

Edmondson Park South Part 3A - Stage 1 Project 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

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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').

This report has been prepared to accompany a Project Application under Part 3A of the Environmental Planning & Assessment Act, 1979 (EP&A Act) for Stage 1 of Edmondson Park South.

Reference should be made to the overall TMAP – Edmondson Park South Part 3A Concept Plan Application Traffic Management and Accessibility Plan for assessment of the overall Concept Plan that includes the Stage 1 development.

Description of overall 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 40,000m² 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 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.

Stage 1 development

Stage 1 of the proposed Edmondson Park South development will comprise the creation of 206 residential lots, 8 super lots for future subdivision 15 Environmental Living lots. It is expected that construction of Stage 1 development will commence by the end of 2010 and be completed by 2012.

A new access is proposed at Macdonald Road to access the new development. A new collector road will also be constructed to connect the Stage 1 development with the Macdonald Road access.

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. 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.

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 bus services along Macdonald Road.

Package of measures

A package of sustainable measures recommended for the successful delivery of Stage 1 of the proposed development in Edmondson Park South include:

- Sustainable travel strategies, to include provision of a bicycle to each household, marketing of public transport options, or free travel passes.
- Infrastructure improvements to provide easy pedestrian and cyclist access via a safe and efficient shared path and footpath network within the proposed development and connecting to public transport services at Macdonald Road during the initial stages of the development.
- Public transport infrastructure, including well-designed bus stops to provide safe and convenient means for the future residents to use public transport services.
- Transport service improvements, including the implementation of a new bus service connecting the development with Liverpool.
- Road infrastructure upgrades to provide access to the site via a new intersection at Macdonald Road.

As a comprehensive package of measures, this will meet the needs of future residents of Stage 1 of the proposed Edmondson Park South development, 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	4 x 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
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

1.0 Introduction

1.1 Background

A 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').

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 40,000m² 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 report has been prepared to accompany a Project Application under Part 3A of the Environmental Planning & Assessment Act, 1979 (EP&A Act) for Stage 1 of Edmondson Park South.

Reference should be made to the overall TMAP – Edmondson Park South Part 3A Concept Plan Application Traffic Management and Accessibility Plan for assessment of the overall Concept Plan that includes the Stage 1 development.

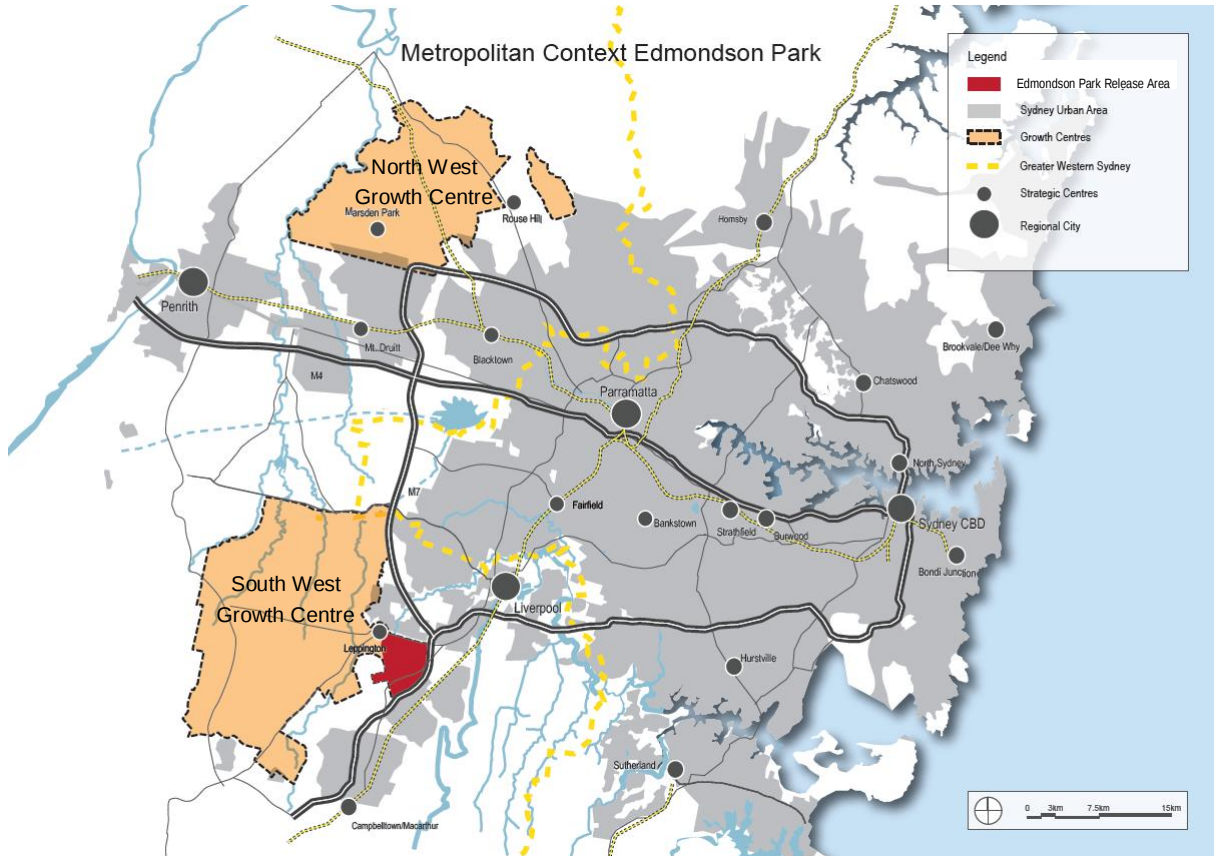
1.2 Edmondson Park Release Area

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.

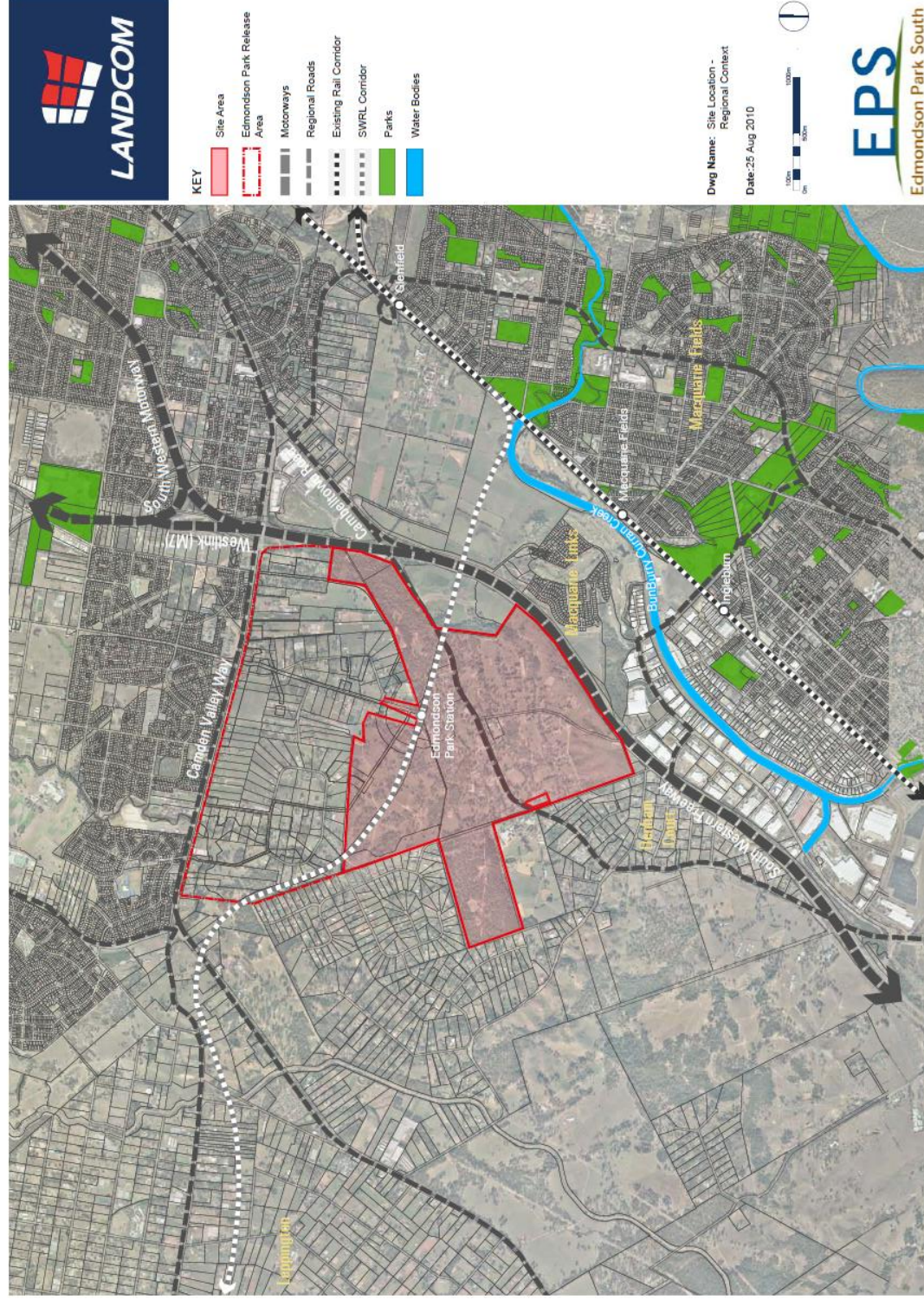
The site is irregular in shape and is generally bounded by the M5 Motorway to the south and the east, the proposed SWRL to the north and Zouch Road to the west. The site boundary and its relation to the Edmondson Park Release Area is shown in **Figure 1-2**.

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.

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 overall TMAP

The overall 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, the 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, which has been specifically addressed by this report for the delivery of the (Stage 1) 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 5.0).

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 the overall TMAP can be found in **Appendix A**. This report is an extract of the overall TMAP and referenced only to the proposed Stage 1 development of Edmondson Park South. The assessment of Stage 1 development has fulfilled the requirements of the above DGRs, if appropriate.

1.5 Project application assessment study area

The report has considered the impacts of the Stage 1 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).

1.6 Report structure

This report is structured to provide an assessment of the traffic impact and transport accessibility issues relating to the proposed Stage 1 development of Edmondson Park South. This report is laid out as follows:

- **Section 1** provides an overview of the project, background information and the study objectives.
- **Section 2** 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 3** 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 4** describes 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 5** 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 6** presents the traffic and transport impact assessment for the Project Application including assessment of the road network impacts of the proposed development.
- **Section 7** documents the package of measure recommended for the delivery of Stage 1 of the proposed development. Timing of delivery and indicative costs for each component of the Stage 1 package of measures will be documented.
- **Section 8** summarises the conclusions and recommendations of the Stage 1 component of the overall TMAP.

2.0 Existing Transport Context

2.1 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.

2.2 Existing travel patterns

2.2.1 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 2-1**.

Table 2-1: 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.

2.2.2 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 surrounding suburbs / travel zones (TZs) of Horningsea Park and Prestons was analysed to establish the potential travel pattern and trip destinations for the proposed Stage 1 development.

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, prior to the opening of SWRL, are expected to reflect travel patterns of these suburbs.

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

Table 2-2: 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%
TZs of Horningsea Park and Prestons	7,805	70%	6%	9%	2%	3%	10%

*- 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.

2.2.3 Journey-to-work destinations

The journey-to-work destinations for Liverpool LGA, Campbelltown LGA and the selected neighbouring TZs are illustrated in **Table 2-3**.

Table 2-3: 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

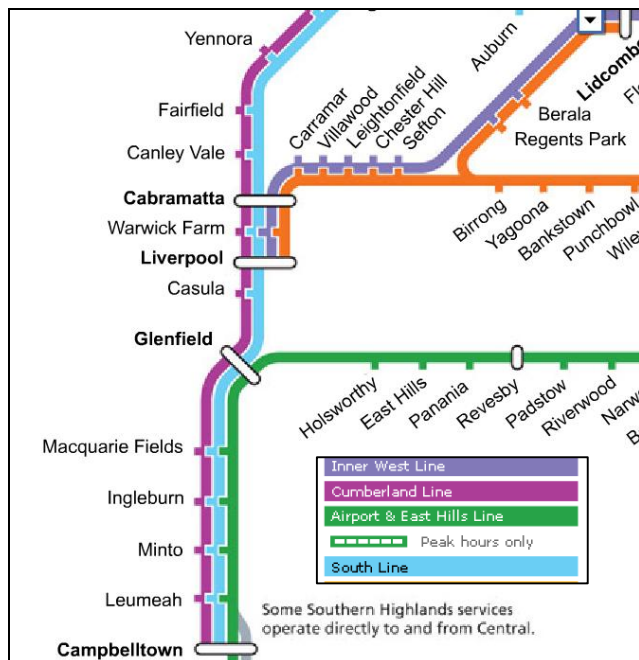
The 2006 Journey-to-Work Data shows that in the suburbs near Edmondson Park, there was approximately 30% of travel to the Liverpool LGA. Other major journey-to-work destinations include Sydney LGA (10%) and Fairfield LGAs (10%), Bankstown (8%), Parramatta LGA (5%) and Campbelltown LGA (5%). Based on 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.

2.3 Existing public transport provision

2.3.1 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 2-1**.

Figure 2-1: 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 2-4**.

Table 2-4: 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 2-2**). According to the 2008 Compendium of CityRail Travel Statistics, approximately 11% of passengers access Glenfield Station by bus during the AM peak hours.

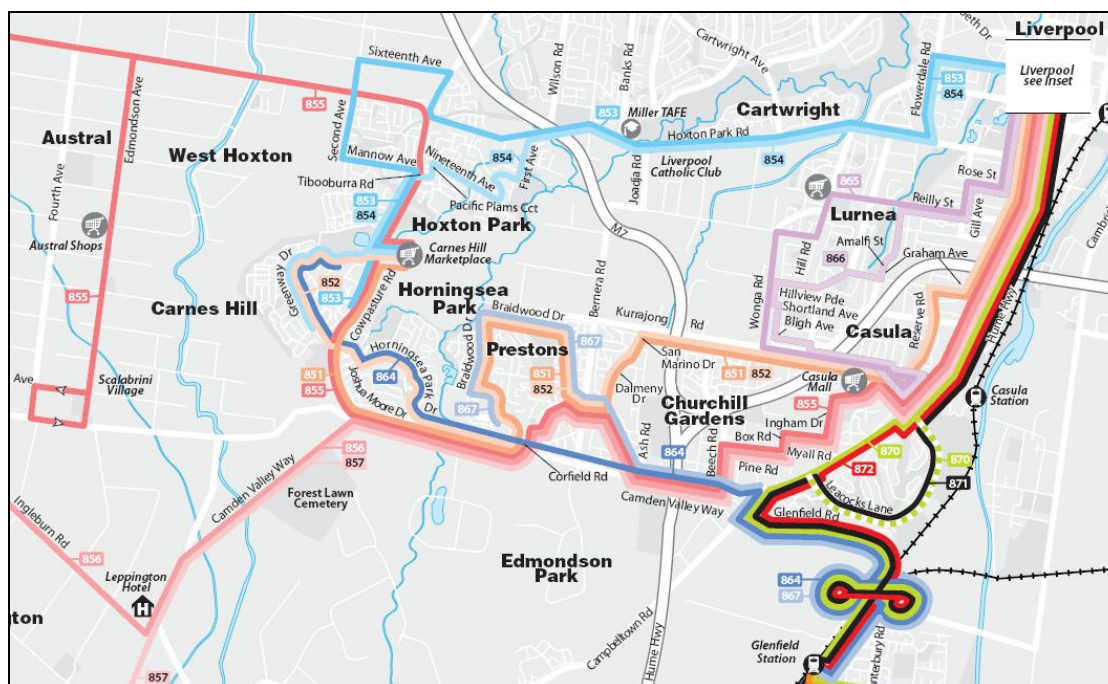
According to the 2004 surveys, approximately 64% of passengers access Glenfield Station by private car, with 33% of them as car passengers and 31% parking their car near the station. On the other hand, approximately 44% of passengers walking to Ingleburn Station and 42% of them using private vehicles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

2.3.2 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 2-2**. 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 2-2: 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 2-5**.

Table 2-5: 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.

2.4 Existing active transport provision

2.4.1 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.

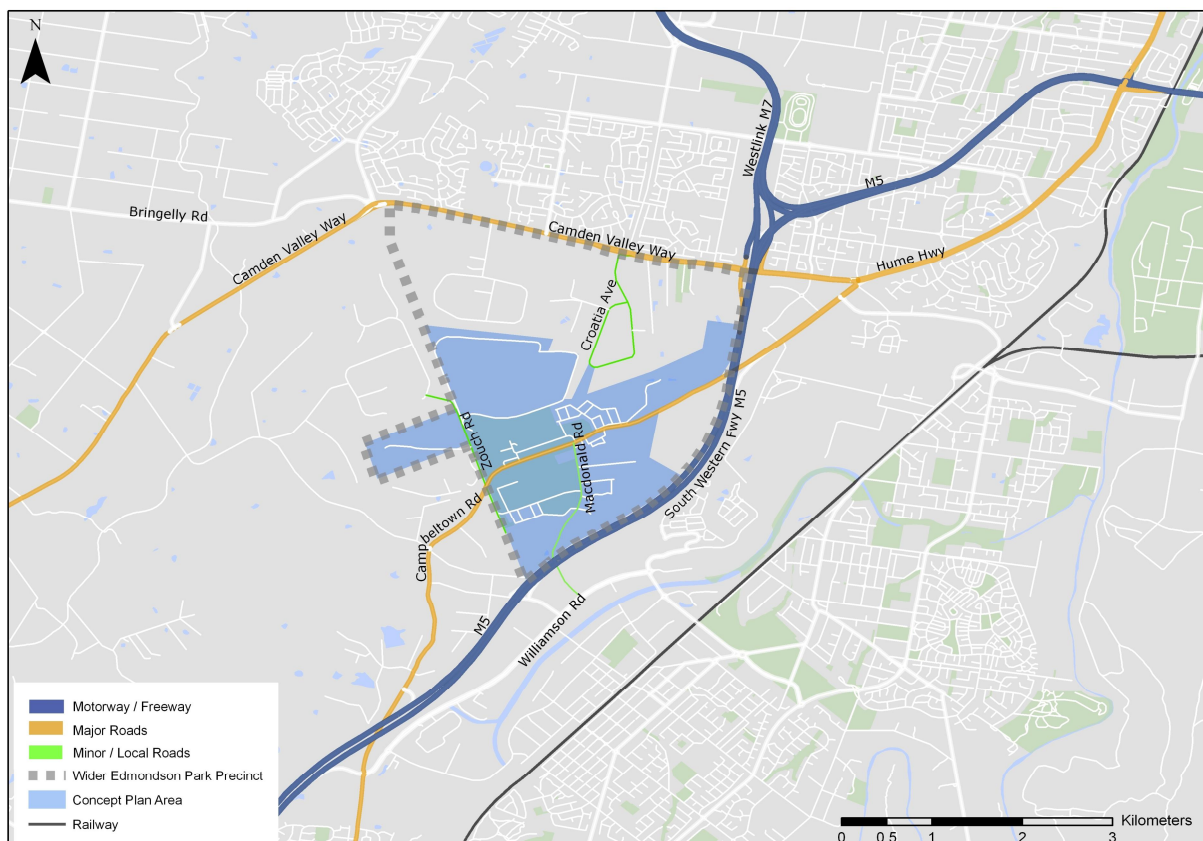
There are currently limited pedestrian facilities in the study area. Signalised pedestrian crossings are provided at the intersections of Macdonald Road and Ingleburn Garden access at Campbelltown Road. There is no continuous footpath network within the study area.

2.5 Existing road infrastructure

2.5.1 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 and 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 2-3**.

Figure 2-3: Existing road hierarchy



Source: AECOM, July 2010

2.5.2 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.

Campbelltown Road

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 north 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.

2.5.3 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 2-6**. The location of the RTA traffic count stations is shown in **Figure 2-4**.

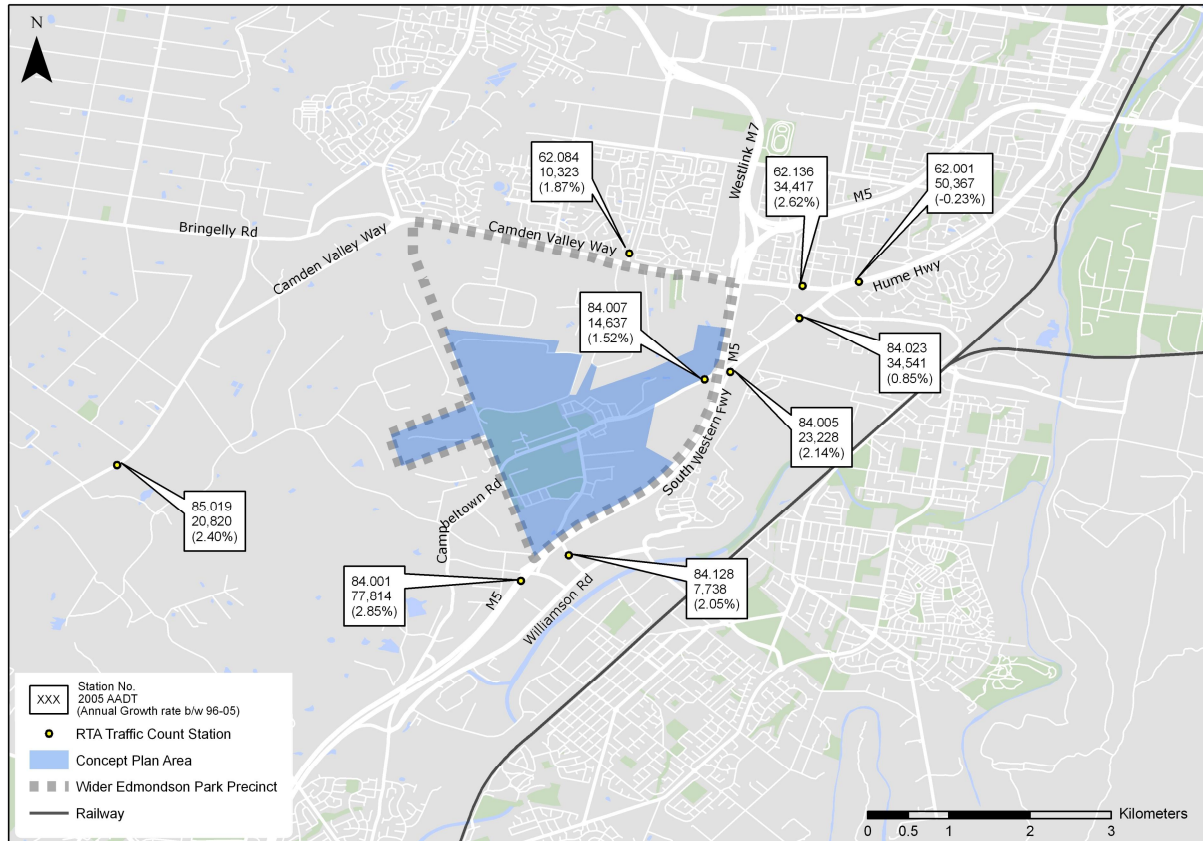
Table 2-6: Historical AADT growth trends in the vicinity of Edmondson Park

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 2-4: 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 2-7**.

Table 2-7: 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

2.5.4 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; and
- Campbelltown Road / Ingleburn Gardens Access Road.

Table 2-8 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 and Macdonald Road in the vicinity of Edmondson Park.

Table 2-8: 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

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.

2.5.5 Intersection controls and performance

The existing key intersections in the vicinity of Stage 1 development of Edmondson Park are:

- Campbelltown Road / Macdonald Road (Traffic Signals); and
- Campbelltown Road / Ingleburn Gardens access (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 peak hour turning volumes derived from the SCATS data for the two 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 2-9 and **Table 2-10** 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 2-9: 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

Source: AECOM, June 2010

Table 2-10: 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

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.

3.0 Future Transport Context

3.1 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.

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 the future development are summarised in the overall TMAP.

3.2 Campbelltown Road upgrade

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.

3.3 Future base traffic demand

3.3.1 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 2-6**).

Historical traffic growth in the area surrounding Edmondson Park has been identified as 1.78% per annum (as discussed in **Section 2.5.3**). 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.**

3.3.2 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 2012 – when Stage 1 development is expected to be completed. The impacts of Stage 1 development in other future years (2016 and 2026) have been assessed as part of the overall Concept Plan and are documented in the overall TMAP.

The peak hour turning volumes for 2012 have been derived by applying the annual growth factor to the existing peak hour traffic at Campbelltown Road and Macdonald Road. The 2012 future base network modelling traffic flows are included in **Appendix C**.

For the purpose of intersection assessment, the existing intersection layouts have been modelled in 2012. The AM and PM peak hour intersection modelling results for the future base scenarios of 2012 are presented in **Table 3-1** and **Table 3-2** respectively. The detailed results of the intersection performance are presented in **Appendix C**.

Table 3-1: Future year base case intersection performance (AM peak hour without development)

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	1,730	0.750	15.7	B	137
Campbelltown Road / Ingleburn Gardens access	1,672	0.818	5.6	A	93

Source: AECOM, July 2010.

Table 3-2: 2012 base case intersection performance (PM peak hour without development)

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	2,073	0.742	14.6	B	136
Campbelltown Road / Ingleburn Gardens access	2,006	0.867	5.9	A	171

Source: AECOM, July 2010.

The results indicate that the Campbelltown Road / Macdonald Road intersection performs with at LoS B in the 2012 peak hours and with approximately 25% spare capacity. The intersection of Campbelltown Road / Ingleburn Gardens access will perform satisfactorily at LoS A in the 2012 peak hours and with a minimum of 14% spare capacity.

4.0 The Edmondson Park South Project

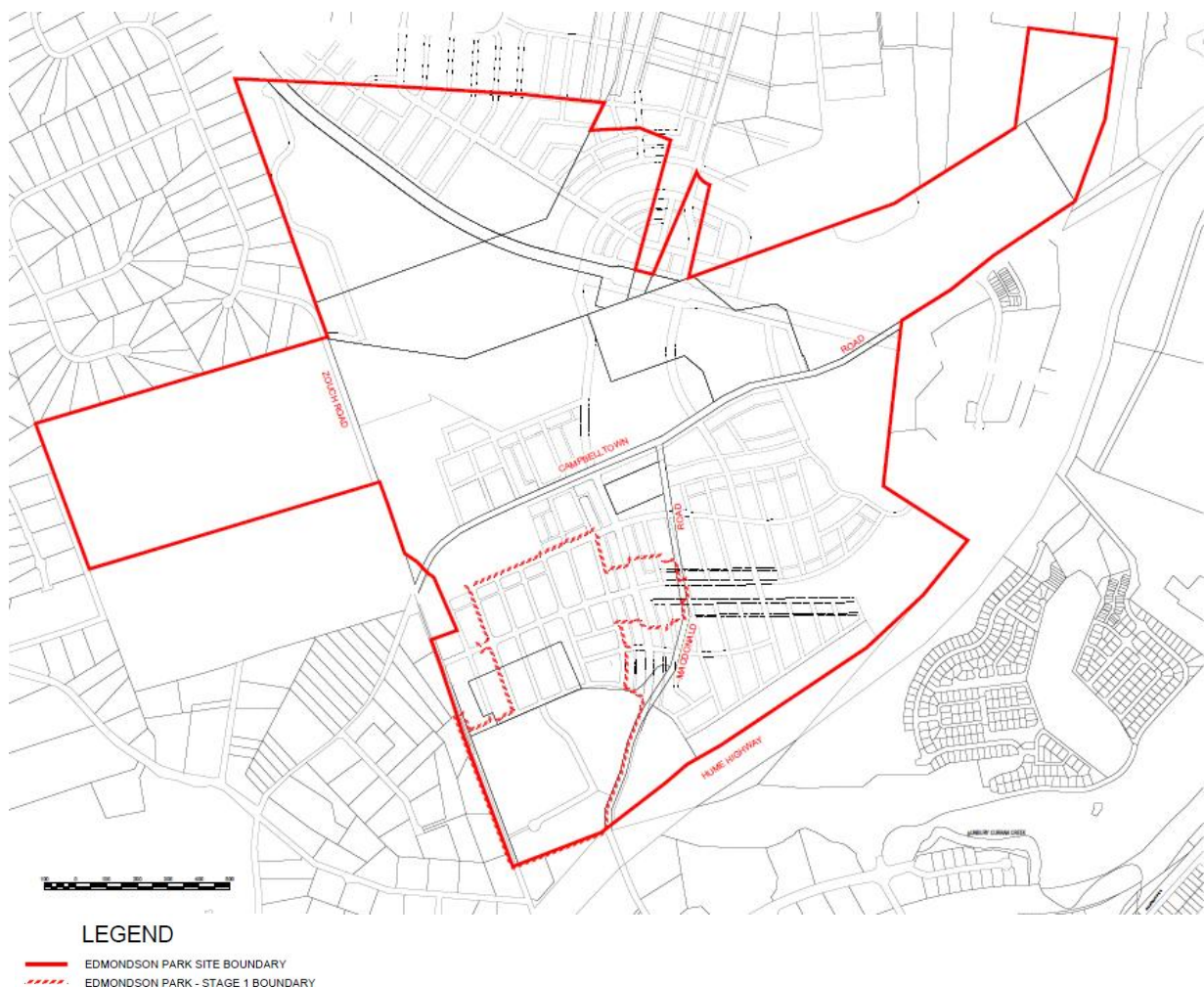
4.1 Introduction

This section provides a brief description of the Stage 1 development proposal, access arrangements, public and active transport networks. Details of the Concept Plan should be referenced to the overall TMAP.

4.2 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 4-1**). It is expected that construction of Stage 1 development will commence by the end of 2010 and be completed by 2012.

Figure 4-1: 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. A new collector road will also be constructed to connect the Stage 1 development with the Macdonald Road access.

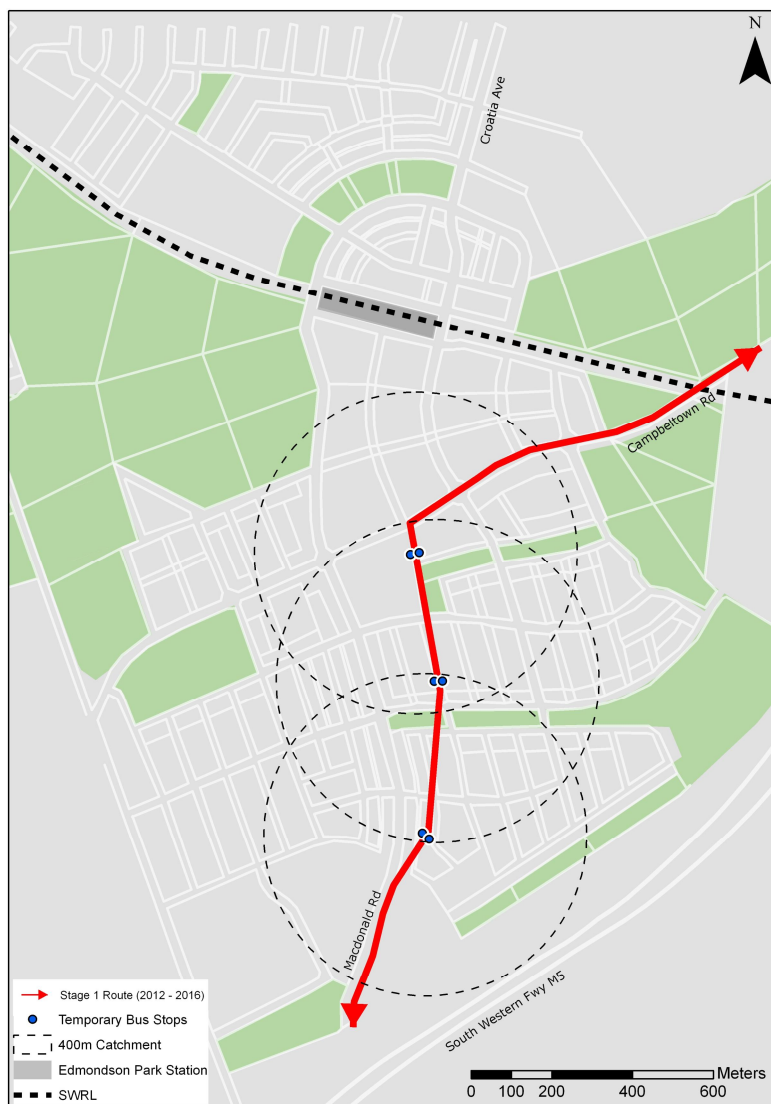
4.3 Public transport network and facilities

The road network and intersection treatments proposed in the Concept Plan have been designed to 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 4-2**. The 400m catchment from each of the bus stops is also highlighted.

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 Macdonald Road and Campbelltown Road during the initial stage of the Edmondson Park South development. 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.

Figure 4-2: Proposed Bus Routes for Stage 1 of Edmondson Park South

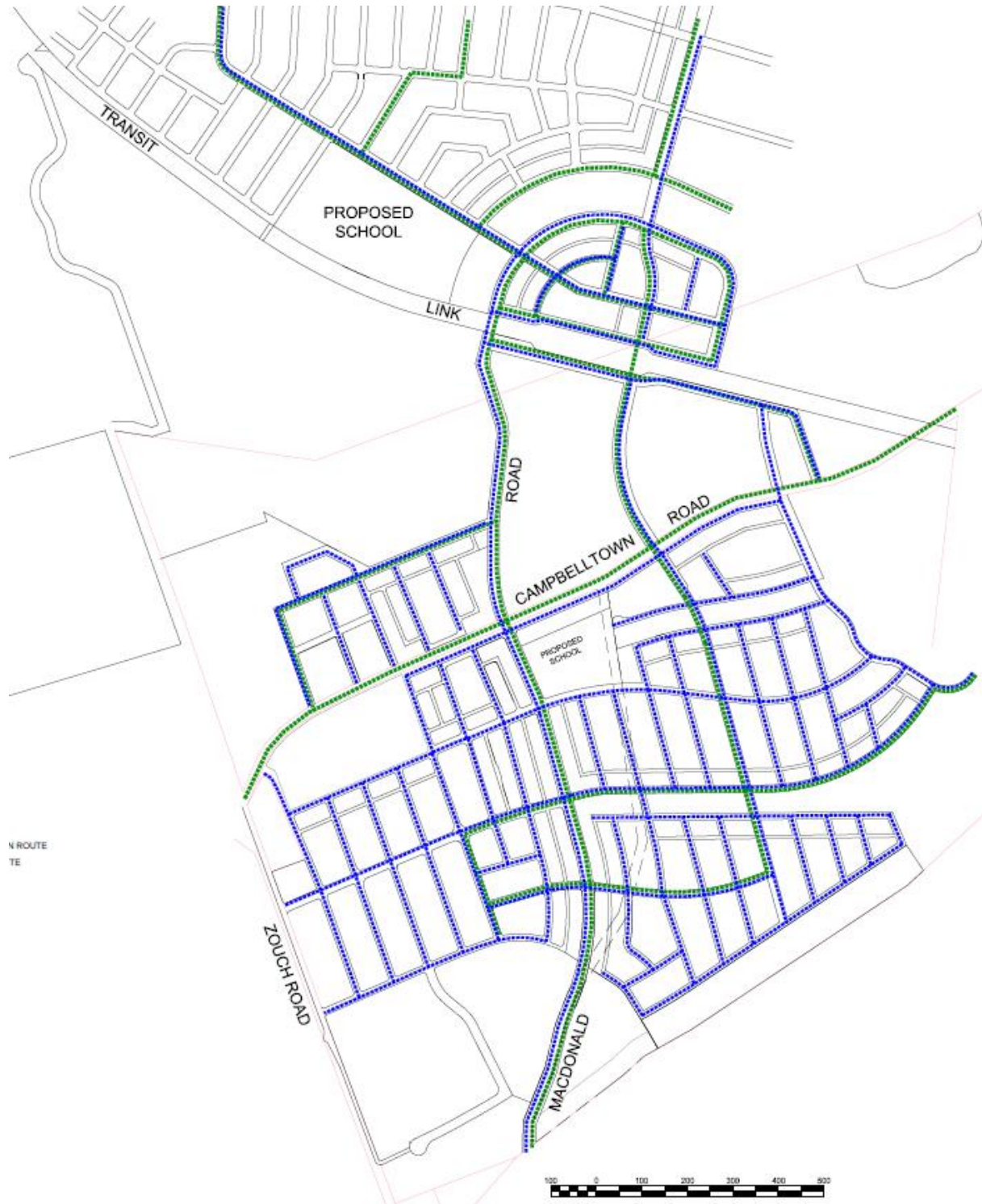


Source: AECOM, July 2010

4.4 Walking and cycling network

The walking and cycling networks for Stage 1 Edmondson Park South development 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 for the overall Edmondson Park South development is shown in **Figure 4-3**.

Figure 4-3: Proposed walking and cycling network for Edmondson Park South



Source: AECOM, July 2010

A network of off-road shared paths and on-road cycle paths are proposed within the Stage 1 project area. The network will link key amenities including open spaces, schools and the facilities in the future 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.

5.0 Sustainable Travel Measures to Reduce Car Dependency

5.1 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.

This section of the report has documented the proposed measures that are relevant to Stage 1 of the proposed development only. Full details of the Sustainable Travel Strategy for the whole Edmondson Park South development can be found in the overall TMAP.

5.2 Sustainable Travel Strategy for Edmondson Park South

Implementing a Sustainable Travel Strategy (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.

5.3 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.

It should be acknowledged that these objectives and targets may not be reached at the initial stages of the proposed development, especially prior to the opening of the SWRL. However, the following sustainable travel measures are proposed to influence travel behaviour of future residents of reducing car uses.

5.4 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.

5.4.1 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.

5.4.2 Public transport measures

3) 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 the Edmondson Park South with 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.

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

The early bus route network for Edmondson Park South has been designed to maximise integration with existing train services at either Liverpool or Ingleburn Stations.

Bus services link residential areas with the existing rail stations will encourage onward travel by public transport. Bus services to Liverpool will also provide direct connections to employment, retail and commerce services at the regional centre.

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

5) 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 5-1**, which are based on the Transport NSW bus planning guidelines.

Table 5-1: 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	<u>Weekdays</u> Peaks 60 mins Inter Peak: 60 mins <u>Weekends</u> Saturday daytime 60 mins Sunday daytime 60 mins	<u>Weekdays</u> Peaks 60 mins Inter Peak: 60 mins <u>Weekends</u> 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.

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

6) Bus service coverage

The proposed bus route in Edmondson Park South has been designed to maximise coverage of the development and to provide connections for residents to major services such as schools, recreational facilities and the regional centre at Liverpool.

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 to service the initial stages of Edmondson Park South will operate along Macdonald Road to provide a direct and efficient service between Liverpool and Ingleburn. **Figure 5-1** shows the 400m coverage of the proposed Stage1 bus service networks in Edmondson Park South.

Figure 5-1: 400m catchment for the bus networks in Edmondson Park South



Source: AECOM, 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, at schools and leisure facilities (Refer to **Figure 4-2**).

Bus stops within Edmondson Park South will be designed to provide seating and information such as timetable and network map. Shelter will not be provided at the bus stops along Macdonald Road during the initial stages of the development as these bus stops will be relocated during the realignment of Macdonald Road.

5.4.3 Bicycle measures**8) Dedicated, high quality cycle routes throughout Edmondson Park South**

Cycle routes are to be provided throughout the proposed development to connect between residential areas, bus stops, schools, local services and other recreational facilities. Therefore these routes will provide for connections for all journey purposes for employment and education, as well as leisure and recreation. The initial routes will form part of 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.

9) 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.

10) 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.

5.4.4 Pedestrian Measures**11) A highly permeable and safe pedestrian network throughout Edmondson Park South**

A high quality pedestrian network will be provided throughout the proposed development through continuous pedestrian footpaths and pedestrian crossing facilities at key locations. The design of a high quality, highly permeable and safe 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.

12) 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.

5.4.5 Travel planning measures**13) 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.

5.4.6 Travel demand management measures**14) 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.

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

Additional measures which can be encouraged through promotion in the HIPs 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.

16) 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 5-2 provides a summary of the proposed Sustainable Travel Strategy measures.

Table 5-2: 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	Timing of bus services and development staging – early 'Start up' buses
4	Integration of public transport services
5	Bus service frequencies to Service Planning Guidelines
6	Bus service coverage
7	Good quality bus stops
Bicycle Measures	
8	Dedicated, high quality cycle routes
9	Bicycle User Group
10	Promotion of bicycle initiatives
Pedestrian Measures	
11	Highly permeable and safe pedestrian network
12	Walking school bus program
Travel Planning Measures	
13	School travel plans
Travel Demand Management Measures	
14	Car sharing scheme
15	Sustainable home deliveries of groceries
16	Community garden and farm

Source: AECOM, July 2010

6.0 Traffic Impact Assessment

6.1 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 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 impacts of Stage 1 development in other future years (2016 and 2026) have been assessed as part of the overall Concept Plan and are documented in the overall TMAP.

6.2 Road network impact assessment

6.2.1 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 2-2**) 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 6-1**.

Table 6-1: 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%
221	664	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.

The modelling has also assumed full development of Ingleburn Gardens by 2012 and will generate approximately 200 vehicular trips during the peak hours.

6.2.2 Trip distribution and assignment

Trip distribution has been based on existing journey-to-work patterns as described in **Section 2.2.3**. 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.

6.2.3 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).

6.2.4 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 D**.

Table 6-2 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 D**.

Table 6-2: 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.

6.2.5 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.

6.2.6 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.

6.2.7 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; and
- All internal road network, footpaths and cycleways to service Stage 1 development.

7.0 Package of Measures

7.1 Introduction

This section provides a summary of the package of measures recommended for the successful delivery of the proposed Stage 1 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.

7.2 Package of measures

An integrated package of measures has been identified for the Stage 1 development. **Table 7-1** provides a summary of the recommended measures responsible by Landcom as part of the proposed Edmondson Park South development.

7.3 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 cost¹. J. Wyndham Prince has provided costs for the civil and infrastructure upgrade works.

Table 7-1 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 7-1: Edmondson Park South proposed package of measures (for Stage 1 development only)

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 (for 221 households only)	\$13,260
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
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)		\$7,000,000
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		\$220,000

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.

8.0 Summary and Conclusions

8.1 Introduction

Stage 1 of the proposed Edmondson Park South development will comprise the creation of 206 residential lots, 8 super lots for future subdivision 15 Environmental Living lots (as shown in **Figure 4-1**). It is expected that construction of Stage 1 development will commence by the end of 2010 and be completed by 2012.

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 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.

Stage 1 development also requires the delivery of a number of road network and intersection improvements to cater for the traffic generated by the development. A new intersection is expected to be constructed along Macdonald Road to provide vehicular traffic to Stage 1 of the development. Internal road network, footpaths and cycleways will also be constructed to facilitate safe and efficient pedestrian, cyclist and bus movements between the development and regional centres as well as other transport hubs.

8.2 Key recommendations

The recommendations of this study are reflected in the package of measures developed for the project discussed in **Section 7**.

Key points of this package include:

- Sustainable travel strategies, to include measures such as provision of a bicycle to each household, marketing of public transport options, or free travel passes.
- Infrastructure improvements to provide easy pedestrian and cyclist access via a safe and efficient shared path and footpath network within the proposed development and connecting to public transport services at Macdonald Road during the initial stages of the development.
- Public transport infrastructure, including well-designed bus stops to provide safe and convenient means for the future residents to use public transport services.
- Transport service improvements, including the implementation of a new bus service connecting the development with Liverpool.
- Road infrastructure upgrades to provide access to the site via a new intersection at Macdonald Road.

As a comprehensive package of measures, this will meet the needs of future residents of Stage 1 of the proposed Edmondson Park South development, while achieving a mode shift towards public transport.

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 <i>SEPP (Major Development) 2005</i>, <i>SEPP 44</i>, <i>SEPP 55</i>, <i>SEPP (Infrastructure) 2007</i>, <i>SEPP (Sydney Region Growth Centres) 2006</i>, <i>Liverpool Local Environmental Plan 2008</i>, <i>Campbelltown (Urban Area) Local Environmental Plan 2002</i>, <i>Metropolitan Strategy</i>, and <i>draft South West Subregional Strategy</i>; (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 <i>draft South West Subregional Strategy</i>. (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 <i>Western Sydney Code of Practice 2003</i>. (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 <i>SEPP 55</i> 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 to 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)

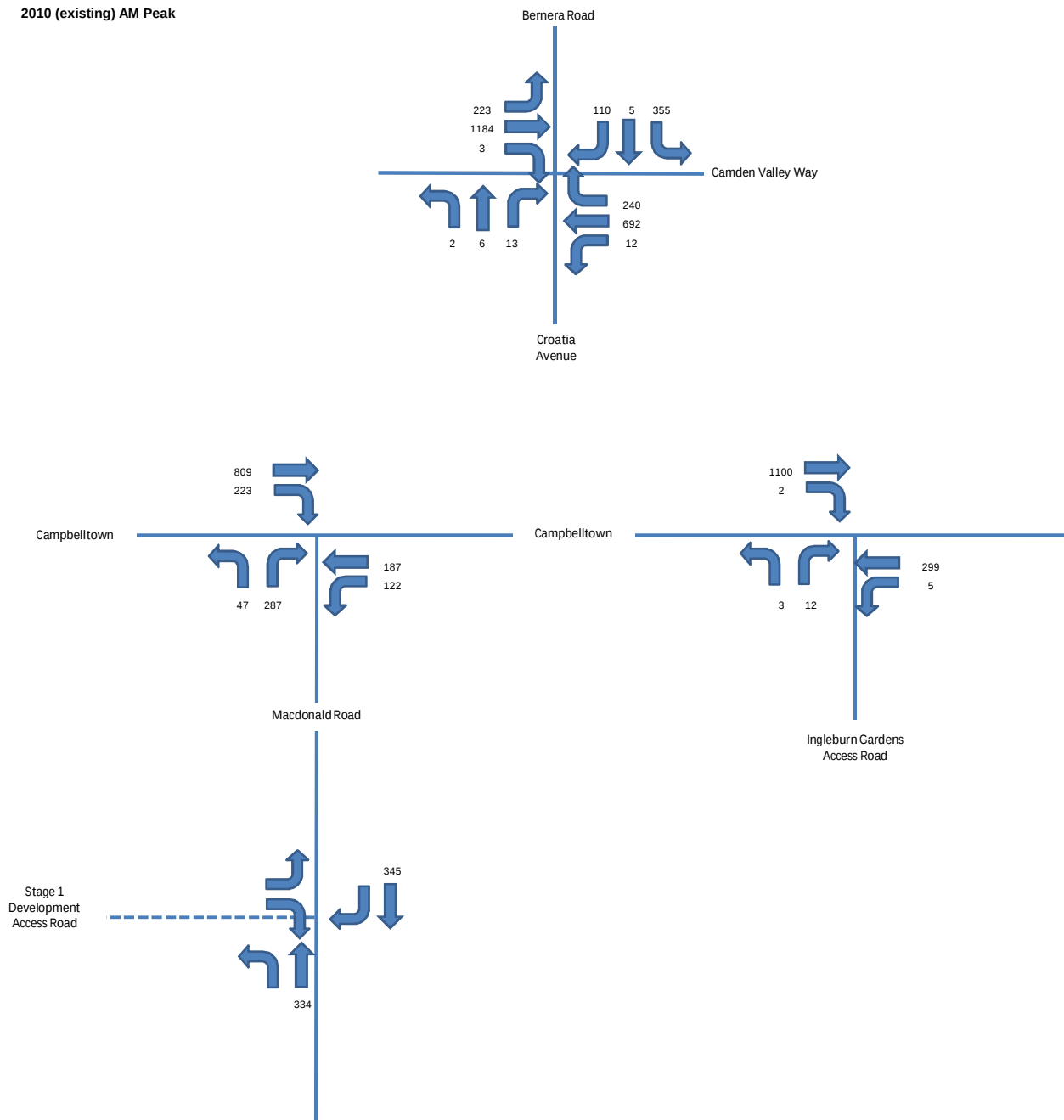
DGR 3: Construction Impacts

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.

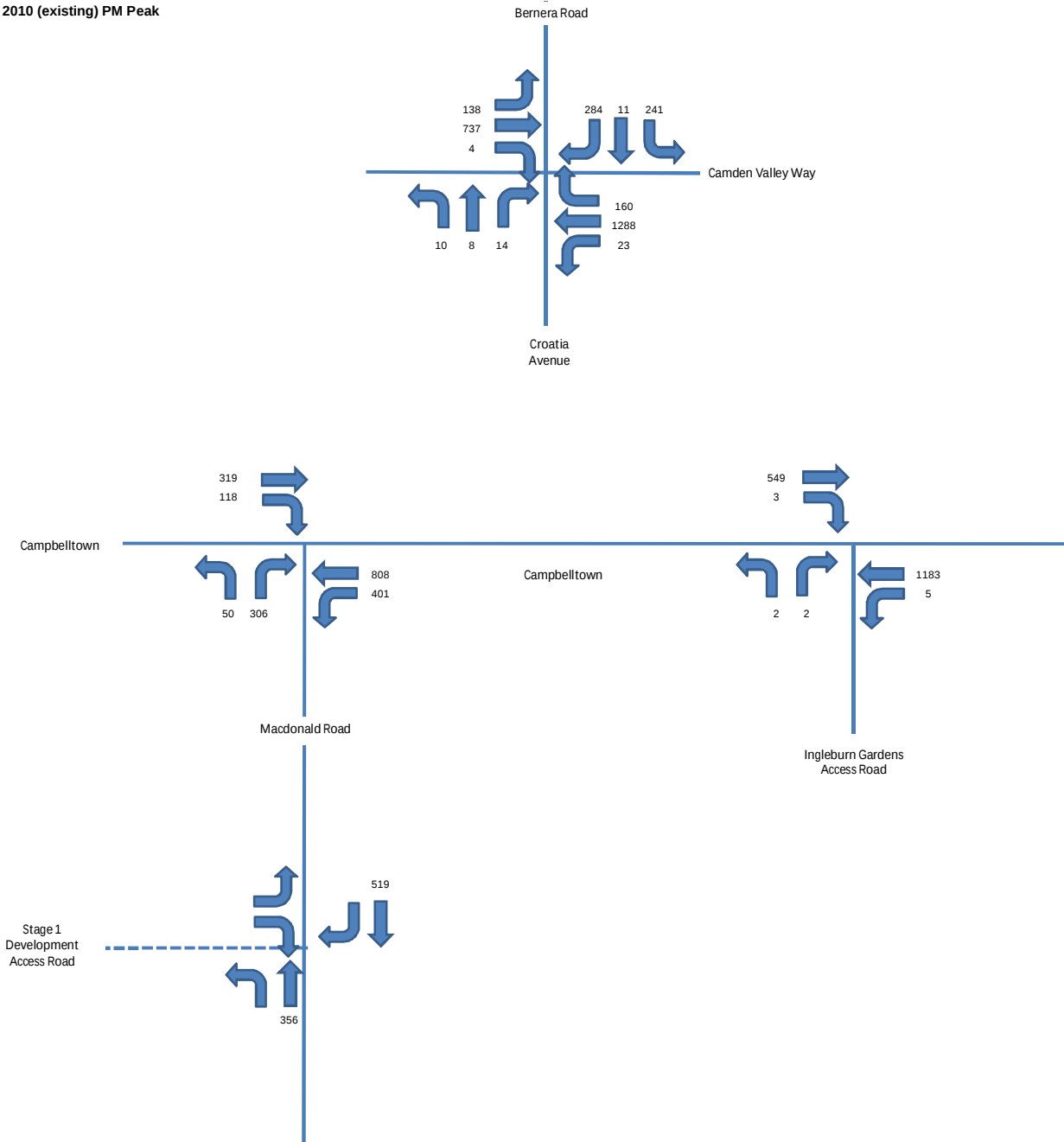
- A high-level construction traffic impact statement for Stage 1 development has been included in Section 7.2.6 of the Concept Plan TMAP.

Existing (2010) Traffic Volumes and Intersection Performance

2010 (existing) AM Peak



2010 (existing) PM Peak





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



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



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



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

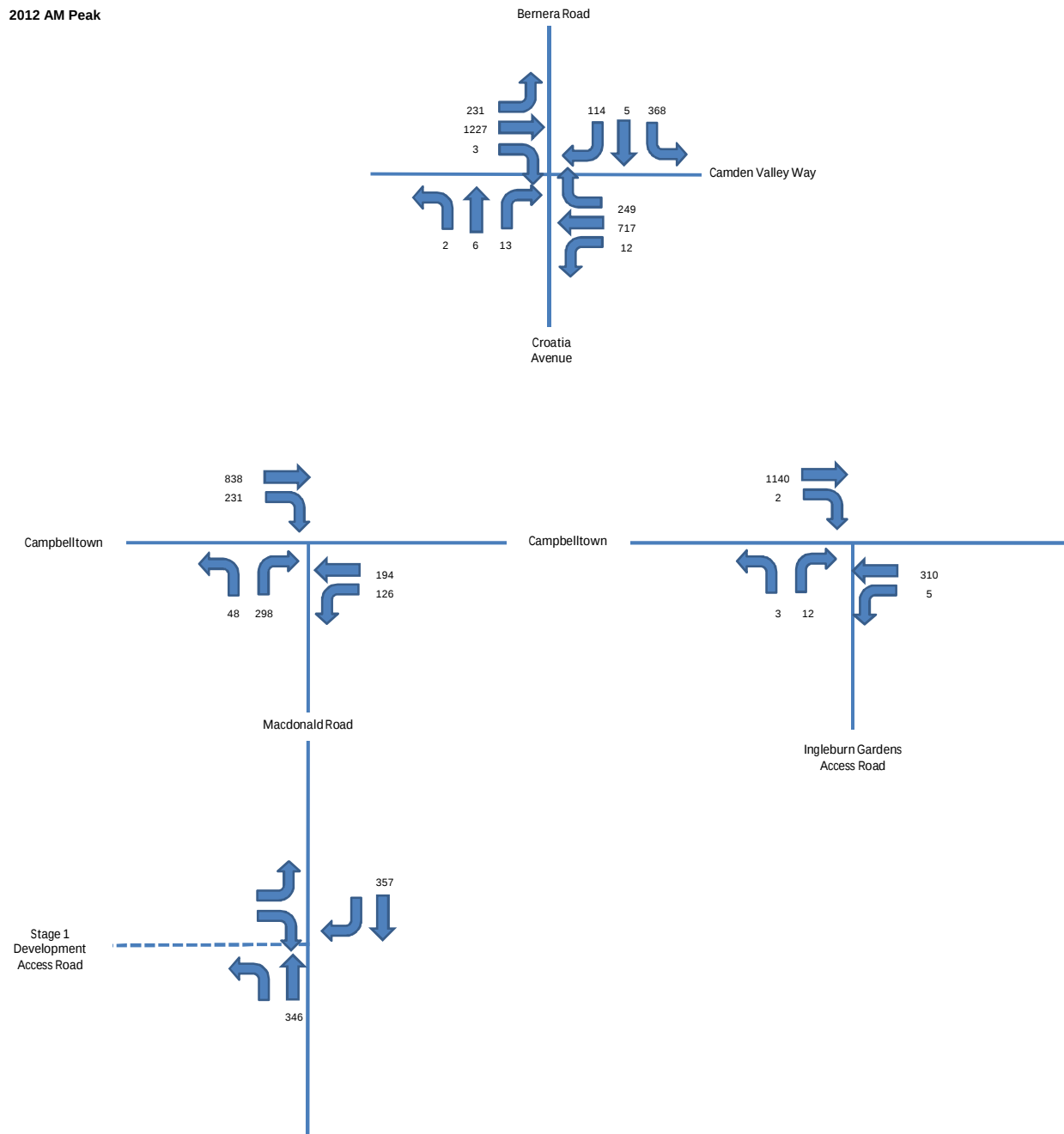
x = 1.00 for Short Lane with resulting Excess Flow

* x = 1.00 due to minimum capacity

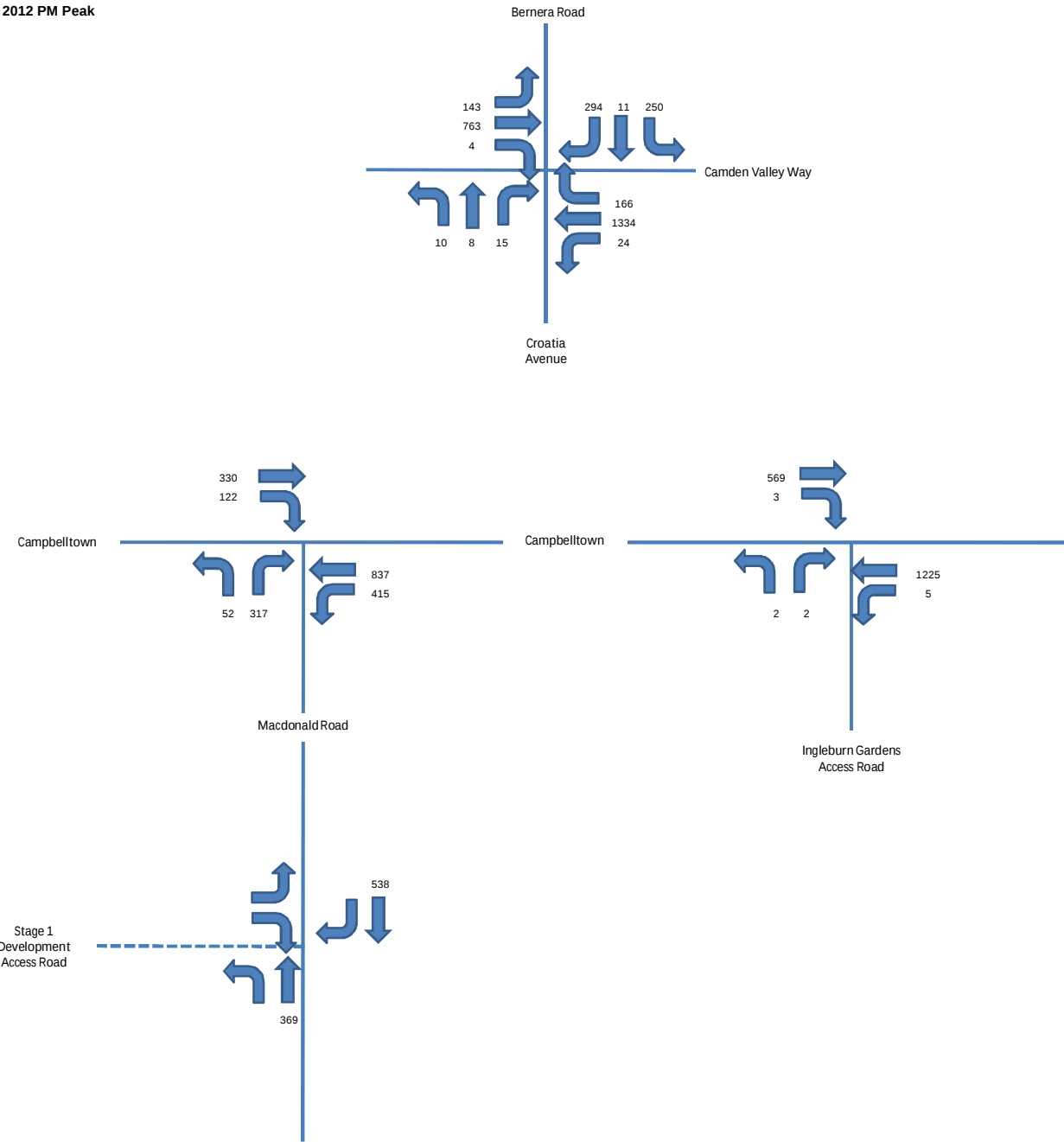
Following LOS

Future Base (2012) Traffic Volumes and Intersection Performance

2012 AM Peak



2012 PM Peak





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



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



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



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

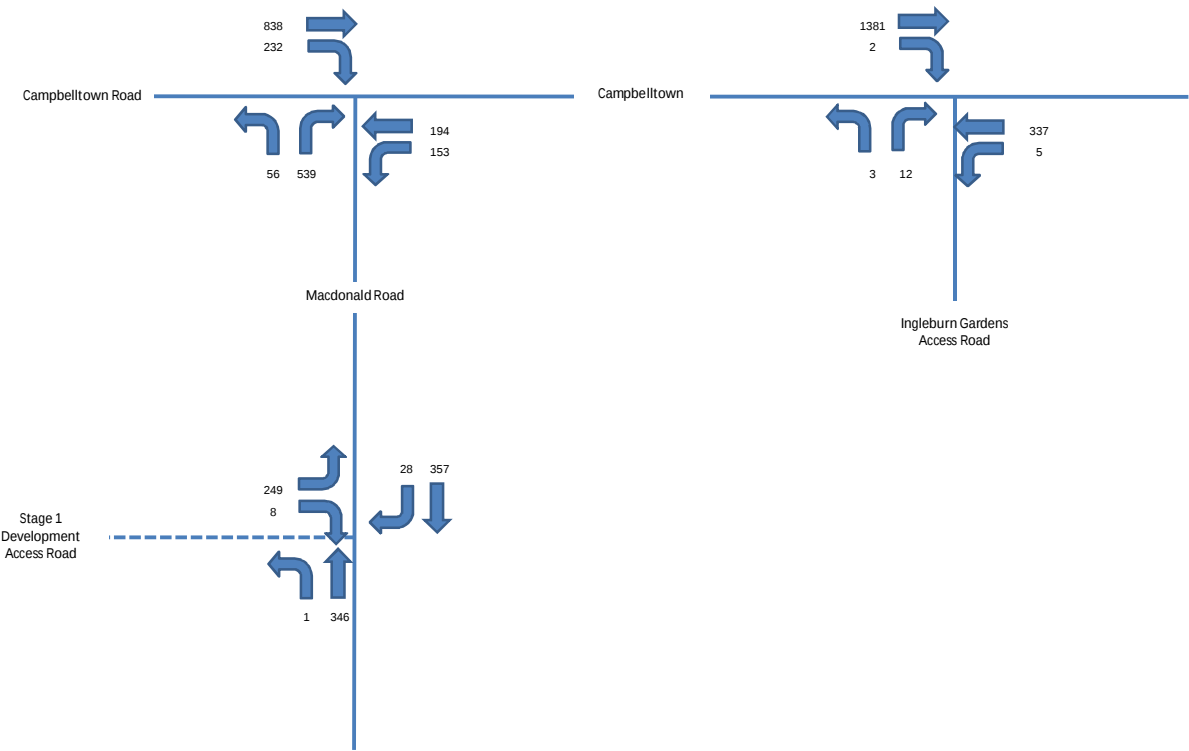
x = 1.00 for Short Lane with resulting Excess Flow

* x = 1.00 due to minimum capacity

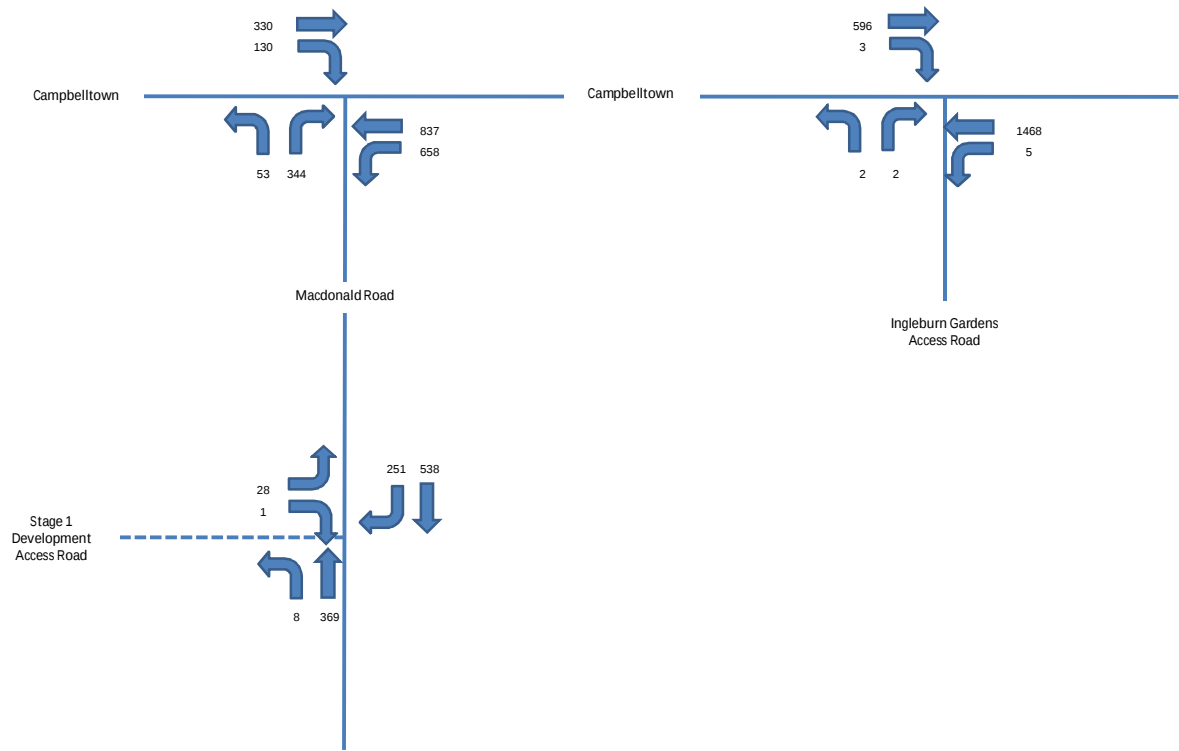
Following LOS

Future Development (2012) Traffic Volumes and Intersection Performance

2012 AM Peak with development



2012 PM Peak with development





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



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



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



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



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



Site: 2012 AM + dev

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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



Site: 2012 PM + dev

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\4_Macdonald_Stage 1 access existing and 2012.aap

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