



Gazcorp  
813-913 Wallgrove Road  
Traffic Impact Assessment

23 August 2013



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Appendix A – Swept Path Analysis

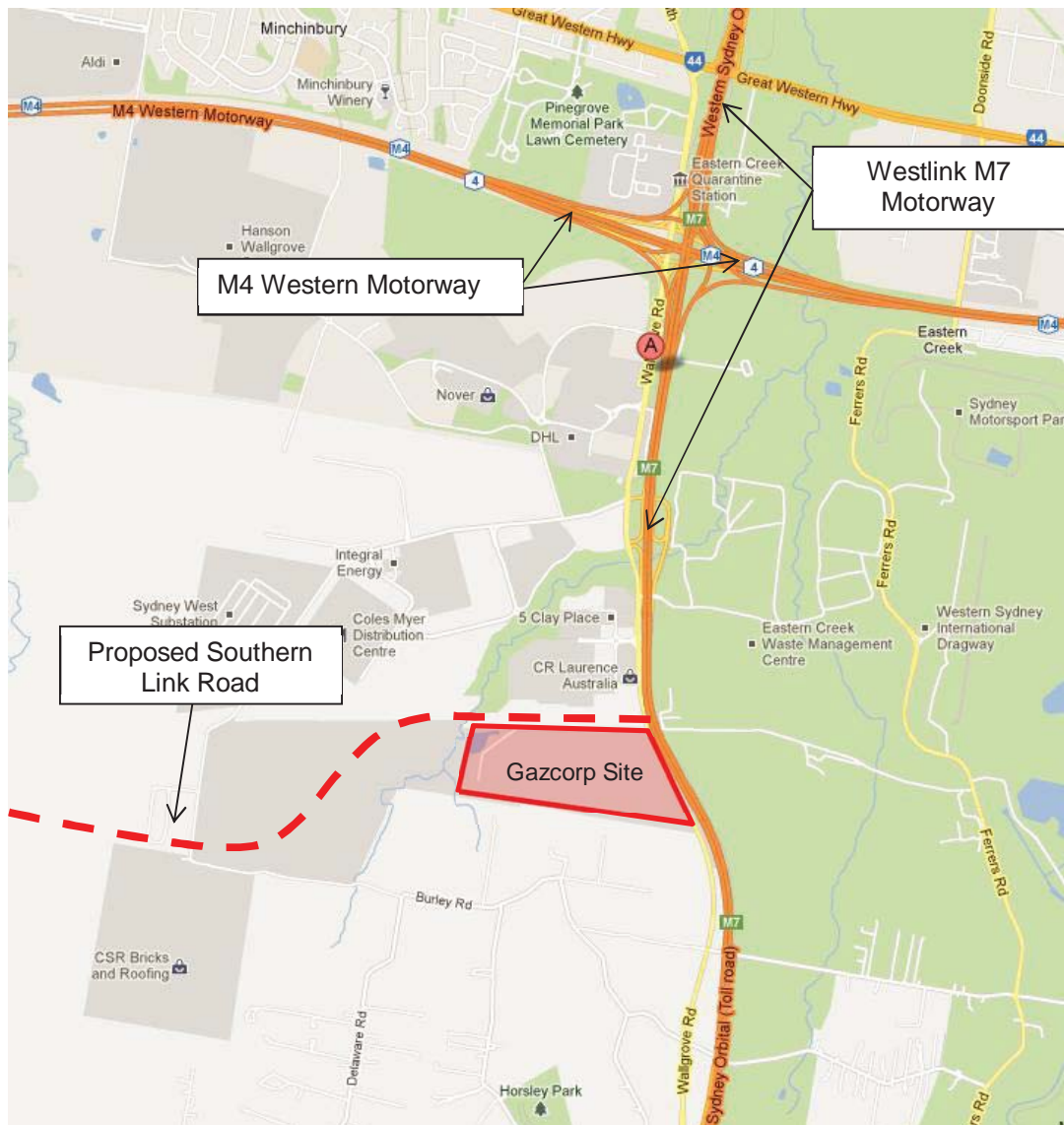
Appendix B – Detailed SIDRA Outputs

# 1. Introduction

## 1.1 Overview

This report has been prepared by GHD Pty Ltd (GHD) on behalf of Gazcorp who are proposing an industrial development within the Western Sydney Employment Area (WSEA). The site is located at 813-913 Wallgrove Road, Horsley Park and is approximately 52 ha in size.

Figure 1 – Site Location



Source: Google Maps, 2013

## 1.2 Study Scope

GHD have undertaken a traffic impact assessment of the proposed Gazcorp site, detailing the existing conditions, the traffic generation of the site and the proposed network improvements required to mitigate the impacts of this additional traffic as well as advised on design requirements for parking and traffic management.

This report has been prepared by GHD for Gazcorp and may only be used and relied on by Gazcorp for the purpose agreed as set out in Section 1.1 of this report.

GHD otherwise disclaims responsibility to any person other than Gazcorp arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in Section 1.3 of this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Gazcorp and others who provided information to GHD (including Government authorities)], which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

### 1.3 Assumptions

This report has been based on the following documents and assumptions:

- In discussion with RMS on 27 March 2013 it was agreed that traffic generation based on a rate of 15 trips per developable hectare was an appropriate traffic generation rate.
- Traffic forecasts for Wallgrove Road and the proposed Southern Link Road are based on modelling undertaken as part of the *Old Wallgrove Road (Roberts Road to M7 Motorway) Review of Environmental Factors (RMS 2012)*.
- Widening of Wallgrove Road to two lanes in each direction has been assumed, as detailed in the concept design assessed in the *Old Wallgrove Road (Roberts Road to M7 Motorway) Review of Environmental Factors (RMS 2012)*.
- Construction of the proposed Southern Link Road connecting to Wallgrove Road as a four lane arterial, as per concept designs provided by the Department of Planning and Infrastructure.
- Details of the site and proposed land use are based on *Preliminary Environmental Assessment Report Request for DGRs State Significant Project – JBA Planning (March 2012)*.

### 1.4 Report Structure

This Traffic Impact Assessment report discusses the following:

- Existing Conditions – a review of existing road features, adjacent developments, traffic volumes, pedestrian facilities, sight distances and crash data;
- Proposed Development– a review of additional traffic generated from the proposed facility, proposed access/egress arrangements and parking facilities; and
- Development Impact– an assessment of sightline distances and the performance of the existing intersections (queues, delays, level of service and safety).

## 2. Existing Conditions

This section outlines the existing conditions around the Gazcorp site including traffic conditions on Wallgrove Road in the vicinity of the site. This includes the profile of the development, the existing transport and accessibility conditions and the existing road network performance.

### 2.1 Existing Road Network Characteristics

The classification of roads on the existing road network can be used as an indication of the functional role each road plays with respect to the volume of traffic they should appropriately carry. NSW Roads and Maritime Services (RMS) have developed a set of road hierarchy classifications detailed in Table 1 indicating typical nominal volumes expressed in terms of average annual daily traffic (AADT) serviced by various classes of roads.

Table 1 Functional Classification of Roads

Type of Road	Traffic Volume (vpd)*	Peak Hour Volume (vph)**
Motorways/Freeways	>15,000	>5,600
Arterial Road	>15,000	1,500 – 5,600
Sub-Arterial Road	5,000 – 20,000	500 – 2,000
Collector Road	2,000 – 10,000	200 – 1,000
Local Road	<2,000	0 – 200

Source: NSW Roads and Maritime Service (formerly NSW RTA), Road Design Guide and AMCORN

Note: \* vpd – vehicles per day

\*\* vph – vehicles per hour

#### 2.1.1 Wallgrove Road

Wallgrove Road is a four lane, two way road which connects Elizabeth Drive and the Great Western Highway. Wallgrove Road is classified as an arterial road and runs parallel to the M7 Motorway with direct connections to both the M7 and M4 Motorways. The road is divided to the north of Old Wallgrove Road and undivided running south of the Wallgrove Road-M7 Motorway intersection.

The speed limit on Wallgrove Road in the vicinity of Old Wallgrove Road intersection is 70 km/h and carries around 30,000 vehicles per day.



*Wallgrove Road viewed southward from the Wonderland Drive intersection*

### 2.1.2 Westlink M7 Motorway

The M7 Motorway is a high capacity road link of national significance and was built to accommodate future traffic growth. The M7 Motorway provides a key western link between the M2 Motorway (to the north) and the M5 Motorway (to the south). In the vicinity of the study area the M7 Motorway has four traffic lanes with a divided carriageway and a major interchange at the M4 Motorway.

The speed limit on the M7 Motorway in the vicinity of the Old Wallgrove Road study area is 100 km/h, and carries around 70,000 vehicles per day.



*Westlink M7 Motorway viewed northward approaching the Old Wallgrove Road (southbound) ramps*

### 2.1.3 M4 Western Motorway

The M4 Western Motorway is a high capacity road link of national significance and is the primary east-west connection to western Sydney. The M4 Motorway provides a key western link between the inner west of Sydney to the M7 Motorway and the Blue Mountains. In the vicinity of the study area the M4 Motorway has six traffic lanes with a divided carriageway and a major interchange at the M4 Motorway.

The speed limit on the M7 Motorway in the vicinity of the Old Wallgrove Road study area is 110 km/h, and carries around 100,000 vehicles per day.



*M4 Westerns Motorway viewed westward approaching the Old Wallgrove Road ramps*

### 2.1.4 Proposed Southern Link Road

The Southern Link Road is a new road that has been proposed along an east-west alignment between Wallgrove Road and Mamre Road, running south of the Sydney Catchment Authority pipeline. This road was proposed as a part of the Erskine Park Link Road project and is currently under investigation by the Department of Planning and Infrastructure. Current concept design has identified that this road will be a four lane dual carriageway arterial road, and will run along the northern border of the Gazcorp site (adjacent to the SCA pipeline) to meet Wallgrove Road at the location of the current Austral Bricks Access Road at a signalised intersection.

## 2.2 Public Transport

### 2.2.1 Rail services

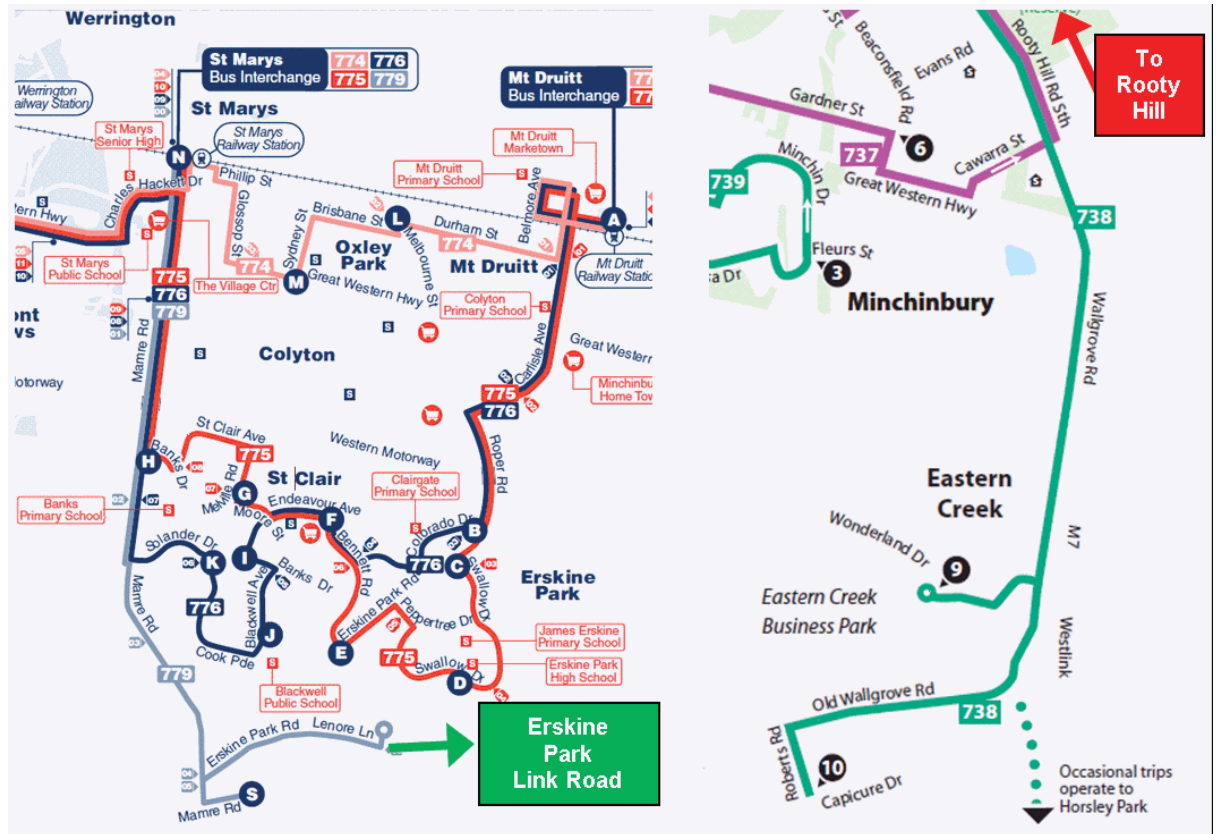
CityRail's Western Line runs to the north of the WSEA, linking Penrith and Richmond with Sydney CBD and the North Shore, running via Parramatta and Strathfield.

Rooty Hill and Mount Druitt stations along the Western Line are located some four kilometres to the north of the WSEA. There are around six to eight services per hour to the CBD in the morning peak serving Mount Druitt Station, and around four per hour to Penrith.

### 2.2.2 Bus services

Figure 2 provides an understanding of existing bus services serving the WSEA and operating in the vicinity of Old Wallgrove Road and Wallgrove Road.

Figure 2 - Current WSEA Bus Service Routes



Sources: <http://www.busways.com.au> and <http://www.cdcbus.com.au>

The information in Table 2 indicates the two bus routes provide two to three hourly services in the weekday peak. Future growth will require a regular review of the adequacy of bus service provision, in accordance with the *Metropolitan Bus Service Planning Guidelines* developed by the Department of Transport.

Table 2 Bus Services to Western Sydney Employment Area

Bus Route Number and Operator	Servicing Area	Weekday Peak Frequency	Weekday Non-Peak Frequency	Weekend Frequency
738 (Busways)	Wallgrove Road <i>(Capicure Drive/ Old Wallgrove Rd to M4)</i>	<u>AM:</u> 20 Minutes	<u>AM:</u> 6:30 – 8:50 <i>Inbound and Outbound</i>	30 Minutes (4:50am – 10am, 2:23pm – 7:23pm) <i>Inbound and Outbound</i>
		<u>PM:</u> 20 Minutes	<u>PM:</u> 3:23 – 5:43 <i>Inbound and Outbound</i>	
	Wallgrove Road <i>(Horsley Park to M4)</i>	N/A	N/A	10:07 am <i>Inbound and Outbound</i> 2:14 pm <i>Inbound and Outbound</i>

Sources: <http://www.busways.com.au> and <http://www.cdcbus.com.au>

## 2.3 Pedestrian and Cycle Facilities

There are currently no pedestrian or cycle facilities on Wallgrove Road in the vicinity of the site, as the current industrial, freight and logistics land uses in the area are not conducive to high proportions of pedestrian and cyclist commuters. There is a cycleway on the eastern side of the Westlink M7 Motorway and proposals for the upgrade of Old Wallgrove Road assessed as part of the *Old Wallgrove Road (Roberts Road to M7 Motorway) Review of Environmental Factors (RMS 2012)* have identified that a shared path will be provided along the western side of Wallgrove Road for the length of the upgrade from two lanes to four lanes.

## 2.4 Existing Road Network Performance

### 2.4.1 Existing Traffic Volumes

Traffic volumes of the road system within this study area were derived from average daily traffic volumes (ADT) counts, obtained from RMS and surveys undertaken for the *Old Wallgrove Road Upgrade Traffic and Transport Report (GHD 2012)*. Classified link counts were conducted from the 21 – 23 February 2011 at the following locations:

- Wallgrove Road - Between M4 Motorway and Interchange Drive (North and Southbound).
- Wallgrove Road - Between the Eastern Creek Waste Management Centre access road and the Sydney Water Pipeline (North and Southbound).
- M7 Motorway – North and Southbound.

A summary of traffic volume data is detailed in Table 3.

Table 3 Average Daily Traffic (ADT) Data – February 2011

Location	ADT
M7 Motorway – North and Southbound	68,400
Wallgrove Road – Between M4 Motorway and Interchange Drive (North and Southbound)	30,600
Wallgrove Road – Between the Eastern Creek Waste Management Centre access road and the Sydney Water Pipeline (North and Southbound)	23,900

Source: February 2011 M7 Motorway and GHD Traffic Volume Counts

The daily traffic volumes indicate that significant volumes are already accommodated on the M7 Motorway and Wallgrove Road.

#### 2.4.2 Existing Peak Hour Traffic

The traffic assessment undertaken for this study focuses on impacts during the AM and PM peak periods, when demand for traffic capacity in the surrounding network is perceived to be at its highest. The existing peak hour traffic volumes are outlined in Table 4.

Table 4 Peak Hour Traffic Volumes (2011)

Road	Location	Peak	Total Vehicles (two-way in veh/h*)	HCVs* (per cent)
M7 Access	At Old Wallgrove Road	AM (0700-0800)	4,877	18%
		PM (1700-1800)	4,988	11%
Wallgrove Road	North of Old Wallgrove Road	AM (0800-0900)	2,388	15%
		PM (1700-1800)	2,305	15%
Wallgrove Road	South of Old Wallgrove Road	AM (0700-0800)	1,769	10%
		PM (1700-1800)	2,016	10%

Source: February 2011 GHD Traffic Volume Classification and Intersection Movement Count Data

\* Note: HCV – Heavy & commercial vehicles and veh/h is measured as vehicles per hour.

#### 2.4.3 Assessment Criteria (Level of Service)

The performance of the existing road network is largely dependent on the operating performance of key intersections that are critical capacity control points on the road network. The capacity of a road network is generally governed by the operation of its intersections. It is therefore appropriate to consider intersection operation as a measure of capacity of the road network.

The 'Level of Service' (or LoS) is the standard measure used to understand the operational performance of the network and intersections. In general there are six levels of service from LoS A to LoS F, with LoS A representing the best performance and LoS F the worst. For the purposes of this study, the target operational performance for intersections will be LoS D to determine the need for upgrading and/or mitigation.

The assessment of intersection operation is based on criteria outlined in Table 5, as defined by the NSW Roads and Traffic Authority (*Guide to Traffic Generating Developments*, RTA 2002).

Table 5 Level of Service Criteria for Intersections (RTA 2002)

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabouts	Give Way & Stop Signs
A	< 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity; at signals, incidents will cause excessive delays  Roundabouts require other control modes	At capacity, requires other control mode
F	> 70	Over Capacity Unstable operation	Over Capacity Unstable operation

Source: RTA Guide to Traffic Generating Developments (2002)

Notes: 1. The average delay assessed for signalised intersections is over all movements.

#### 2.4.4 Existing Intersection Operations

It is noted that there is currently no intersection access to the Gazcorp Site. There is an existing gated access into the Gazcorp site, which is opposite the existing Austral Bricks Access Road. The Austral Bricks access road is a two-lane two-way access road that connects Wallgrove Road with a number of industrial lots on the eastern side of the Westlink M7, and connects to Wallgrove road at a priority intersection.

Intersection capacity and Level of Service (LoS) analysis has been undertaken for the current Austral Brick access intersection during peak period conditions (AM and PM peak) using SIDRA intersection modelling. SIDRA calculates capacities, queue lengths and delays for traffic signals, roundabouts and priority controlled intersections. This analysis is presented in Table 6.

Table 6 Existing Intersection Operations (2013)

Intersection	AM Peak				PM Peak			
	Average Delay	LoS	Control Type	Degree of Saturation	Average Delay*	LoS	Control Type	Degree of Saturation
Wallgrove Rd and Austral Bricks Access Rd	122	F	Priority	0.65	81	F	Priority	0.58

Note: \* Average delay is given in seconds per vehicle.

SIDRA intersection modelling of the existing Austral Bricks Access Road intersection shows that this intersection is currently operating over capacity due to high delays for traffic exiting from the Austral Bricks Access. While intersection analysis indicates that this intersection is performing with excessive delays, these delays are only for heavy vehicles turning right out of the Austral Bricks Access. This movement is very low during the peak period (less than 50 vehicles per hour) and analysis of road safety trends (as detailed in Section 2.5) does not indicate any safety issues with this intersection.

## 2.5 Existing Road Safety Trends

The project will impact on the operations of Wallgrove Road and surrounding intersections. Historical crash data has been evaluated as part of this study to obtain an understanding of current characteristics and trends.

### 2.5.1 Wallgrove Road

RMS Crash Analysis Section has supplied GHD with crash statistics for Wallgrove Road between Old Wallgrove Road and The Horsley Drive for the years 1 July 2007 – 30 June 2012. A summary is shown in Table 7. The crash data was used to determine the main factors contributing to crashes along Wallgrove Road.

Table 7 Crash History – Wallgrove Road (2008-2011 Complete Years)

Year	Total Crashes	Injury	Fatal
2008	24	18	0
2009	17	16	0
2010	15	8	0
2011	15	8	0
<b>Total</b>	<b>71</b>	<b>50</b>	<b>0</b>

Source: RMS Crash Data (2013)

The crash data reveals the following:

- In total 81 crashes occurred along the surveyed section of Wallgrove Road over a five-year period, between 1 July 2007 and 30 June 2012 which is an average of 0.04 per day or 16.2 per year.
- 53 per cent of the crashes resulted in an injury and there were no fatalities recorded.
- 89 per cent were multi-vehicle crashes.
- 89 per cent occurred on a weekday.
- 22 per cent occurred in wet conditions and 31 per cent in poor visibility or darkness.
- Speed and fatigue were contributing factors in 16 per cent of the crashes.
- 64 per cent of crashes occurred at intersections with 28 per cent being rear end crashes and 12 per cent opposing vehicles turning.

The crash statistics indicate that a relatively higher number of crashes occurred at intersections and involved a vehicle turning right colliding with a vehicle travelling in the opposite direction. The recent upgrade of the Old Wallgrove Road with Wallgrove Road and the M7 Motorway intersection was targeted at addressing this trend and related safety issues.

## 3. Proposed Gazcorp Industrial Estate

This section outlines the proposed Gazcorp development and details the land uses and proposed accesses connecting the site with the surrounding road network.

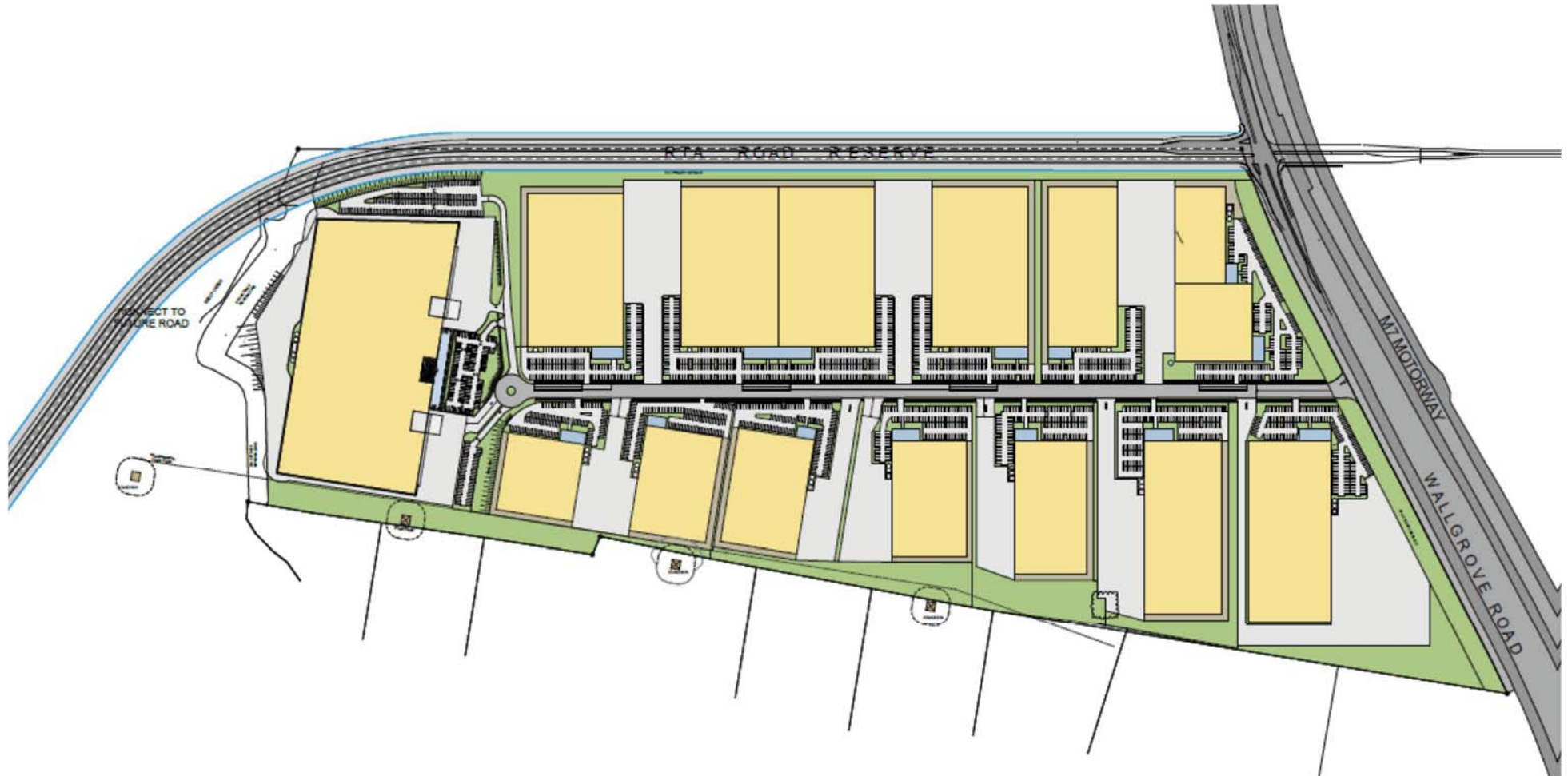
### 3.1 Overview – Proposed Industrial Estate

Gazcorp are proposing to develop land within the WSEA as an industrial estate. The site is approximately 52 ha in size and located at 813-913 Wallgrove Road, Horsley Park. Of the 52 ha, approximately 40 Ha are developable and will be used to house primarily warehousing and logistics businesses, with smaller lots occupied by industrial premises.

This report assesses the traffic impacts of the proposed development which involves the construction and operation of a warehouse and distribution facility, including ancillary offices of up to 40,000 sqm on the western portion of the site, as well as the ultimate full development of the site.

A plot of the proposed master plan for the site is shown in Figure 3.

Figure 3 - Proposed Master Plan



## 4. Traffic Impacts

### 4.1 Proposed Traffic Generation

The development of the site has been proposed in two stages, the first stage of which will involve the development of a large parcel on the western end of the site of some 10.5 ha. As the ultimate development of 40 developable ha is planned to be completed before 2031, this assessment has focussed on traffic impacts and requirements for the ultimate scenario at 2031.

A summary of traffic generation of the two stages is shown below in Table 8.

Traffic generation for industrial sites can be calculated based on a number of methods including:

- **Gross Floor Area (GFA):** The *RTA Guide to Traffic Generating Developments (2002)* recommends that a trip generation rate of 0.5 trips per 100 m<sup>2</sup> of GFA in the peak hour for warehouse properties
- **Employees:** The *RTA Guide to Traffic Generating Developments (2002)* recommends that a trip generation rate of 307 trips per 1000 employees in the peak hour be used for industrial properties, based on an employee density of 28 employees per developed hectare.
- **Recent Surveys:** surveys of industrial land undertaken by Blacktown found that industrial land within Blacktown and Horsley Park generated traffic at rate of 15 trips per developable hectare. This rate has been used for other developments in the surrounding area, including the Huntingwood Estate as well as Jacfin and Goodman properties within the Western Sydney Employment Area.

Comparison of the three methods of determining trip generation shows that trip generation based on GFA is roughly double that calculated on the basis of employees, with the recent Blacktown surveys being between the two rates. The trip generation rates provided in the *RTA Guide to Traffic Generating Developments (2002)* are based on surveys undertaken in the 1970s, when industrial land was of a significantly different nature to that currently proposed for the Gazcorp Site. It is therefore appropriate to use the Blacktown Council rate of 15 trips per developable Hectare.

At a site meeting dated 27<sup>th</sup> March 2013, RMS and GHD agreed on the traffic generation rate of 15 trips per developable hectare. This has therefore been used for this assessment.

Table 8 Potential Traffic Generation

Stage	Component	Site Area	Peak Hour Traffic Generation Rate	Peak Hour Trips
1	Operational warehouse and distribution facility including ancillary offices	10.51 ha	15 trips per developable hectare	157
Ultimate	Operational warehouse and distribution facility including ancillary offices	40 Ha	15 trips per developable hectare	600

## 4.2 Proposed Access Arrangements

The site has a 680 m frontage to Wallgrove Road on the east border. Along its northern boundary is the Sydney Catchment Authority (SCA) pipeline. Department of Planning and Infrastructure, in conjunction with RMS have proposed the construction of the Southern Link Road to serve the Western Sydney Employment Area. This new road is proposed to connect to Wallgrove Road in a road reserve between the SCA pipeline and the Gazcorp Site at the location of the current Austral Bricks Access.

An on-site meeting was undertaken on 27 March, 2013 to discuss the proposed access arrangements for the site. At this meeting, it was agreed that the proposed Southern Link Road is expected to connect to Wallgrove Rd at a signalised intersection. While the current Gazcorp master plan only shows a single signalised access on to Wallgrove Road, it was agreed that three access scenarios for the site would be tested. These scenarios were:

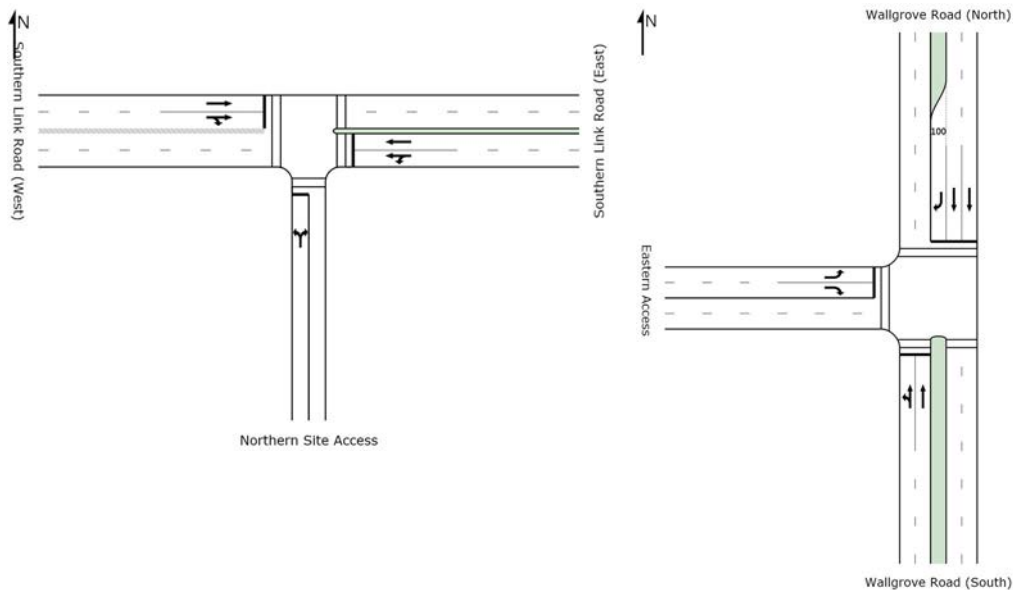
### 4.2.1 Scenario 1

The proposed estate road would connect to the road network via:

- A signalised intersection on the northern edge of the property at the proposed Southern Link Road; and
- A signalised intersection on the eastern edge of the property at Old Wallgrove Road.

Plots of the proposed access layouts for Scenario 1 are shown in Figure 4.

Figure 4 - Scenario 1 Proposed Access Layouts



Proposed Northern Site Access to Southern Link Road

Proposed Eastern Site Access to Wallgrove Road

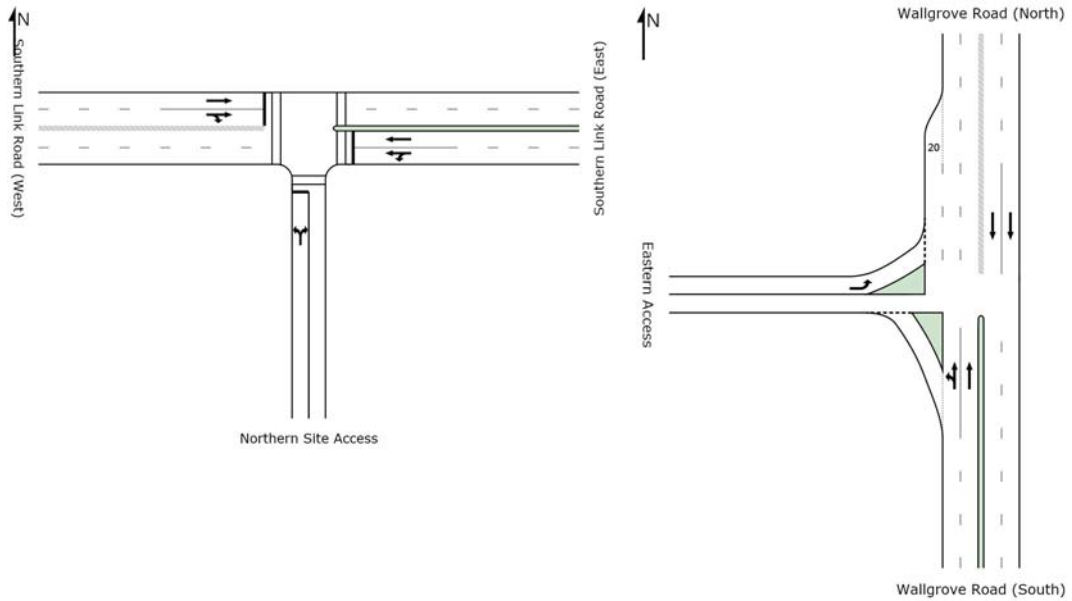
#### 4.2.2 Scenario 2

The proposed estate road would connect to the road network via:

- A signalised intersection on the northern edge of the property at the proposed Southern Link Road; and
- A priority intersection on the eastern edge of the property at Old Wallgrove Road allowing left in and left out movements only.

Plots of the proposed access layouts for Scenario 2 are shown in Figure 5.

Figure 5 - Scenario 2 Proposed Access Layouts



Proposed Northern Site Access to Southern Link Road

Proposed Eastern Site Access to Wallgrove Road

#### 4.2.3 Scenario 3

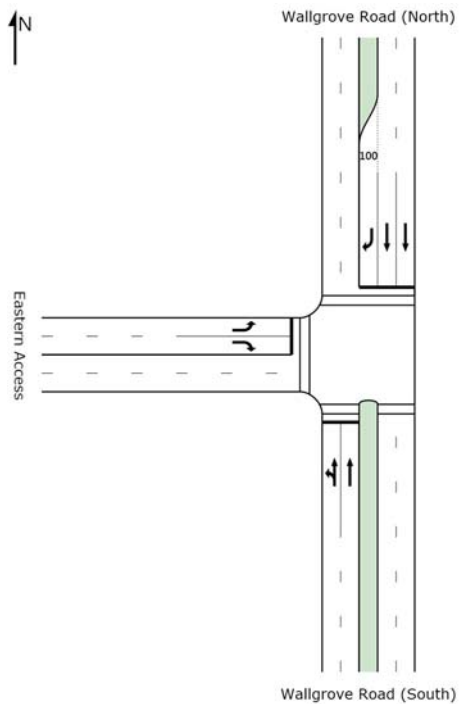
The proposed estate road would connect to the road network via:

- A signalised intersection on the eastern edge of the property with Old Wallgrove Road.

No connection would be provided to the Southern Link Road at the Northern edge of the property under Scenario 3.

Plots of the proposed access layouts for Scenario 2 are shown in Figure 6Figure 5.

Figure 6 - Scenario 3 Proposed Access Layouts



Proposed Eastern Site Access to Wallgrove Road

Under all three of these scenarios, it is assumed that Wallgrove Road will be widened to two lanes in each direction as part of the Old Wallgrove Road upgrade project. This widening is assumed to extend beyond the southern edge of the Gazcorp site. A summary of the various advantages and disadvantages of each access strategy is provided in Table 9.

Table 9 Summary of Access Strategies

Scenario	Advantages	Disadvantages
Scenario 1	Provides full access at both access points	Requires signalisation of all intersections Allows traffic to potentially travel through the development to Southern Link Road Increases intersection delays at Southern Link Road and Wallgrove Road
Scenario 2	Reduces northbound delays along Wallgrove Road Reduces the number of signalised intersections	Intersection of Eastern Access fails Allows traffic to potentially travel through the development to Southern Link Road Increases intersection delays at Southern Link Road and Wallgrove Road
Scenario 3	Allows traffic to enter and exit at a single managed point Reduces average delays at the intersection of Southern Link Road and Wallgrove Road Removes potential for traffic to travel through the development to the Southern Link Road	Increases delays for traffic heading northbound and southbound on Wallgrove Road

### 4.3 Parking Requirements

Fairfield City Council Development Control Plan Chapter 12 Car Parking and Access Management Version 17 provides car parking requirements for Warehouses based on a gross leasable floor area (GLFA). Currently only the gross floor area (GFA) is known and not the GLFA therefore the RMS Guide to Traffic Generating Developments 2002 has been used as an alternative reference as it provides a warehouse rate for GFA.

Table 10 Site Parking Requirements

Stage	Component	Area	Parking Requirements	No. Spaces Required
1	Warehouse and distribution facility	40,000 m <sup>2</sup> GFA	1 space per 300 m <sup>2</sup> GFA	133
	Office	1,000 m <sup>2</sup> GFA	1 space per 40 m <sup>2</sup> GFA	25
			<i>Stage 1 Total</i>	<i>158</i>
Ultimate	Warehouse and distribution facility	192,326 m <sup>2</sup> GFA	1 space per 300 m <sup>2</sup> GFA	641
	Office	5,699 m <sup>2</sup> GFA	1 space per 40 m <sup>2</sup> GFA	142
			<i>Ultimate Development Total</i>	<i>793</i>

A total of 158 parking spaces in total would be required within Stage 1 of this development, with 784 spaced required for the ultimate development.

In accordance with the *Australian Standards AS 2890.1:2004 Parking Facilities, Part 1: Off-street Car Parking*, the parking space measurements will be as follows:

- 2.4 m wide;
- 4.8 m long (car parking is controlled by a kerb which allows overhang); and
- Aisle width of 5.8 m.

Accessible parking spaces are to be provided in accordance with the DCP's Chapter 12 Section 12.5.1 which states 2 spaces are required for every 100 car parking spaces. Therefore a total of 3 accessible parking spaces would need to be proportionally distributed within this development.

The proposed master plan allows for 2,231 parking spaces, which is in excess of those required for the site.

#### 4.3.1 Provision for delivery and service vehicles

The *RMS Guide to Traffic Generating Developments 2002* has been used to determine the required provision for delivery and service vehicles.

**Table 11 RMS Provision for Delivery and Service Vehicles – Stage 1**

Stage	Component	Area	Parking Requirements	No. Spaces Required
1	Warehouse and distribution facility	40,000 m <sup>2</sup>	>8,000 m <sup>2</sup> GFA 10+1 space per 1000 m <sup>2</sup> over 8,000 m <sup>2</sup>	42
Ultimate	Warehouse and distribution facility	192,326 m <sup>2</sup>	>8,000 m <sup>2</sup> GFA 10+1 space per 1000 m <sup>2</sup> over 8,000 m <sup>2</sup>	207

A total of 42 delivery and service vehicle spaces in total would be required within Stage 1 with 194 spaces required for the ultimate development. The proposed 2,231 parking spaces allowed for in the master plan are also sufficient to cater for deliver and service vehicle requirements.

#### 4.4 Circulation and Turning Paths

Swept turning paths for critical circulation movements around the site including parking manoeuvres have been undertaken for both semi-trailers and B-Doubles. These swept paths are shown in Appendix A.

#### 4.5 Traffic Modelling

Strategic traffic modelling of the surrounding regional road network was undertaken for RMS as a part of the Review of Environmental Factors for the proposed upgrade of Old Wallgrove Road. This traffic modelling took into account the traffic generation of the current Western Sydney Employment Area, of which the Gazcorp site is one of the key developments. This traffic modelling is detailed in *Old Wallgrove Road Upgrade Traffic and Transport Report (GHD 2012)*.

#### 4.6 Traffic Growth

The distribution and future expected traffic growth that was forecast as a part Old Wallgrove Road Upgrade Review of Environmental Factors has been used to form the basis the assessment of the Gazcorp site. The traffic generation for the Gazcorp site has already been included within the forecast traffic generation assumed in future modelling of the proposed Old Wallgrove Road upgrade and the development of the Western Sydney Employment area. Therefore the balance of forecast traffic on Wallgrove Road and the proposed Southern Link

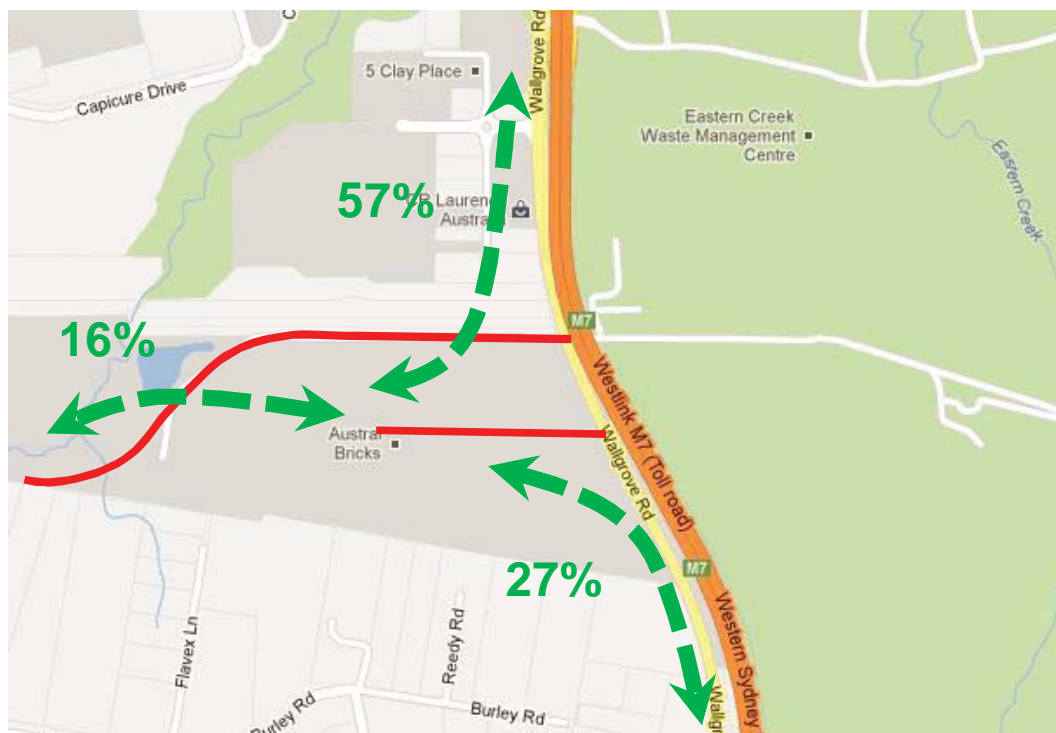
Road form the background traffic growth assumptions that have been used in traffic modelling of intersections providing access to the Gazcorp site.

This assessment addresses the impact of the traffic generation associated with the Gazcorp site along with background traffic growth on the proposed access locations, under the three separate scenarios described in Section **Error! Reference source not found.**

#### 4.7 Proposed Traffic Distribution

Traffic modelling that was undertaken by GHD for the assessment of the proposed upgrade of Wallgrove Road was used to determine the likely distribution of trips from the Gazcorp site. Figure 7 shows the assumed distribution of development traffic from the Gazcorp development based on this traffic modelling work. This distribution shows that the majority of traffic will be travelling to and from the site in a northerly direction, reflecting the proximity of the site to the existing interchange at the Westlink M7 and to a lesser extent the M4 Western Motorway.

Figure 7 –Proposed Traffic Distribution



Source: Google Maps, 2013

#### 4.8 Road Network Performance

SIDRA intersection modelling has been undertaken for each of the three access scenarios using the proposed 2031 traffic generation and background traffic assumptions outlined in Sections 4.1 and 4.6.

Estimated future 2031 traffic flows were analysed using SIDRA for each of the three scenarios to obtain the operation of key intersections in the study area. Proposed intersection layouts and detailed outputs from SIDRA are provided in Appendix B.

A summary of the Scenario 1, 2031 intersection performance is shown in Table 12.

Table 12 Scenario 1- Intersection Performance AM and PM Peak Hour – Traffic Conditions 2031 (with development)

Intersection	Morning Peak			Evening Peak		
	Av Delay (s)	LoS	DoS	Av Delay (s)	LoS	DoS
Northern Access/Southern Link Rd	8	A	0.40	15.0	B	0.64
Wallgrove Road/Southern Link Road/ Austral Access	42	C	0.86	53	D	0.95
Eastern Access/Wallgrove Rd	21	B	0.74	19	B	0.65

The Scenario 1 results show that the proposed new intersections would operate satisfactorily in both the AM and PM peaks in 2031, with the exception of the intersection of Wallgrove Road and the proposed Southern Link Road.

A summary of the Scenario 2, 2031 intersection performance is shown in Table 13.

Table 13 Scenario 2- Intersection Performance AM and PM Peak Hour – Traffic Conditions 2031 (with development)

Intersection	Morning Peak			Evening Peak		
	Av Delay (s)	LoS	DoS	Av Delay (s)	LoS	DoS
Northern Access/Southern Link Rd	11	A	0.40	18	B	0.68
Wallgrove Road/Southern Link Road/ Austral Access	50	D	1.0	55	D	0.95
Eastern Access/Wallgrove Rd	25	B	0.36	845	F	1.88

The Scenario 2 results show that the proposed left-in left-out intersection with Wallgrove Road would not have sufficient capacity to accommodate the expected left turn demand out of the site to the north of Wallgrove Road.

A summary of the Scenario 3, 2031 intersection performance is shown in Table 14.

Table 14 Scenario 3- Intersection Performance AM and PM Peak Hour – Traffic Conditions 2031 (with development)

Intersection	Morning Peak			Evening Peak		
	Av Delay (s)	LoS	DoS	Av Delay (s)	LoS	DoS
Northern Access/Southern Link Rd	-	-	-	-	-	-
Wallgrove Road/Southern Link Road/Austral Access	42	C	0.86	51	D	0.95
Eastern Access/Wallgrove Rd	21	B	0.75	19	B	0.67

The Scenario 3 results show that the proposed new intersections would operate satisfactorily in both the AM and PM peaks in 2031. Furthermore, under scenario 3, right turn traffic at the intersection of the Southern Link Road and Wallgrove Road is reduced, which in turn reduces average delays.

Overall, analysis of the proposed access scenarios shows that the provision of two accesses from the site would require signalisation at both the Southern Link Road and at Wallgrove Road.

By 2031, a left-in left-out arrangement on Wallgrove Road would not have sufficient capacity to cater for the expected left turn demand out of the site.

By limiting access to the site to Wallgrove Road, the number of signalised intersections is reduced and the average delay at the proposed Southern Link Road and Wallgrove Road intersection is also reduced, as a large proportion of traffic that would turn right into the Southern Link Road would now turn right further south. Scenario 3 is thus the preferred access arrangement for the site.

Analysis of queue lengths from the proposed access onto Wallgrove Road under scenario 3 shows that 95<sup>th</sup> percentile queue lengths for both through and right turn movements would not interfere with the proposed Southern Link Road intersection.

## 4.9 Construction Traffic Management

Construction of 813-913 Wallgrove Road is expected to take place in a staged manner, with the first stage constituting the peak construction period. A detailed Development Application for the Stage 1 works at 813-913 Wallgrove Road has been submitted that identifies in greater detail the construction works required. A construction traffic management plan will be appropriately provided as part of detailed construction planning.

For the purposes of this traffic impact assessment, the following general principles for managing construction traffic have been assumed and provide an understanding of the likely impacts of construction scheduling and sequencing.

The staging and sequencing of construction assumes that the development would be constructed with a connection to Wallgrove Road and would involve the following:

- An internal access road connecting to Wallgrove Road
- A new signalised intersection at Wallgrove Road south of the existing Austral Bricks Access, including a 100m right turn bay into the site
- The reservation of land on the northern edge of the site to accommodate the Southern Link Road Access.

As Stage 1 would constitute the peak construction period, when the majority of lead-in works including construction of the access road and the intersection with Wallgrove Road. Consequently, the construction of Stage 1 is assumed to have the greatest impact on the road network during the construction of the development.

The construction programme for the development has not yet been finalised, however the duration of the construction period is estimated to last 15 months for Stage 1, the primary construction activity. This section provides a preliminary assessment of the likely impacts of the expected staging and sequencing of the development and addresses the following:

- Haulage movements;
- Construction periods;
- Construction traffic generation; and
- Access and mitigation measures.

It is recommended that further, more detailed construction traffic management planning be undertaken and that these plans be assessed as and when they become available.

### 4.9.1 Potential Haulage Routes

The primary potential haulage route to and from the site would be via Wallgrove Road, with trucks accessing the site from the M7 Motorway either via the Old Wallgrove Road interchange

from the north or the Horsley Drive interchange from the south. Both routes are currently identified as heavy vehicle routes by RMS. The development would generate additional truck movements along these routes. Given that these routes currently carry high volumes of heavy vehicles, construction of the development would not have a significant impact of heavy vehicle volumes on Wallgrove Road or the M7 Motorway.

The movement of materials would be managed through the scheduling of deliveries and would aim to minimise the number of heavy vehicles accessing the site during peak periods and weekends. Earthworks quantities would be balanced as far as practicable during detailed design to ensure that transfer of material on the external road network is minimised.

#### 4.9.2 Proposed Working Hours

The construction workforce would vary depending on the phase of construction and associated activities and includes both construction and design personnel. An on-site workforce of 30 people for Stage 1 is expected to be the peak working population on site at any given time during the construction period.

Construction works would be undertaken during standard working hours which are assumed to be as follows:

- Monday to Friday: 7 AM to 3 PM
- Saturday: 8 AM to 1 PM
- Sunday and public holidays: No planned work.

It may be necessary to undertake night works to minimise disruption to traffic, particularly during construction within the road corridor. Further construction traffic management planning would be undertaken to ensure that the construction within the road reserve is undertaken in accordance with *RMS Specification D&C G10 (2011)*.

#### 4.9.3 Construction Traffic Generation

Light vehicle traffic generation would be associated with staff movements to and from the site. Staff would be comprised of project managers, various trades and general construction staff. Over the full construction period, the peak workforce is expected to be approximately 30 people, which represents the worst case scenario for vehicle movements during the morning or evening road network peak hour. The workforce arrival and departure periods (6:30 AM to 7:00 AM and 5:00 PM to 5:30 PM) represent the peak construction traffic generation periods.

Allowing for some vehicle sharing, it is expected that 27 daily two-way trips (assuming 1.1 people per vehicle) would be generated by light vehicles during the peak periods. Light vehicle construction trips are expected to arrive in the morning and depart in the evening; based on this traffic generation, construction is likely to result in increases of up to 27 vehicles per hour during peak periods, which is well within the daily variation of traffic on the road network around the development. Parking for these construction vehicles will be provided on-site.

Heavy vehicle traffic would mainly be generated by activities associated with the removal of excavated material, delivery of construction equipment and delivery of material for construction works. The current master plan would not require fill to be moved on or off site as cut and fill volumes for the site are balanced.

It is anticipated that under a worst case scenario no more than 5 trucks per day would be required for the delivery of construction materials to site, except during the period of concrete pouring, where the daily delivery may peak at 30 trucks per day. These deliveries are likely to occur outside of the peak traffic periods and will have negligible impact on traffic on Wallgrove Road or the M7 Motorway which currently both have high proportions of heavy vehicle.

#### 4.9.4 Construction Mitigation Measures

While the impacts of construction of the development are likely to be negligible, the following measures can be undertaken to minimise the impacts of the construction activities of the development:

- Traffic control would be required to manage and regulate traffic movements into and out of the site during construction.
- Disruption to road users would be kept to a minimum by scheduling intensive delivery activities outside of peak hours.
- Construction of the new intersection at Wallgrove Road would be undertaken in concert with the upgrade of Wallgrove Road to minimise disruptions to traffic.
- Construction and delivery vehicles would be limited to use of Wallgrove Road and the M7 Motorway and restricted to non-peak periods.

## 5. Conclusions

The following conclusions are made based on the above investigations:

### 5.1 Access Arrangements and Road Network

Three access scenarios were assessed as part of this assessment for the estate, in terms of intersection performance capacity, Scenario 1 and 3 operate satisfactorily in both the AM and PM peaks in 2031. Scenario 2 would result in unacceptable delays for traffic turning out of the Gazcorp site onto Wallgrove Road in the evening peak period.

Based on the results of intersection modelling, and considerations for potential through traffic that may use the access road as an alternative means of accessing the Southern Link Road, Scenario 3 is preferred. Under this scenario, a single access would be provided directly on to Wallgrove Road. It would be a signalised intersection with a 100m right turn bay on the northern leg, with provision for pedestrian crossings on all legs.

### 5.2 Parking Arrangement

The RMS *Guide to Traffic Generating Developments 2002* has been used to determine the appropriate parking rate for the development. Based on this a total of 758 parking spaces in total would be required for the development.

Parking spaces are to be designed in accordance with the *Australian Standards AS 2890.1:2004 Parking Facilities, Part 1: Off-street Car Parking*.

Three accessible parking spaces are to be provided in accordance with Fairfield City Council's DCP Chapter 12 Section 12.5.1.

In accordance with the RMS *Guide to Traffic Generating Developments 2002*, 194 delivery and service vehicle spaces in total would be required for the ultimate development.

The 2,231 parking spaces proposed under the master plan would be sufficient to cater for the parking requirements of the development.

### 5.3 Traffic Impact

The traffic generated by the proposed site can be accommodated on the road network at a single signalised access on to Wallgrove Road, under the assumption that Wallgrove Road will be widened to two lanes in each direction as part of the Old Wallgrove Road upgrade.

The proposed access intersection will perform satisfactorily under the forecast 2031 traffic flows in the morning and evening peak periods and 95<sup>th</sup> percentile queues can be comfortably accommodated within the proposed bay lengths.

The provision of a single access will also eliminate the possibility of traffic using the internal road network as an alternative route to the Southern Link Road.

### 5.4 Road Safety

The crash statistics indicate that a relatively higher number of crashes occurred at intersections along Wallgrove Road and involved a vehicle turning right colliding with a vehicle travelling in the opposite direction. The recent upgrade of the Old Wallgrove Road with Wallgrove Road and the M7 Motorway intersection was targeted at addressing this trend and related safety issues.

## 5.5 Public Transport

Two bus routes provide two to three hourly services in the weekday peak. Future growth will require a regular review of the adequacy of bus service provision, in accordance with the *Metropolitan Bus Service Planning Guidelines (2006)* developed by the Department of Transport, however due to the operational nature of industrial and logistics operations, these land uses are not amenable to high public transport mode share.

This traffic impact assessment has shown that there will be sufficient capacity in the proposed road network to accommodate the traffic generated by the Gazcorp development and that the intersections along Wallgrove Road would continue to operate satisfactorily under forecast 2031 traffic volumes in both morning and evening peak periods under the preferred access arrangement of a single signalised intersection at Wallgrove Road.

## 5.6 Construction Traffic

Construction traffic impacts from the development are likely to be negligible. Truck deliveries are likely to occur outside of peak periods and construction traffic is expected to access the site from roads that currently have high proportions of heavy vehicles. The primary impact of construction is likely to be during the construction of the new intersection at Wallgrove Road; the impacts of this construction can be mitigated by scheduling these works at the same time as the upgrade of Wallgrove Road currently proposed by RMS.

# Appendix A – Swept Path Analysis



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**ARCHITECTS**

**MBMO**  
 MORRIS BRAY MARTIN OLLMANN  
 168 Pitt Street NSW  
 Suite 1001 NSW 2000 Australia  
 400 00 100 00 100  
 1001 Architects Registration Board (Not a Member) Architects, Terry Moran (1001) Gary Day (1001)

**CLIENT**

**GAZCORP PTY LTD**

STREET ADDRESS  
 SUBURB, STATE AND POSTCODE

PHONE: (02) 0000 0000  
 FAX: (02) 0000 0000  
 EMAIL: email address

**PROJECT MANAGER**

Project Manager

STREET ADDRESS  
 SUBURB, STATE AND POSTCODE

PHONE: (02) 0000 0000  
 FAX: (02) 0000 0000  
 EMAIL: email address

**PROJECT**

**MOMENTUM M7**  
 813-913 WALLGROVE ROAD  
 EASTERN CREEK NSW

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