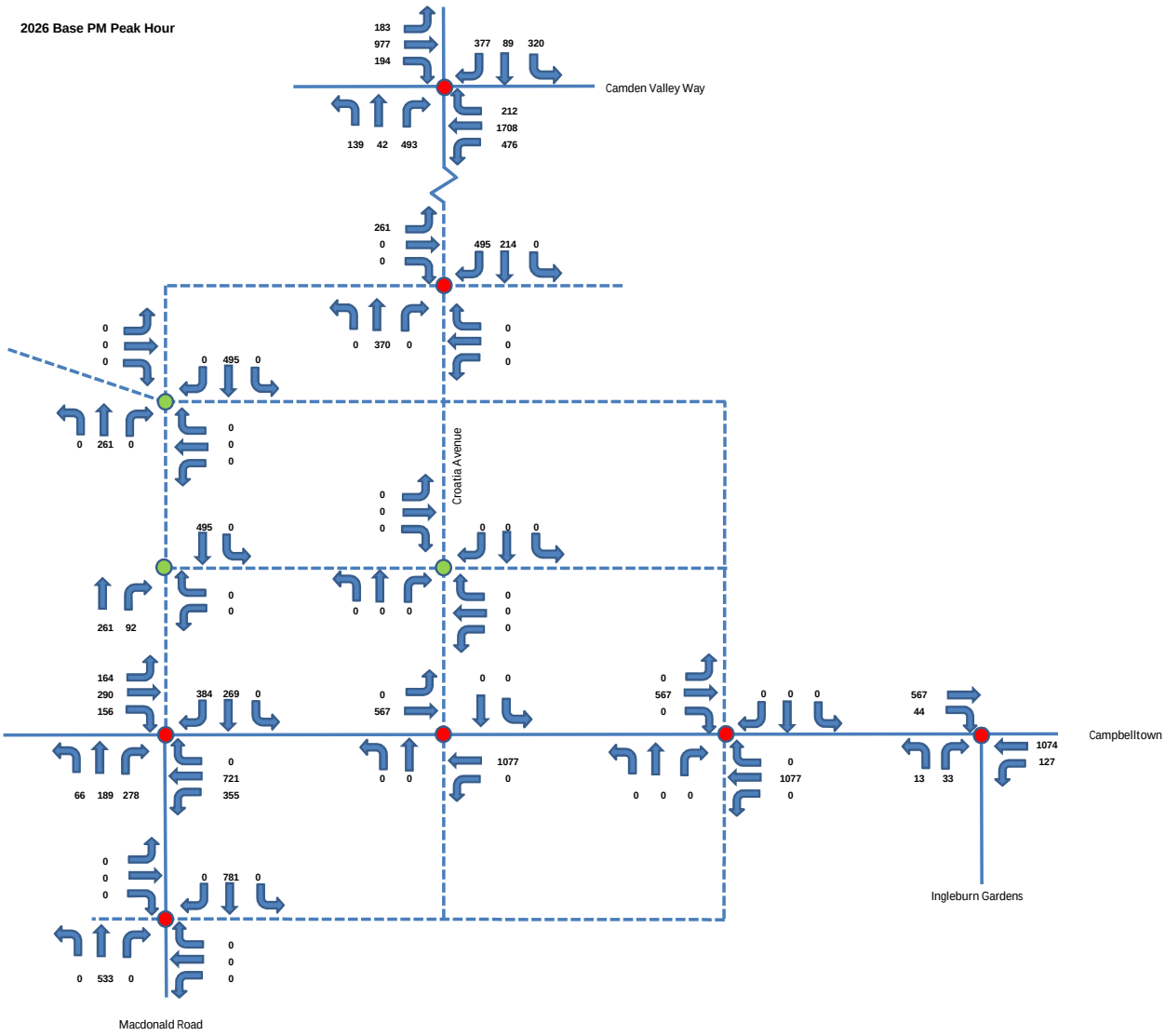

Bernera Road
143
763
4
294
11
250
Camden Valley Way
166
1334
24
10
8
15
Croatia Avenue
330
122
Campbelltown
837
415
52
317
Macdonald Road
Campbelltown
569
3
1225
5
2
2
Ingleburn Gardens Access Road
538
Stage 1 Development Access Road
369


2016 Base AM Peak Hour
248
1316
30
122
6
395
Camden Valley Way
267
769
175
16
7
97
Croatia Avenue
27
899
248
14
28
0
0
208
136
52
54
319
0
1218
0
0
0
344
0
0
0
0
0
1218
0
0
0
0
0
344
0
0
0
0
1223
12
43
133
332
36
Campbelltown
Ingleburn Gardens
0
0
0
0
411
0
0
0
0
0
425
0
Macdonald Road

2016 Base PM Peak Hour




2026 Base AM Peak Hour
Camden Valley Way
Croatia Avenue
Campbelltown
Ingleburn Gardens
Macdonald Road


2026 Base PM Peak Hour
183
977
194
377 89 320
Camden Valley Way
139 42 493
212
1708
476
261
0
0
495 214 0
0 370 0
0
0
0
0 495 0
0 261 0
0
0
0
Croatia Avenue
0
0
0
495 0
0 0 0
261 92
0
0
0 0 0
0
0
0
164
290
156
384 269 0
0
721
355
66 189 278
0 567
0 0
1077
0
0 567
0
0 0 0
0 1077 0
0 0 0
567
44
13 33
1074
127
Campbelltown
Ingleburn Gardens
0
0
0
0 781 0
0 533 0
0
0
0
Macdonald Road

SIDRA INTERSECTION

Movement Summary

Campbelltown Road / Macdonald Road

2012 AM Peak

Signalised - Fixed time Cycle Time = 60 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Macdonald Road										
1	L	48	2.1	0.209	31.3	LOS C	14	0.91	0.73	27.1
3	R	298	2.0	0.698	31.0	LOS C	73	0.97	0.90	27.1
Approach		346	2.0	0.698	31.1	LOS C	73	0.96	0.88	27.1
Campbelltown Road E										
4	L	126	4.0	0.161	10.3	LOS A	7	0.28	0.72	51.5
5	T	194	4.1	0.170	5.7	LOS A	26	0.47	0.39	59.7
Approach		320	4.1	0.170	7.5	LOS A	26	0.40	0.52	56.5
Campbelltown Road W										
11	T	838	4.1	0.735	9.7	LOS A	137	0.77	0.71	54.2
12	R	231	3.9	0.750	25.9	LOS B	48	0.68	0.90	36.8
Approach		1069	4.0	0.750	13.2	LOS A	137	0.75	0.75	49.7
All Vehicles		1735	3.6	0.750	15.7	LOS B	137	0.73	0.73	43.3

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	7.5	LOS A	0	0.50	0.50
P7	50	22.5	LOS C	0	0.87	0.87
All Peds	100	15.0	LOS B	0	0.68	0.68

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

SIDRA INTERSECTION

Movement Summary

Campbelltown Road / Macdonald Road

2012 PM Peak

Signalised - Fixed time Cycle Time = 60 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Macdonald Road										
1	L	52	1.9	0.226	31.3	LOS C	15	0.91	0.73	27.1
3	R	317	1.9	0.742	32.2	LOS C	79	0.98	0.95	26.7
Approach		369	1.9	0.741	32.1	LOS C	79	0.97	0.92	26.8
Campbelltown Road E										
4	L	415	4.1	0.533	10.6	LOS A	27	0.35	0.75	51.1
5	T	837	3.9	0.734	9.6	LOS A	136	0.77	0.71	54.3
Approach		1252	4.0	0.734	10.0	LOS A	136	0.63	0.72	53.3
Campbelltown Road W										
11	T	330	3.9	0.289	6.3	LOS A	45	0.52	0.44	58.9
12	R	122	4.1	0.639	31.4	LOS C	34	0.88	0.86	33.4
Approach		452	4.0	0.640	13.0	LOS A	45	0.61	0.56	49.8
All Vehicles		2073	3.6	0.742	14.6	LOS B	136	0.69	0.72	44.6

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	7.5	LOS A	0	0.50	0.50
P7	50	22.5	LOS C	0	0.87	0.87
All Peds	100	15.0	LOS B	0	0.68	0.68

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

SIDRA INTERSECTION

Movement Summary

Campbelltown Road / Macdonald Road

2016 AM Peak

Signalised - Fixed time Cycle Time = 70 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Macdonald Road S										
1	L	52	3.8	0.111	19.9	LOS B	11	0.57	0.73	40.3
2	T	54	0.0	0.102	20.8	LOS B	15	0.78	0.59	38.2
3	R	319	4.1	0.785	39.6	LOS C	94	0.98	0.96	29.9
Approach		425	3.5	0.785	34.8	LOS C	94	0.91	0.89	31.8
Campbelltown Road E										
4	L	136	3.7	0.330	32.6	LOS C	38	0.78	0.78	33.9
5	T	208	3.8	0.330	19.8	LOS B	44	0.72	0.59	43.9
6	R	1	0.0	0.003	33.9	LOS C	0	0.77	0.61	33.2
Approach		345	3.8	0.330	24.9	LOS B	44	0.74	0.67	39.5
Macdonald Road N										
7	L	1	0.0	0.002	19.2	LOS B	0	0.54	0.64	40.7
8	T	28	0.0	0.053	20.4	LOS B	8	0.77	0.56	38.5
9	R	14	0.0	0.039	31.1	LOS C	4	0.79	0.70	33.6
Approach		43	0.0	0.053	23.8	LOS B	8	0.77	0.61	36.7
Campbelltown Road W										
10	L	27	0.0	0.783	35.0	LOS C	115	0.92	0.91	32.6
11	T	899	4.0	0.785	25.9	LOS B	118	0.92	0.86	39.4
12	R	248	4.0	0.740	41.0	LOS C	74	0.97	0.88	30.0
Approach		1174	3.9	0.785	29.3	LOS C	118	0.93	0.87	36.9
All Vehicles		1987	3.7	0.785	29.6	LOS C	118	0.89	0.83	36.0

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	22.4	LOS C	0	0.80	0.80
P3	50	27.5	LOS C	0	0.89	0.89
P5	50	22.4	LOS C	0	0.80	0.80

P7	50	27.5	LOS C	0	0.89	0.89
All Peds	200	24.9	LOS B	0	0.84	0.84

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

Site: Ctown_McDonald AM 2016 + SWRL 2 lanes
K:\60159516_Edmondson\4. Tech work area\4.5. Planning\Concept Plan work\SIDRA\Existing and future without dev\2016\1_Campbelltown Road_Macdonald Road_2016.aap
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SIDRA INTERSECTION

Movement Summary

Campbelltown Road / Macdonald Road

2016 PM Peak

Signalised - Fixed time Cycle Time = 90 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Macdonald Road S										
1	L	56	3.6	0.168	29.0	LOS C	17	0.68	0.74	34.7
2	T	29	0.0	0.056	26.4	LOS B	10	0.77	0.57	34.8
3	R	340	4.1	0.831	50.4	LOS D	125	1.00	1.00	26.2
Approach		425	3.8	0.831	45.9	LOS D	125	0.94	0.94	27.5
Campbelltown Road E										
4	L	446	4.0	0.812	33.6	LOS C	174	0.87	0.91	33.3
5	T	898	4.0	0.812	21.2	LOS B	187	0.83	0.79	42.7
6	R	1	0.0	0.006	49.8	LOS D	0	0.90	0.60	26.7
Approach		1345	4.0	0.812	25.4	LOS B	187	0.84	0.83	39.2
Macdonald Road N										
7	L	1	0.0	0.003	27.8	LOS B	0	0.65	0.63	35.2
8	T	1	0.0	0.002	25.5	LOS B	0	0.75	0.45	35.3
9	R	28	0.0	0.080	36.7	LOS C	10	0.79	0.73	31.0
Approach		30	0.0	0.080	36.0	LOS C	10	0.78	0.72	31.3
Campbelltown Road W										
10	L	15	0.0	0.211	21.4	LOS B	35	0.46	0.76	40.9
11	T	355	3.9	0.210	12.3	LOS A	35	0.46	0.38	51.0
12	R	131	3.8	0.815	58.5	LOS E	57	1.00	0.89	24.2
Approach		501	3.8	0.815	24.7	LOS B	57	0.60	0.53	39.7
All Vehicles		2301	3.9	0.831	29.2	LOS C	187	0.81	0.78	36.3

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	17.4	LOS B	0	0.62	0.62
P3	50	32.9	LOS D	0	0.86	0.86
P5	53	17.4	LOS B	0	0.62	0.62

P7	50	32.9	LOS D	0	0.86	0.86
All Peds	203	25.1	LOS B	0	0.74	0.74

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

SIDRA SOLUTIONS

Site: Ctown_McDonald PM 2016 + SWRL 2 lanes
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SIDRA INTERSECTION

Movement Summary

Campbelltown Road / Macdonald Road

2026 AM Peak

Signalised - Fixed time Cycle Time = 130 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Macdonald Road S										
1	L	62	3.2	0.260	40.3	LOS C	27	0.72	0.74	29.6
2	T	226	0.0	0.443	57.3	LOS E	59	0.97	0.77	23.3
3	R	261	3.8	0.552	67.5	LOS E	70	0.98	0.80	22.0
Approach		549	2.2	0.552	60.2	LOS E	70	0.95	0.78	23.2
Campbelltown Road E										
4	L	110	3.6	0.196	23.1	LOS B	30	0.56	0.76	39.8
5	T	165	4.2	0.196	25.1	LOS B	46	0.59	0.48	39.9
6	R	1	0.0	0.004	52.7	LOS D	1	0.75	0.61	25.9
Approach		276	4.0	0.196	24.4	LOS B	46	0.58	0.59	39.8
Macdonald Road N										
7	L	1	0.0	0.223	73.1	LOS F	31	0.93	0.76	20.8
8	T	111	0.0	0.221	59.6	LOS E	32	0.93	0.71	22.7
9	R	106	0.0	0.218	64.2	LOS E	30	0.93	0.75	22.6
Approach		218	0.0	0.221	61.9	LOS E	32	0.93	0.73	22.7
Campbelltown Road W										
10	L	391	0.0	0.806	46.4	LOS D	214	0.90	0.90	27.8
11	T	734	4.0	0.806	37.9	LOS C	222	0.90	0.83	32.7
12	R	296	4.1	0.820	67.1	LOS E	142	1.00	0.92	22.2
Approach		1421	2.9	0.820	46.3	LOS D	222	0.92	0.87	28.6
All Vehicles		2464	2.6	0.820	48.3	LOS D	222	0.89	0.80	27.4

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	37.7	LOS D	0	0.76	0.76
P3	50	59.1	LOS E	0	0.95	0.95
P5	50	35.4	LOS D	0	0.74	0.74

P7	50	59.1	LOS E	0	0.95	0.95
All Peds	200	47.9	LOS D	0	0.85	0.85

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

Site: Ctown_McDonald AM 2026 + SWRL 2 lanes + 2 double RTs
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SIDRA INTERSECTION

Movement Summary

Campbelltown Road / Macdonald Road

2026 AM Peak

Signalised - Fixed time Cycle Time = 110 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Macdonald Road S										
1	L	66	4.5	0.167	24.2	LOS B	16	0.74	0.74	37.4
2	T	189	0.0	0.314	45.3	LOS D	43	0.93	0.73	26.7
3	R	278	4.0	0.651	61.5	LOS E	66	1.00	0.83	23.3
Approach		533	2.6	0.651	51.2	LOS D	66	0.94	0.78	25.6
Campbelltown Road E										
4	L	355	3.9	0.864	47.2	LOS D	195	0.96	1.02	27.6
5	T	721	4.0	0.864	41.9	LOS C	205	0.97	0.96	30.9
6	R	1	0.0	0.004	38.4	LOS C	0	0.63	0.64	31.1
Approach		1077	4.0	0.864	43.7	LOS D	205	0.97	0.98	29.8
Macdonald Road N										
7	L	1	0.0	0.458	55.4	LOS D	59	0.96	0.80	24.7
8	T	269	0.0	0.449	46.5	LOS D	59	0.96	0.77	26.3
9	R	384	0.0	0.875	70.7	LOS F	92	1.00	1.01	21.3
Approach		654	0.0	0.875	60.7	LOS E	92	0.98	0.91	23.1
Campbelltown Road W										
10	L	164	0.0	0.203	14.2	LOS A	26	0.23	0.73	47.3
11	T	290	4.1	0.203	7.0	LOS A	33	0.28	0.24	57.8
12	R	156	3.8	0.341	45.2	LOS D	58	0.78	0.85	28.5
Approach		610	3.0	0.340	18.7	LOS B	58	0.39	0.53	44.0
All Vehicles		2874	2.6	0.875	43.6	LOS D	205	0.84	0.83	29.0

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	49.2	LOS E	0	0.95	0.95
P3	50	49.2	LOS E	0	0.95	0.95
P5	50	46.4	LOS E	0	0.92	0.92

P7	50	49.2	LOS E	0	0.95	0.95
All Peds	200	48.5	LOS D	0	0.94	0.94

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

Site: Ctown_McDonald PM 2026 + SWRL 2 lanes + 2 double RTs
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SIDRA INTERSECTION

Movement Summary

Campbelltown Road / Ingleburn Gardens Access

2012 AM Peak

Signalised - Fixed time Cycle Time = 90 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Ingleburn Gardens Access										
1	L	43	0.0	0.057	6.2	LOS A	1	0.14	0.57	39.9
3	R	132	0.0	0.533	46.9	LOS D	51	0.98	0.79	23.9
Approach		175	0.0	0.533	36.9	LOS C	51	0.77	0.74	26.5
Campbelltown Rd E										
4	L	35	0.0	0.031	10.7	LOS A	1	0.14	0.68	57.1
5	T	310	3.9	0.222	0.9	LOS A	9	0.07	0.06	77.8
Approach		345	3.5	0.222	1.9	LOS A	9	0.08	0.12	75.5
Campbelltown Rd W										
11	T	1140	4.0	0.818	2.1	LOS A	93	0.24	0.21	74.3
12	R	12	0.0	0.024	14.4	LOS A	2	0.28	0.74	52.3
Approach		1152	4.0	0.818	2.2	LOS A	93	0.25	0.22	74.0
All Vehicles		1672	3.5	0.818	5.8	LOS A	93	0.27	0.25	62.7

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	4.0	LOS A	0	0.30	0.30
P3	50	36.5	LOS D	0	0.90	0.90
P7	50	39.2	LOS D	0	0.93	0.93
All Peds	150	26.6	LOS B	0	0.71	0.71

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS

SIDRA INTERSECTION

Movement Summary

Campbelltown Road / Ingleburn Gardens Access

2012 PM Peak

Signalised - Fixed time Cycle Time = 140 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Ingleburn Gardens Access										
1	L	12	0.0	0.065	9.8	LOS A	2	0.28	0.60	37.8
3	R	32	0.0	0.201	72.0	LOS F	21	0.97	0.73	19.2
Approach		44	0.0	0.201	55.0	LOS D	21	0.78	0.69	22.2
Campbelltown Rd E										
4	L	125	0.0	0.103	10.6	LOS A	5	0.11	0.69	57.4
5	T	1225	4.0	0.867	3.1	LOS A	171	0.31	0.30	72.8
Approach		1350	3.6	0.868	3.8	LOS A	171	0.29	0.33	71.4
Campbelltown Rd W										
11	T	569	4.0	0.361	1.0	LOS A	29	0.08	0.07	77.4
12	R	43	0.0	0.518	86.6	LOS F	30	1.00	0.74	18.0
Approach		612	3.8	0.518	7.0	LOS A	30	0.15	0.12	65.2
All Vehicles		2006	3.6	0.867	5.9	LOS A	171	0.26	0.28	66.3

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	5.4	LOS A	0	0.28	0.28
P3	50	61.3	LOS F	0	0.94	0.94
P7	50	64.1	LOS F	0	0.96	0.96
All Peds	150	43.6	LOS D	0	0.72	0.72

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS

SIDRA INTERSECTION

Movement Summary

Campbelltown Road / Ingleburn Gardens Access

2016 AM Peak

Signalised - Fixed time Cycle Time = 140 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Ingleburn Gardens Access										
1	L	43	0.0	0.068	6.3	LOS A	3	0.13	0.56	39.9
3	R	133	0.0	0.336	13.3	LOS A	34	0.53	0.74	35.7
Approach		176	0.0	0.336	11.6	LOS A	34	0.43	0.69	36.6
Campbelltown Rd E										
4	L	36	0.0	0.029	10.6	LOS A	1	0.09	0.68	57.5
5	T	332	3.9	0.151	14.3	LOS A	48	0.49	0.41	54.9
Approach		368	3.5	0.151	13.9	LOS A	48	0.45	0.44	55.1
Campbelltown Rd W										
11	T	1223	4.0	0.406	4.6	LOS A	100	0.33	0.30	69.6
12	R	12	0.0	0.053	49.5	LOS D	6	0.90	0.69	27.2
Approach		1235	4.0	0.406	5.1	LOS A	100	0.34	0.31	68.8
All Vehicles		1779	3.5	0.406	7.5	LOS A	100	0.37	0.37	60.5

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	13.7	LOS B	0	0.44	0.44
P3	50	61.3	LOS F	0	0.94	0.94
P7	50	64.1	LOS F	0	0.96	0.96
All Peds	150	46.4	LOS D	0	0.78	0.78

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS

SIDRA INTERSECTION

Movement Summary

Campbelltown Road / Ingleburn Gardens Access

2016 PM Peak

Signalised - Fixed time Cycle Time = 140 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Ingleburn Gardens Access										
1	L	12	0.0	0.051	9.0	LOS A	2	0.26	0.59	38.2
3	R	32	0.0	0.093	11.2	LOS A	6	0.39	0.67	36.8
Approach		44	0.0	0.093	10.6	LOS A	6	0.35	0.65	37.2
Campbelltown Rd E										
4	L	126	0.0	0.105	10.6	LOS A	5	0.11	0.69	57.4
5	T	1315	4.0	0.494	10.1	LOS A	150	0.50	0.45	60.4
Approach		1441	3.7	0.494	10.2	LOS A	150	0.46	0.47	60.2
Campbelltown Rd W										
11	T	610	3.9	0.202	3.7	LOS A	47	0.26	0.23	71.4
12	R	43	0.0	0.469	85.0	LOS F	30	1.00	0.74	18.3
Approach		653	3.7	0.469	9.1	LOS A	47	0.31	0.26	61.9
All Vehicles		2138	3.6	0.494	9.8	LOS A	150	0.41	0.41	59.9

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	7.2	LOS A	0	0.32	0.32
P3	50	61.3	LOS F	0	0.94	0.94
P7	50	64.1	LOS F	0	0.96	0.96
All Peds	150	44.2	LOS D	0	0.74	0.74

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS

SIDRA INTERSECTION

Movement Summary

Campbelltown Road / Ingleburn Gardens Access

2026 AM Peak

Signalised - Fixed time Cycle Time = 130 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Ingleburn Gardens Access										
1	L	44	0.0	0.065	6.3	LOS A	2	0.13	0.56	39.9
3	R	136	0.0	0.296	13.5	LOS A	31	0.53	0.73	35.6
Approach		180	0.0	0.296	11.8	LOS A	31	0.43	0.69	36.5
Campbelltown Rd E										
4	L	37	0.0	0.030	10.6	LOS A	1	0.10	0.68	57.4
5	T	271	4.1	0.136	16.7	LOS B	42	0.54	0.45	52.0
Approach		308	3.6	0.136	16.0	LOS B	42	0.49	0.48	52.5
Campbelltown Rd W										
11	T	995	4.0	0.337	4.6	LOS A	79	0.33	0.29	69.7
12	R	13	0.0	0.047	42.6	LOS D	6	0.87	0.69	30.0
Approach		1008	4.0	0.337	5.1	LOS A	79	0.33	0.30	68.8
All Vehicles		1496	3.4	0.337	8.1	LOS A	79	0.38	0.38	58.9

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	16.2	LOS B	0	0.50	0.50
P3	50	56.3	LOS E	0	0.93	0.93
P7	50	59.1	LOS E	0	0.95	0.95
All Peds	150	43.9	LOS D	0	0.79	0.79

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS

SIDRA INTERSECTION

Movement Summary

Campbelltown Road / Ingleburn Gardens Access

2026 PM Peak

Signalised - Fixed time Cycle Time = 130 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Ingleburn Gardens Access										
1	L	13	0.0	0.042	7.9	LOS A	2	0.23	0.58	38.9
3	R	33	0.0	0.082	10.1	LOS A	5	0.36	0.66	37.4
Approach		46	0.0	0.082	9.5	LOS A	5	0.33	0.64	37.8
Campbelltown Rd E										
4	L	127	0.0	0.106	10.7	LOS A	5	0.11	0.69	57.3
5	T	1074	4.0	0.422	10.4	LOS A	119	0.50	0.45	59.9
Approach		1201	3.6	0.422	10.5	LOS A	119	0.46	0.47	59.7
Campbelltown Rd W										
11	T	567	4.1	0.192	4.0	LOS A	44	0.28	0.24	71.0
12	R	44	0.0	0.407	77.8	LOS F	28	1.00	0.74	19.6
Approach		611	3.8	0.407	9.3	LOS A	44	0.33	0.28	61.6
All Vehicles		1858	3.6	0.422	10.0	LOS A	119	0.41	0.41	59.4

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	8.1	LOS A	0	0.35	0.35
P3	50	56.3	LOS E	0	0.93	0.93
P7	50	59.1	LOS E	0	0.95	0.95
All Peds	150	41.2	LOS C	0	0.75	0.75

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS

SIDRA INTERSECTION

Movement Summary

Camden Valley Way / Croatia Avenue / Bernera Road

2012 AM Peak

Signalised - Fixed time Cycle Time = 120 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Croatia Avenue										
1	L	2	33.3	0.014	11.4	LOS A	1	0.27	0.64	47.3
2	T	6	14.3	0.025	45.9	LOS D	4	0.87	0.59	26.5
3	R	13	7.7	0.183	71.2	LOS F	9	0.99	0.68	21.3
Approach		23	13.0	0.183	55.7	LOS D	9	0.86	0.65	24.5
Camden Valley Way E										
4	L	12	8.3	0.010	9.0	LOS A	0	0.10	0.64	53.4
5	T	717	5.0	0.456	26.9	LOS B	118	0.77	0.67	38.7
6	R	249	4.8	0.793	64.9	LOS E	118	1.00	0.92	22.7
Approach		978	5.0	0.793	36.3	LOS C	118	0.82	0.73	33.1
Bernera Road										
7	L	368	4.9	0.507	20.0	LOS B	95	0.61	0.78	40.4
8	T	5	16.7	0.022	45.8	LOS D	4	0.87	0.58	26.6
9	R	114	5.3	0.637	74.6	LOS F	36	1.00	0.79	20.6
Approach		488	5.1	0.637	33.1	LOS C	95	0.71	0.78	32.9
Camden Valley Way W										
10	L	231	5.2	0.251	11.2	LOS A	29	0.28	0.69	50.8
11	T	1227	5.0	0.779	32.8	LOS C	226	0.93	0.84	35.2
12	R	3	25.0	0.015	53.0	LOS D	3	0.85	0.66	25.8
Approach		1462	5.1	0.779	29.4	LOS C	226	0.83	0.82	36.9
All Vehicles		2951	5.1	0.793	32.5	LOS C	226	0.81	0.78	34.7

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	24.7	LOS C	0	0.64	0.64
P3	50	54.2	LOS E	0	0.95	0.95
P5	50	26.7	LOS C	0	0.67	0.67

P7	50	54.2	LOS E	0	0.95	0.95
All Peds	200	39.9	LOS C	0	0.80	0.80

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

Site: 2012 AM
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SIDRA INTERSECTION

Movement Summary

Camden Valley Way / Croatia Avenue / Bernera Road

2012 PM Peak

Signalised - Fixed time Cycle Time = 130 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Croatia Avenue										
1	L	10	9.1	0.076	18.1	LOS B	3	0.43	0.67	41.8
2	T	8	11.1	0.034	51.2	LOS D	6	0.88	0.61	24.9
3	R	15	6.7	0.194	60.5	LOS E	9	0.89	0.69	23.6
Approach		35	8.6	0.193	44.8	LOS D	9	0.74	0.66	27.9
Camden Valley Way E										
4	L	24	4.2	0.019	9.0	LOS A	1	0.10	0.64	53.4
5	T	1334	5.0	0.620	19.7	LOS B	202	0.72	0.66	43.9
6	R	166	4.8	0.546	63.1	LOS E	83	0.97	0.81	23.1
Approach		1524	5.0	0.621	24.3	LOS B	202	0.74	0.67	40.3
Bernera Road										
7	L	250	5.2	0.329	12.7	LOS A	41	0.34	0.70	46.3
8	T	11	9.1	0.041	51.3	LOS D	7	0.89	0.61	24.9
9	R	294	5.1	0.619	65.9	LOS E	84	0.98	0.81	22.4
Approach		556	5.2	0.619	41.6	LOS C	84	0.69	0.76	29.3
Camden Valley Way W										
10	L	143	4.9	0.138	10.2	LOS A	14	0.20	0.67	52.1
11	T	763	5.0	0.571	36.4	LOS C	147	0.87	0.75	33.4
12	R	4	20.0	0.073	67.5	LOS E	4	0.91	0.69	22.0
Approach		911	5.0	0.571	32.4	LOS C	147	0.76	0.74	35.2
All Vehicles		3026	5.1	0.620	30.1	LOS C	202	0.74	0.71	36.1

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	50.9	LOS E	0	0.88	0.88
P3	50	59.1	LOS E	0	0.95	0.95
P5	50	34.0	LOS D	0	0.72	0.72

P7	50	59.1	LOS E	0	0.95	0.95
All Peds	200	50.8	LOS D	0	0.88	0.88

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

Site: 2012 PM
K:\60159516_Edmondson\4. Tech work area\4.5. Planning\Stage 1 TIA\SIDRA analysis\Existing and 2012\3_Camden VW_Croatia_Bernera_existing.aap
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SIDRA INTERSECTION

Movement Summary

Camden Valley Way / Croatia Avenue / Bernera Road

2016 AM Peak

Signalised - Fixed time Cycle Time = 150 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Croatia Avenue										
1	L	16	5.9	0.065	10.8	LOS A	2	0.22	0.65	47.9
2	T	7	12.5	0.035	61.8	LOS E	6	0.90	0.61	22.2
3	R	97	1.0	0.415	74.9	LOS F	59	0.97	0.78	20.6
Approach		122	2.5	0.415	65.1	LOS E	59	0.86	0.76	22.5
Camden Valley Way E										
4	L	175	1.1	0.141	8.9	LOS A	6	0.09	0.65	53.4
5	T	769	4.9	0.325	13.8	LOS A	104	0.50	0.45	49.5
6	R	267	4.9	0.826	79.1	LOS F	152	1.00	0.94	19.8
Approach		1211	4.4	0.826	27.5	LOS B	152	0.55	0.58	37.8
Bernera Road										
7	L	395	5.1	0.784	30.1	LOS C	132	0.64	0.82	34.4
8	T	6	14.3	0.031	61.7	LOS E	5	0.90	0.61	22.3
9	R	122	4.9	0.295	73.6	LOS F	44	0.94	0.76	20.8
Approach		524	5.2	0.784	40.7	LOS C	132	0.72	0.80	29.7
Camden Valley Way W										
10	L	248	4.8	0.292	11.9	LOS A	38	0.27	0.69	50.0
11	T	1316	5.0	0.857	47.8	LOS D	330	0.98	0.94	28.7
12	R	30	3.2	0.137	49.4	LOS D	18	0.75	0.75	26.9
Approach		1595	5.0	0.857	42.3	LOS C	330	0.87	0.90	30.6
All Vehicles		3452	4.7	0.857	37.6	LOS C	330	0.74	0.77	32.2

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	56.3	LOS E	0	0.87	0.87
P3	50	69.1	LOS F	0	0.96	0.96
P5	50	32.7	LOS D	0	0.66	0.66

P7	50	69.1	LOS F	0	0.96	0.96
All Peds	200	56.8	LOS E	0	0.86	0.86

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

Site: 2016 AM + SWRL
K:\60159516_Edmondson\4. Tech work area\4.5. Planning\Concept Plan work\SIDRA\Existing and future without dev\2016\3_Camden VW_Croatia_Bernera_2016.aap
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SIDRA INTERSECTION

Movement Summary

Camden Valley Way / Croatia Avenue / Bernera Road

2016 PM Peak

Signalised - Fixed time Cycle Time = 120 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Croatia Avenue										
1	L	38	2.6	0.264	20.7	LOS B	11	0.51	0.70	39.9
2	T	9	10.0	0.034	46.0	LOS D	6	0.87	0.60	26.5
3	R	177	1.1	0.607	60.5	LOS E	81	0.98	0.82	23.6
Approach		226	1.8	0.607	53.0	LOS D	81	0.90	0.79	25.5
Camden Valley Way E										
4	L	108	0.9	0.084	8.9	LOS A	4	0.11	0.65	53.3
5	T	1432	5.0	0.711	22.4	LOS B	226	0.81	0.74	41.8
6	R	178	5.1	0.568	58.8	LOS E	83	0.97	0.82	24.2
Approach		1718	4.8	0.711	25.3	LOS B	226	0.79	0.74	39.5
Bernera Road										
7	L	268	4.9	0.407	17.1	LOS B	57	0.49	0.74	42.6
8	T	12	7.7	0.044	46.1	LOS D	7	0.88	0.61	26.5
9	R	316	5.1	0.613	60.4	LOS E	83	0.97	0.81	23.7
Approach		597	5.0	0.613	40.6	LOS C	83	0.75	0.77	29.7
Camden Valley Way W										
10	L	153	5.2	0.146	10.1	LOS A	14	0.21	0.67	52.1
11	T	819	5.0	0.703	39.5	LOS C	159	0.94	0.82	32.0
12	R	18	5.3	0.289	75.9	LOS F	13	1.00	0.68	20.3
Approach		991	5.0	0.703	35.7	LOS C	159	0.83	0.80	33.5
All Vehicles		3532	4.7	0.711	32.6	LOS C	226	0.80	0.77	34.6

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	46.8	LOS E	0	0.88	0.88
P3	50	54.2	LOS E	0	0.95	0.95
P5	50	36.0	LOS D	0	0.77	0.77

P7	50	54.2	LOS E	0	0.95	0.95
All Peds	200	47.8	LOS D	0	0.89	0.89

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

Site: 2016 PM + SWRL
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SIDRA INTERSECTION

Movement Summary

Camden Valley Way / Croatia Avenue / Bernera Road

2026 AM Peak

Signalised - Fixed time Cycle Time = 130 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Croatia Avenue										
1	L	162	1.2	0.261	11.5	LOS A	24	0.29	0.69	47.2
2	T	63	1.6	0.079	44.4	LOS D	17	0.84	0.62	27.0
3	R	476	1.1	0.799	70.1	LOS E	118	1.00	0.93	21.6
Approach		701	1.1	0.799	54.2	LOS D	118	0.82	0.84	25.2
Camden Valley Way E										
4	L	399	1.0	0.305	8.9	LOS A	11	0.07	0.65	53.6
5	T	918	5.0	0.421	28.5	LOS B	98	0.66	0.57	37.7
6	R	318	5.0	0.824	76.2	LOS F	89	1.00	0.90	20.4
Approach		1635	4.0	0.824	33.0	LOS C	98	0.58	0.65	34.6
Bernera Road										
7	L	471	5.1	0.736	30.3	LOS C	142	0.76	0.90	34.3
8	T	25	3.8	0.033	43.7	LOS D	7	0.82	0.58	27.3
9	R	146	4.8	0.287	60.6	LOS E	45	0.92	0.76	23.7
Approach		643	5.0	0.736	37.7	LOS C	142	0.80	0.86	30.9
Camden Valley Way W										
10	L	296	5.1	0.241	9.3	LOS A	10	0.07	0.65	53.3
11	T	1570	5.0	0.819	42.9	LOS D	218	0.94	0.87	30.5
12	R	97	1.0	0.428	75.5	LOS F	31	0.99	0.74	20.5
Approach		1964	4.8	0.819	39.5	LOS C	218	0.81	0.83	31.8
All Vehicles		4943	4.1	0.824	39.2	LOS C	218	0.73	0.78	31.3

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	35.4	LOS D	0	0.74	0.74
P3	50	59.1	LOS E	0	0.95	0.95
P5	50	40.0	LOS E	0	0.78	0.78

P7	50	59.1	LOS E	0	0.95	0.95
All Peds	200	48.4	LOS D	0	0.86	0.86

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

Site: 2026 AM + SWRL mitigated 3 lanes
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SIDRA INTERSECTION

Movement Summary

Camden Valley Way / Croatia Avenue / Bernera Road

2026 PM Peak

Signalised - Fixed time Cycle Time = 130 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Croatia Avenue										
1	L	139	0.7	0.226	23.0	LOS B	42	0.56	0.75	38.3
2	T	42	2.3	0.056	45.0	LOS D	12	0.84	0.61	26.8
3	R	493	1.0	0.790	68.8	LOS E	120	1.00	0.92	21.9
Approach		675	1.0	0.790	57.8	LOS E	120	0.90	0.86	24.3
Camden Valley Way E										
4	L	476	1.1	0.393	9.1	LOS A	17	0.08	0.65	53.3
5	T	1708	5.0	0.800	36.7	LOS C	221	0.90	0.82	33.3
6	R	212	5.2	0.513	68.8	LOS E	59	0.96	0.79	21.9
Approach		2396	4.2	0.800	34.1	LOS C	221	0.74	0.78	34.2
Bernera Road										
7	L	320	5.0	0.500	18.8	LOS B	84	0.56	0.77	41.3
8	T	89	1.1	0.115	45.7	LOS D	23	0.85	0.65	26.6
9	R	377	5.0	0.721	65.4	LOS E	109	0.98	0.86	22.6
Approach		786	4.6	0.721	44.2	LOS D	109	0.80	0.80	28.3
Camden Valley Way W										
10	L	183	4.9	0.143	9.1	LOS A	5	0.06	0.64	53.5
11	T	977	5.0	0.521	36.2	LOS C	118	0.77	0.67	33.5
12	R	194	1.0	0.760	78.1	LOS F	58	1.00	0.84	20.0
Approach		1354	4.4	0.760	38.5	LOS C	118	0.71	0.69	32.1
All Vehicles		5211	3.9	0.800	39.8	LOS C	221	0.76	0.77	31.0

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	36.2	LOS D	0	0.75	0.75
P3	50	60.1	LOS F	0	0.96	0.96
P5	50	40.8	LOS E	0	0.79	0.79

P7	50	60.1	LOS F	0	0.96	0.96
All Peds	200	49.3	LOS D	0	0.87	0.87

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

Site: 2026 PM + SWRL mitigated 3 lanes
K:\60159516_Edmondson\4. Tech work area\4.5. Planning\Concept Plan work\SIDRA\Existing and future without dev\2026\3_Camden VW_Croatia_Bernera_2026.aap
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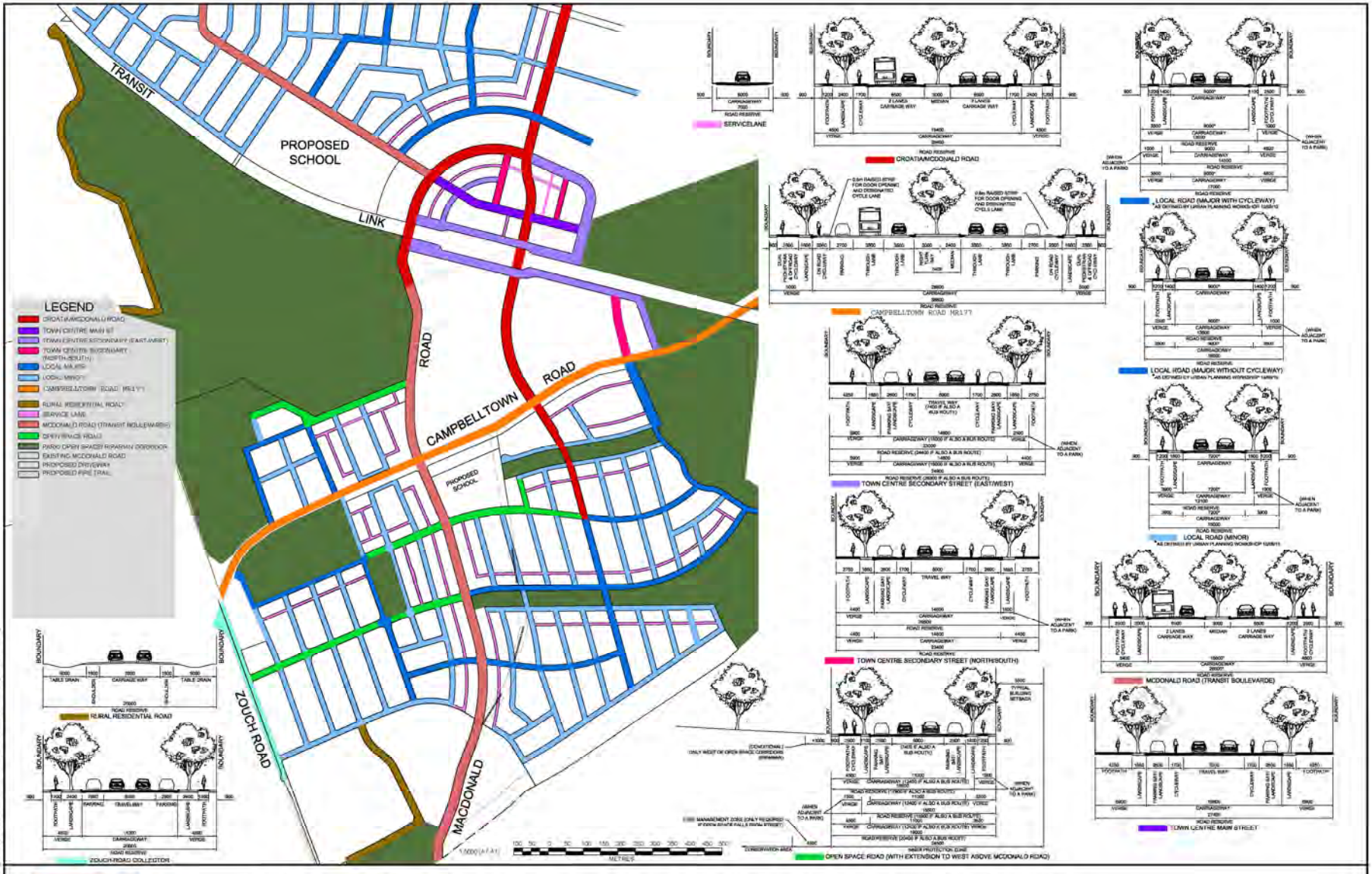
Appendix D

Proposed Road Cross-sections



EDMONDSON PARK SOUTH - PART 3A - CONCEPT PLAN APPLICATION

PROPOSED ROAD CROSS SECTIONS AND HIERARCHY PLAN

LANDCOM

J. WYNDHAM PRINCE

9015/SK59 K

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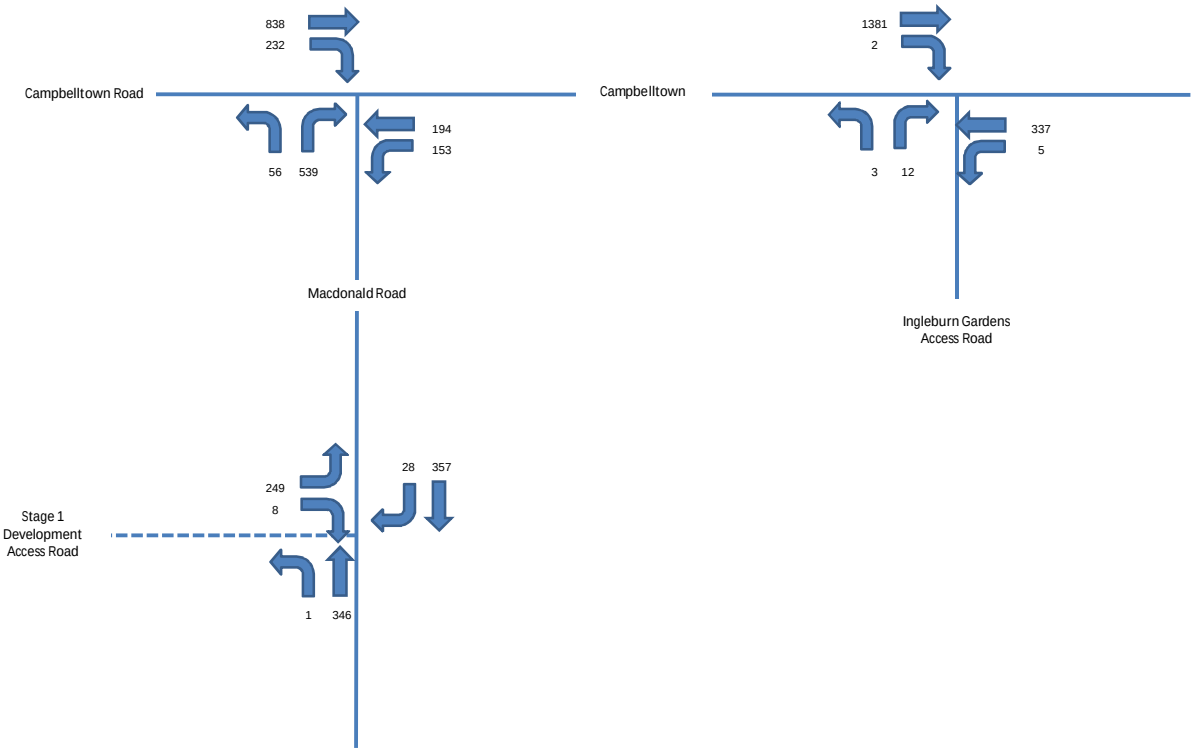
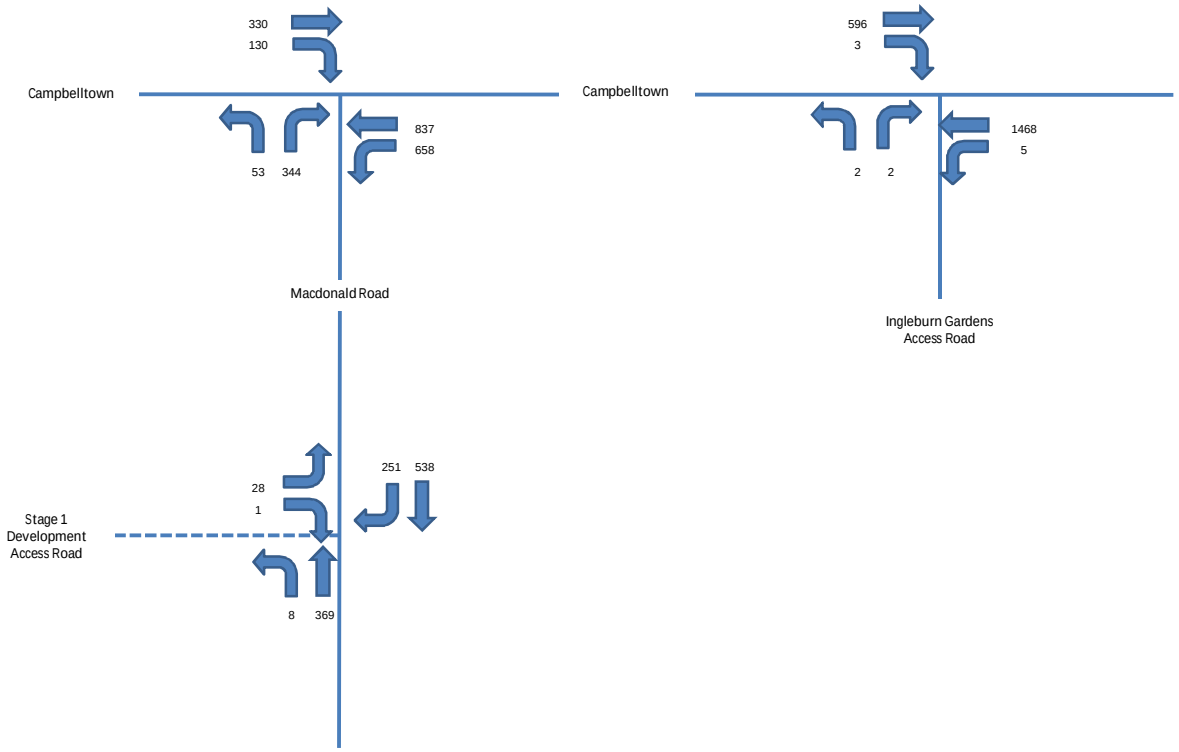
Appendix E

Future Development (2012, 2016, 2026, 2036) Traffic Volumes and Intersection Performance

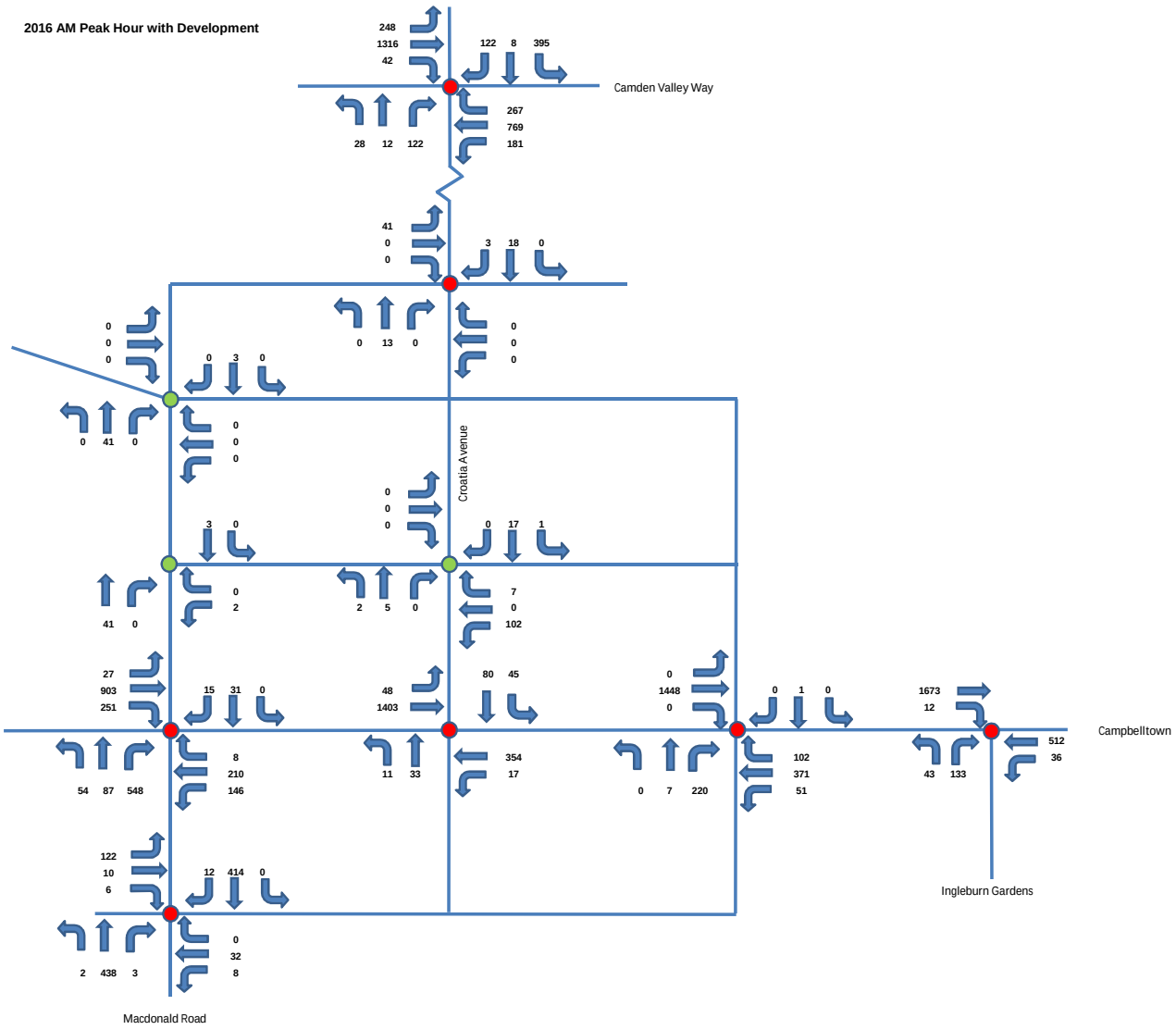
2012 AM Peak with development



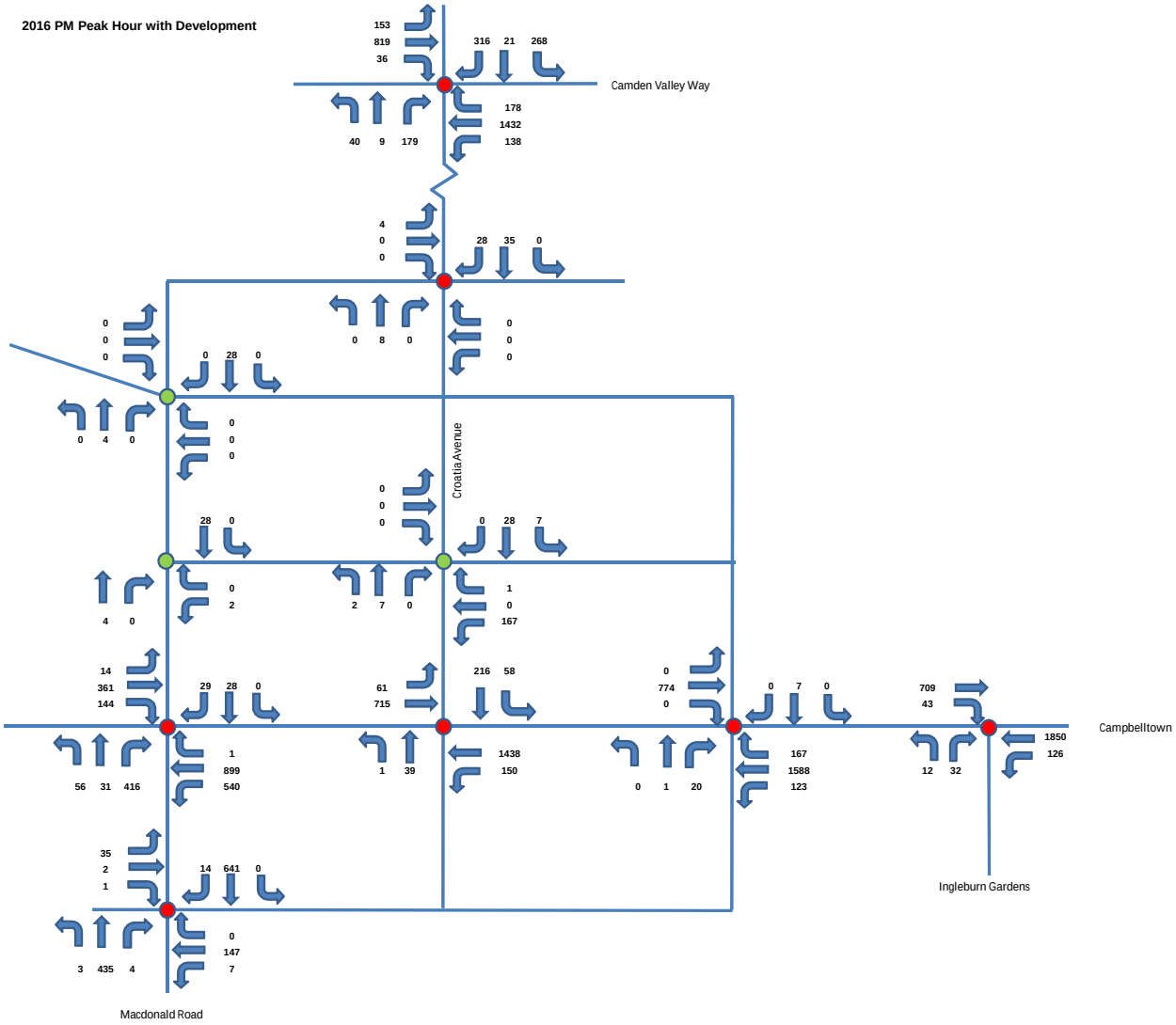
2012 PM Peak with development



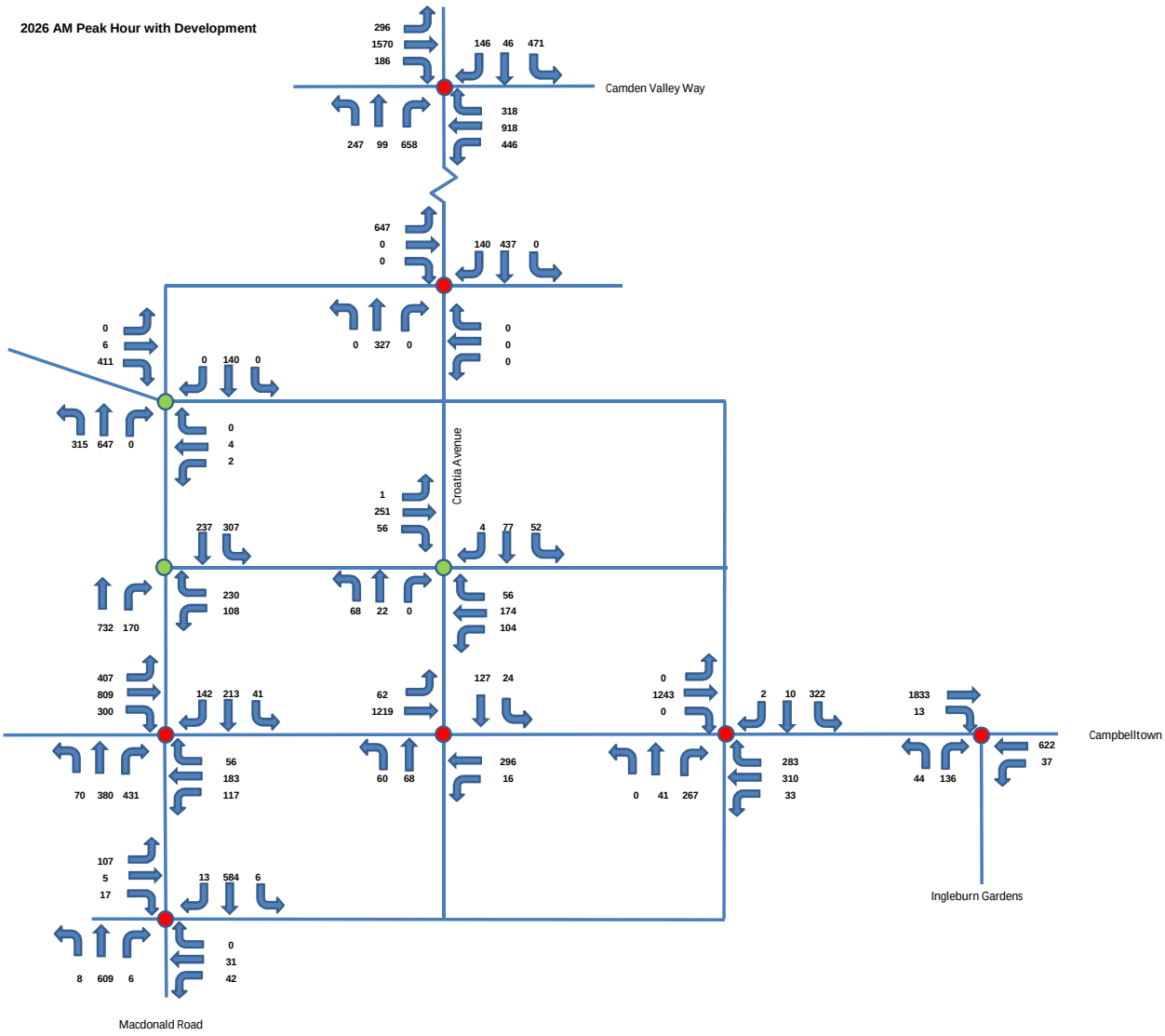
2016 AM Peak Hour with Development



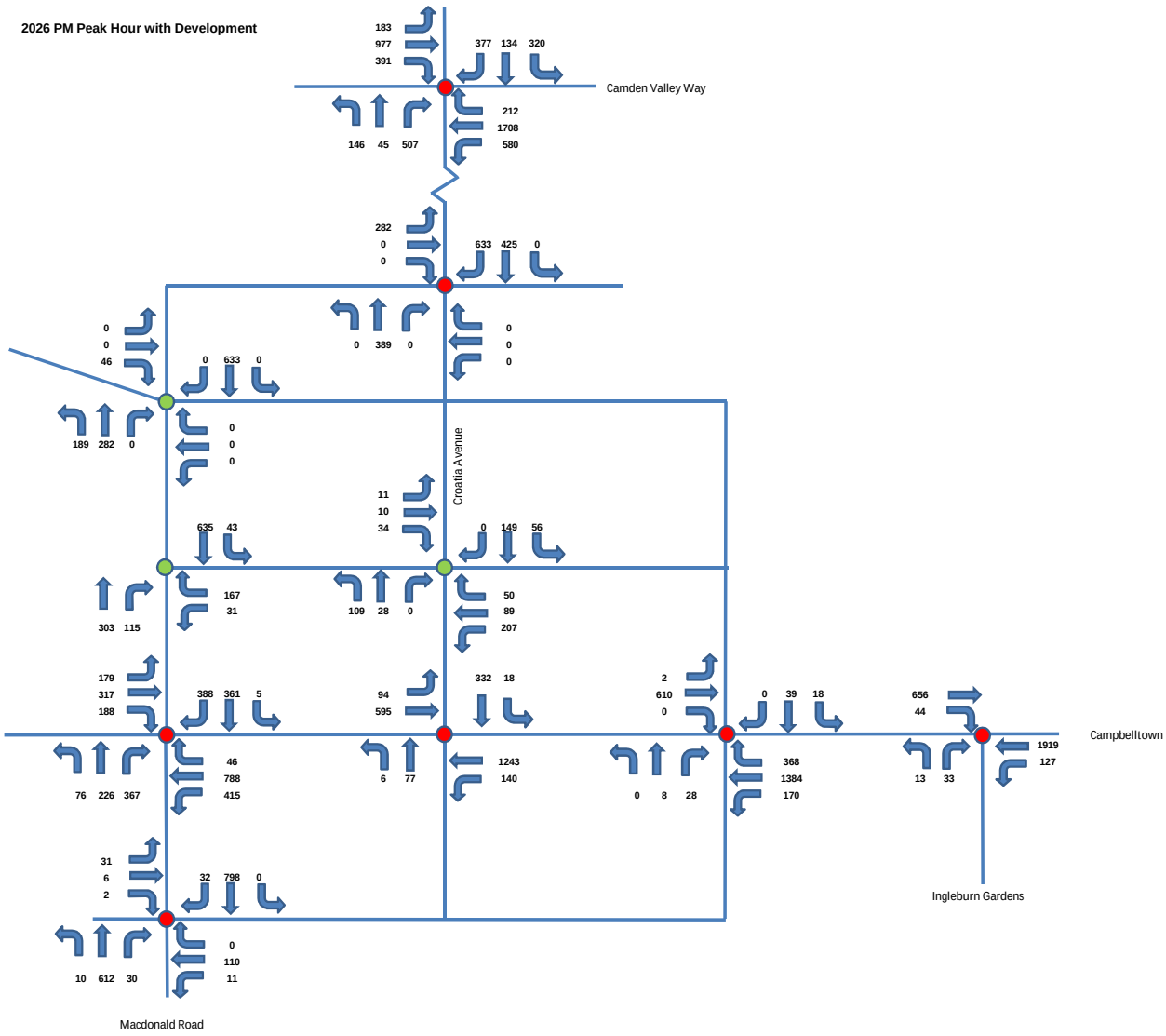
2016 PM Peak Hour with Development



2026 AM Peak Hour with Development



2026 PM Peak Hour with Development



SIDRA INTERSECTION

Movement Summary

Campbelltown Road / Macdonald Road

2012 AM Peak + Development

Signalised - Fixed time Cycle Time = 70 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Macdonald Road										
1	L	56	1.8	0.236	27.0	LOS B	15	0.78	0.72	28.5
3	R	539	2.0	0.859	38.1	LOS C	153	1.00	1.12	25.0
Approach		595	2.0	0.859	37.0	LOS C	153	0.98	1.09	25.3
Campbelltown Road E										
4	L	153	3.9	0.402	16.1	LOS B	24	0.48	0.74	44.9
5	T	194	4.1	0.596	30.3	LOS C	59	0.97	0.80	36.6
Approach		347	4.0	0.596	24.0	LOS B	59	0.75	0.77	39.6
Campbelltown Road W										
11	T	838	4.1	0.882	27.9	LOS B	237	0.97	1.04	38.0
12	R	232	3.9	0.876	25.7	LOS B	54	0.79	0.79	36.8
Approach		1070	4.0	0.882	27.5	LOS B	237	0.93	0.99	37.8
All Vehicles		2012	3.4	0.882	29.7	LOS C	237	0.91	0.98	33.1

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	29.3	LOS C	0	0.91	0.91
P7	50	19.3	LOS B	0	0.74	0.74
All Peds	100	24.3	LOS B	0	0.83	0.83

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

SIDRA INTERSECTION

Movement Summary

Campbelltown Road / Macdonald Road

2012 PM Peak + Development

Signalised - Fixed time Cycle Time = 50 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Macdonald Road										
1	L	53	1.9	0.207	28.0	LOS B	13	0.92	0.73	28.2
3	R	344	2.0	0.783	29.6	LOS C	77	0.99	1.01	27.6
Approach		397	2.0	0.783	29.4	LOS C	77	0.98	0.98	27.7
Campbelltown Road E										
4	L	658	4.0	0.851	14.7	LOS B	61	0.56	0.83	46.4
5	T	837	3.9	0.786	12.4	LOS A	139	0.85	0.83	51.0
Approach		1495	3.9	0.851	13.4	LOS A	139	0.72	0.83	49.1
Campbelltown Road W										
11	T	330	3.9	0.310	6.4	LOS A	42	0.57	0.48	58.7
12	R	130	3.8	0.643	31.7	LOS C	33	0.96	0.87	33.2
Approach		460	3.9	0.643	13.5	LOS A	42	0.68	0.59	49.2
All Vehicles		2352	3.6	0.851	16.1	LOS B	139	0.76	0.81	43.2

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	7.8	LOS A	0	0.56	0.56
P7	50	19.4	LOS B	0	0.88	0.88
All Peds	100	13.6	LOS A	0	0.72	0.72

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

SIDRA INTERSECTION

Movement Summary

Campbelltown Road / Macdonald Road

2016 AM Peak + Development

Signalised - Fixed time Cycle Time = 120 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Macdonald Road S										
1	L	54	3.7	0.202	34.7	LOS C	21	0.67	0.74	31.9
2	T	87	0.0	0.233	44.4	LOS D	41	0.89	0.70	27.0
3	R	548	4.0	0.792	63.4	LOS E	126	1.00	0.93	22.8
Approach		689	3.5	0.792	58.8	LOS E	126	0.96	0.88	23.8
Campbelltown Road E										
4	L	146	4.1	0.298	25.6	LOS B	42	0.67	0.78	38.0
5	T	210	3.8	0.298	30.4	LOS C	62	0.70	0.58	36.6
6	R	8	0.0	0.035	52.9	LOS D	4	0.79	0.68	25.7
Approach		364	3.8	0.298	29.0	LOS C	62	0.69	0.66	36.8
Macdonald Road N										
7	L	1	0.0	0.002	26.4	LOS B	0	0.74	0.62	36.0
8	T	31	0.0	0.112	48.8	LOS D	17	0.91	0.66	25.6
9	R	15	0.0	0.057	57.2	LOS E	8	0.89	0.70	24.3
Approach		47	0.0	0.112	51.0	LOS D	17	0.90	0.68	25.3
Campbelltown Road W										
10	L	27	0.0	0.800	50.6	LOS D	179	0.93	0.90	26.4
11	T	903	4.0	0.798	42.0	LOS C	182	0.94	0.86	30.9
12	R	251	4.0	0.794	64.1	LOS E	115	1.00	0.90	22.8
Approach		1181	3.9	0.798	46.9	LOS D	182	0.95	0.87	28.8
All Vehicles		2281	3.7	0.800	47.7	LOS D	182	0.91	0.83	27.9

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	36.8	LOS D	0	0.78	0.78
P3	50	54.2	LOS E	0	0.95	0.95
P5	50	34.5	LOS D	0	0.76	0.76

P7	50	48.6	LOS E	0	0.90	0.90
All Peds	200	43.5	LOS D	0	0.85	0.85

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

Site: Ctown_McDonald AM 2016 + SWRL 2 lanes + dev + double RT
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SIDRA INTERSECTION

Movement Summary

Campbelltown Road / Macdonald Road

2016 PM Peak + Development

Signalised - Fixed time Cycle Time = 140 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Macdonald Road S										
1	L	56	3.6	0.216	37.2	LOS C	23	0.85	0.75	30.9
2	T	31	0.0	0.131	59.7	LOS E	20	0.93	0.68	22.7
3	R	416	4.1	0.807	77.5	LOS F	116	1.00	0.93	20.0
Approach		503	3.8	0.807	71.9	LOS F	116	0.98	0.89	21.0
Campbelltown Road E										
4	L	540	4.1	0.812	30.8	LOS C	231	0.79	0.91	34.9
5	T	899	4.0	0.812	27.4	LOS B	263	0.83	0.76	38.4
6	R	1	0.0	0.003	28.3	LOS B	0	0.42	0.66	36.2
Approach		1440	4.0	0.812	28.6	LOS C	263	0.81	0.82	37.0
Macdonald Road N										
7	L	1	0.0	0.006	71.9	LOS F	1	0.93	0.60	21.0
8	T	28	0.0	0.118	59.5	LOS E	18	0.92	0.67	22.8
9	R	29	0.0	0.109	65.4	LOS E	18	0.90	0.73	22.3
Approach		58	0.0	0.118	62.7	LOS E	18	0.91	0.70	22.5
Campbelltown Road W										
10	L	14	0.0	0.161	15.2	LOS B	26	0.21	0.72	46.4
11	T	361	3.9	0.160	6.3	LOS A	27	0.22	0.18	58.8
12	R	144	4.2	0.485	63.2	LOS E	74	0.88	0.92	23.0
Approach		519	3.9	0.485	22.3	LOS B	74	0.40	0.40	41.4
All Vehicles		2520	3.8	0.812	36.8	LOS C	263	0.76	0.74	32.3

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	64.1	LOS F	0	0.96	0.96
P3	50	64.1	LOS F	0	0.96	0.96
P5	50	61.3	LOS F	0	0.94	0.94

P7	50	64.1	LOS F	0	0.96	0.96
All Peds	200	63.4	LOS E	0	0.95	0.95

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

Site: Ctown_McDonald PM 2016 + SWRL 2 lanes + dev + double RT
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SIDRA INTERSECTION

Movement Summary

Campbelltown Road / Macdonald Road

2026 AM Peak + Development

Signalised - Fixed time Cycle Time = 130 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Macdonald Road S										
1	L	70	4.3	0.296	40.5	LOS C	31	0.72	0.75	29.5
2	T	380	0.0	0.704	59.8	LOS E	94	1.00	0.85	22.7
3	R	431	3.9	0.862	77.9	LOS F	117	1.00	1.00	20.0
Approach		881	2.3	0.862	67.2	LOS E	117	0.98	0.92	21.6
Campbelltown Road E										
4	L	117	4.3	0.214	23.3	LOS B	33	0.57	0.76	39.7
5	T	183	3.8	0.214	25.2	LOS B	50	0.59	0.49	39.8
6	R	56	0.0	0.260	56.1	LOS D	27	0.81	0.74	24.9
Approach		356	3.4	0.260	29.4	LOS C	50	0.62	0.62	36.4
Macdonald Road N										
7	L	41	0.0	0.526	58.4	LOS E	56	0.98	0.81	24.0
8	T	213	0.0	0.526	54.9	LOS D	69	0.98	0.79	23.9
9	R	142	0.0	0.292	64.9	LOS E	39	0.94	0.77	22.5
Approach		396	0.0	0.526	58.8	LOS E	69	0.97	0.79	23.4
Campbelltown Road W										
10	L	407	0.0	0.874	53.8	LOS D	260	0.96	0.97	25.4
11	T	809	4.0	0.874	44.5	LOS D	271	0.96	0.94	29.9
12	R	300	4.0	0.864	71.4	LOS F	150	1.00	0.96	21.3
Approach		1516	2.9	0.874	52.3	LOS D	271	0.97	0.95	26.6
All Vehicles		3149	2.4	0.874	54.7	LOS D	271	0.93	0.88	25.3

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	37.7	LOS D	0	0.76	0.76
P3	50	59.1	LOS E	0	0.95	0.95
P5	50	35.4	LOS D	0	0.74	0.74

P7	50	58.2	LOS E	0	0.95	0.95
All Peds	200	47.6	LOS D	0	0.85	0.85

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

Site: Ctown_McDonald AM 2026 shared left turns SS test on all roads
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SIDRA INTERSECTION

Movement Summary

Campbelltown Road / Macdonald Road

2026 PM Peak + Development

Signalised - Fixed time Cycle Time = 130 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Macdonald Road S										
1	L	76	3.9	0.244	30.5	LOS C	25	0.80	0.75	33.9
2	T	226	0.0	0.443	57.3	LOS E	59	0.97	0.77	23.3
3	R	367	4.1	0.778	72.7	LOS F	98	1.00	0.90	20.9
Approach		669	2.7	0.778	62.7	LOS E	98	0.97	0.84	22.7
Campbelltown Road E										
4	L	415	4.1	0.806	39.0	LOS C	207	0.86	0.94	30.8
5	T	788	4.1	0.806	34.5	LOS C	227	0.89	0.83	34.3
6	R	46	0.0	0.193	38.5	LOS C	18	0.60	0.74	31.1
Approach		1249	3.9	0.806	36.2	LOS C	227	0.87	0.86	33.0
Macdonald Road N										
7	L	5	0.0	0.722	70.3	LOS E	91	1.00	0.86	21.3
8	T	361	0.0	0.723	61.3	LOS E	93	1.00	0.86	22.3
9	R	388	0.0	0.799	73.4	LOS F	100	1.00	0.92	20.7
Approach		754	0.0	0.799	67.6	LOS E	100	1.00	0.89	21.5
Campbelltown Road W										
10	L	179	0.0	0.213	14.0	LOS A	28	0.19	0.72	47.6
11	T	317	4.1	0.213	6.7	LOS A	36	0.24	0.21	58.3
12	R	188	4.3	0.471	55.3	LOS D	81	0.83	0.92	25.2
Approach		684	3.1	0.471	21.9	LOS B	81	0.39	0.54	41.3
All Vehicles		3356	2.6	0.806	45.6	LOS D	227	0.82	0.80	28.2

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	59.1	LOS E	0	0.95	0.95
P3	50	59.1	LOS E	0	0.95	0.95
P5	50	56.3	LOS E	0	0.93	0.93

P7	50	59.1	LOS E	0	0.95	0.95
All Peds	200	58.4	LOS E	0	0.95	0.95

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

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Site: Ctown_McDonald PM 2026 shared left turns SS test on all roads
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SIDRA INTERSECTION

Movement Summary

Campbelltown Road / Macdonald Road

2036 AM Peak + Development

Signalised - Fixed time Cycle Time = 130 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Macdonald Road S										
1	L	78	3.8	0.295	33.6	LOS C	30	0.64	0.75	32.4
2	T	422	0.0	0.612	53.9	LOS D	97	0.98	0.81	24.2
3	R	478	4.0	0.748	66.5	LOS E	117	1.00	0.89	22.2
Approach		978	2.2	0.748	58.4	LOS E	117	0.96	0.84	23.6
Campbelltown Road E										
4	L	130	3.8	0.204	22.7	LOS B	29	0.57	0.76	40.0
5	T	203	3.9	0.204	40.0	LOS C	42	0.75	0.59	31.7
6	R	62	0.0	0.269	51.5	LOS D	28	0.76	0.74	26.3
Approach		395	3.3	0.269	36.1	LOS C	42	0.69	0.67	32.9
Macdonald Road N										
7	L	46	0.0	0.427	55.2	LOS D	60	0.94	0.83	24.8
8	T	236	0.0	0.427	49.7	LOS D	71	0.94	0.77	25.4
9	R	158	0.0	0.240	58.6	LOS E	41	0.90	0.77	24.0
Approach		440	0.0	0.427	53.5	LOS D	71	0.93	0.78	24.8
Campbelltown Road W										
10	L	452	0.0	0.802	41.5	LOS C	217	0.87	0.89	29.7
11	T	898	4.0	0.802	49.1	LOS D	217	0.96	0.87	28.2
12	R	333	3.9	0.799	62.8	LOS E	152	0.98	0.90	23.2
Approach		1683	2.9	0.802	49.8	LOS D	217	0.94	0.88	27.4
All Vehicles		3496	2.4	0.802	51.1	LOS D	217	0.91	0.83	26.4

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	56	50.9	LOS E	0	0.88	0.88
P3	56	59.1	LOS E	0	0.95	0.95
P5	56	48.2	LOS E	0	0.86	0.86

P7	56	59.1	LOS E	0	0.95	0.95
All Peds	224	54.3	LOS D	0	0.91	0.91

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

Site: Ctown_McDonald AM 2036 + dev 11%
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SIDRA INTERSECTION

Movement Summary

Campbelltown Road / Macdonald Road

2036 PM Peak + Development

Signalised - Fixed time Cycle Time = 120 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Macdonald Road S										
1	L	84	3.6	0.207	24.2	LOS B	20	0.72	0.75	37.4
2	T	251	0.0	0.336	45.5	LOS D	56	0.91	0.73	26.7
3	R	407	3.9	0.751	65.2	LOS E	98	1.00	0.89	22.5
Approach		742	2.6	0.751	53.9	LOS D	98	0.94	0.82	24.9
Campbelltown Road E										
4	L	461	3.9	0.783	32.1	LOS C	131	0.89	0.90	34.1
5	T	875	4.0	0.784	43.9	LOS D	163	0.95	0.85	30.2
6	R	51	0.0	0.245	48.9	LOS D	23	0.76	0.76	27.1
Approach		1386	3.8	0.783	40.1	LOS C	163	0.92	0.87	31.2
Macdonald Road N										
7	L	6	0.0	0.548	56.7	LOS E	87	0.95	0.82	24.4
8	T	401	0.0	0.548	47.8	LOS D	88	0.96	0.79	25.9
9	R	431	0.0	0.774	65.8	LOS E	100	1.00	0.90	22.3
Approach		838	0.0	0.774	57.1	LOS E	100	0.98	0.85	23.9
Campbelltown Road W										
10	L	199	0.0	0.176	12.9	LOS A	20	0.17	0.72	48.7
11	T	352	4.0	0.176	12.4	LOS A	36	0.38	0.32	51.0
12	R	209	3.8	0.490	53.0	LOS D	82	0.84	0.93	25.9
Approach		759	2.9	0.490	23.6	LOS B	82	0.45	0.59	40.1
All Vehicles		3725	2.5	0.784	43.3	LOS D	163	0.84	0.80	29.1

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	56	54.1	LOS E	0	0.95	0.95
P3	56	54.1	LOS E	0	0.95	0.95
P5	56	51.3	LOS E	0	0.93	0.93

P7	56	54.1	LOS E	0	0.95	0.95
All Peds	224	53.4	LOS D	0	0.94	0.94

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

Site: Ctown_McDonald PM 2036 + dev 11%
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SIDRA INTERSECTION

Movement Summary

Campbelltown Road / Ingleburn Gardens Access

2012 AM Peak + Development

Signalised - Fixed time Cycle Time = 130 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Ingleburn Gardens Access										
1	L	43	0.0	0.067	6.3	LOS A	2	0.13	0.57	39.9
3	R	132	0.0	0.770	73.5	LOS F	73	1.00	0.92	19.0
Approach		175	0.0	0.770	57.0	LOS E	73	0.79	0.83	21.8
Campbelltown Rd E										
4	L	35	0.0	0.028	10.6	LOS A	1	0.10	0.68	57.4
5	T	337	3.9	0.281	5.6	LOS A	42	0.22	0.20	67.8
Approach		372	3.5	0.281	6.1	LOS A	42	0.21	0.24	66.9
Campbelltown Rd W										
11	T	1381	4.0	0.891	2.7	LOS A	202	0.36	0.27	71.9
12	R	12	0.0	0.066	52.3	LOS D	6	0.94	0.68	26.2
Approach		1393	3.9	0.891	3.1	LOS A	202	0.36	0.27	71.0
All Vehicles		1940	3.5	0.891	8.5	LOS A	202	0.37	0.32	58.6

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	10.0	LOS B	0	0.39	0.39
P3	50	56.3	LOS E	0	0.93	0.93
P7	50	59.1	LOS E	0	0.95	0.95
All Peds	150	41.8	LOS C	0	0.76	0.76

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS

SIDRA INTERSECTION

Movement Summary

Campbelltown Road / Ingleburn Gardens Access

2012 PM Peak + Development

Signalised - Fixed time Cycle Time = 150 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Ingleburn Gardens Access										
1	L	12	0.0	0.102	17.3	LOS B	4	0.44	0.64	33.9
3	R	32	0.0	0.215	77.6	LOS F	23	0.97	0.73	18.4
Approach		44	0.0	0.215	61.1	LOS E	23	0.83	0.71	21.0
Campbelltown Rd E										
4	L	125	0.0	0.111	10.6	LOS A	4	0.09	0.69	57.5
5	T	1468	4.0	0.920	3.2	LOS A	295	0.44	0.32	70.3
Approach		1593	3.7	0.920	3.8	LOS A	295	0.41	0.35	69.3
Campbelltown Rd W										
11	T	596	4.0	0.373	1.0	LOS A	33	0.08	0.08	77.4
12	R	43	0.0	0.496	23.8	LOS B	17	0.50	0.80	41.9
Approach		639	3.8	0.496	2.6	LOS A	33	0.11	0.13	74.0
All Vehicles		2276	3.6	0.920	4.5	LOS A	295	0.33	0.30	67.6

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	2.4	LOS A	0	0.18	0.18
P3	50	66.3	LOS F	0	0.94	0.94
P7	50	69.1	LOS F	0	0.96	0.96
All Peds	150	45.9	LOS D	0	0.69	0.69

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS

SIDRA INTERSECTION

Movement Summary

Campbelltown Road / Ingleburn Gardens Access

2016 AM Peak + Development

Signalised - Fixed time Cycle Time = 150 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Ingleburn Gardens Access										
1	L	43	0.0	0.084	6.6	LOS A	3	0.15	0.57	39.7
3	R	133	0.0	0.395	15.1	LOS B	46	0.65	0.78	34.8
Approach		176	0.0	0.395	13.0	LOS A	46	0.53	0.73	35.9
Campbelltown Rd E										
4	L	36	0.0	0.029	10.5	LOS A	1	0.09	0.68	57.5
5	T	512	3.9	0.213	12.2	LOS A	68	0.45	0.39	57.5
Approach		548	3.6	0.213	12.1	LOS A	68	0.43	0.41	57.5
Campbelltown Rd W										
11	T	1673	4.0	0.546	5.2	LOS A	153	0.38	0.35	68.5
12	R	12	0.0	0.068	57.6	LOS E	7	0.94	0.68	24.5
Approach		1685	4.0	0.546	5.6	LOS A	153	0.38	0.35	67.8
All Vehicles		2409	3.6	0.546	7.6	LOS A	153	0.40	0.39	61.4

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	11.2	LOS B	0	0.39	0.39
P3	50	66.3	LOS F	0	0.94	0.94
P7	50	69.1	LOS F	0	0.96	0.96
All Peds	150	48.9	LOS D	0	0.76	0.76

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS

SIDRA INTERSECTION

Movement Summary

Campbelltown Road / Ingleburn Gardens Access

2016 PM Peak + Development

Signalised - Fixed time Cycle Time = 150 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Ingleburn Gardens Access										
1	L	12	0.0	0.087	13.5	LOS A	3	0.36	0.62	35.7
3	R	32	0.0	0.115	17.2	LOS B	11	0.53	0.71	33.8
Approach		44	0.0	0.115	16.2	LOS B	11	0.48	0.68	34.3
Campbelltown Rd E										
4	L	126	0.0	0.104	10.6	LOS A	5	0.10	0.69	57.4
5	T	1850	4.0	0.670	11.5	LOS A	252	0.58	0.54	58.5
Approach		1976	3.7	0.670	11.4	LOS A	252	0.55	0.55	58.4
Campbelltown Rd W										
11	T	709	3.9	0.231	3.6	LOS A	55	0.26	0.23	71.7
12	R	43	0.0	0.555	92.5	LOS F	32	1.00	0.74	17.1
Approach		752	3.7	0.555	8.7	LOS A	55	0.30	0.26	62.5
All Vehicles		2772	3.7	0.670	10.7	LOS A	252	0.48	0.47	58.8

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	6.5	LOS A	0	0.29	0.29
P3	50	66.3	LOS F	0	0.94	0.94
P7	50	69.1	LOS F	0	0.96	0.96
All Peds	150	47.3	LOS D	0	0.73	0.73

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS

SIDRA INTERSECTION

Movement Summary

Campbelltown Road / Ingleburn Gardens Access

2026 AM Peak + Development

Signalised - Fixed time Cycle Time = 150 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Ingleburn Gardens Access										
1	L	44	0.0	0.096	6.8	LOS A	4	0.16	0.57	39.6
3	R	136	0.0	0.406	17.8	LOS B	53	0.72	0.80	33.5
Approach		180	0.0	0.406	15.1	LOS B	53	0.59	0.75	34.8
Campbelltown Rd E										
4	L	37	0.0	0.029	10.5	LOS A	1	0.09	0.68	57.5
5	T	622	4.0	0.256	12.2	LOS A	81	0.46	0.40	57.5
Approach		659	3.8	0.256	12.1	LOS A	81	0.44	0.42	57.5
Campbelltown Rd W										
11	T	1833	4.0	0.598	5.7	LOS A	178	0.41	0.38	67.7
12	R	13	0.0	0.078	58.5	LOS E	8	0.95	0.69	24.2
Approach		1846	4.0	0.598	6.0	LOS A	178	0.41	0.38	67.0
All Vehicles		2685	3.6	0.598	8.1	LOS A	178	0.43	0.42	60.8

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	10.8	LOS B	0	0.38	0.38
P3	50	66.3	LOS F	0	0.94	0.94
P7	50	69.1	LOS F	0	0.96	0.96
All Peds	150	48.7	LOS D	0	0.76	0.76

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS

SIDRA INTERSECTION

Movement Summary

Campbelltown Road / Ingleburn Gardens Access

2026 PM Peak + Development

Signalised - Fixed time Cycle Time = 150 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Ingleburn Gardens Access										
1	L	13	0.0	0.101	14.7	LOS B	4	0.39	0.62	35.1
3	R	33	0.0	0.119	18.6	LOS B	12	0.55	0.72	33.1
Approach		46	0.0	0.119	17.5	LOS B	12	0.51	0.69	33.6
Campbelltown Rd E										
4	L	127	0.0	0.105	10.6	LOS A	5	0.10	0.69	57.4
5	T	1919	4.0	0.695	11.9	LOS A	270	0.60	0.56	57.9
Approach		2046	3.8	0.695	11.8	LOS A	270	0.57	0.57	57.9
Campbelltown Rd W										
11	T	656	4.0	0.214	3.5	LOS A	51	0.25	0.22	71.9
12	R	44	0.0	0.568	92.6	LOS F	33	1.00	0.75	17.1
Approach		700	3.7	0.568	9.1	LOS A	51	0.30	0.25	61.8
All Vehicles		2792	3.7	0.695	11.2	LOS A	270	0.50	0.49	58.1

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	6.5	LOS A	0	0.29	0.29
P3	50	66.3	LOS F	0	0.94	0.94
P7	50	69.1	LOS F	0	0.96	0.96
All Peds	150	47.3	LOS D	0	0.73	0.73

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS

SIDRA INTERSECTION

Movement Summary

Camden Valley Way / Croatia Avenue / Bernera Road

2016 AM Peak + Development

Signalised - Fixed time Cycle Time = 140 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Croatia Avenue										
1	L	28	3.4	0.112	11.3	LOS A	4	0.25	0.66	47.5
2	T	12	7.7	0.052	56.8	LOS E	9	0.90	0.63	23.4
3	R	122	0.8	0.771	81.8	LOS F	74	1.00	0.88	19.4
Approach		164	1.8	0.771	67.4	LOS E	74	0.86	0.82	22.0
Camden Valley Way E										
4	L	181	1.1	0.167	9.1	LOS A	10	0.13	0.66	53.2
5	T	769	4.9	0.375	19.4	LOS B	116	0.62	0.54	44.2
6	R	267	4.9	0.801	72.5	LOS F	141	1.00	0.92	21.0
Approach		1217	4.4	0.801	29.5	LOS C	141	0.63	0.64	36.6
Bernera Road										
7	L	395	5.1	0.665	31.4	LOS C	130	0.73	0.88	33.8
8	T	8	11.1	0.036	56.5	LOS E	6	0.89	0.61	23.5
9	R	122	4.9	0.397	76.5	LOS F	40	0.99	0.76	20.3
Approach		526	5.1	0.665	42.3	LOS C	130	0.79	0.85	29.1
Camden Valley Way W										
10	L	248	4.8	0.295	11.8	LOS A	36	0.28	0.69	50.2
11	T	1316	5.0	0.827	40.4	LOS C	293	0.96	0.89	31.6
12	R	42	2.3	0.366	79.8	LOS F	30	1.00	0.74	19.6
Approach		1607	4.9	0.827	37.0	LOS C	293	0.85	0.86	32.9
All Vehicles		3514	4.6	0.827	36.6	LOS C	293	0.77	0.78	32.6

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	18.0	LOS B	0	0.51	0.51
P3	50	64.1	LOS F	0	0.96	0.96
P5	50	29.6	LOS C	0	0.65	0.65

P7	50	64.1	LOS F	0	0.96	0.96
All Peds	200	44.0	LOS D	0	0.77	0.77

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

Site: 2016 AM + SWRL + dev
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Movement Summary

Camden Valley Way / Croatia Avenue / Bernera Road

2016 PM Peak + Development

Signalised - Fixed time Cycle Time = 120 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Croatia Avenue										
1	L	40	2.4	0.291	23.2	LOS B	13	0.55	0.70	38.2
2	T	9	10.0	0.034	46.0	LOS D	6	0.87	0.60	26.5
3	R	179	1.1	0.777	68.4	LOS E	88	1.00	0.90	21.8
Approach		230	1.7	0.777	59.4	LOS E	88	0.91	0.85	23.8
Camden Valley Way E										
4	L	138	0.7	0.126	9.2	LOS A	7	0.14	0.66	53.1
5	T	1432	5.0	0.812	30.8	LOS C	264	0.93	0.86	36.3
6	R	178	5.1	0.596	59.9	LOS E	84	0.98	0.82	23.9
Approach		1748	4.7	0.813	32.1	LOS C	264	0.87	0.84	35.4
Bernera Road										
7	L	268	4.9	0.375	17.6	LOS B	62	0.51	0.75	42.1
8	T	21	4.5	0.073	46.5	LOS D	12	0.88	0.64	26.3
9	R	316	5.1	0.705	66.3	LOS E	80	1.00	0.86	22.3
Approach		606	5.0	0.705	44.1	LOS D	80	0.78	0.80	28.4
Camden Valley Way W										
10	L	153	5.2	0.152	10.3	LOS A	15	0.22	0.67	51.9
11	T	819	5.0	0.620	34.7	LOS C	150	0.89	0.78	34.2
12	R	36	2.7	0.406	72.8	LOS F	23	1.00	0.73	20.9
Approach		1009	5.0	0.620	32.4	LOS C	150	0.79	0.76	35.2
All Vehicles		3593	4.6	0.812	35.9	LOS C	264	0.84	0.81	32.9

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	21.0	LOS C	0	0.59	0.59
P3	50	54.2	LOS E	0	0.95	0.95
P5	50	32.3	LOS D	0	0.73	0.73

P7	50	54.2	LOS E	0	0.95	0.95
All Peds	200	40.4	LOS C	0	0.81	0.81

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

Site: 2016 PM + SWRL + dev
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SIDRA INTERSECTION

Movement Summary

Camden Valley Way / Croatia Avenue / Bernera Road

2026 AM Peak + Development

Signalised - Fixed time Cycle Time = 130 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Croatia Avenue										
1	L	247	0.8	0.373	12.3	LOS A	39	0.34	0.71	46.5
2	T	99	1.0	0.123	44.9	LOS D	26	0.85	0.65	26.9
3	R	658	1.1	0.893	74.1	LOS F	166	1.00	1.02	20.8
Approach		1004	1.0	0.893	56.0	LOS D	166	0.82	0.90	24.7
Camden Valley Way E										
4	L	446	0.9	0.361	9.0	LOS A	15	0.08	0.65	53.4
5	T	918	5.0	0.527	39.1	LOS C	115	0.80	0.69	32.2
6	R	318	5.0	0.887	81.4	LOS F	93	1.00	0.96	19.4
Approach		1682	3.9	0.887	39.1	LOS C	115	0.65	0.73	31.6
Bernera Road										
7	L	471	5.1	0.749	35.2	LOS C	145	0.80	0.94	32.0
8	T	46	2.1	0.059	44.1	LOS D	13	0.83	0.61	27.1
9	R	146	4.8	0.248	55.6	LOS D	46	0.88	0.76	25.0
Approach		664	4.8	0.749	40.3	LOS C	145	0.82	0.88	29.8
Camden Valley Way W										
10	L	296	5.1	0.245	9.3	LOS A	10	0.07	0.65	53.3
11	T	1570	5.0	0.901	56.5	LOS D	256	1.00	1.01	25.9
12	R	186	1.1	0.505	70.5	LOS E	52	0.97	0.78	21.5
Approach		2053	4.7	0.901	51.0	LOS D	256	0.86	0.94	27.4
All Vehicles		5403	3.8	0.901	46.9	LOS D	256	0.78	0.86	28.3

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	43.2	LOS E	0	0.82	0.82
P3	50	59.1	LOS E	0	0.95	0.95
P5	50	43.2	LOS E	0	0.82	0.82

P7	50	59.1	LOS E	0	0.95	0.95
All Peds	200	51.2	LOS D	0	0.88	0.88

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

Site: 2026 AM + SWRL mitigated + dev 3 lanes
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SIDRA INTERSECTION

Movement Summary

Camden Valley Way / Croatia Avenue / Bernera Road

2026 PM Peak + Development

Signalised - Fixed time Cycle Time = 150 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Croatia Avenue										
1	L	146	0.7	0.263	25.8	LOS B	50	0.57	0.75	36.6
2	T	45	2.2	0.066	54.5	LOS D	15	0.86	0.63	24.0
3	R	507	1.0	0.825	79.7	LOS F	141	1.00	0.94	19.8
Approach		699	1.0	0.825	66.8	LOS E	141	0.90	0.88	22.2
Camden Valley Way E										
4	L	580	1.0	0.561	10.1	LOS A	31	0.13	0.67	52.1
5	T	1708	5.0	0.822	44.3	LOS D	261	0.92	0.84	30.0
6	R	212	5.2	0.467	75.5	LOS F	65	0.95	0.79	20.5
Approach		2500	4.1	0.822	39.0	LOS C	261	0.74	0.80	31.8
Bernera Road										
7	L	320	5.0	0.597	20.2	LOS B	98	0.58	0.78	40.2
8	T	134	0.7	0.192	56.1	LOS D	40	0.89	0.69	23.6
9	R	377	5.0	0.765	75.6	LOS F	129	0.98	0.89	20.6
Approach		831	4.3	0.765	51.1	LOS D	129	0.81	0.81	26.0
Camden Valley Way W										
10	L	183	4.9	0.148	9.1	LOS A	6	0.06	0.64	53.4
11	T	977	5.0	0.470	35.9	LOS C	122	0.71	0.61	33.7
12	R	391	1.0	0.837	83.8	LOS F	113	1.00	0.91	19.0
Approach		1551	4.0	0.837	44.8	LOS D	122	0.71	0.69	29.4
All Vehicles		5581	3.7	0.837	45.9	LOS D	261	0.76	0.78	28.6

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	41.1	LOS E	0	0.74	0.74
P3	50	69.1	LOS F	0	0.96	0.96
P5	50	41.1	LOS E	0	0.74	0.74

P7	50	69.1	LOS F	0	0.96	0.96
All Peds	200	55.1	LOS D	0	0.85	0.85

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

Site: 2026 PM + SWRL mitigated + dev 3 lanes
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SIDRA INTERSECTION

Movement Summary

Macdonald Road / Stage 1 development access road

2012 AM Peak + Development

Give-way

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Macdonald Road S										
1	L	1	0.0	0.200	8.2	LOS A	0	0.00	0.67	49.0
2	T	346	4.0	0.183	0.0	LOS A	0	0.00	0.00	60.0
Approach		347	4.0	0.183	0.0	LOS A		0.00	0.00	60.0
Macdonald Road N										
8	T	357	3.9	0.188	0.0	LOS A	0	0.00	0.00	60.0
9	R	28	0.0	0.024	9.4	LOS A	1	0.41	0.65	47.1
Approach		385	3.6	0.188	0.7	LOS A	1	0.03	0.05	58.8
Stage1_Access Road										
10	L	249	0.0	0.307	10.8	LOS A	12	0.49	0.79	46.2
12	R	8	0.0	0.015	13.1	LOS A	0	0.56	0.77	44.0
Approach		257	0.0	0.307	10.9	LOS A	12	0.49	0.79	46.2
All Vehicles		989	2.8	0.307	3.1	Not Applicable	12	0.14	0.22	55.3

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

SIDRA SOLUTIONS

Site: 2012 AM + dev
K:\60159516_Edmondson\4. Tech work area\4.5. Planning\Stage 1 TIA\SIDRA analysis\Existing and 2012 \4_Macdonald_Stage 1 access existing and 2012.aap
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SIDRA INTERSECTION

Movement Summary

Macdonald Road / Stage 1 development access road

2012 PM Peak + Development

Give-way

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Macdonald Road S										
1	L	8	0.0	0.200	8.2	LOS A	0	0.00	0.67	49.0
2	T	369	4.1	0.198	0.0	LOS A	0	0.00	0.00	60.0
Approach		377	4.0	0.199	0.2	LOS A		0.00	0.01	59.7
Macdonald Road N										
8	T	538	4.1	0.283	0.0	LOS A	0	0.00	0.00	60.0
9	R	251	0.0	0.216	9.8	LOS A	8	0.47	0.72	46.9
Approach		789	2.8	0.283	3.1	LOS A	8	0.15	0.23	55.1
Stage1_Access Road										
10	L	28	0.0	0.036	10.3	LOS A	1	0.43	0.70	46.7
12	R	1	0.0	0.003	18.7	LOS B	0	0.76	0.79	39.5
Approach		29	0.0	0.036	10.6	LOS A	1	0.44	0.70	46.5
All Vehicles		1195	3.1	0.283	2.4	Not Applicable	8	0.11	0.17	56.2

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

SIDRA SOLUTIONS

Site: 2012 PM + dev
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SIDRA INTERSECTION

Movement Summary

Macdonald Road / Stage 1 development access road / Primary School Access Road

2016 AM Peak + Development

Signalised - Fixed time Cycle Time = 50 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Macdonald Road S										
1	L	2	0.0	0.455	15.2	LOS B	61	0.69	0.79	36.6
2	T	438	0.0	0.452	8.8	LOS A	61	0.69	0.60	41.2
3	R	3	0.0	0.008	17.1	LOS B	1	0.64	0.65	35.4
Approach		443	0.0	0.452	8.9	LOS A	61	0.69	0.60	41.1
Primary School Access Road										
4	L	8	0.0	0.027	26.2	LOS B	2	0.87	0.66	30.7
5	T	32	0.0	0.068	15.4	LOS B	7	0.78	0.57	36.4
6	R	1	0.0	0.068	21.9	LOS B	7	0.78	0.71	32.7
Approach		41	0.0	0.069	17.6	LOS B	7	0.80	0.59	35.0
Macdonald Road N										
7	L	1	0.0	0.417	15.1	LOS B	57	0.68	0.78	36.7
8	T	414	0.0	0.426	8.7	LOS A	57	0.68	0.59	41.3
9	R	12	0.0	0.033	18.1	LOS B	2	0.67	0.68	34.8
Approach		427	0.0	0.426	9.0	LOS A	57	0.68	0.59	41.1
Stage 1 development access road										
10	L	122	0.0	0.411	28.1	LOS B	28	0.94	0.78	29.8
11	T	10	0.0	0.044	17.1	LOS B	3	0.81	0.57	35.4
12	R	6	0.0	0.044	23.6	LOS B	3	0.81	0.69	31.8
Approach		138	0.0	0.411	27.1	LOS B	28	0.93	0.76	30.2
All Vehicles		1049	0.0	0.455	11.7	LOS A	61	0.72	0.62	39.0

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	18.5	LOS B	0	0.86	0.86
P3	50	9.6	LOS A	0	0.62	0.62

P5	50	18.5	LOS B	0	0.86	0.86
P7	50	9.6	LOS A	0	0.62	0.62
All Peds	200	14.1	LOS A	0	0.74	0.74

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

Site: 2016 AM + dev 1 lane
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SIDRA INTERSECTION

Movement Summary

Macdonald Road / Stage 1 development access road / Primary School Access Road

2016 PM Peak + Development

Signalised - Fixed time Cycle Time = 60 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Macdonald Road S										
1	L	3	0.0	0.387	13.1	LOS A	58	0.55	0.76	38.0
2	T	435	0.0	0.375	6.7	LOS A	58	0.55	0.48	43.0
3	R	4	0.0	0.013	17.9	LOS B	1	0.60	0.66	34.9
Approach		442	0.0	0.375	6.8	LOS A	58	0.55	0.49	42.9
Primary School Access Road										
4	L	7	0.0	0.032	32.7	LOS C	2	0.91	0.66	27.9
5	T	147	0.0	0.383	23.3	LOS B	37	0.91	0.73	31.9
6	R	1	0.0	0.385	29.9	LOS C	37	0.91	0.79	29.0
Approach		155	0.0	0.383	23.8	LOS B	37	0.91	0.73	31.7
Macdonald Road N										
7	L	1	0.0	0.484	14.2	LOS A	89	0.64	0.79	37.3
8	T	641	0.0	0.549	7.7	LOS A	89	0.64	0.57	42.1
9	R	14	0.0	0.034	14.9	LOS B	2	0.53	0.68	36.7
Approach		656	0.0	0.549	7.9	LOS A	89	0.64	0.58	42.0
Stage 1 development access road										
10	L	35	0.0	0.162	33.6	LOS C	10	0.93	0.72	27.6
11	T	2	0.0	0.011	22.9	LOS B	1	0.85	0.54	32.1
12	R	1	0.0	0.011	29.5	LOS C	1	0.85	0.63	29.2
Approach		38	0.0	0.162	33.0	LOS C	10	0.93	0.71	27.9
All Vehicles		1291	0.0	0.549	10.2	LOS A	89	0.65	0.57	40.1

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	24.3	LOS C	0	0.90	0.90
P3	50	7.5	LOS A	0	0.50	0.50

P5	50	24.3	LOS C	0	0.90	0.90
P7	50	7.5	LOS A	0	0.50	0.50
All Peds	200	15.9	LOS B	0	0.70	0.70

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

Site: 2016 PM + dev 1 lane
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SIDRA INTERSECTION

Movement Summary

Macdonald Road / Stage 1 development access road / Primary School Access Road

2026 AM Peak + Development

Signalised - Fixed time Cycle Time = 60 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Macdonald Road S										
1	L	8	0.0	0.534	14.0	LOS A	85	0.63	0.79	37.4
2	T	609	0.0	0.529	7.6	LOS A	85	0.63	0.56	42.2
3	R	6	0.0	0.017	17.3	LOS B	1	0.59	0.67	35.3
Approach		623	0.0	0.529	7.8	LOS A	85	0.63	0.57	42.1
Primary School Access Road										
4	L	42	0.0	0.194	33.8	LOS C	12	0.94	0.73	27.5
5	T	31	0.0	0.087	21.7	LOS B	8	0.84	0.62	32.8
6	R	1	0.0	0.087	28.2	LOS B	8	0.84	0.72	29.7
Approach		74	0.0	0.194	28.6	LOS C	12	0.90	0.68	29.6
Macdonald Road N										
7	L	6	0.0	0.505	13.9	LOS A	81	0.62	0.78	37.5
8	T	584	0.0	0.506	7.4	LOS A	81	0.62	0.55	42.4
9	R	13	0.0	0.040	18.1	LOS B	3	0.61	0.69	34.8
Approach		603	0.0	0.506	7.7	LOS A	81	0.62	0.55	42.1
Stage 1 development access road										
10	L	107	0.0	0.494	35.2	LOS C	31	0.98	0.77	27.1
11	T	5	0.0	0.110	27.1	LOS B	7	0.92	0.66	30.2
12	R	17	0.0	0.109	33.6	LOS C	7	0.92	0.70	27.6
Approach		129	0.0	0.494	34.7	LOS C	31	0.97	0.76	27.2
All Vehicles		1429	0.0	0.534	11.3	LOS A	85	0.67	0.58	39.3

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	24.3	LOS C	0	0.90	0.90
P3	50	7.5	LOS A	0	0.50	0.50

P5	50	24.3	LOS C	0	0.90	0.90
P7	50	7.5	LOS A	0	0.50	0.50
All Peds	200	15.9	LOS B	0	0.70	0.70

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

SIDRA SOLUTIONS

Site: 2026 AM + dev 1 lane
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SIDRA INTERSECTION

Movement Summary

Macdonald Road / Stage 1 development access road / Primary School Access Road

2026 PM Peak + Development

Signalised - Fixed time Cycle Time = 80 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Macdonald Road S										
1	L	10	0.0	0.461	12.1	LOS A	85	0.48	0.75	38.7
2	T	612	0.0	0.457	5.6	LOS A	85	0.48	0.43	44.0
3	R	30	0.0	0.111	18.4	LOS B	7	0.55	0.71	34.6
Approach		652	0.0	0.457	6.3	LOS A	85	0.48	0.45	43.4
Primary School Access Road										
4	L	11	0.0	0.068	44.1	LOS D	5	0.94	0.68	24.2
5	T	110	0.0	0.384	34.3	LOS C	38	0.94	0.74	27.3
6	R	1	0.0	0.381	40.9	LOS C	38	0.94	0.78	25.2
Approach		122	0.0	0.384	35.2	LOS C	38	0.94	0.74	27.0
Macdonald Road N										
7	L	1	0.0	0.523	12.9	LOS A	118	0.55	0.78	38.1
8	T	798	0.0	0.586	6.5	LOS A	118	0.55	0.50	43.2
9	R	32	0.0	0.096	15.4	LOS B	6	0.48	0.70	36.4
Approach		831	0.0	0.586	6.9	LOS A	118	0.55	0.51	42.9
Stage 1 development access road										
10	L	31	0.0	0.191	45.0	LOS D	13	0.96	0.72	24.0
11	T	6	0.0	0.036	34.0	LOS C	3	0.90	0.61	27.4
12	R	2	0.0	0.036	40.5	LOS C	3	0.90	0.67	25.3
Approach		39	0.0	0.191	43.1	LOS D	13	0.95	0.70	24.5
All Vehicles		1644	0.0	0.586	9.6	LOS A	118	0.56	0.51	40.6

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	34.2	LOS D	0	0.93	0.93
P3	50	5.6	LOS A	0	0.38	0.38

P5	50	34.2	LOS D	0	0.93	0.93
P7	50	5.6	LOS A	0	0.38	0.38
All Peds	200	19.9	LOS B	0	0.65	0.65

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

Site: 2026 PM + dev 1 lane
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SIDRA INTERSECTION

Movement Summary

Campbelltown Road / Town Centre Main Street / Croatia Avenue

2016 AM Peak + Development

Signalised - Fixed time Cycle Time = 90 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Croatia Avenue										
1	L	11	0.0	0.059	47.9	LOS D	5	0.93	0.68	24.1
2	T	33	0.0	0.109	35.8	LOS C	13	0.89	0.65	26.8
Approach		44	0.0	0.109	38.8	LOS C	13	0.90	0.66	26.0
Campbelltown Road E										
4	L	17	0.0	0.135	8.4	LOS A	5	0.06	0.66	47.6
5	T	354	0.0	0.135	0.9	LOS A	5	0.06	0.05	58.5
Approach		371	0.0	0.135	1.2	LOS A	5	0.06	0.08	58.0
Town Centre Main Street										
7	L	45	0.0	0.242	49.3	LOS D	20	0.96	0.74	23.7
8	T	80	0.0	0.264	37.0	LOS C	31	0.92	0.71	26.4
Approach		125	0.0	0.264	41.4	LOS C	31	0.93	0.72	25.3
Campbelltown Road W										
10	L	48	0.0	0.527	8.8	LOS A	32	0.11	0.68	47.1
11	T	1403	0.0	0.526	2.5	LOS A	32	0.11	0.22	55.0
Approach		1451	0.0	0.526	2.7	LOS A	32	0.11	0.24	54.7
All Vehicles		1991	0.0	0.527	5.7	LOS A	32	0.17	0.25	50.3

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	5.7	LOS A	0	0.36	0.36
P3	50	39.2	LOS D	0	0.93	0.93
P5	50	5.7	LOS A	0	0.36	0.36
P7	50	39.2	LOS D	0	0.93	0.93
All Peds	200	22.4	LOS B	0	0.64	0.64

SIDRA INTERSECTION

Movement Summary

Campbelltown Road / Town Centre Main Street / Croatia Avenue

2016 PM Peak + Development

Signalised - Fixed time Cycle Time = 80 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Croatia Avenue										
1	L	1	0.0	0.004	40.4	LOS C	0	0.89	0.60	26.3
2	T	39	0.0	0.107	29.5	LOS C	14	0.86	0.64	29.2
Approach		40	0.0	0.107	29.8	LOS C	14	0.86	0.64	29.1
Campbelltown Road E										
4	L	150	0.0	0.627	11.3	LOS A	73	0.32	0.73	44.5
5	T	1438	0.0	0.627	3.6	LOS A	73	0.30	0.27	54.6
Approach		1588	0.0	0.627	4.3	LOS A	73	0.30	0.31	53.6
Town Centre Main Street										
7	L	58	0.0	0.250	42.7	LOS D	22	0.94	0.75	25.5
8	T	216	0.0	0.591	33.0	LOS C	68	0.96	0.79	27.8
Approach		274	0.0	0.591	35.1	LOS C	68	0.96	0.78	27.2
Campbelltown Road W										
10	L	61	0.0	0.305	10.3	LOS A	27	0.19	0.69	45.5
11	T	715	0.0	0.305	3.8	LOS A	27	0.18	0.27	53.1
Approach		776	0.0	0.305	4.3	LOS A	27	0.18	0.30	52.4
All Vehicles		2678	0.0	0.627	7.8	LOS A	73	0.34	0.36	48.0

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	6.8	LOS A	0	0.41	0.41
P3	50	33.3	LOS D	0	0.91	0.91
P5	50	6.8	LOS A	0	0.41	0.41
P7	50	33.3	LOS D	0	0.91	0.91
All Peds	200	20.1	LOS B	0	0.66	0.66

SIDRA INTERSECTION

Movement Summary

Campbelltown Road / Town Centre Main Street / Croatia Avenue

2026 AM Peak + Development

Signalised - Fixed time Cycle Time = 80 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Croatia Avenue										
1	L	60	0.0	0.287	44.0	LOS D	23	0.95	0.75	25.2
2	T	68	0.0	0.199	31.1	LOS C	23	0.89	0.68	28.5
Approach		128	0.0	0.287	37.2	LOS C	23	0.92	0.71	26.8
Campbelltown Road E										
4	L	16	0.0	0.120	9.2	LOS A	7	0.12	0.67	46.7
5	T	296	0.0	0.120	1.7	LOS A	7	0.12	0.10	57.3
Approach		312	0.0	0.120	2.1	LOS A	7	0.12	0.13	56.7
Town Centre Main Street										
7	L	24	0.0	0.115	42.9	LOS D	9	0.93	0.71	25.5
8	T	127	0.0	0.372	32.3	LOS C	42	0.93	0.74	28.0
Approach		151	0.0	0.372	34.0	LOS C	42	0.93	0.73	27.6
Campbelltown Road W										
10	L	62	0.0	0.491	9.8	LOS A	41	0.19	0.70	46.0
11	T	1219	0.0	0.492	3.6	LOS A	42	0.19	0.28	53.4
Approach		1281	0.0	0.492	3.9	LOS A	42	0.19	0.30	53.0
All Vehicles		1872	0.0	0.492	8.3	LOS A	42	0.29	0.34	46.9

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	6.4	LOS A	0	0.40	0.40
P3	50	34.2	LOS D	0	0.93	0.93
P5	50	6.4	LOS A	0	0.40	0.40
P7	50	34.2	LOS D	0	0.93	0.93
All Peds	200	20.3	LOS B	0	0.66	0.66

SIDRA INTERSECTION

Movement Summary

Campbelltown Road / Town Centre Main Street / Croatia Avenue

2026 PM Peak + Development

Signalised - Fixed time Cycle Time = 60 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Croatia Avenue										
1	L	6	0.0	0.019	30.2	LOS C	2	0.86	0.66	30.0
2	T	77	0.0	0.158	19.4	LOS B	19	0.82	0.63	34.0
Approach		83	0.0	0.158	20.1	LOS B	19	0.82	0.63	33.7
Campbelltown Road E										
4	L	140	0.0	0.665	15.3	LOS B	87	0.59	0.79	41.0
5	T	1243	0.0	0.665	7.4	LOS A	88	0.57	0.51	49.8
Approach		1383	0.0	0.665	8.2	LOS A	88	0.57	0.54	48.8
Town Centre Main Street										
7	L	18	0.0	0.058	30.6	LOS C	5	0.87	0.70	29.8
8	T	332	0.0	0.681	23.5	LOS B	77	0.96	0.85	31.9
Approach		350	0.0	0.681	23.9	LOS B	77	0.95	0.84	31.8
Campbelltown Road W										
10	L	94	0.0	0.335	14.2	LOS A	37	0.43	0.74	41.9
11	T	595	0.0	0.335	7.2	LOS A	37	0.40	0.42	48.9
Approach		689	0.0	0.335	8.2	LOS A	37	0.40	0.47	47.8
All Vehicles		2505	0.0	0.681	10.8	LOS A	88	0.59	0.57	44.7

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	9.1	LOS A	0	0.55	0.55
P3	50	23.4	LOS C	0	0.88	0.88
P5	50	9.1	LOS A	0	0.55	0.55
P7	50	23.4	LOS C	0	0.88	0.88
All Peds	200	16.2	LOS B	0	0.72	0.72

SIDRA INTERSECTION

Movement Summary

Campbelltown Road / Town Centre Main Street / Croatia Avenue

2036 AM Peak + Development

Signalised - Fixed time Cycle Time = 60 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Croatia Avenue										
1	L	67	0.0	0.165	26.5	LOS B	16	0.81	0.74	31.5
2	T	75	0.0	0.115	15.1	LOS B	16	0.73	0.56	36.6
Approach		142	0.0	0.165	20.5	LOS B	16	0.77	0.65	34.0
Campbelltown Road E										
4	L	18	0.0	0.129	16.1	LOS B	15	0.46	0.72	40.4
5	T	329	0.0	0.130	8.2	LOS A	15	0.44	0.35	49.0
Approach		347	0.0	0.129	8.6	LOS A	15	0.44	0.37	48.5
Town Centre Main Street										
7	L	27	0.0	0.066	25.9	LOS B	7	0.79	0.71	31.8
8	T	141	0.0	0.217	15.7	LOS B	30	0.76	0.61	36.2
Approach		168	0.0	0.217	17.4	LOS B	30	0.76	0.63	35.4
Campbelltown Road W										
10	L	69	0.0	0.529	18.3	LOS B	68	0.63	0.79	38.7
11	T	1353	0.0	0.530	11.5	LOS A	68	0.61	0.58	44.4
Approach		1422	0.0	0.530	11.8	LOS A	68	0.61	0.59	44.0
All Vehicles		2079	0.0	0.530	12.3	LOS A	68	0.61	0.56	43.0

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	56	12.0	LOS B	0	0.63	0.63
P3	56	24.3	LOS C	0	0.90	0.90
P5	56	12.0	LOS B	0	0.63	0.63
P7	56	24.3	LOS C	0	0.90	0.90
All Peds	224	18.2	LOS B	0	0.77	0.77

SIDRA INTERSECTION

Movement Summary

Campbelltown Road / Town Centre Main Street / Croatia Avenue

2036 PM Peak + Development

Signalised - Fixed time Cycle Time = 50 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Croatia Avenue										
1	L	7	0.0	0.014	20.5	LOS B	1	0.72	0.66	34.6
2	T	85	0.0	0.109	10.2	LOS A	14	0.66	0.51	40.1
Approach		92	0.0	0.109	11.0	LOS A	14	0.66	0.53	39.6
Campbelltown Road E										
4	L	155	0.0	0.768	26.2	LOS B	85	0.91	0.92	33.8
5	T	1380	0.0	0.769	17.1	LOS B	95	0.89	0.84	40.8
Approach		1535	0.0	0.769	18.0	LOS B	95	0.89	0.85	40.0
Town Centre Main Street										
7	L	20	0.0	0.040	20.7	LOS B	4	0.73	0.69	34.4
8	T	369	0.0	0.473	12.2	LOS A	60	0.79	0.67	38.6
Approach		389	0.0	0.473	12.7	LOS A	60	0.78	0.67	38.3
Campbelltown Road W										
10	L	104	0.0	0.389	22.7	LOS B	37	0.75	0.78	35.8
11	T	660	0.0	0.389	14.0	LOS A	41	0.69	0.62	42.1
Approach		764	0.0	0.389	15.2	LOS B	41	0.70	0.64	41.1
All Vehicles		2780	0.0	0.769	16.3	LOS B	95	0.81	0.75	40.0

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	56	14.4	LOS B	0	0.76	0.76
P3	56	19.4	LOS B	0	0.88	0.88
P5	56	14.4	LOS B	0	0.76	0.76
P7	56	19.4	LOS B	0	0.88	0.88
All Peds	224	16.9	LOS B	0	0.82	0.82

SIDRA INTERSECTION

Movement Summary

Campbelltown Road / East Town Centre Street

2016 AM Peak + Development

Signalised - Fixed time Cycle Time = 150 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
East Town Centre Street S										
1	L	1	0.0	0.039	72.0	LOS F	6	0.92	0.67	19.0
2	T	7	0.0	0.039	64.8	LOS E	6	0.92	0.62	19.5
3	R	220	0.0	0.523	76.2	LOS F	66	0.99	0.79	18.3
Approach		228	0.0	0.523	75.8	LOS F	66	0.99	0.79	18.4
Campbelltown Road E										
4	L	51	0.0	0.173	13.2	LOS A	27	0.19	0.69	42.8
5	T	371	0.0	0.173	5.8	LOS A	27	0.19	0.17	51.8
6	R	102	0.0	0.408	28.5	LOS C	30	0.75	0.78	30.7
Approach		524	0.0	0.408	10.9	LOS A	30	0.30	0.34	44.9
East Town Centre Street N										
7	L	1	0.0	0.002	53.2	LOS D	1	0.78	0.61	22.7
8	T	1	0.0	0.012	59.9	LOS E	1	0.89	0.55	20.4
9	R	1	0.0	0.012	67.0	LOS E	1	0.89	0.62	19.9
Approach		3	0.0	0.012	60.1	LOS E	1	0.85	0.60	20.9
Campbelltown Road W										
10	L	1	0.0	0.652	71.4	LOS F	236	0.71	0.84	19.5
11	T	1448	0.0	0.743	45.2	LOS D	238	0.71	0.69	25.7
12	R	1	0.0	0.003	22.5	LOS B	0	0.34	0.63	36.0
Approach		1450	0.0	0.743	45.2	LOS D	238	0.71	0.69	25.7
All Vehicles		2205	0.0	0.743	40.3	LOS C	238	0.64	0.62	27.4

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	69.1	LOS F	0	0.96	0.96
P3	50	66.3	LOS F	0	0.94	0.94
P5	50	21.9	LOS C	0	0.54	0.54

P7	50	69.1	LOS F	0	0.96	0.96
All Peds	200	56.6	LOS E	0	0.85	0.85

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

Site: 2016 AM + dev scaled back
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Movement Summary

Campbelltown Road / East Town Centre Street

2016 PM Peak + Development

Signalised - Fixed time Cycle Time = 150 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
East Town Centre Street S										
1	L	1	0.0	0.012	73.6	LOS F	1	0.93	0.62	18.8
2	T	1	0.0	0.012	66.4	LOS E	1	0.93	0.58	19.2
3	R	20	0.0	0.048	71.2	LOS F	7	0.92	0.68	19.2
Approach		22	0.0	0.048	71.1	LOS F	7	0.92	0.68	19.1
Campbelltown Road E										
4	L	123	0.0	0.672	15.4	LOS B	132	0.32	0.76	41.0
5	T	1588	0.0	0.673	7.6	LOS A	139	0.33	0.32	49.7
6	R	167	0.0	0.698	21.6	LOS B	51	0.44	0.78	34.0
Approach		1878	0.0	0.698	9.3	LOS A	139	0.34	0.39	47.1
East Town Centre Street N										
7	L	1	0.0	0.007	75.5	LOS F	1	0.94	0.60	18.4
8	T	7	0.0	0.049	63.7	LOS E	6	0.92	0.62	19.7
9	R	1	0.0	0.049	70.9	LOS F	6	0.92	0.67	19.2
Approach		9	0.0	0.049	65.8	LOS E	6	0.92	0.62	19.5
Campbelltown Road W										
10	L	1	0.0	0.323	12.1	LOS A	42	0.18	0.69	43.8
11	T	774	0.0	0.304	6.0	LOS A	45	0.18	0.27	50.3
12	R	1	0.0	0.017	22.2	LOS B	0	0.32	0.65	36.2
Approach		776	0.0	0.304	6.1	LOS A	45	0.18	0.27	50.2
All Vehicles		2685	0.0	0.698	9.1	LOS A	139	0.30	0.36	47.1

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	12.0	LOS B	0	0.40	0.40
P3	50	69.1	LOS F	0	0.96	0.96
P5	50	11.2	LOS B	0	0.39	0.39

P7	50	69.1	LOS F	0	0.96	0.96
All Peds	200	40.4	LOS C	0	0.68	0.68

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

Site: 2016 PM + dev scaled back
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SIDRA INTERSECTION

Movement Summary

Campbelltown Road / East Town Centre Street

2026 AM Peak + Development

Signalised - Fixed time Cycle Time = 130 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
East Town Centre Street S										
1	L	1	0.0	0.167	61.9	LOS E	24	0.92	0.74	20.8
2	T	41	0.0	0.167	54.8	LOS D	24	0.92	0.69	21.5
3	R	267	0.0	0.550	65.6	LOS E	69	0.98	0.80	20.1
Approach		309	0.0	0.550	64.1	LOS E	69	0.98	0.79	20.3
Campbelltown Road E										
4	L	33	0.0	0.152	15.3	LOS B	26	0.27	0.70	41.0
5	T	310	0.0	0.152	7.9	LOS A	27	0.27	0.22	49.3
6	R	283	0.0	0.805	46.3	LOS D	95	0.98	0.96	24.5
Approach		626	0.0	0.805	25.6	LOS B	95	0.59	0.58	33.6
East Town Centre Street N										
7	L	322	0.0	0.593	49.6	LOS D	129	0.91	0.84	23.6
8	T	10	0.0	0.062	51.3	LOS D	7	0.89	0.61	22.3
9	R	2	0.0	0.062	58.4	LOS E	7	0.89	0.68	21.6
Approach		334	0.0	0.593	49.7	LOS D	129	0.91	0.83	23.6
Campbelltown Road W										
10	L	1	0.0	0.812	89.2	LOS F	262	0.87	0.88	16.7
11	T	1243	0.0	0.798	58.8	LOS E	262	0.87	0.81	22.0
12	R	1	0.0	0.004	29.5	LOS C	0	0.48	0.63	32.1
Approach		1245	0.0	0.798	58.8	LOS E	262	0.87	0.81	22.0
All Vehicles		2514	0.0	0.812	50.0	LOS D	262	0.82	0.75	24.1

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	55.4	LOS E	0	0.92	0.92
P3	50	57.2	LOS E	0	0.94	0.94
P5	50	27.1	LOS C	0	0.65	0.65

P7	50	59.1	LOS E	0	0.95	0.95
All Peds	200	49.7	LOS D	0	0.87	0.87

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

Site: 2026 AM + dev scaled back_shared lefts
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SIDRA INTERSECTION

Movement Summary

Campbelltown Road / East Town Centre Street

2026 PM Peak + Development

Signalised - Fixed time Cycle Time = 150 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
East Town Centre Street S										
1	L	1	0.0	0.043	71.2	LOS F	6	0.92	0.68	19.1
2	T	8	0.0	0.043	64.0	LOS E	6	0.92	0.63	19.6
3	R	28	0.0	0.067	71.5	LOS F	10	0.92	0.70	19.1
Approach		37	0.0	0.067	69.9	LOS E	10	0.92	0.68	19.2
Campbelltown Road E										
4	L	170	0.0	0.611	14.5	LOS B	109	0.28	0.75	41.7
5	T	1384	0.0	0.612	6.9	LOS A	115	0.29	0.28	50.5
6	R	368	0.0	0.498	21.5	LOS B	77	0.62	0.80	34.0
Approach		1922	0.0	0.612	10.4	LOS A	115	0.35	0.42	45.4
East Town Centre Street N										
7	L	18	0.0	0.023	22.6	LOS B	6	0.61	0.68	33.4
8	T	39	0.0	0.246	65.6	LOS E	27	0.94	0.70	19.3
9	R	1	0.0	0.245	72.7	LOS F	27	0.94	0.73	18.9
Approach		58	0.0	0.246	52.4	LOS D	27	0.84	0.69	22.3
Campbelltown Road W										
10	L	2	0.0	0.565	57.1	LOS E	131	0.85	0.83	22.5
11	T	610	0.0	0.575	51.1	LOS D	132	0.85	0.75	24.0
12	R	1	0.0	0.017	53.0	LOS D	1	0.66	0.65	23.5
Approach		613	0.0	0.575	51.2	LOS D	132	0.85	0.75	23.9
All Vehicles		2630	0.0	0.612	21.6	LOS B	132	0.49	0.51	36.6

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	38.2	LOS D	0	0.71	0.71
P3	50	69.1	LOS F	0	0.96	0.96
P5	50	44.1	LOS E	0	0.77	0.77

P7	50	69.1	LOS F	0	0.96	0.96
All Peds	200	55.1	LOS D	0	0.85	0.85

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

Site: 2026 PM + dev scaled back_shared lefts
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SIDRA INTERSECTION

Movement Summary

Campbelltown Road / East Town Centre Street

2036 AM Peak + Development

Signalised - Fixed time Cycle Time = 130 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
East Town Centre Street S										
1	L	1	0.0	0.136	55.9	LOS D	25	0.88	0.74	22.1
2	T	46	0.0	0.137	48.7	LOS D	25	0.88	0.67	22.9
3	R	296	0.0	0.450	59.2	LOS E	71	0.94	0.80	21.5
Approach		343	0.0	0.450	57.7	LOS E	71	0.93	0.78	21.7
Campbelltown Road E										
4	L	37	0.0	0.130	21.5	LOS B	28	0.39	0.71	36.6
5	T	344	0.0	0.130	13.5	LOS A	28	0.38	0.31	43.7
6	R	314	0.0	0.798	45.8	LOS D	110	0.98	0.93	24.7
Approach		695	0.0	0.798	28.5	LOS C	110	0.65	0.61	32.2
East Town Centre Street N										
7	L	357	0.0	0.543	43.1	LOS D	132	0.86	0.84	25.4
8	T	11	0.0	0.065	47.4	LOS D	7	0.86	0.59	23.3
9	R	2	0.0	0.065	54.4	LOS D	7	0.86	0.68	22.5
Approach		370	0.0	0.543	43.3	LOS D	132	0.86	0.83	25.3
Campbelltown Road W										
10	L	1	0.0	0.691	118.0	LOS F	390	0.95	0.91	13.5
11	T	1380	0.0	0.808	69.9	LOS E	390	0.95	0.88	19.7
12	R	1	0.0	0.004	41.7	LOS C	0	0.63	0.62	27.0
Approach		1382	0.0	0.808	69.9	LOS E	390	0.95	0.88	19.7
All Vehicles		2790	0.0	0.808	54.6	LOS D	390	0.86	0.80	22.9

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	56	51.8	LOS E	0	0.89	0.89
P3	56	59.1	LOS E	0	0.95	0.95
P5	56	36.9	LOS D	0	0.75	0.75

P7	56	59.1	LOS E	0	0.95	0.95
All Peds	224	51.7	LOS D	0	0.89	0.89

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

Site: 2036 AM + dev
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SIDRA INTERSECTION

Movement Summary

Campbelltown Road / East Town Centre Street

2036 PM Peak + Development

Signalised - Fixed time Cycle Time = 110 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
East Town Centre Street S										
1	L	1	0.0	0.026	44.1	LOS D	5	0.82	0.68	25.1
2	T	9	0.0	0.026	37.0	LOS C	5	0.82	0.57	26.4
3	R	31	0.0	0.040	44.2	LOS D	7	0.83	0.69	25.2
Approach		41	0.0	0.040	42.6	LOS D	7	0.82	0.67	25.4
Campbelltown Road E										
4	L	189	0.0	0.704	32.9	LOS C	154	0.77	0.88	30.4
5	T	1536	0.0	0.704	24.9	LOS B	160	0.78	0.71	35.6
6	R	408	0.0	0.826	40.4	LOS C	131	0.97	0.93	26.3
Approach		2133	0.0	0.826	28.6	LOS C	160	0.82	0.77	32.9
East Town Centre Street N										
7	L	20	0.0	0.028	18.3	LOS B	4	0.64	0.69	35.8
8	T	43	0.0	0.183	37.9	LOS C	20	0.84	0.63	26.1
9	R	1	0.0	0.184	44.9	LOS D	20	0.84	0.73	25.0
Approach		64	0.0	0.183	31.9	LOS C	20	0.78	0.65	28.6
Campbelltown Road W										
10	L	2	0.0	0.806	64.0	LOS E	100	1.00	0.96	20.9
11	T	677	0.0	0.852	57.9	LOS E	101	1.00	0.95	22.2
12	R	1	0.0	0.013	54.0	LOS D	1	0.84	0.63	23.3
Approach		680	0.0	0.852	57.9	LOS E	101	1.00	0.95	22.2
All Vehicles		2918	0.0	0.852	35.7	LOS C	160	0.86	0.81	29.5

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	56	39.3	LOS D	0	0.85	0.85
P3	56	49.2	LOS E	0	0.95	0.95
P5	56	46.4	LOS E	0	0.92	0.92

P7	56	49.2	LOS E	0	0.95	0.95
All Peds	224	46.0	LOS D	0	0.91	0.91

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

Site: 2036 PM + dev
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SIDRA INTERSECTION

Movement Summary

Croatia Avenue / Macdonald Road / Town Centre Main Street

2016 AM Peak + Development

Give-way

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Town Centre Main Street										
1	L	1	0.0	0.007	6.4	LOS A	0	0.00	0.61	43.3
2	T	13	0.0	0.007	0.0	LOS A	0	0.00	0.00	50.0
Approach		14	0.0	0.007	0.5	LOS A		0.00	0.04	49.5
Macdonald Road E										
4	L	1	0.0	0.003	6.6	LOS A	0	0.09	0.57	43.0
5	T	1	0.0	0.003	5.3	LOS A	0	0.09	0.49	44.1
6	R	1	0.0	0.003	6.7	LOS A	0	0.09	0.60	42.8
Approach		3	0.0	0.003	6.2	LOS A	0	0.09	0.55	43.3
Croatia Avenue										
7	L	1	0.0	0.010	6.4	LOS A	0	0.00	0.61	43.3
8	T	18	0.0	0.010	0.0	LOS A	0	0.00	0.00	50.0
9	R	3	0.0	0.002	6.8	LOS A	0	0.06	0.62	42.8
Approach		22	0.0	0.010	1.2	LOS A	0	0.01	0.11	48.5
Macdonald Road W										
10	L	41	0.0	0.036	6.5	LOS A	1	0.06	0.59	43.1
11	T	1	0.0	0.036	5.2	LOS A	1	0.06	0.50	44.2
12	R	1	0.0	0.036	6.8	LOS A	1	0.06	0.63	42.8
Approach		43	0.0	0.036	6.5	LOS A	1	0.06	0.58	43.1
All Vehicles		82	0.0	0.036	4.0	Not Applicable	1	0.04	0.36	45.5

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

SIDRA INTERSECTION

Movement Summary

Croatia Avenue / Macdonald Road / Town Centre Main Street

2016 PM Peak + Development

Give-way

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Town Centre Main Street										
1	L	1	0.0	0.005	6.4	LOS A	0	0.00	0.61	43.3
2	T	8	0.0	0.005	0.0	LOS A	0	0.00	0.00	50.0
Approach		9	0.0	0.005	0.7	LOS A		0.00	0.07	49.2
Macdonald Road E										
4	L	1	0.0	0.003	6.7	LOS A	0	0.13	0.56	42.8
5	T	1	0.0	0.003	5.4	LOS A	0	0.13	0.49	43.9
6	R	1	0.0	0.003	6.8	LOS A	0	0.13	0.58	42.7
Approach		3	0.0	0.003	6.3	LOS A	0	0.13	0.54	43.1
Croatia Avenue										
7	L	1	0.0	0.019	6.4	LOS A	0	0.00	0.61	43.3
8	T	35	0.0	0.018	0.0	LOS A	0	0.00	0.00	50.0
9	R	28	0.0	0.019	6.8	LOS A	1	0.05	0.63	42.8
Approach		64	0.0	0.019	3.1	LOS A	1	0.02	0.28	46.5
Macdonald Road W										
10	L	4	0.0	0.005	6.5	LOS A	0	0.04	0.59	43.2
11	T	1	0.0	0.005	5.2	LOS A	0	0.04	0.51	44.3
12	R	1	0.0	0.005	6.9	LOS A	0	0.04	0.64	42.8
Approach		6	0.0	0.005	6.4	LOS A	0	0.04	0.59	43.3
All Vehicles		82	0.0	0.019	3.2	Not Applicable	1	0.02	0.29	46.4

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

SIDRA INTERSECTION

Movement Summary

Croatia Avenue / Macdonald Road / Town Centre Main Street

2026 AM Peak + Development

Signalised - Fixed time Cycle Time = 60 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Town Centre Main Street										
1	L	1	0.0	0.536	25.0	LOS B	68	0.87	0.82	31.2
2	T	327	0.0	0.532	18.6	LOS B	68	0.87	0.74	34.5
Approach		328	0.0	0.532	18.6	LOS B	68	0.87	0.74	34.5
Macdonald Road E										
4	L	1	0.0	0.008	27.3	LOS B	1	0.82	0.63	30.2
5	T	1	0.0	0.008	20.9	LOS B	1	0.82	0.52	33.2
6	R	1	0.0	0.008	27.4	LOS B	1	0.82	0.63	30.1
Approach		3	0.0	0.008	25.2	LOS B	1	0.82	0.60	31.1
Croatia Avenue										
7	L	1	0.0	0.441	14.3	LOS A	62	0.60	0.77	37.2
8	T	437	0.0	0.396	7.8	LOS A	62	0.60	0.52	42.0
9	R	140	0.0	0.260	15.5	LOS B	21	0.76	0.75	36.4
Approach		578	0.0	0.396	9.7	LOS A	62	0.64	0.58	40.5
Macdonald Road W										
10	L	647	0.0	0.627	6.7	LOS A	35	0.36	0.64	42.5
11	T	1	0.0	0.006	21.8	LOS B	1	0.84	0.52	32.7
12	R	1	0.0	0.006	28.4	LOS B	1	0.84	0.62	29.7
Approach		649	0.0	0.627	6.8	LOS A	35	0.37	0.64	42.5
All Vehicles		1558	0.0	0.627	10.4	LOS A	68	0.57	0.64	39.8

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	20.0	LOS C	0	0.82	0.82
P3	50	16.1	LOS B	0	0.73	0.73
P5	50	24.3	LOS C	0	0.90	0.90
P7	50	18.4	LOS B	0	0.78	0.78

All Peds	200	19.7	LOS B	0	0.81	0.81

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

Site: 2026 AM + dev scaled back
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SIDRA INTERSECTION

Movement Summary

Croatia Avenue / Macdonald Road / Town Centre Main Street

2026 PM Peak + Development

Signalised - Fixed time Cycle Time = 80 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Town Centre Main Street										
1	L	1	0.0	0.762	41.3	LOS C	118	1.00	0.97	25.1
2	T	389	0.0	0.801	34.8	LOS C	118	1.00	0.97	27.1
Approach		390	0.0	0.801	34.9	LOS C	118	1.00	0.97	27.1
Macdonald Road E										
4	L	1	0.0	0.010	37.8	LOS C	1	0.87	0.63	26.2
5	T	1	0.0	0.010	31.4	LOS C	1	0.87	0.55	28.4
6	R	1	0.0	0.010	37.9	LOS C	1	0.87	0.63	26.1
Approach		3	0.0	0.010	35.7	LOS C	1	0.87	0.61	26.8
Croatia Avenue										
7	L	1	0.0	0.296	12.2	LOS A	60	0.45	0.73	38.7
8	T	425	0.0	0.324	5.7	LOS A	60	0.45	0.39	43.9
9	R	633	0.0	0.820	28.7	LOS C	144	0.95	1.01	29.6
Approach		1059	0.0	0.820	19.5	LOS B	144	0.75	0.76	34.0
Macdonald Road W										
10	L	282	0.0	0.284	6.2	LOS A	12	0.20	0.59	43.3
11	T	1	0.0	0.009	32.5	LOS C	1	0.88	0.55	28.0
12	R	1	0.0	0.009	39.0	LOS C	1	0.88	0.62	25.7
Approach		284	0.0	0.284	6.4	LOS A	12	0.20	0.59	43.1
All Vehicles		1736	0.0	0.820	20.8	LOS B	144	0.71	0.78	33.3

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	29.8	LOS C	0	0.86	0.86
P3	50	24.8	LOS C	0	0.79	0.79
P5	50	34.2	LOS D	0	0.93	0.93
P7	50	27.2	LOS C	0	0.82	0.82

All Peds	200	29.0	LOS C	0	0.85	0.85

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

Site: 2026 PM + dev scaled back
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SIDRA INTERSECTION

Movement Summary

Ring Road_Access Road

4-way signalised intersection

Give-way

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Ring Road S										
1	L	1	0.0	0.001	6.4	LOS A	0	0.00	0.61	43.3
2	T	41	0.0	0.011	0.0	LOS A	0	0.00	0.00	50.0
Approach		42	0.0	0.011	0.2	LOS A		0.00	0.01	49.8
Access Road E										
4	L	1	0.0	0.004	6.7	LOS A	0	0.04	0.59	43.0
5	T	1	0.0	0.004	5.5	LOS A	0	0.04	0.51	44.1
6	R	1	0.0	0.004	6.7	LOS A	0	0.04	0.60	43.1
Approach		3	0.0	0.004	6.3	LOS A	0	0.04	0.57	43.4
Ring Road N										
7	L	1	0.0	0.001	6.4	LOS A	0	0.00	0.61	43.3
8	T	3	0.0	0.001	0.0	LOS A	0	0.00	0.00	50.0
9	R	1	0.0	0.001	6.6	LOS A	0	0.12	0.57	42.9
Approach		5	0.0	0.001	2.6	LOS A	0	0.02	0.24	47.0
Access Road W										
10	L	1	0.0	0.002	6.7	LOS A	0	0.15	0.55	42.8
11	T	1	0.0	0.002	5.5	LOS A	0	0.15	0.48	43.7
12	R	1	0.0	0.001	6.8	LOS A	0	0.16	0.56	42.8
Approach		3	0.0	0.002	6.4	LOS A	0	0.15	0.53	43.1
All Vehicles		53	0.0	0.011	1.1	Not Applicable	0	0.01	0.10	48.7

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

SIDRA INTERSECTION

Movement Summary

Ring Road_Access Road

4-way signalised intersection

Give-way

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Ring Road S										
1	L	1	0.0	0.001	6.4	LOS A	0	0.00	0.61	43.3
2	T	4	0.0	0.001	0.0	LOS A	0	0.00	0.00	50.0
Approach		5	0.0	0.001	1.3	LOS A		0.00	0.12	48.5
Access Road E										
4	L	1	0.0	0.003	6.7	LOS A	0	0.13	0.56	42.8
5	T	1	0.0	0.003	5.5	LOS A	0	0.13	0.49	43.8
6	R	1	0.0	0.003	6.6	LOS A	0	0.13	0.56	42.9
Approach		3	0.0	0.004	6.3	LOS A	0	0.13	0.54	43.2
Ring Road N										
7	L	1	0.0	0.007	6.4	LOS A	0	0.00	0.61	43.3
8	T	28	0.0	0.007	0.0	LOS A	0	0.00	0.00	50.0
9	R	1	0.0	0.001	6.4	LOS A	0	0.03	0.60	43.2
Approach		30	0.0	0.007	0.4	LOS A	0	0.00	0.04	49.5
Access Road W										
10	L	1	0.0	0.002	6.6	LOS A	0	0.04	0.59	43.1
11	T	1	0.0	0.002	5.4	LOS A	0	0.04	0.51	44.2
12	R	1	0.0	0.001	6.7	LOS A	0	0.13	0.56	42.8
Approach		3	0.0	0.002	6.2	LOS A	0	0.07	0.55	43.4
All Vehicles		41	0.0	0.007	1.4	Not Applicable	0	0.02	0.12	48.3

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

SIDRA INTERSECTION

Movement Summary

Macdonald Road / High School Access Road

2026 AM Peak + Development

Signalised - Fixed time Cycle Time = 50 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Macdonald Road S										
1	L	315	0.0	0.666	24.8	LOS B	62	0.92	0.87	31.3
2	T	647	0.0	0.873	25.1	LOS B	141	0.99	1.14	31.1
Approach		962	0.0	0.873	25.0	LOS B	141	0.97	1.05	31.2
Access Road E										
4	L	2	0.0	0.010	18.1	LOS B	1	0.68	0.65	34.8
5	T	4	0.0	0.010	11.7	LOS A	1	0.68	0.46	39.0
6	R	1	0.0	0.010	18.3	LOS B	1	0.68	0.66	34.7
Approach		7	0.0	0.010	14.5	LOS A	1	0.68	0.54	37.0
Macdonald Road N										
7	L	1	0.0	0.188	17.8	LOS B	24	0.70	0.75	35.0
8	T	140	0.0	0.191	11.4	LOS A	24	0.70	0.57	39.2
9	R	1	0.0	0.006	30.4	LOS C	0	0.94	0.58	28.8
Approach		142	0.0	0.191	11.5	LOS A	24	0.71	0.57	39.1
High School Access Road										
10	L	1	0.0	0.010	17.4	LOS B	1	0.66	0.65	35.2
11	T	6	0.0	0.010	11.0	LOS A	1	0.66	0.44	39.5
12	R	411	0.0	0.891	37.8	LOS C	103	1.00	1.21	26.1
Approach		418	0.0	0.891	37.4	LOS C	103	0.99	1.20	26.3
All Vehicles		1529	0.0	0.891	27.1	LOS B	141	0.95	1.05	30.2

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	13.7	LOS B	0	0.74	0.74
P3	50	11.6	LOS B	0	0.68	0.68
P5	50	13.7	LOS B	0	0.74	0.74
P7	50	13.7	LOS B	0	0.74	0.74

All Peds	200	13.2	LOS A	0	0.73	0.73

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

Site: 2026 AM + dev 1 lane mac road
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SIDRA INTERSECTION

Movement Summary

Macdonald Road / High School Access Road

2026 PM Peak + Development

Signalised - Fixed time Cycle Time = 50 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Macdonald Road S										
1	L	189	0.0	0.336	16.7	LOS B	30	0.68	0.75	35.7
2	T	282	0.0	0.278	7.3	LOS A	37	0.60	0.50	42.5
Approach		471	0.0	0.336	11.1	LOS A	37	0.63	0.60	39.4
Access Road E										
4	L	1	0.0	0.007	23.8	LOS B	1	0.82	0.63	31.8
5	T	1	0.0	0.007	17.4	LOS B	1	0.82	0.52	35.2
6	R	1	0.0	0.007	24.1	LOS B	1	0.82	0.63	31.6
Approach		3	0.0	0.007	21.8	LOS B	1	0.82	0.59	32.8
Macdonald Road N										
7	L	1	0.0	0.595	15.8	LOS B	89	0.76	0.82	36.2
8	T	633	0.0	0.626	9.4	LOS A	89	0.76	0.68	40.8
9	R	1	0.0	0.002	17.7	LOS B	0	0.65	0.62	35.0
Approach		635	0.0	0.626	9.4	LOS A	89	0.76	0.68	40.7
High School Access Road										
10	L	1	0.0	0.006	24.8	LOS B	0	0.84	0.62	31.3
11	T	1	0.0	0.006	18.4	LOS B	0	0.84	0.52	34.6
12	R	46	0.0	0.171	28.2	LOS B	11	0.91	0.73	29.7
Approach		48	0.0	0.171	27.9	LOS B	11	0.91	0.72	29.8
All Vehicles		1157	0.0	0.626	10.9	LOS A	89	0.72	0.65	39.6

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	19.4	LOS B	0	0.88	0.88
P3	50	7.3	LOS A	0	0.54	0.54
P5	50	19.4	LOS B	0	0.88	0.88
P7	50	9.0	LOS A	0	0.60	0.60

All Peds	200	13.8	LOS A	0	0.73	0.73

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

SIDRA SOLUTIONS

Site: 2026 PM + dev 1 lane mac road
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SIDRA INTERSECTION

Movement Summary

Macdonald Road / Station South Access Road

2016 AM Peak + Development

Give-way

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Macdonald Road S										
2	T	41	0.0	0.021	0.0	LOS A	0	0.00	0.00	50.0
3	R	1	0.0	0.001	6.8	LOS A	0	0.03	0.64	42.9
Approach		42	0.0	0.021	0.2	LOS A	0	0.00	0.02	49.8
Station South Access Road										
4	L	2	0.0	0.003	6.6	LOS A	0	0.02	0.60	43.2
6	R	1	0.0	0.003	6.7	LOS A	0	0.02	0.62	43.0
Approach		3	0.0	0.003	6.6	LOS A	0	0.02	0.61	43.1
Macdonald Road N										
7	L	1	0.0	0.001	6.4	LOS A	0	0.00	0.61	43.3
8	T	3	0.0	0.002	0.0	LOS A	0	0.00	0.00	50.0
Approach		4	0.0	0.002	1.6	LOS A		0.00	0.15	48.1
All Vehicles		49	0.0	0.021	0.7	Not Applicable	0	0.00	0.06	49.2

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

SIDRA SOLUTIONS

Site: 2016 AM + dev_Give Way
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SIDRA INTERSECTION

Movement Summary

Macdonald Road / Station South Access Road

2016 PM Peak + Development

Give-way

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Macdonald Road S										
2	T	4	0.0	0.002	0.0	LOS A	0	0.00	0.00	50.0
3	R	1	0.0	0.001	6.9	LOS A	0	0.09	0.61	42.7
Approach		5	0.0	0.002	1.4	LOS A	0	0.02	0.12	48.3
Station South Access Road										
4	L	2	0.0	0.003	6.6	LOS A	0	0.10	0.57	42.9
6	R	1	0.0	0.003	6.8	LOS A	0	0.10	0.59	42.8
Approach		3	0.0	0.003	6.6	LOS A	0	0.10	0.58	42.9
Macdonald Road N										
7	L	1	0.0	0.001	6.4	LOS A	0	0.00	0.61	43.3
8	T	28	0.0	0.014	0.0	LOS A	0	0.00	0.00	50.0
Approach		29	0.0	0.014	0.2	LOS A		0.00	0.02	49.7
All Vehicles		37	0.0	0.014	0.9	Not Applicable	0	0.01	0.08	48.9

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

SIDRA SOLUTIONS

Site: 2016 PM + dev_Give Way
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SIDRA INTERSECTION

Movement Summary

Macdonald Road / Station South Access Road

2026 AM Peak + Development

Signalised - Fixed time Cycle Time = 60 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Macdonald Road S										
2	T	732	0.0	0.704	11.4	LOS A	121	0.80	0.72	39.2
3	R	170	0.0	0.443	22.1	LOS B	37	0.79	0.79	32.6
Approach		902	0.0	0.704	13.4	LOS A	121	0.80	0.74	37.8
Station South Access Road										
4	L	108	0.0	0.317	30.3	LOS C	28	0.91	0.77	28.9
6	R	230	0.0	0.676	33.4	LOS C	59	0.98	0.87	27.7
Approach		338	0.0	0.676	32.4	LOS C	59	0.96	0.84	28.0
Macdonald Road N										
7	L	307	0.0	0.595	18.3	LOS B	53	0.70	0.77	34.7
8	T	237	0.0	0.228	8.0	LOS A	35	0.56	0.47	41.9
Approach		544	0.0	0.595	13.8	LOS A	53	0.64	0.64	37.5
All Vehicles		1784	0.0	0.704	17.1	LOS B	121	0.78	0.73	35.4

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	20.8	LOS C	0	0.83	0.83
P3	50	9.6	LOS A	0	0.57	0.57
P5	50	20.8	LOS C	0	0.83	0.83
All Peds	150	17.1	LOS B	0	0.74	0.74

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS

SIDRA INTERSECTION

Movement Summary

Macdonald Road / Station South Access Road

2026 PM Peak + Development

Signalised - Fixed time Cycle Time = 50 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Macdonald Road S										
2	T	303	0.0	0.299	7.4	LOS A	40	0.60	0.51	42.4
3	R	115	0.0	0.369	22.5	LOS B	24	0.83	0.78	32.4
Approach		418	0.0	0.368	11.6	LOS A	40	0.67	0.59	39.1
Station South Access Road										
4	L	31	0.0	0.119	27.8	LOS B	8	0.91	0.71	29.9
6	R	167	0.0	0.642	30.9	LOS C	40	0.99	0.85	28.6
Approach		198	0.0	0.642	30.4	LOS C	40	0.98	0.83	28.8
Macdonald Road N										
7	L	43	0.0	0.076	15.7	LOS B	7	0.62	0.70	36.2
8	T	635	0.0	0.626	9.4	LOS A	89	0.76	0.68	40.8
Approach		678	0.0	0.626	9.8	LOS A	89	0.75	0.68	40.4
All Vehicles		1294	0.0	0.642	13.5	LOS A	89	0.76	0.67	37.7

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	19.4	LOS B	0	0.88	0.88
P3	50	9.0	LOS A	0	0.60	0.60
P5	50	19.4	LOS B	0	0.88	0.88
All Peds	150	15.9	LOS B	0	0.79	0.79

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS

SIDRA INTERSECTION

Movement Summary

Croatia Avenue / Station South Access Road

2016 AM Peak + Development

Give-way

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Croatia Avenue S										
1	L	2	0.0	0.001	6.4	LOS A	0	0.00	0.61	43.3
2	T	5	0.0	0.003	0.0	LOS A	0	0.07	0.00	49.3
3	R	1	0.0	0.003	6.8	LOS A	0	0.07	0.62	42.7
Approach		8	0.0	0.003	2.5	LOS A	0	0.05	0.23	46.8
Station South Access Road E										
4	L	102	0.0	0.093	6.5	LOS A	3	0.08	0.58	43.0
5	T	1	0.0	0.091	5.2	LOS A	3	0.08	0.50	44.1
6	R	7	0.0	0.093	6.6	LOS A	3	0.08	0.60	42.9
Approach		110	0.0	0.093	6.5	LOS A	3	0.08	0.58	43.0
Croatia Avenue N										
7	L	1	0.0	0.009	6.4	LOS A	0	0.00	0.61	43.3
8	T	17	0.0	0.009	0.0	LOS A	0	0.00	0.00	50.0
9	R	1	0.0	0.001	6.8	LOS A	0	0.04	0.63	42.8
Approach		19	0.0	0.009	0.7	LOS A	0	0.00	0.07	49.2
Station South Access Road W										
10	L	1	0.0	0.003	6.6	LOS A	0	0.04	0.59	43.1
11	T	1	0.0	0.003	5.3	LOS A	0	0.04	0.50	44.3
12	R	1	0.0	0.003	6.8	LOS A	0	0.04	0.62	43.0
Approach		3	0.0	0.003	6.2	LOS A	0	0.04	0.57	43.4
All Vehicles		140	0.0	0.093	5.5	Not Applicable	3	0.06	0.49	44.0

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

SIDRA INTERSECTION

Movement Summary

Croatia Avenue / Station South Access Road

2016 PM Peak + Development

Give-way

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Croatia Avenue S										
1	L	2	0.0	0.001	6.4	LOS A	0	0.00	0.61	43.3
2	T	7	0.0	0.004	0.1	LOS A	0	0.11	0.00	49.0
3	R	1	0.0	0.004	6.8	LOS A	0	0.11	0.60	42.6
Approach		10	0.0	0.004	2.0	LOS A	0	0.09	0.18	47.1
Station South Access Road E										
4	L	167	0.0	0.145	6.6	LOS A	5	0.11	0.58	42.9
5	T	1	0.0	0.143	5.3	LOS A	5	0.11	0.50	44.0
6	R	1	0.0	0.143	6.7	LOS A	5	0.11	0.60	42.8
Approach		169	0.0	0.145	6.6	LOS A	5	0.11	0.58	42.9
Croatia Avenue N										
7	L	7	0.0	0.018	6.4	LOS A	0	0.00	0.61	43.3
8	T	28	0.0	0.018	0.0	LOS A	0	0.00	0.00	50.0
9	R	1	0.0	0.001	6.8	LOS A	0	0.05	0.63	42.8
Approach		36	0.0	0.018	1.4	LOS A	0	0.00	0.14	48.3
Station South Access Road W										
10	L	1	0.0	0.003	6.8	LOS A	0	0.04	0.59	43.0
11	T	1	0.0	0.003	5.5	LOS A	0	0.04	0.50	44.1
12	R	1	0.0	0.003	6.9	LOS A	0	0.04	0.62	42.8
Approach		3	0.0	0.003	6.4	LOS A	0	0.04	0.57	43.3
All Vehicles		218	0.0	0.145	5.5	Not Applicable	5	0.09	0.49	43.9

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

SIDRA INTERSECTION

Movement Summary

Croatia Avenue / Station South Access Road

2026 AM Peak + Development

Signalised - Fixed time Cycle Time = 40 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Town Centre Main Street										
1	L	68	0.0	0.209	22.7	LOS B	13	0.89	0.74	32.3
2	T	22	0.0	0.041	11.0	LOS A	4	0.73	0.53	39.5
3	R	1	0.0	0.041	17.5	LOS B	4	0.73	0.69	35.1
Approach		91	0.0	0.209	19.8	LOS B	13	0.85	0.69	33.8
Station South Access Road E										
4	L	104	0.0	0.204	19.0	LOS B	17	0.80	0.75	34.3
5	T	174	0.0	0.358	9.4	LOS A	32	0.74	0.62	40.7
6	R	56	0.0	0.358	16.0	LOS B	32	0.74	0.78	36.1
Approach		334	0.0	0.358	13.5	LOS A	32	0.76	0.69	37.7
Croatia Avenue N										
7	L	52	0.0	0.297	20.3	LOS B	22	0.85	0.77	33.6
8	T	77	0.0	0.297	13.9	LOS A	22	0.85	0.68	37.4
9	R	4	0.0	0.014	22.8	LOS B	1	0.87	0.64	32.2
Approach		133	0.0	0.297	16.6	LOS B	22	0.85	0.71	35.7
Station South Access Road W										
10	L	1	0.0	0.331	15.6	LOS B	34	0.73	0.77	36.3
11	T	251	0.0	0.324	9.2	LOS A	34	0.73	0.61	40.9
12	R	56	0.0	0.154	19.9	LOS B	10	0.81	0.74	33.7
Approach		308	0.0	0.324	11.2	LOS A	34	0.74	0.63	39.4
All Vehicles		866	0.0	0.358	13.8	LOS A	34	0.78	0.67	37.5

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	11.2	LOS B	0	0.75	0.75
P3	50	14.4	LOS B	0	0.85	0.85
P5	50	11.2	LOS B	0	0.75	0.75

P7	50	14.4	LOS B	0	0.85	0.85
All Peds	200	12.9	LOS A	0	0.80	0.80

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

SIDRA SOLUTIONS

Site: 2026 AM + dev
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SIDRA INTERSECTION

Movement Summary

Croatia Avenue / Station South Access Road

2026 PM Peak + Development

Signalised - Fixed time Cycle Time = 40 seconds

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Town Centre Main Street										
1	L	109	0.0	0.293	22.0	LOS B	20	0.89	0.76	32.7
2	T	28	0.0	0.048	10.2	LOS A	4	0.71	0.52	40.1
3	R	1	0.0	0.048	16.8	LOS B	4	0.71	0.70	35.6
Approach		138	0.0	0.293	19.6	LOS B	20	0.85	0.71	34.0
Station South Access Road E										
4	L	207	0.0	0.446	20.9	LOS B	35	0.89	0.79	33.3
5	T	89	0.0	0.211	9.5	LOS A	20	0.71	0.57	40.7
6	R	50	0.0	0.211	16.0	LOS B	20	0.71	0.75	36.0
Approach		346	0.0	0.446	17.2	LOS B	35	0.82	0.73	35.3
Croatia Avenue N										
7	L	56	0.0	0.392	19.8	LOS B	33	0.86	0.79	33.9
8	T	149	0.0	0.392	13.3	LOS A	33	0.86	0.70	37.8
9	R	1	0.0	0.003	21.6	LOS B	0	0.84	0.60	32.8
Approach		206	0.0	0.392	15.1	LOS B	33	0.86	0.72	36.6
Station South Access Road W										
10	L	11	0.0	0.038	17.4	LOS B	3	0.73	0.69	35.2
11	T	10	0.0	0.038	10.9	LOS A	3	0.73	0.52	39.5
12	R	34	0.0	0.120	22.6	LOS B	7	0.87	0.72	32.3
Approach		55	0.0	0.120	19.4	LOS B	7	0.82	0.68	34.0
All Vehicles		745	0.0	0.446	17.2	LOS B	35	0.83	0.72	35.3

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	12.0	LOS B	0	0.77	0.77
P3	50	13.6	LOS B	0	0.82	0.82
P5	50	12.0	LOS B	0	0.77	0.77

P7	50	13.6	LOS B	0	0.82	0.82
All Peds	200	12.8	LOS A	0	0.80	0.80

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

SIDRA SOLUTIONS

Site: 2026 PM + dev
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