EG Funds Management

Summer Hill Flour Mill

Transport Management and Accessibility Plan (TMAP)

220640

Rev A | May 2011

Arup
Arup Pty Ltd ABN 18 000 966 165

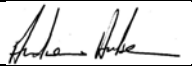
Arup
Level 10 201 Kent Street
Sydney NSW 2000
www.arup.com

Job number 220640

ARUP

Document Verification

ARUP

Job title		Summer Hill Flour Mill			**Job number** 220640
Document title		Transport Management and Accessibility Plan (TMAP)			**File reference**
Document ref		220640			
Revision	**Date**	**Filename**	0002DraftDGRReportSummerHillFlourMillFeb11.docx		
Draft 1	18/02/11	**Description**	First draft		
			Prepared by	Checked by	Approved by
		Name	Abdullah Uddin	Andrew Hulse	Andrew Hulse
		Signature			
Draft 2	04/03/11	**Filename**	Draft 2 Summer Hill Flour Mill DGR Transport		
		Description	Client's comments incorporated		
			Prepared by	Checked by	Approved by
		Name	Abdullah Uddin	Andrew Hulse	Andrew Hulse
		Signature			
Issue	10/03/11	**Filename**	Summer Hill Flour Mill TMAP.docx		
		Description	Issue		
			Prepared by	Checked by	Approved by
		Name	Abdullah Uddin	Andrew Hulse	Andrew Hulse
		Signature			
Rev A	03/05/11	**Filename**	Summer Hill Flour Mill TMAP RevA.docx		
		Description	Updated apartment upper limit		
			Prepared by	Checked by	Approved by
		Name	Abdullah Uddin	Andrew Hulse	Andrew Hulse
		Signature			

Issue Document Verification with Document ✓

Contents

Appendices

1 Introduction

Arup was commissioned in 2010 by EG Funds Management to undertake a transport analysis for the Summer Hill Flour Mill site redevelopment. The site, located at 2-32 Smith Street, Summer Hill NSW, is proposed to be redeveloped for mixed use purposes, including largely residential use and ancillary retail and commercial uses. A transport assessment was previously undertaken for all modes of access to support a Planning Proposal to Ashfield and Marrickville councils to rezone the site.

The Master Plan for the adjacent McGill Street precinct to the east of the Greenway corridor was adopted by Marrickville Council in November 2009 and assessed a similar type and mix of development. These two precincts are focused on the Lewisham Station public transport hub and utilise the same road system for access.

In December 2010, the Director-General of the NSW Department of Planning (DoP) accepted the project under Part 3A of the Environmental Planning and Assessment Act 1979 (EPA Act). The DoP letter dated 16 December 2010 provided Director-General's Requirements (DGRs) including assessment advice from various government authorities.

This report assesses the transport and accessibility impacts resulting from the proposed development at Summer Hill Flour Mill combined with the potential future development on the McGill Street precinct and covers the traffic and transport issues for the Concept Plan application for the development.

1.1 Director-General's Requirements

Section 6 of the DGRs for the development (Application Number: MP 10_0155 (Concept Plan) and MP 10_0180 (Project Application)) states that:

"The EA shall provide a Transport Management and Accessibility Plan (TMAP) prepared in accordance with the RTA's guidelines for TMAP's and to be prepared with reference to the Metropolitan Transport Plan – Connecting the City of Cities, the NSW State Plan 2010, NSW Planning Guidelines for Walking and Cycling, the integrating Land Use and Transport policy package and the RTA's Guide to Traffic Generating Developments."

A TMAP[1] is a comprehensive assessment of transport impacts (addressing both the movement of people and goods) of a major site development or redevelopment proposal, and the identification of a package of appropriate transport measures (including infrastructure services and demand management initiatives). A TMAP helps to manage the demand for travel to/from the development; in particular, to reduce the demand for travel by private car and commercial vehicle.

This report provides responses to the transport-related issues prescribed in the DGRs as outlined in Table 1.

[1] TMAP Interim Guidelines, DoT and RTA NSW

Table 1 DGR issues to be addressed

DGR No.	Description	Relevant Section of Report
DGR 6.1a	The TMAP shall consider: – traffic generation of the various land uses on site (including daily and peak traffic movements) – any required road/intersection upgrades and analysis of intersection capacities to ensure adequate levels of service are maintained – access (including waste collection, deliveries and emergency vehicle access) – loading dock(s) including vehicle type and delivery times – car parking arrangements – the impact of additional parking demand for on-street parking in surrounding / adjacent streets – measures to promote public transport usage – pedestrian and bicycle linkages	 6.1 6.5 6.8 6.9 5.0 5.4 7.0 7.6
DGR 6.1b	The TMAP shall model the relevant intersections and road network as detailed in RTA's letter dated 3 December 2010 and Ashfield Council's letter dated 1 December 2010 (point 6), provide an estimate of the total trips generated by the proposed development and analyse the impact on the road network.	4.2, 4.3 and 6.4
DGR 6.1c	The TMAP shall consider any cumulative impacts of the proposal in the context of approved and proposed development within the vicinity of the site: – The proposed Sydney Inner West light rail corridor and station – The proposed Greenway – The local path network – Lewisham and Summer Hill stations – The adopted Marrickville Council McGill Street Precinct Masterplan, and – The Concept plan application for 78-90 Old Canterbury Road, Lewisham (MP08_0195)	6.0 and 7.0
DGR 6.1d	The TMAP should consider the appropriate provision of on-site car parking for the proposal having regard to the site's very high accessibility to public transport, local planning controls and the RTA Guidelines. (Note: the Department supports reduced car parking rates). Parking provision for shared cars and adaptive re-use of parking for storage or other uses should also be specifically addressed.	5.0
DGR 6.1e	The TMAP should consider demand for on-street parking by potential future light rail users and the need and cost associated with the implementation of a resident parking scheme on the site.	5.4
DGR 6.2	The EA shall provide a Transport Map detailing current and proposed public transport provision (bus, rail and light rail) and walking and cycling connections within the vicinity of the site and address the potential for improving accessibility to and from the site, to and from Lewisham and Summer Hill Stations, and connections to the wider region via sustainable transport modes.	7.6

DGR No.	Description	Relevant Section of Report
DGR 6.3	The EA shall identify measures to manage travel demand, increase public transport and non-car transport modes, and assist in achieving the objectives and targets set out in the NSW State Plan 2010.	2.1
DGR 6.4	The EA should demonstrate impacts on travel demand on bus operations and investigate the provision of bus priority measures at the intersection of Railway Terrace and Old Canterbury Road and the potential signalised intersection of Edward Street and Old Canterbury Road.	7.4
DGR 6.5	The EA should address the potential for implementing a location specific sustainable travel plan, such as a Workplace Travel Plan (WTP) for workers and/or a Travel Access Guide (TAG) for visitors of the site.	7.5.2

1.2 Comments from government authorities

Transport-related comments were received from the following government authorities and included for information with the DGRs:

- Ashfield Council
- GreenWay Group
- Marrickville Council
- NSW Transport
- RTA
- RailCorp
- NSW State Transit

A detailed response to the issues raised by the above authorities has been included in the relevant sections of this report.

2 Project Context

2.1 Strategic Context

2.1.1 NSW State Plan 2010

NSW State Plan 2010 provides a framework for the delivery of service improvements for NSW through strategies, targets and actions. The *NSW State Plan 2010* relates to this Study through the following:

- **Better Transport and Liveable Cities**

This chapter recognises the key link between transport links and jobs, facilities and quality of life. This chapter also includes priorities to improve the public transport system and the road network. Specific targets are:

  - Increase the proportion of total journeys to work by public transport in the Sydney Metropolitan region to 28% by 2016.
  - Increase the share of commute trips made by public transport:
    - To and from Sydney CBD during peak hours to 80% by 2016
    - To and from Parramatta CBD during peak hours to 50% by 2016
    - To and from Liverpool CBD during peak hours to 20% by 2016
    - To and from Penrith CBD during peak hours to 25% by 2016
  - Reduce road fatalities to 4.9 per 100,000 population by 2016
  - Increase the mode share of bicycle trips made in the Greater Sydney Region at a local and district level to 5% by 2016.
  - Increase the percentage of the population living within 30 minutes by public transport of a city or major centre in Metropolitan Sydney.

- **Healthy Communities**

  The chapter highlights the priority to ‘Promote healthy lifestyles’ through development and initiatives that can shape our lifestyles, such as influencing transport modes and supporting incidental exercise.

- **Green State**

  This chapter looks toward NSW being a ‘green state.’ The priority, ‘Tackle climate change’ seeks to promote initiatives that reduce carbon dioxide emissions, including those from transport.

The proposed SHFM development, located next to a number of public transport facilities and bicycle routes, will support the state government objectives and initiatives. The residential precinct surrounding the site currently has a public transport mode of over 40% for journey to work. The proposed type and location of development is expected to achieve higher public transport mode of travel.

2.1.2 Metropolitan Transport Plan, Connecting the City of Cities, NSW TI, 2010

The NSW Government updated the *Metropolitan Plan* in 2010 to review the *2005 Metropolitan Strategy* and ensure that is responding to the challenges facing Sydney. The *Metropolitan Plan for Sydney 2036* is founded by the following policy settings:

- Establish no new Greenfield fronts to Sydney's existing urban footprint under the Plan;
- Increase the proportion of homes within 30 minutes by public transport of jobs in a Major Centre, ensuring more jobs are located closer to home;
- Build at least 70% of new homes in the existing urban area;
- Enable residential and employment growth in areas where there is available or planned public transport capacity;
- Build at least 80% of all new homes within the walking catchments of existing and planned centres of all sizes with good public transport;
- Locate 50% of planned employment capacity in Western Sydney; and
- Plan land use, service provision and infrastructure capacity for 770,000 additional homes by 2036 and 760,000 more jobs by 2036.

The *Metropolitan Plan for Sydney 2036* continues to highlight the importance of integrating transport and land use planning to overcome Sydney's challenges of managing congestion and reducing Sydney's energy related greenhouse gas emissions. The *Plan* also promotes actions to support sustainable travel, including the implementation of the NSW Bike Plan and Work Place Travel Plans.

The proposed SHFM development, which is a Transit Oriented Development (with a combination of residential, retail, commercial and recreation components), is aligned with the Metropolitan Transport Plan.

2.1.3 Sydney Metropolitan Strategy, NSW DoP, 2005

The Metropolitan Strategy - City of Cities is a strategic planning document that provides a broad framework for the growth and development of Sydney towards 2031. It outlines the vision, challenges and directions facing Sydney in relation to: Economy and Employment, Centres and Corridors, Housing, Transport, Environment and Resources, Parks and Public Places and Implementation and Governance. The *Strategy* identifies five aims including:

- Enhance liveability;
- Strengthen economic competitiveness;
- Ensure fairness;
- Protect the environment; and
- Improve governance.

According to the 2005 NSW Metropolitan Strategy, Sydney's current population is anticipated to grow by 1.1 million people between 2004 and 2031, to reach 5.3 million by 2031. To cater for this growth, the Government has predicted it will

require 640,000 new homes; 6.8 million square metres of additional commercial floor space and 3.7 million square metres of additional retail space.

In the accompanying Metropolitan Sub Regional Strategies, the Sydney Inner West subregion is predicted to cater for 30,000 new dwellings and 10,000 new jobs by 2031. The SHFM development, which is a genuine mixed-use Transit Oriented Development, is aligned with the NSW State Government's stated development targets and objectives.

2.1.4 South Subregional Strategy, NSW DoP, 2007

In the South Subregional Strategy 35,000 new dwellings are targeted (between 2004 and 2031). The majority of the dwellings are proposed to be located in centres, ranging from Neighbourhoods to Major Centres, with good public transport. The strategy emphasised the adequate supply of land and sites for residential development. In terms of new housing, the key issues include:

- 30 – 40% of new housing in land release areas;
- Apply sustainability criteria for new urban development;
- Plan for increased housing capacity targets in existing areas;
- Improved monitoring of future housing and employment supply; and
- Facilitate redevelopment of existing apartments and higher occupation of existing dwellings.

The proposed SHFM development will comply with all the above objectives.

2.1.5 Inner West Subregional Strategy, NSW DoP, 2007

The Draft Inner West Subregional Strategy states that dwelling growth is forecast to outstrip employment growth in the west and north-west, and employment growth is forecast to exceed dwelling growth in Sydney city, so there is likely to be strong demand for trips from the west and north-west to Sydney city. Planned major improvements to public transport access (by rail or bus) for these trips will help minimize the impact of through traffic growth on the Inner West Subregion.

The proposed light rail extension to Dulwich Hill is likely to reduce the through traffic in the area.

2.1.6 NSW Bike Plan 2010

A key element of the Metropolitan Transport Plan is the NSW Bikeplan 2010 that outlines the delivery of the building of missing cycle links in the Metro Sydney Bike Network and provides funding to assist local Councils in improving local cycleway networks. The Plan recognises the potential to shift a high number of short trips (under 10 kilometres) from car to active transport alternatives such as cycling and walking.

The planned Greenway along the light rail corridor will provide a strategic bicycle route with connections into local cycle networks.

2.2 Document Review

Background documents reviewed in this study included:

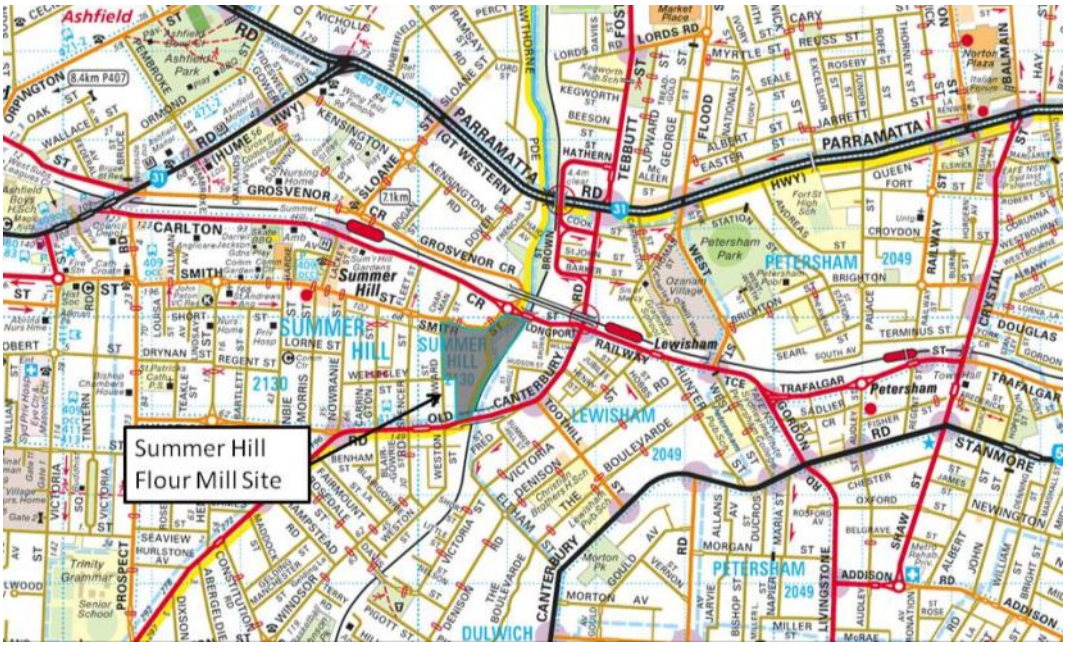
- Road and Traffic Authority NSW – Road Design Guide – August 1991;
- RTA Guide to Traffic Generating Developments;
- NSW State Plan;
- Sydney Metropolitan Strategy;
- Draft Inner West Subregional Strategy and Draft South Subregional Strategy;
- Ashfield Local Environment Plan 1985 and relevant Ashfield Council documents including relevant Development Control Plans;
- Marrickville Local Environment Plan 2001 and relevant Marrickville Council documents including relevant Development Control Plans;
- Adopted Marrickville Council McGill Street Precinct Masterplan;
- Metropolitan Transport Plan 2010;
- NSW Bike Plan 2010;
- Planning Guidelines for Walking and Cycling;
- Integrating Land Use and Transport Policy Package 2001;
- Development Near Rail Corridors and Busy Roads – Interim Guidelines;
- Sydney Light Rail Extension Stage 1 – Inner West extension, Volume 1, Main Report, prepared by PB, October 2010;
- "GreenWay Group" Design Principle for Major Development fronting the GreenWay Corridor; and
- TMAP Study, 78-90 Canterbury Road, Lewisham, prepared by Traffix, October 2010.

3 The Project

3.1 Summer Hill Flour Mill Development

The subject site, Summer Hill Flour Mill (SHFM), falls mainly in the Ashfield LGA with a small section east of the Hawthorne Canal within the Marrickville LGA. It is located in the suburb of Summer Hill and is bounded by Edward Street to the west, Smith Street to the north, Hawthorne Canal and the Rozelle Goods Line to the east and Old Canterbury Road to the south. The location of the site is shown in Figure 1.

Figure 1: Site Location



The proposal involves medium density residential development, complemented with ancillary retail and commercial land uses. An internal road network allows a total of five sub-precincts within the development (refer to Figure 2). The proposed number of dwellings is between 280-300 units with the average number for each precinct indicated in Table 2. A total provision of 3,500-4,000 m^2 commercial GFA and 2,500-2,800m^2 retail GFA is proposed.

Table 2 Proposed Dwelling Numbers

Precinct Number	**Number of Units**				
	1 bed	2 bed	3 bed	4 bed	TOTAL
1	34	40	9	0	83
2	0	4	0	0	4
3	58	32	9	2	101
4	12	8	8	8	36
5	14	46	0	6	66
Total	118	130	26	16	**290**

Figure 2 Summer Hill Flour Mill Precincts

3.2 McGill Street Precinct development

The McGill Street precinct is within Marrickville LGA and is bounded by Old Canterbury Road to the east and south, Hawthorne Canal and the Rozelle Goods Line to the west and Longport Street to the north (refer to Figure 3). The McGill Street precinct is situated 150m west of Lewisham Station and is currently zoned for industrial use.

The McGill Street Masterplan was assessed on the basis of 6 precincts as shown in Figure 4 and Table 3. The Masterplan for the development was endorsed and approved by Marrickville Council on 10 November 2009.

Recently, there has been a Concept Plan Application for 78-90 Old Canterbury Road, Lewisham (MP08_0195) submitted to the DoP. This application relates generally to Precincts 4 and 5 of the Masterplan area. With the inclusion of this development, for these two precincts, the number of residential units would increase from 216 to 400, commercial floorspace would reduce from 1,257m^2 to 287m^2 and the retail floorspace would increase from 636m^2 6,018.5m^2 (refer to Table 4).

The traffic assessment for the SHFM site rezoning undertook an assessment of the cumulative traffic impact of both SHFM and McGill Street Masterplan development scenarios. The DGRs request further analysis to take account the cumulative impact including the larger scale of the development proposed at 78-90 Old Canterbury Road, Lewisham.

There is no change of land use in the SHFM development. Therefore, this report has undertaken the traffic impact assessment based on additional traffic in precincts 4 and 5 in the McGill Street Masterplan area.

Figure 3: McGill Street Precinct

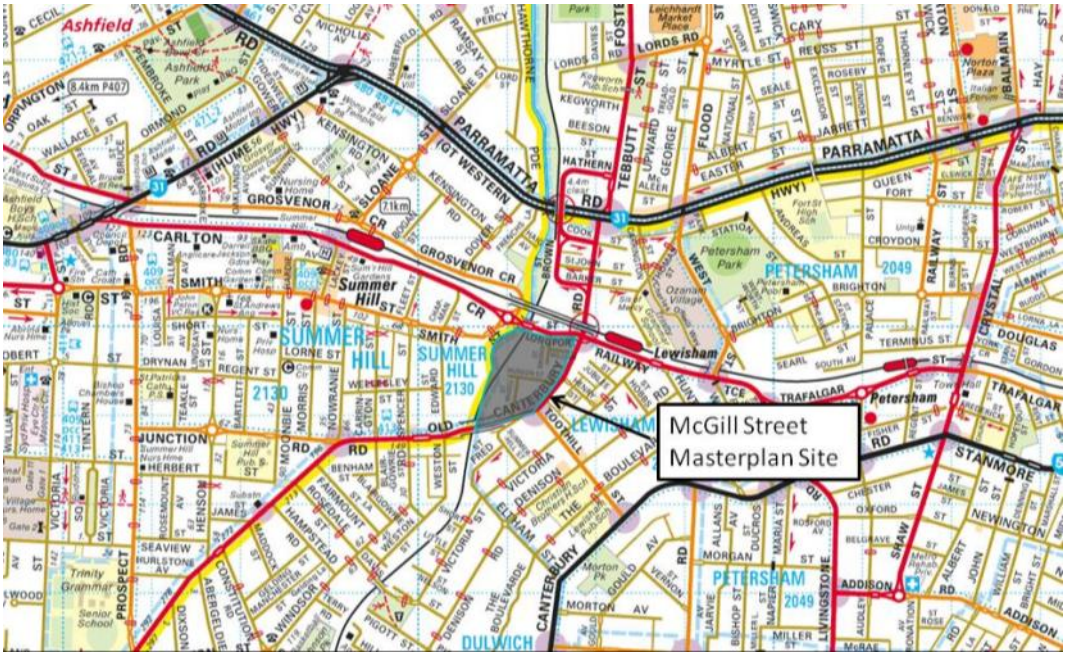


Figure 4: McGill Street Masterplan Precincts

Table 3: McGill Street Masterplan Land Use Mix

Precinct	Residential Units	Commercial	Retail
1,2,3 and 6	284 units	5,152 m^2	2,306m^2
4 and 5	216 units	1,257 m^2	636m^2
Total	500 units	6,409 m^2	2,942m^2

Table 4: Change of Land Use Mix in Precincts 4 and 5 (78-90 Old Canterbury Road)

Precinct	**Residential Units**	**Commercial**	**Retail**
Equivalent 4 and 5	400 units	287 m^2	6,018.5m^2

4 Existing Conditions

4.1 Road Network

The site is served by a number of key arterial roads, including:

- Old Canterbury Road
- Parramatta Road
- Railway Terrace / Longport Street / Carlton Crescent

Current daily traffic volumes on selected roads surrounding the Summer Hill Flour Mill precinct is presented in Table 5.

Table 5: Daily Traffic Volumes

Location	Daily Traffic Volume
Longport Street	19,330
Carlton Crescent	7,950
Railway Terrace	17,250
Old Canterbury Road	19,980
Toothill Street	9,490
Smith Street	4,650
Edward Street	2,100

4.2 Traffic Volumes

4.2.1 Existing Site Traffic

The Allied Mills head office functions remain on site although the industrial activity has now ceased. Site observations indicate approximately 40 vehicles are parked in the existing Summer Hill Flour Mill precinct during the day. It is reasonable to assume that of these vehicles, 50% would arrive and depart the site in the AM and PM commuter peak hours.

If the site remained fully operational, it could be expected that a higher level of traffic generation would occur including heavy vehicle movements. For the consolidated site area of approximately 25,000m^2 and applying the site FSR of 1:1 for the industrial zoning, the site could generate 1,250 vehicles / day and 250 vehicles in the evening peak hour based on the rates outlined in the RTA Guide to Traffic Generating Developments for Industry. This level of traffic generation aligns closely with that anticipated from the planned levels of mixed use development as described later in Section 3.3 of this report.

For the McGill Street precinct, morning peak hour traffic counts were undertaken at existing access points to the precinct. This showed 36 vehicles inbound and 24 vehicles outbound generated by the existing residential and commercial uses.

The existing traffic generation for both of these sites is relatively low due to many of the buildings on the sites being underutilised. These sites would have contributed more traffic to the road system when industry was fully operational.

4.2.2 Intersection surveys

The RTA has requested that the following intersections be analysed:

- Liverpool Road / Elizabeth Street / Grosvenor Crescent
- Liverpool Road/ Carlton Crescent
- Carlton Crescent / Lackey Street
- Old Canterbury Road / Nowranie Street
- Old Canterbury Road / Toothill Street
- Old Canterbury Road / Longport Street / Railway Terrace
- Railway Terrace / West Street
- Parramatta Road / West Street / Flood Street
- Parramatta Road / Tebbutt Street / Old Canterbury Road

For the proposed development, Arup previously surveyed the following intersections on Wednesday 9 June 2010. This data is still valid for ongoing assessment:

- Old Canterbury Road/ Longport Street/ Railway Terrace
- Old Canterbury Road/ Toothill Road
- Old Canterbury Road/ Edward Street
- Smith Street/ Edward Road/ Chapman Street
- Longport Street/ Smith Street/ Carlton Crescent/ Grosvenor Crescent

Intersection traffic volume data for the following intersections has been obtained from the Traffix report and used in this assessment:

- Parramatta Road/ West Street/ Flood Street
- Railway Terrace/ West Street
- Parramatta Road/ Old Canterbury Road (westbound traffic only)

The following five intersections have been surveyed by Arup appointed private contractor 'Roar Data' on Wednesday, 9 February 2011 between 7am – 9am and 4.30pm – 6.30pm:

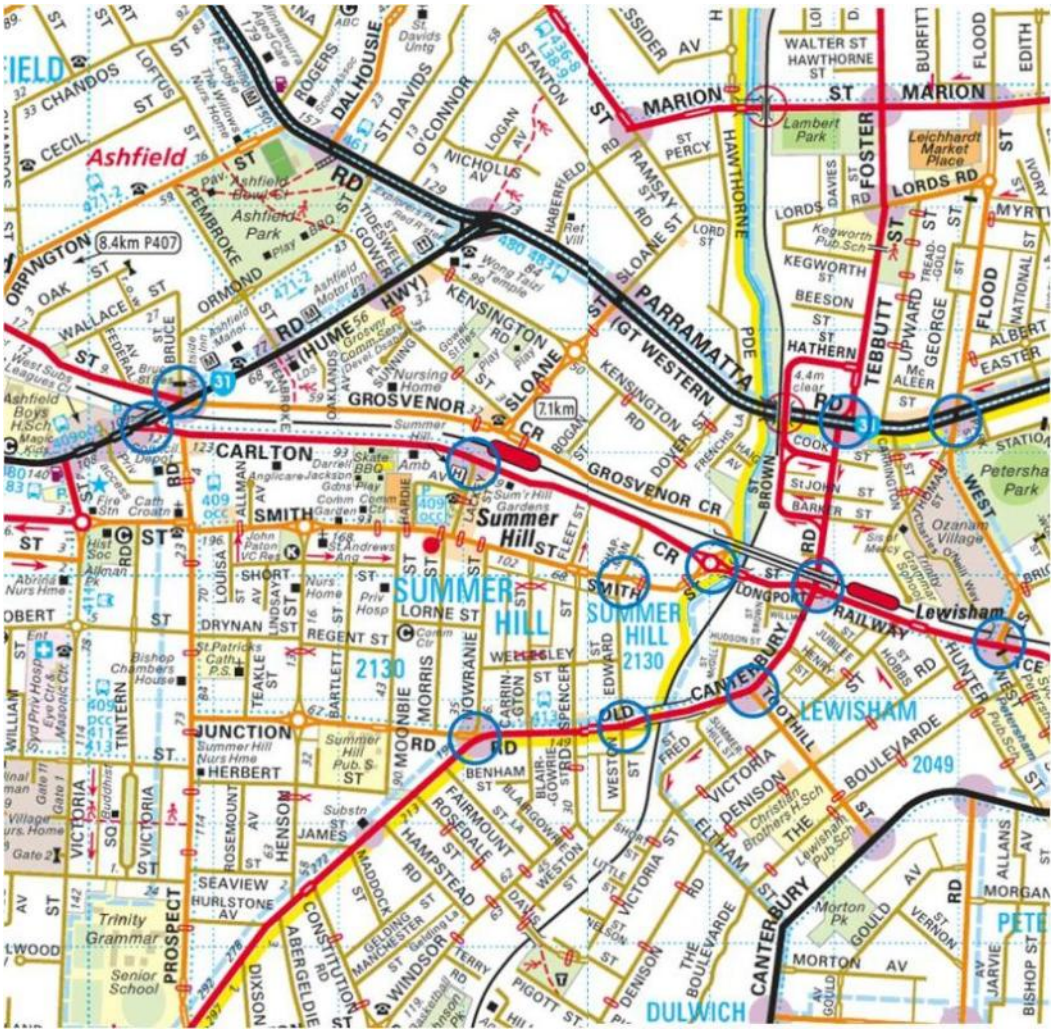
- Old Canterbury Road/ Junction Road/ Nowranie Street
- Liverpool Road/ Carlton Crescent
- Liverpool Road/ Elizabeth Street/ Grosvenor Crescent
- Carlton Crescent/ Lackey Street
- Parramatta Road/ Tebbutt Street (eastbound traffic only)

The traffic volume data collected by Arup is attached in Appendix A.

4.2.3 Intersection analysis

All the intersections discussed in the previous section have been analysed by Sidra intersection modelling program (refer to Figure 5). Although the surveyed intersections had different peak traffic periods, each intersection has been analysed in the worst case scenario (maximum traffic in that intersection).

Figure 5: Analysed Intersections



4.3 Existing Road Network Operation

On-site observations of traffic conditions at key intersections surrounding the Summer Hill Flour Mill site has been undertaken for the purposes of this study. These are described in the sections below:

4.3.1 Old Canterbury Road / Railway Terrace / Longport Street

This intersection is controlled by traffic signals with pedestrian crossing facilities on all approaches. No right turns are permitted in the AM and PM peak hours from any of the four approaches. Significant levels of queuing occurs on Railway Terrace and Longport Street in both commuter peaks. This is largely a result of Railway Terrance being able to carry only one lane of traffic in either direction. On occasions traffic was observed queuing across the intersection. On-site observations indicated however that despite the significant queues, all vehicles were able to clear the intersection in a single signal cycle.

Photograph 1: Old Canterbury Rd / Railway Tce / Longport St Intersection

4.3.2 Old Canterbury Road / Edward Street

This priority intersection was observed to be operating efficiently for vehicles travelling east-west along Old Canterbury Road. Vehicles turning right out of Edward Street onto Canterbury Road experienced significant delays of up to three minutes due to the high traffic volumes on Old Canterbury Road. Additionally, sight lines for this movement are poor as the intersection is located at the base of the railway overpass.

4.3.3 Edward Street / Smith Street / Chapman Street

This priority intersection was observed to operate well during peak periods. Traffic volumes at this intersection were relatively low, with no significant queues or delays observed. The northern leg of the intersection (Chapman Street) is slightly offset, however due to the low traffic volumes no issues were observed.

4.3.4 Smith Street / Longport Street / Carlton Crescent

This intersection is roundabout controlled, with one central circulating lane. Some vehicles were observed to be queued back from the Longport St / Old Canterbury Rd intersection, however this did not affect the operation of the roundabout.

4.3.5 Old Canterbury Road / Toothill Street

Controlled by traffic signals, this T-intersection provides pedestrian crossing facilities on the southern and western legs. The signals operate on a three phase cycle, with a dedicated right turn phase from the western leg of Old Canterbury Road to Toothill Street provided. With two lanes provided on all approaches, the intersection operates efficiently during peak periods. No significant levels of queuing was observed during on-site observations.

Photograph 2: Old Canterbury Rd / Toothill Street Intersection

4.4 Public Transport Provision

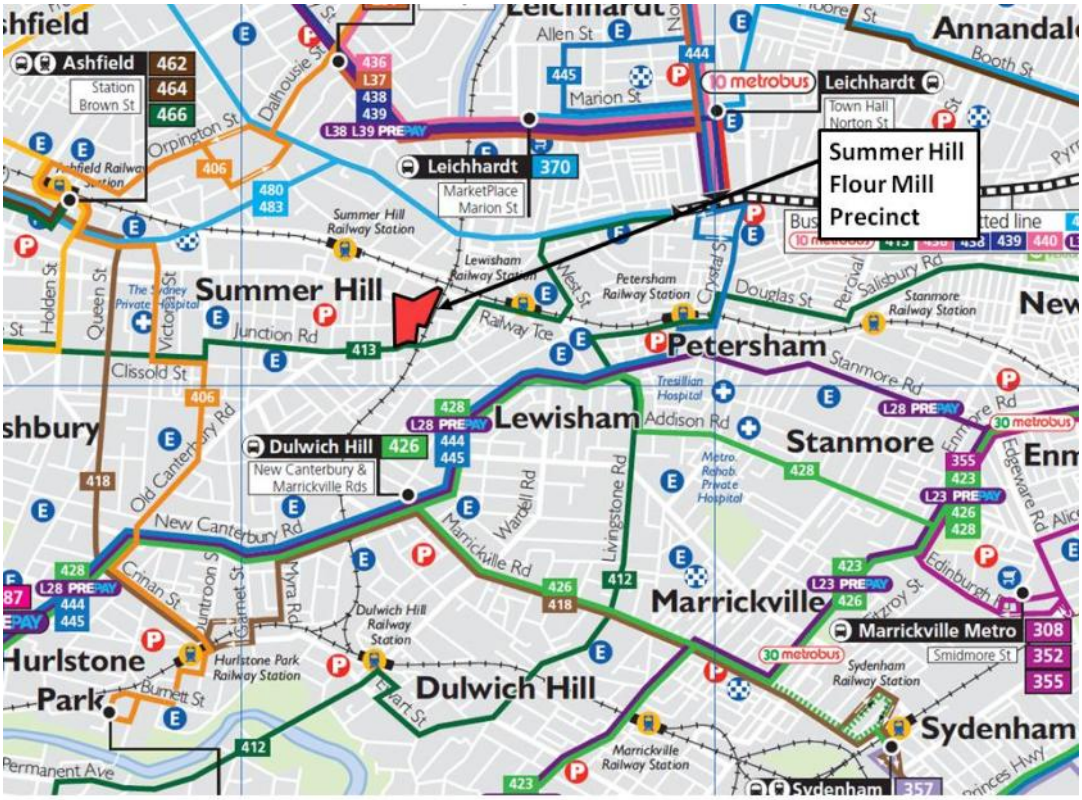
4.4.1 Bus

The site is well connected to existing State Transit routes, with a number of public bus routes operating near the Summer Hill Flour Mill site. These are presented in Figure 6.

Route 413 runs directly adjacent to the site along Old Canterbury Road, from Campsie to the City via Ashbury. This bus route stops at the intersection of Edward Street and Old Canterbury Road. Five services are provided in the weekday morning peak hour (8am – 9am).

Additional bus services to local town centres are available within viable walking distance from the site. This includes routes servicing Marrickville, Ashfield and Dulwich Hill.

Figure 6: Bus Network Surrounding Summer Hill Flour Mill site



Source: Sydney Buses (2010)

4.4.2 Rail

The precinct is well located for people wishing to use heavy rail as a mode of transport. Both Summer Hill and Lewisham stations are located approximately 500m from the Summer Hill Flour Mill site. These stations are located on the Inner West Line of the City Rail network some 8km from the Sydney CBD, with 4 trains travelling to the CBD in peak hours.

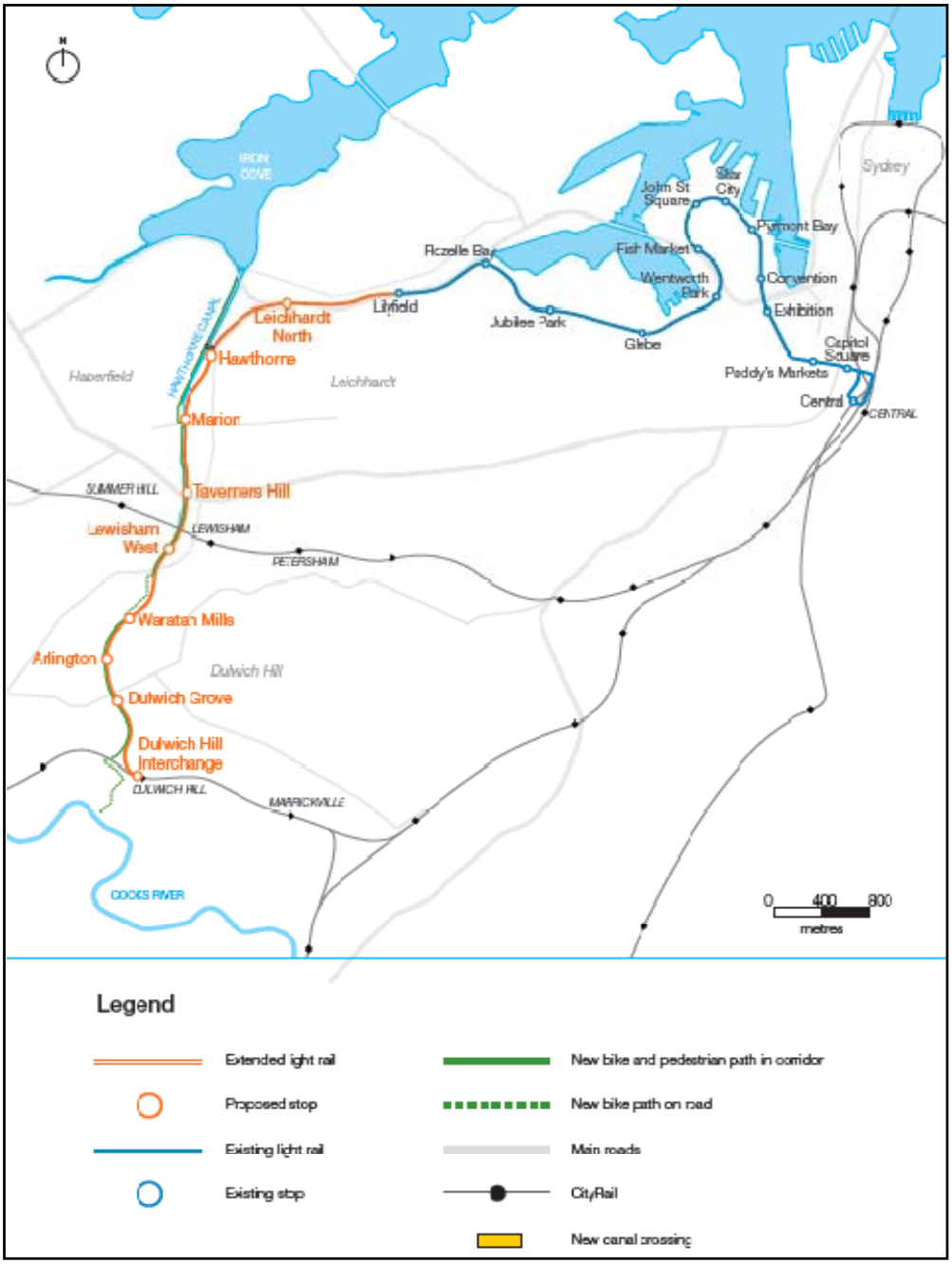
4.4.3 Light Rail

As a component of the NSW Metropolitan Transport Plan, a 5.6km extension of the light rail service is planned to be constructed between Lilyfield and Dulwich Hill (see Figure 7). The Minister for Planning granted planning approval on 18 February 2011 for construction of the Inner West Light Rail Extension and Greenway. This approval enables design and construction work to commence in 2011, with the new extension to the Inner West up and running in 2012.

This includes a station at Lewisham within walking distance of the existing Lewisham heavy rail station, which will act as an interchange between the two transport modes. The line is scheduled to operate from early 2012. Provision of this infrastructure upgrade will increase public transport availability for future residents in the Summer Hill Flour Mill site.

Both the McGill Street precinct and Summer Hill Flour Mill site are best served with the light rail stop located on the east-west through site pedestrian connection between Smith Street and Old Canterbury Road as planned. This would place the station some 150m south of Longport Street with relatively level connections between the stop and the surrounding open space. This also establishes more pedestrian friendly routes between the light rail stop, Lewisham Station and the surrounding residential area. Locating the light rail stop at the heart of these two precincts will transform it into a destination as well as a place of origin.

Figure 7: Inner West Light Rail Extension



Source: Sydney Light Rail Extension Community Update March 2011

4.5 Walking and Cycling

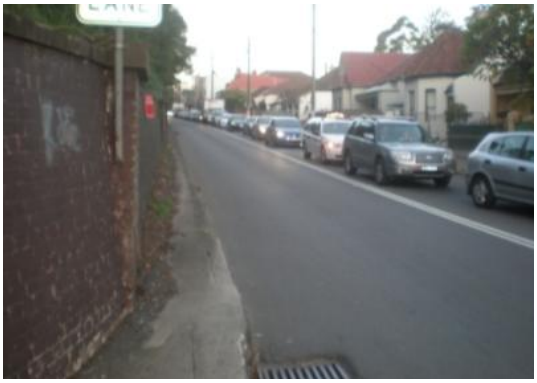
4.5.1 Walking Provision

Local footpaths provide walking access to key destinations surrounding the site. A pedestrian underpass exists at Lewisham Station (entrance via Victoria Street and Thomas Street) which provides through access across the railway line.

A current issue with the pedestrian network is that the northern footpath along Railway Terrace is currently of insufficient width to allow for pedestrian movements (Photograph 3).

Summer Hill Station is within easy walking distance of the Summer Hill Flour Mill site with footpaths along Smith Street and Lackey Street providing a suitable walking route.

Photograph 3: Railway Terrace Pedestrian Facilities

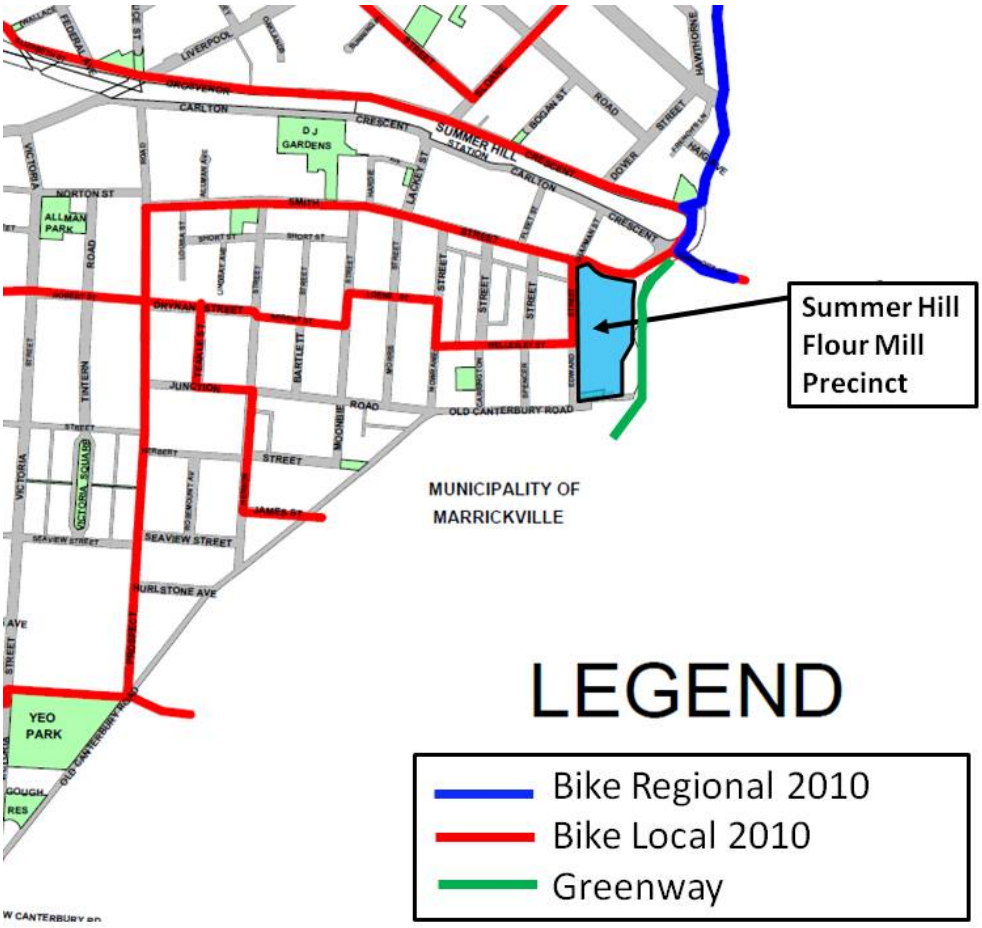


4.5.2 Cycling Provision

The Summer Hill Flour Mill site is located nearby to a number of local cycling routes. An off-road regional route which links Canada Bay, Leichhardt, Ashfield and Marrickville also exists in close proximity to the site.

The local cycling network surrounding the site is shown in Figure 8.

Figure 8: Cycling Network Surrounding Site



Source: Ashfield Council (2010)

4.5.3 The Cooks River to Iron Cove GreenWay

The Cooks River to Iron Cove GreenWay is an urban green corridor in Sydney's Inner West that connects the Cooks River at Earlwood to Iron Cove Bay at Haberfield. The GreenWay is a community vision for a "recognisable environmental, cultural and non-polluting transport corridor connecting two of Sydney's most important waterways".

The GreenWay corridor passes through Canterbury, Marrickville, Ashfield and Leichhardt Council areas of Sydney's Inner West and incorporates Hawthorne Canal and the Rozelle freight rail corridor. Transport NSW have incorporated the provision of the GreenWay into the approval for the light rail project as described in Section 4.3.3. The GreenWay will be a 3m wide walking and cycling shared path from the Cooks River to Iron Cove, and incorporate bushcare sites.

To provide the most direct route and to avoid crossing the light rail tracks, it will be located on the western side of the light rail corridor and mostly within the existing rail corridor, safely separated from the tracks.

Figure 9: The Cooks River to Iron Cove Greenway

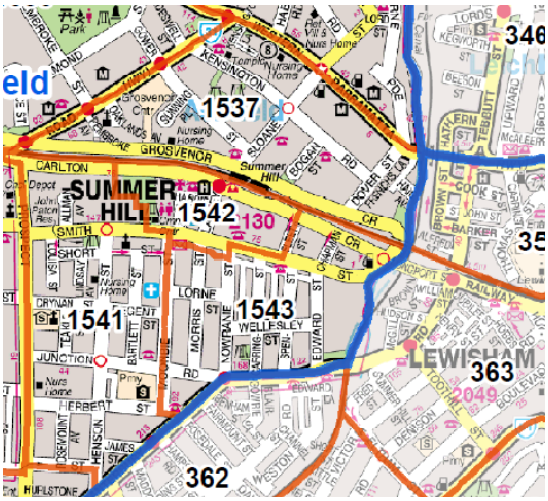
Source: GreenWay website

4.6 Travel Patterns

4.6.1 Mode Split

The existing 2006 ABS Journey to Work data for the travel zone 1543 surrounding the Summer Hill Flour Mill site (see Figure 10) has been analysed for this study.

Figure 10: Travel Zones Surrounding Summer Hill Flour Mill Site



Source: Transport Data Centre (2010)

The mode split of workers departing the area is indicated in Table 6.

Table 6: Journey to Work Existing Mode Split

Mode	Total Trips	Proportion of Total Trips
One method: Car driver	241	44.8%
One method: Train	179	33.3%
One method: Walked only	33	6.1%
One method: Car passenger	20	3.6%
Two methods: Train and Bus	19	3.5%
One method: Bus	17	3.2%
One method: Bicycle	6	1.1%
One method: Other	4	0.7%
Three methods: Train and two other modes	4	0.7%
One method: Motorbike	3	0.6%
Two methods: Train and Car driver	3	0.6%
Two methods: Train and Car passenger	3	0.6%
Two or Three methods: With Ferry or Tram	3	0.6%
Two or Three methods: Without Ferry or Tram	3	0.6%
TOTAL	**538**	**100.00%**

The analysis indicates that public transport currently accounts for over 40% of work related trips in the area surrounding the site. This is a result of the proximity of Lewisham and Summer Hill railway stations to the site. The proportion of people utilising public transport will increase following the planned light rail extension, which includes a station adjacent to the site.

4.6.2 Arrival Location

The final destination of all workers departing from the travel zones surrounding the site, based on 2006 Journey to Work data, is presented in Table 7. A high proportion of residents in this travel zone have Sydney as the work destination which is best served by rail for commuter access. There are also 16% of residents who work in Marrickville or Ashfield local government areas which allows walk, cycle and bus modes to be viable travel options.

Table 7 Final Destination of Workers

Destination LGA	Total Trips	Proportion of Total Trips
Sydney	205	38.1%
Ashfield	54	10.0%
Marrickville	31	5.8%
Leichhardt	26	4.8%
North Sydney	25	4.6%
Ryde	19	3.4%
Auburn	19	3.4%
Bankstown	17	3.2%
Burwood	16	3.0%
Botany Bay	12	2.2%
Canada Bay	12	2.2%
Randwick	10	1.9%
Willoughby	9	1.7%
Canterbury	9	1.7%
Other	*74*	*14.0%*
Total	**538**	**100.00%**

5 Parking Provision

5.1 Required Parking

The current Ashfield Council DCP parking rates as outlined in Part C11 (parking) are shown in Table 8.

Table 8 Ashfield Council DCP Parking Rates

Land Use	Parking Rate
Multi-Unit Housing in Residential Zones	– 1 space per unit – Additional space for every five 2-bedroom units – Additional space for every two 3-bedroom units – 1 visitor space for every five dwellings
Commercial Premises	1 space per 40m^2 GFA
Retail Shops	1 space per 40m^2 GFA

The DCP rates for residential and visitor parking are considered appropriate given the need for residents to garage a car which may not be used for journey to work and given the desire to allocate all on-street car parking to visitors and deliveries to the mixed uses in the precinct.

The commercial and retail rates are both considered high for a mixed use precinct such as this with good public transport access, however as a conservative measure the DCP rates have been adopted.

The proposed SHFM site uses result in a requirement for 553 parking spaces as shown in Table 9.

Table 9 Required Parking Provision by Precinct (see Figure 2)

Precinct	Required Parking Spaces				
	Residential		Commercial	Retail	**Total**
	Resident	Visitor			
1	96	16	7	9	**129**
2	5	1	71	29	**108**
3	113	20	13	6	**155**
4	46	7	0	10	**67**
5	78	13	4	9	**109**
Total	**338**	**57**	**95**	**63**	**553**

5.2 Proposed Parking Provision

The Summer Hill Flour Mill development proposes to provide a total of 450-550 underground parking spaces, which would be allocated to residents and other regular users of the site. An additional 50 to 70 on-street parking spaces are to be provided within the precinct. These would be allocated to visitors and other short-stay users. All on-street parking will need to be time restricted with an appropriate allocation of Loading Zones.

5.3 Minimise car parking provision on-site

The NSW Government seeks to reduce the demand for travel by private car to the Sydney CBD. The relatively low parking provision for the proposed development is in keeping with this philosophy. The site is well served by multiple modes of public transport and therefore suitable alternatives to private car travel are readily available.

The proposed parking rates are based on Ashfield Council DCP (Part C11). These parking rates are considered appropriate given the need for residents to garage a car which may not be used for journey to work but could be used for other purposes (e.g. shopping, recreation) during the off-peak periods.

Implementing constrained parking rates at SHFM development, in addition to implementing a future resident parking scheme or time restricted parking (if required) in the adjoining streets, to which future residents of SHFM will not have access, will result in less vehicles in the area and less overall traffic congestion in the future.

5.4 On-Street Parking in Surrounding Streets

Marrickville Council has introduced a resident parking scheme with time restricted parking within 250m of Lewisham Station to restrict commuter car parking from occurring on local streets. Ashfield Council has introduced time restricted parking on streets in the Summer Hill town centre adjacent to Summer Hill Station. The majority of other streets are unrestricted.

With the introduction of the light rail stop at Lewisham, it could be expected that additional time restricted parking and resident parking schemes will need to be introduced to manage commuter parking. Drop-off and pick-up zones would be facilitated by the local streets in both the Summer Hill Flour Mill site and the McGill Street precinct.

The parking provision proposed for each development allows for resident and visitor parking on-site. Additional on-street parking will be available on the new streets and it is expected that this would be time restricted to encourage turnover by visitors. There will also be underground parking for the retail and commercial uses on the sites.

6 Traffic Assessment

6.1 Forecast Traffic Generation

6.1.1 Methodology

For a mixed use site such as this which includes a substantial proportion of residential development supported by retail and commercial uses, it should be expected that some self-containment will occur:

- A mix of small retail outlets will service the local residential community on this site and the surrounding area. Commercial uses on the site will also support these uses.
- There is the opportunity for some employees in the commercial uses to live on the site.

The provision of car parking in the Summer Hill Flour Mill site will respond to the high public transport accessibility and expected levels of self-containment for the complementary land uses. The traffic generation for retail and commercial uses is therefore best calculated based on a turnover of available car spaces rather than typical RTA rates which are based on floor space.

6.1.2 Summer Hill Flour Mill Site

Residential traffic generation:

The RTA peak hour rate of 0.4 trips / unit for medium density residential flats has been applied which for 290 units with 338 car spaces is equivalent to 35% of car spaces generating a trip in the peak hour. This is considered appropriate.

Commercial traffic generation:

Applying the RTA rate of 2 trips / 100m^2 GFA for commercial uses would generate 75 vehicle trips in the peak hour. This is equivalent to 80% of car spaces generating a trip in the peak hour. This is considered excessive for a mixture of small commercial uses likely to include designers, service industry and boutique office uses. A more appropriate turnover of 50% of spaces in the peak hour has therefore been applied.

Retail traffic generation:

Applying the RTA rate of 10 trips / 100m^2 GFA for retail use would generate 265 vehicle trips in the peak hour. This is equivalent to each of the 63 retail cars spaces generating 4 vehicle movements in the peak hour. This is considered excessive for a mixture of small retail uses servicing the site and adjacent local precinct. A more appropriate turnover of 2 vehicle movements per space in the peak hour has therefore been applied.

A comparison between the RTA rates for traffic generation and the adopted rates for the SHFM site is provided in Table 10.

Table 10: Traffic Generation Rates

Land Use	**Traffic Generation Rate**		**Comment**
	RTA	Adopted	
Medium density residential flat			
Daily vehicle trip	4/ unit	4/ unit	RTA rate adopted
Weekday trip/ hour	0.4/ unit	0.4/ unit	
Commercial			
Daily vehicle trips	10/100m2 GFA)	5/ space	Adopted rate based on turnover of spaces
Weekday trip / hour	2/100m2 GFA	0.5/ space	
Retail			
Daily vehicle trips	90/100m2 GFA (121/100m2GLFA	20/ space	Adopted rate based on turnover of spaces
Weekday trip /hour	10/100m2 GFA (12.5/100m2GLFA	2/ space	

A summary of the forecast traffic generation is shown in Table 11.

Table 11: Forecast Traffic Generation – Summer Hill Flour Mill Site

Precinct	**Forecast Traffic Generation**					
	Daily	Peak Hour	Morning Peak		Evening Peak	
			In	Out	In	Out
1	552	56	11	35	40	16
2	951	95	47	19	34	61
3	588	59	13	40	43	16
4	337	34	6	18	23	11
5	460	46	9	28	33	13
Sub Total	2887	289	85	141	172	117

6.1.3 McGill Street Precinct

Arup prepared a report in November 2009 assessing the transport impacts resulting from the proposed McGill Street precinct mixed use development. Traffic generation rates as described in Table 10 have been used to formulate the forecast vehicle trips generated from this development. Located directly adjacent to the east of the Summer Hill Flour Mill site, the development was forecast to generate 229 vehicle trips in the AM peak hour and 287 in the PM peak hour (indicated in Table 12).

Table 12: Forecast Traffic Generation – McGill Street Precinct

	Morning Peak Hour Traffic		Afternoon Peak Hour Traffic	
	In	Out	In	Out
Commercial	48	5	5	48
Retail	0	0	29	29
Residential	18	158	123	53
TOTAL	66	163	157	130

6.2 Traffic Distribution

The journey to work data as outlined in Section 4.6 has been used to determine the current travel distribution for car drivers and passengers. Just under 50% of all trips from this area were made by private vehicle (either car driver or car passenger).

Many of the people who choose to live in the Summer Hill Flour Mill site will do so because of the good public transport access, especially when the light rail extension to Dulwich Hill is considered. It could therefore be expected that journey to work by car would be focused more towards the south and west which are not as well serviced by public transport and so the traffic distribution has been adjusted as shown in Table 13.

Table 13: Forecast Traffic Distribution from Summer Hill Flour Mill Site

Direction	Existing Distribution	Forecast Distribution
North	19%	20%
East	49%	30%
South	12%	20%
West	20%	30%

Traffic generated from the Summer Hill Flour Mill site has been distributed across the road network based on this analysis. Existing traffic generated by the Summer Hill Flour Mill site and McGill St precinct (as described in section 4.2.1) has been deducted from this total traffic generation.

The total number of additional vehicles generated at each leg of the five key intersections surrounding the site, following both the proposed Summer Hill Flour Mill and McGill Street developments, is presented in Figure 11 and Figure 12.

Full turning movements for vehicles entering and departing the site entrances are provided as Appendix D.

Figure 11 Traffic Distribution at Key Intersections during AM Peak (8am – 9am)

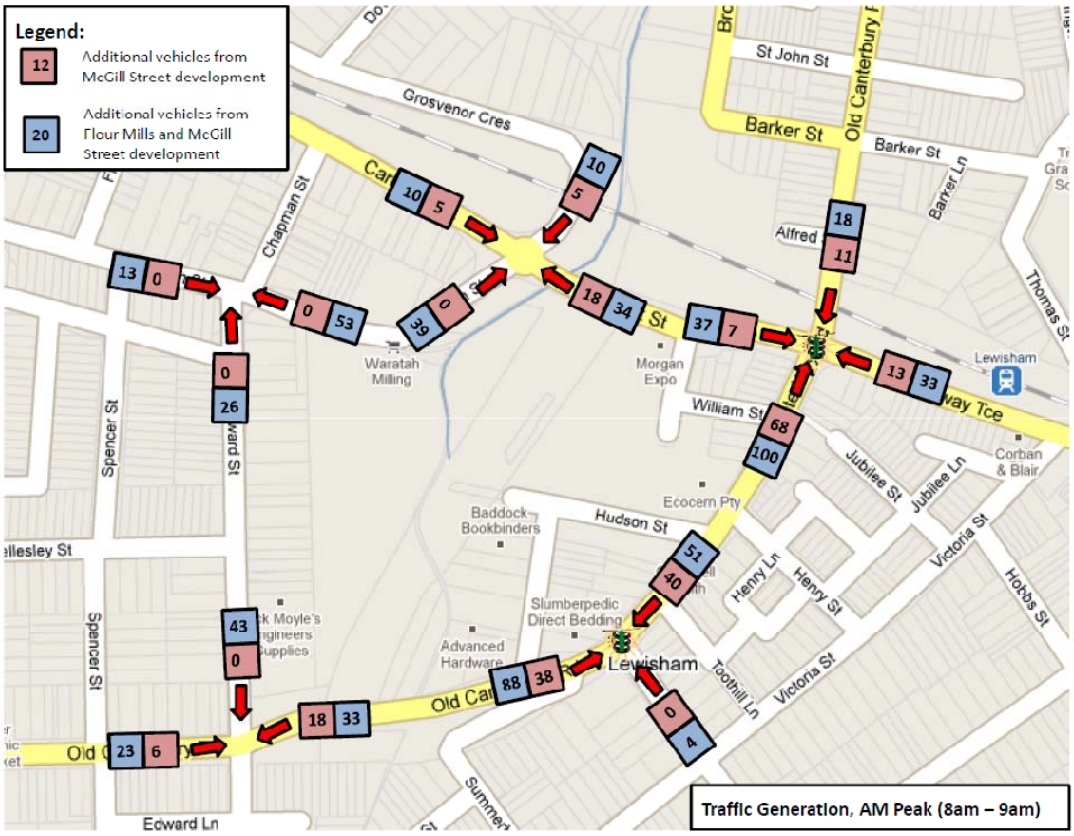
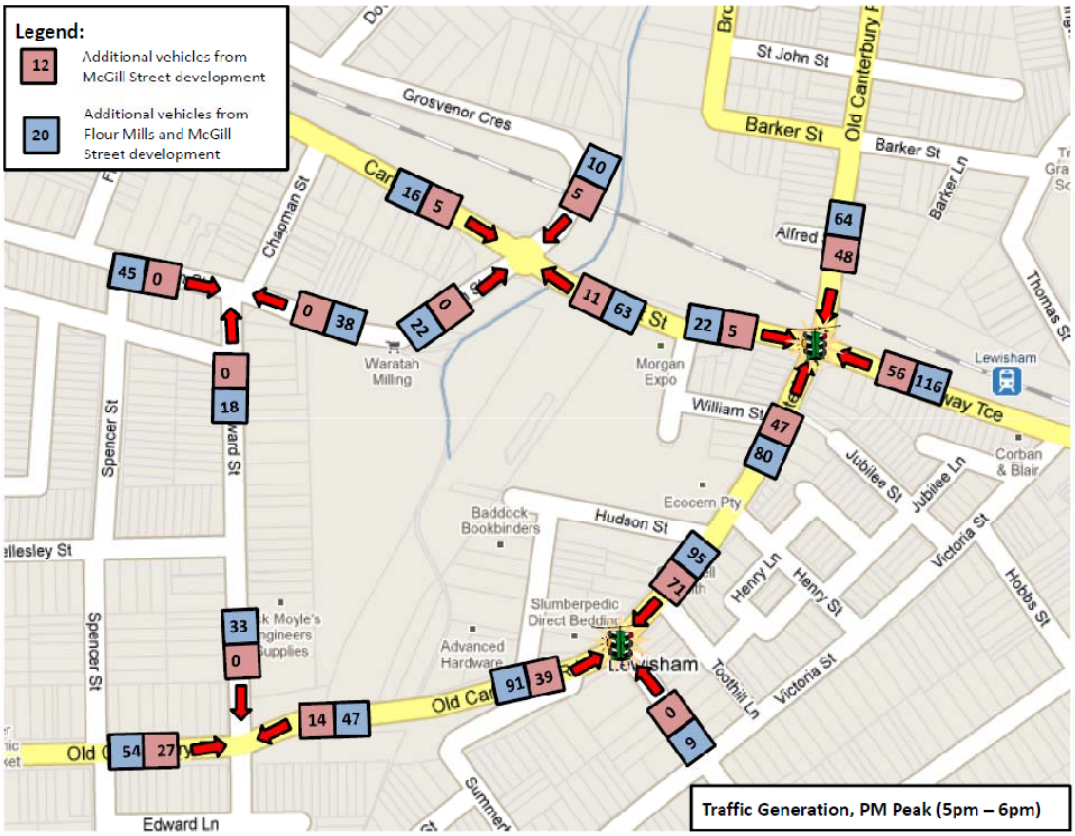


Figure 12 Traffic Distribution at Key Intersections during PM Peak (5pm – 6pm)



6.3 Traffic increase due to 78-90 Old Canterbury Road

As a result of the 78-90 Old Canterbury Road proposal in the McGill Street precinct (refer to section 3.2), there will be a significant increase in traffic. Arup estimated that the morning peak traffic generation has increased from 79 veh/hour to 207 veh/hr (162% increases) and the afternoon peak has increased from 93 veh/hr to 475 veh/hr (411% increase) as shown in Table 15.

Table 14: McGill Street Masterplan Traffic Generation

	Morning Peak (veh/hr)		Afternoon Peak (veh/hr)	
	In	Out	In	Out
1,2,3 and 6	50	100	101	107
4 and 5	16	63	56	37
Total	**66**	**163**	**157**	**130**

Source: Arup report 2/11/09

Table 15: Proposed 78-90 Old Canterbury Road Traffic Generation

	Morning Peak (veh/hr)		Afternoon Peak (veh/hr)	
	In	Out	In	Out
Equivalent 4 and 5	71	136	285	190

Source: (Source: Traffix report 9/10/10)

The key issues resulting from the increased site traffic generation are:

- The proposed 78-90 Old Canterbury Road development contributes significantly more traffic to the road system than that assessed by the approved McGill Street Masterplan; and
- Depending on the future land use mix across the entire McGill Street precinct, there will be significantly more traffic generated. If the anticipated Master Plan development is added, then a total of 357 veh/hr in the morning peak and 683 veh/hr in the afternoon peak would result. The Traffix report, prepared for the proposed development of 78-90 Old Canterbury Road development, considers an additional 400 units on the remainder of the site which would result in a total of 367 veh/hr in the morning peak and 635 veh/hr in the afternoon peak. These are significantly higher than the 229 veh/hr in the morning peak and 287 veh/hr in the afternoon peak predicted by the Masterplan.

6.4 Intersection Analysis

These intersections have been analysed in the following three scenarios:

- Existing traffic;
- Existing, SHFM and McGill Street Masterplan development traffic; and
- Existing, SHFM and McGill Street Masterplan development (including 78-90 Old Canterbury Road) traffic.

To be consistent with Sidra modelling in different scenarios, the additional traffic generation rate (from the residential, retail and commercial components) and traffic distribution from the 78-90 Old Canterbury Road is kept similar with the previous Arup traffic assessment for the site.

The traffic distribution for the McGill Street precinct development (McGill Street Development, Transport Analysis report prepared by Arup, November 2009) and for the 78-90 Old Canterbury Road development (Traffix report) have been adopted. The traffic distributions vary depending upon lane use type and time of travel.

6.4.1 SIDRA Analysis

For the purposes of this investigation, an individual intersection traffic control model, SIDRA, has been used to assess the performance of the local road network surrounding the Summer Hill Flour Mill precinct.

The existing intersection performance is assessed in this report in terms of the following four factors for each intersection.

- Degree of Saturation
- Average Delay (seconds per vehicle)
- Level of Service
- Length and direction of peak traffic queue (95th percentile traffic queue)

In urban areas, the performance of the major road network is generally a function of the performance of key intersections. This performance is quantified in terms of Level of Service (LOS), which is an index of the operational performance of traffic at an intersection and is based on the average delay per vehicle. LOS ranges from A = very good to F = highly congested travel conditions, as shown in Table 16.

Table 16 Level of Service Definitions

Description	Level of Service (RTA Definition)	Average Delay per Vehicle (s)
Very Good	A	< 14.5
Good	B	14.5 ≤ 28.5
Satisfactory	C	28.5 ≤ 42.5
Near Capacity	D	42.5 ≤ 56.5
At Capacity	E	56.5 ≤ 70.5
Over Capacity	F	≥ 70.5

Generally it is desirable to aim at achieving a Level of Service of C or better at all major road intersections. However, in practice, it is reasonable for some intersections to operate at Level of Service D at peak times. Another common measure of intersection performance is the degree of saturation (DOS), which provides an overall measure of the capability of the intersection to accommodate additional traffic. A DOS of 1.0 indicates that an intersection is operating at capacity. The desirable maximum degree of saturation for an intersection with traffic signals is 0.9.

6.4.2 Results of the intersection analysis for existing configuration

The intersection results are provided in Table 17. Detailed intersection results are attached in Appendix B. According to Arup traffic distribution, the effects of the 78-90 Old Canterbury Road traffic are more significant for the intersections located in the vicinity. The intersections located away from the site will experience less effect as traffic will be dispersed in various directions, resulting in less traffic at any particular intersection.

Table 17: Intersection Results

Intersection	Scenario	Time Period	LOS	DOS	AVD (sec)
Old Canterbury Rd/ Railway Tce	Existing	AM Peak	D	0.97	53
		PM Peak	C	0.87	36
	Existing + SHFM + McGill St	AM Peak	F	1.06	77
		PM Peak	D	0.98	53
	Existing + SHFM + McGill St (78-90 Old Canterbury Road)	AM Peak	F	1.07	88
		PM Peak	F	1.01	75
Old Canterbury Rd/ Toothill St	Existing	AM Peak	B	0.65	26
		PM Peak	B	0.71	23
	Existing + SHFM + McGill St	AM Peak	B	0.78	26
		PM Peak	B	0.84	26
	Existing + SHFM + McGill St (78-90 Old Canterbury Road)	AM Peak	C	0.86	29
		PM Peak	D	1.05	48
Old Canterbury Rd/ Edward St	Existing	AM Peak	n/a	0.50	5
		PM Peak	n/a	0.42	6
	Existing + SHFM + McGill St	AM Peak	B	0.79	16
		PM Peak	B	0.86	20
	Existing + SHFM + McGill St (78-90 Old Canterbury Road)	AM Peak	B	0.81	18
		PM Peak	B	0.89	22
Smith St / Edward St /Chapman St	Existing	AM Peak	n/a	0.20	4
		PM Peak	n/a	0.13	5
	Existing + SHFM + McGill St	AM Peak	A	0.23	5
		PM Peak	A	0.21	7
	Existing + SHFM + McGill St (78-90 Old Canterbury Road)	AM Peak	A	0.23	5
		PM Peak	A	0.21	7
Longport St/ Grosvenor Cr	Existing	AM Peak	A	0.54	13
		PM Peak	A	0.74	11
	Existing + SHFM + McGill St	AM Peak	A	0.61	14
		PM Peak	A	0.80	12
	Existing + SHFM + McGill St (78-90 Old Canterbury Road)	AM Peak	B	0.65	15
		PM Peak	A	0.82	13

Intersection	Scenario	Time Period	LOS	DOS	AVD (sec)
Old Canterbury Rd/ Nowranie St/ Junction Rd	Existing	AM Peak	D	0.90	45
		PM Peak	C	0.81	31
	Existing + SHFM + McGill St	AM Peak	D	0.92	47
		PM Peak	C	0.87	34
	Existing + SHFM + McGill St (78-90 Old Canterbury Road)	AM Peak	D	0.93	50
		PM Peak	C	0.95	42
Hume Hwy/ Carlton Cr	Existing	AM Peak	A	0.67	10
		PM Peak	A	0.80	13
	Existing + SHFM + McGill St	AM Peak	A	0.67	10
		PM Peak	A	0.81	14
	Existing + SHFM + McGill St (78-90 Old Canterbury Road)	AM Peak	A	0.67	10
		PM Peak	A	0.83	14
Hume Hwy/ Grosvenor Cr/ Elizabeth St	Existing	AM Peak	C	0.90	30
		PM Peak	C	0.86	35
	Existing + SHFM + McGill St	AM Peak	D	1.00	45
		PM Peak	C	0.89	38
	Existing + SHFM + McGill St (78-90 Old Canterbury Road)	AM Peak	D	1.00	45
		PM Peak	C	0.89	40
Carlton Cr/ Lackey St	Existing	AM Peak	B	0.65	18
		PM Peak	B	0.74	19
	Existing + SHFM + McGill St	AM Peak	B	0.67	18
		PM Peak	B	0.77	20
	Existing + SHFM + McGill St (78-90 Old Canterbury Road)	AM Peak	B	0.67	18
		PM Peak	B	0.77	20
Parramatta Rd/ Tebbutt St	Existing	AM Peak	A	0.84	13
		PM Peak	A	0.75	14
	Existing + SHFM + McGill St	AM Peak	A	0.84	13
		PM Peak	B	0.77	16
	Existing + SHFM + McGill St (78-90 Old Canterbury Road)	AM Peak	A	0.84	13
		PM Peak	B	0.79	16

Intersection	Scenario	Time Period	LOS	DOS	AVD (sec)
Parramatta Rd/ Old Canterbury Rd	Existing	AM Peak	A & F[2]	0.54	3
		PM Peak	A & F	0.96	5
	Existing + SHFM + McGill St	AM Peak	A & F	0.55	3
		PM Peak	A & F	0.97	6
	Existing + SHFM + McGill St (78-90 Old Canterbury Road)	AM Peak	A & F	0.56	3
		PM Peak	A & F	1.01	6
Parramatta Rd/ West St/ Flood St	Existing	AM Peak	C	0.85	33.2
		PM Peak	E	0.98	59.2
	Existing + SHFM + McGill St	AM Peak	C	0.86	33.3
		PM Peak	E	0.99	62.7
	Existing + SHFM + McGill St (78-90 Old Canterbury Road)	AM Peak	C	0.87	33.3
		PM Peak	E	1.00	62.2
Railway Terrace/ West St.	Existing	AM Peak	F	1.46	112
		PM Peak	C	0.90	31.1
	Existing + SHFM + McGill St	AM Peak	F	1.46	118
		PM Peak	C	0.90	31.5
	Existing + SHFM + McGill St (78-90 Old Canterbury Road)	AM Peak	F	1.464	117.1
		PM Peak	C	0.90	31.5

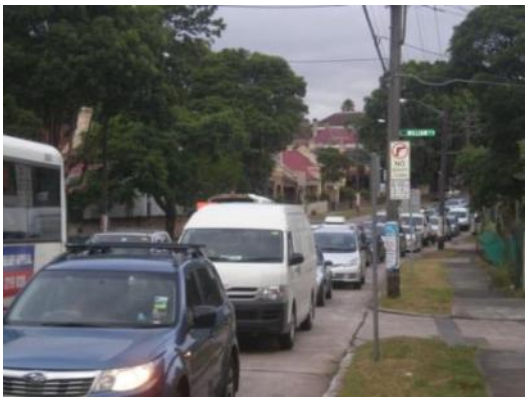
Note: LOS : Level of Service; DOS: Degree of Saturation; AVD: Average Vehicle Delay (refer to Appendix C for Sidra Explanatory Notes)

[2] For priority controlled intersections, the average LOS is not considered as the average vehicular delay of the intersection could be deceptive (such as major approach (Parramatta Rd) could be LOS A and the minor approach (Old Canterbury Rd) could be LOS F). Therefore, for a priority controlled intersections, the delay is reported separately on each individual approach. As a result, more than one LOS can be obtained for this type of intersection.

Old Canterbury Road/ Longport Street/ Railway Terrace (traffic signals)

There are long queues of traffic on the south and west approaches to the intersection (refer to Photograph 4). The Sidra analysis is unable to predict delay to vehicles accurately when there is significant queuing and some vehicles wait for a number of phase changes in the peak hour to traverse the traffic signals. This means that the overall intersection LOS is underestimated. The two critical movements are the northbound flow on Old Canterbury Road and the eastbound flow on Longport Street. On the northern and eastern departure sides there is only a single traffic lane limits the capacity of the intersection, particularly when there is upstream congestion.

Photograph 4: Traffic Queue on Old Canterbury Road and Longport Street



Traffic Queue on Old Canterbury Rd (looking south)

Traffic Queue on Longport St (looking west)

In the am peak hour, the Sidra analysis predicts that the intersection is currently operating at LOS D and close to capacity with a DOS of 0.97. With each of the development scenarios modelled, the intersection will experience increased delay and is predicted to operate at LOS F with DOS above 1.0.

In the pm peak hour, the intersection is currently operating at LOS C with a DOS of 0.87. With the SHFM and McGill Street Masterplan development, a LOS D is predicted with DOS of 0.98. With the 78-90 Old Canterbury Road development, the intersection is predicted to operate at LOS F and DOS of 1.01.

Old Canterbury Road/ Toothill Road (traffic signals)

In the am peak period, Sidra result shows that the intersection is operating at LOS B with a DOS of 0.65. However, in reality there is a long northbound traffic queue at this intersection (refer to Photograph 5). This intersection is constrained for the following reasons:

- Right turning movement is permitted from Old Canterbury Road to Toothill Road. According to the traffic count data about 25 – 30% of traffic turns right from Old Canterbury Road to Toothill Street and the northbound approach lane is shared by both through and right turning traffic. Although a right turning arrow (phase) is provided at this traffic signal, it is not sufficient to clear all the right turn movements. Consequently, the right turning traffic delays northbound through traffic on Old Canterbury Road; and

- The northbound traffic on Old Canterbury Road is queued back from the Longport Street intersection which reduces the ability for traffic to proceed through the Toothill Street intersection.

Photograph 5: Traffic Queue on Old Canterbury Road and Toothill Street

Traffic Queue on Old Canterbury Rd (looking north from Edward Rd)

Traffic on Toothill St (looking south from Old Canterbury Rd)

The Sidra modelling predicts that with the SHFM and McGill Street Masterplan development, a LOS B is maintained with DOS of 0.75. With the 78-90 Old Canterbury Road development, the intersection is predicted to operate at LOS C and DOS of 0.86.

In the pm peak hour, the intersection is currently operating at LOS B with DOS of 0.71. With the SHFM and McGill Street Masterplan development, a LOS B is maintained with DOS of 0.84. With the 78-90 Old Canterbury Road development, the intersection is predicted to operate at LOS D and DOS of 1.05.

Old Canterbury Road/ Edward Street (existing giveway, proposed traffic signals)

During the site inspection in the am peak period, very few vehicles were observed to feed into Old Canterbury Road from Edward Street. With development of the SHFM site, it is proposed to install traffic signals to improve amenity for local vehicles and pedestrians. Sidra modelling shows that due to the development scenarios modelled, the intersection will operate at LOS B with a DOS of 0.79 – 0.89.

Smith Street/ Edward Road/ Chapman Street (existing giveway, proposed roundabout)

This intersection is modelled as a roundabout. During the site inspection this intersection is observed to be free flowing. With the development sceanrios the roundabout will operate a LOS A.

Longport Street/ Smith Street/ Carlton Crescent/ Grosvenor Crescent (roundabout)

In the am peak hour, Sidra shows that the intersection is operating at LOS A with DOS of 0.54. However, in reality there is a long eastbound traffic queue at this intersection (refer to Photograph 6).The eastbound traffic remains static due to

traffic congestion at the Old Canterbury Road intersection. There are moderate traffic queues on Smith Street. The development traffic scenarios have a minor impact at this intersection.

In the pm peak hour, Sidra shows that the intersection is also operating at LOS A and again the development scenarios have only a minor impact on operations.

Photograph 6: Traffic Queue on Carlton Crescent and Smith Street

Long traffic Queue on Carlton Crescent (looking west)

Traffic Queue on Smith Street (looking south)

Old Canterbury Road/ Junction Road/ Nowranie Street (traffic signals)

There is an existing left turn restriction from Old Canterbury Road to Junction Road at this intersection ('No Left Turn; Vehicles over 6m'). It is unclear whether this also applies to Nowranie Street, however there is a central median extending out from Junction Road which should block this movement. Vehicles were observed to turn left from Old Canterbury Road to Nowranie Street avoiding the incoming traffic on Nowranie Street (refer to Figure 13). This matter is not related to SHFM development and should be investigated by the RTA.

Figure 13: Unsafe Traffic Movement at the Old Canterbury Rd/ Junction Rd/ Nowranie St intersection

In the am peak period, Sidra modelling shows that the intersection is currently operating at LOS D and just over 90% capacity. During the site inspection, a long eastbound traffic queue was observed in Old Canterbury Road and Junction Road (refer to Photograph 7). The development traffic for both scenarios will result in a slight deterioration at the intersection but the LOS will still remain at D.

In the pm peak period, the intersection is currently operating at LOS C with DOS of 0.81. With the development traffic the intersection will experience a slight deterioration in operation although still at LOS C.

Photograph 7: Traffic Queue on Old Canterbury Road and Junction Road

Old Canterbury Rd at Junction St (looking south)

Junction Rd at Old Canterbury Rd (looking west)

Liverpool Road (Hume Hwy) / Carlton Crescent (traffic signals)

The right turn movement is not permitted from Carlton Crescent to Liverpool Road and on site observations revealed no traffic queuing at this intersection. In the am peak hour, the intersection is currently operating at LOS A with DOS of 0.67. The increased traffic resulting from the development scenarios has little impact on the intersection operation In the pm peak hour the intersection is also

operating at LOS A with a DOS of 0.80. A similar level of operation is predicted with development traffic.

Liverpool Road (Hume Hwy) / Elizabeth Street/ Grosvenor Crescent (traffic signals)

In the am peak period, Sidra results show that the intersection is currently operating at LOS C with DOS of 0.90. With development traffic, a LOS D is predicted with DOS of 1.00. In the pm peak period, this intersection is currently operating at LOS C with DOS of 0.86. With development, the intersection will continue to operate at LOS C with slight increases in DOS and AVD.

Carlton Crescent/ Lackey Street (traffic signals)

This intersection is currently operating at LOS B with DOS of 0.65 in the am peak and 0.71 in the pm peak with low AVD. With development this intersection will continue to operate at LOS B with marginal changes it its operating parameters.

Parramatta Road/ Tebbutt Street (eastbound traffic only) (giveway)

This intersection is currently a left in – left out give way intersection (refer to Figure 14). Due to the high volume of eastbound traffic on Parramatta Road, vehicles on Tebbutt Street experience delay when exiting. However, opportunities arise for the waiting vehicles on Tebbutt Street when the pedestrian operated traffic lights on Parramatta Road hold the eastbound traffic on Parramatta Road. Vehicles turning left from Parramatta Road into Tebbutt Street are also delayed when the pedestrian lights are activated.

Figure 14: Parramatta Road/ Tebbutt St/ Old Canterbury Road Intersection

Sidra shows that the intersection is currently operating at LOS A in both the peak hours with DOS of 0.84 in the am peak and 0.75 in the pm peak. With development traffic, the intersection will continue to operate at the same LOS but with slightly increased DOS and AVD.

Parramatta Road/ Old Canterbury Road (westbound traffic only) (giveway)

Due to the high volume of westbound traffic on Parramatta Road, vehicles turning left from Old Canterbury Road to Parramatta Road experience significant delay in all the traffic scenarios and this movement experiences a LOS F. The effect of development traffic will, however, be minor at this intersection.

Parramatta Road/ West Street/ Flood Street (traffic signals)

In the am peak peak, this intersection is currently operating at LOS C with a DOS of).85. With development the intersection will continue to operate at LOS C with marginal increase of DOS and AVD.

In the pm peak period, the intersection is currently operating at LOS E and close to capacity. With development, the intersection will continue to operate at LOS E with a slight increase of DOS and AVD.

Railway Terrace/ West Street (traffic signals)

In the am peak period the intersection is currently operating at LOS F and significantly over capacity. However with development traffic, the intersection will continue to operate at the same capacity.

In the pm peak period, the intersection is currently performing better than the am peak period with LOS C and DOS of 0.90. With development traffic, the intersection will not experience any significant traffic impact.

6.5 Intersection analysis based on proposed intersection upgrades

The Traffix assessment proposes a number of intersection upgrade works to improve operations as follows:

- Old Canterbury Road/ Toothill Street intersection: This intersection is proposed to be upgraded in two stages. In the short term, a 60m right turn bay is proposed in the south approach. In the longer term, this intersection is proposed to be a four – way intersection with additional right turn bays on both the north and south approaches (refer to Figure 15).The longer term proposal requires land to be dedicated for road widening on the McGill Street site.

Figure 15: Short term and long term proposal for Old Canterbury Road/ Toothill St Intersection

Short term proposal Long term proposal

Source: Traffix Report

- Old Canterbury Road/ Longport Road/ Railway Terrace: The eastbound kerbside lane is proposed to be converted to a left turn only lane as shown in Figure 16. This generally replicates existing lane usage.

Figure 16: Proposed changes on Old Canterbury Road/ Longport Street/ Railway Terrace Intersection

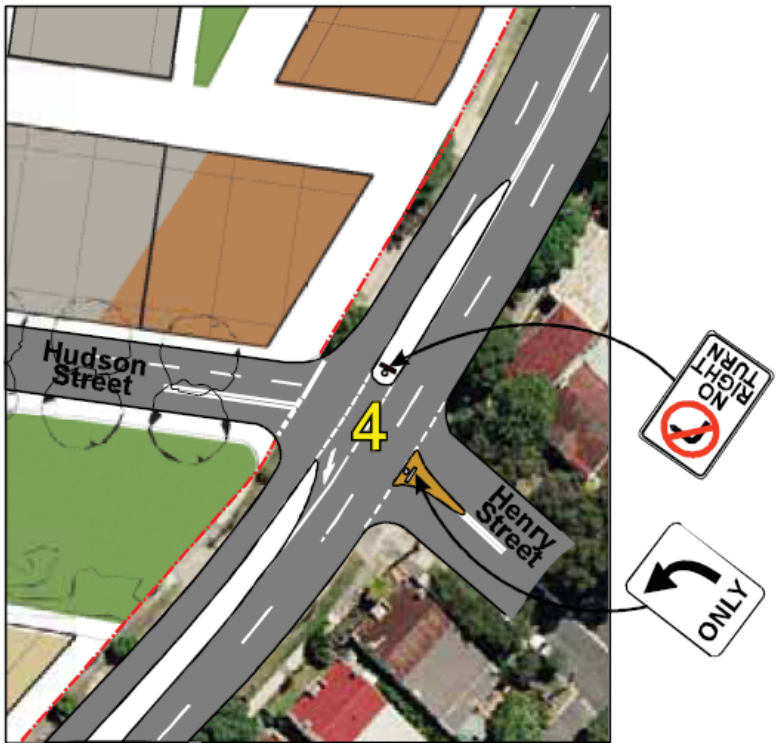
Source: Traffix Report

- Railway Terrace/ West Street intersection: A dedicated left turn lane on Railway Terrace (west approach) is proposed. This will involve loss of four parking spaces on the southern side of Railway Terrace, immediately west of West Street.

The above three intersections have been analysed for the future proposed layouts with additional traffic in the road network due to the 78-90 Old Canterbury Road development. However, it should be noted that in the Traffix report, there are a number of traffic issues that will require further clarification, for instance:

- In the am peak period, 23 incoming vehicles (westbound) are added in Railway Terrace/ West Street intersection but not in the Old Canterbury Road/ Railway Terrace/ Longport Street intersection;
- In the am peak hour, 93 incoming vehicles (westbound) are added in the Old Canterbury Road/ Railway Terrace/ Longport Street intersection but not in Railway Terrace/ West Street intersection;
- In the am peak period, 85 vehicles were estimated to head west by turning left from the Old Canterbury Road to Parramatta Road but in the pm peak period the inbound vehicles from the west is significantly lower compared to outbound vehicles;
- The traffic distribution in the Traffix report assumes that a large proportion of the site traffic would not travel through the Old Canterbury Road/ Longport Street/ Railway Terrace, instead choosing to head to the south. This would appear to bias the distribution from what would be expected;
- In the short term, incoming vehicles from the north rely on a right turn from the Old Canterbury Road to McGill Street for access to the site but it is not stated how this would affect the southbound movement on Old Canterbury Road; and
- In the short term, a right turn movement is proposed from Hudson Street to Old Canterbury Road. This right turn movement is proposed to occur in two stages. However, the storage capacity at the middle of Old Canterbury Road appears to be small considering 79 vehicles/ hour are predicted to turn right at this location (refer to Figure 17).

Figure 17: Proposed Old Canterbury Road/ Hudson Street Intersection



Source: Traffix Report

Due to the above discrepancies, the future estimated traffic volume for the 78-90 Old Canterbury Road site could not be recalculated. Therefore, Arup has kept the traffic generation as per Table 14 and Table 15 of this report but traffic distribution is assumed in accordance with the Traffix Report.

The Sidra results for the future proposed layouts of the above three intersections are presented in Table 18. It should be noted that the Traffix report has undertaken the intersection analysis only for 78-90 Old Canterbury Road development, where as Arup has undertaken the analysis considering existing + SHFM + McGill Street development (with 78-90 Old Canterbury Road traffic).

Table 18: Sidra Results for the future proposed layouts of the intersections

Intersection	Scenario	Peak Period	LOS	DOS	AVD (sec)
Old Canterbury Rd/ Toothill St	Future Short Term	AM Peak	B	0.79	26
		PM Peak	D	1.00	49
	Future Long Term	AM Peak	B	1.00	27
		PM Peak	D	1.16	46
Old Canterbury Rd/ Longport St/ Railway Tce	Future	AM Peak	F	1.10	100
		PM Peak	E	0.98	61
Railway Tce/ West St	Future	AM Peak	F	1.35	75
		PM Peak	C	0.85	29

Old Canterbury Road/ Toothill Street

The actual scenario of this intersection is described in the previous section. With the short term layout of the intersection, Sidra shows that the intersection will perform better compared to the do nothing scenario (business as usual) with the same amount of traffic (refer to Table 17). The LOS, DOS and AVD will improve in both the peak hours and therefore, the benefit of a right turn bay on the south approach is evident.

For the longer term (additional 400 units as per Traffix report, page 29), the intersection will perform better compared to do nothing scenario in the am peak hour. The LOS and AVD will be lower but the intersection will reach at its capacity.

In the pm peak period, the benefits would be marginal compared to do nothing scenario (refer to Table 17). The LOS would remain as D and AVD would slightly decrease however, capacity of the intersection would increase by about 10%.

In summary, the short term proposed layout would be beneficial but the long term (with additional vehicles from the 78-90 Old Canterbury Road development) would be marginal, unless other measures are considered to improve the operation of this traffic signal.

Old Canterbury Road/ Longport Street/ Railway Terrace

An exclusive left turn bay is proposed on the west approach of this intersection in both the shorter and longer terms. Compared to the do nothing scenario, Sidra results do not show any significant benefit with the proposed layout. In the am peak period, the intersection will continue to operate LOS F with slightly lower DOS but the AVD will increase by 12 seconds (refer to Table 17 and Table 18).

In the pm peak period, the intersection will operate at LOS E compared to do nothing scenario (LOS D). However, the capacity of the intersection will come down to less than 1.0.

Although the benefit for the proposed layout will not be significant, the proposal may be justifiable considering there is only one exit lane on the east approach of the intersection. It is however should be noted that, in this proposal the eastbound though vehicles on Longport Street will be affected by the right tuning vehicles from Longport Street to the Old Canterbury Road during the inter peak periods.

Railway Terrace/ West Street

A dedicated left turn bay on the west approach will be beneficial at this intersection. The comparison of the Sidra results for the two layouts reveals a lower DOS and AVD in both the peak hours (refer to Table 17 and Table 18). However, the intersection will continue to operate at LOS F in the am peak period.

In summary, the proposal will be beneficial in terms of traffic operations but the loss of four parking spaces on the southern side of Railway Terrace must be supported by Marrickville Council and/ or the RTA.

6.6 Road Classification and Capacity

The road network providing access to the precinct can be described in terms of the hierarchy of each road and the expected daily traffic volume. The key roads providing access to this precinct have a functional classification as Sub-arterial roads with an expected daily traffic volume of up to 20,000 vehicles.

Existing daily traffic volumes on selected roads surrounding the Summer Hill Flour Mill precinct is presented in Table 19.

Table 19 Road Classification and Daily Traffic Volumes

Location	Administrative Road Classification	Functional Road Classification	Expected Daily Traffic Volume[3]	Existing Daily Traffic Volume[4]
Longport Street	Regional	Sub-arterial	10,000 – 20,000	19,330
Carlton Crescent	Regional	Sub-arterial	10,000 – 20,000	7,950
Railway Terrace	State	Sub-arterial	10,000 – 20,000	17,250
Old Canterbury Road	State	Sub-arterial	10,000 – 20,000	19,980
Toothill Street	Regional	Collector	5,000 – 10,000	9,490
Smith Street	Local	Collector	5,000 – 10,000	4,650
Edward Street	Local	Local	2,000 – 4,000	2,100

Old Canterbury Road, Longport Street and Railway Terrace are all functioning at the upper end of the expected daily traffic volume range indicating that they are functioning as major roads for longer distance travel in the network. These roads are expected to provide access to development such as proposed in the McGill Street and Summer Hill Flour Mills precinct.

The predicted increase on each street providing access to the combined McGill Street and Summer Hill Flour Mills precinct is shown in Table 20. The key sub-arterial roads providing access are anticipated to experience an increase of between 3% and 9%. Slightly higher percentage increases are expected on the local access streets however these will continue to operate within their functional classification.

Table 20 Predicted AM and PM Peak Traffic Increases

Location	AM Peak			PM Peak		
	Existing	Additional	% change	Existing	Additional	% change
Longport Street	1790	71	4%	1660	85	5%
Carlton Crescent	670	20	3%	915	23	3%
Railway Terrace	1800	57	3%	1645	130	8%
Old Canterbury Road	1770	128	7%	2045	177	9%
Toothill Street	945	62	7%	995	68	7%
Smith Street	475	63	13%	455	60	13%
Edward Street	185	50	27%	235	41	17%

[3] RTA Road Design Guide – August 1991
[4] Source: RTA count data or factored from peak period counts.

6.7 Traffic lights at Carlton Crescent/ Smith Street intersection to improve pedestrian connectivity

There is an existing pedestrian refuge island on Longport Street, about 400m east of Smith Street intersection. Carlton Crescent/ Smith Street intersection has been analysed for traffic signals as requested by Ashfield Council. The comparison of existing roundabout and future traffic signals with existing + SHFM + McGill Street (with 78-90 Old Canterbury Road) traffic is presented in Table 21.

Table 21: Comparison of Sidra Results at Carlton Crescent/ Smith Street intersection

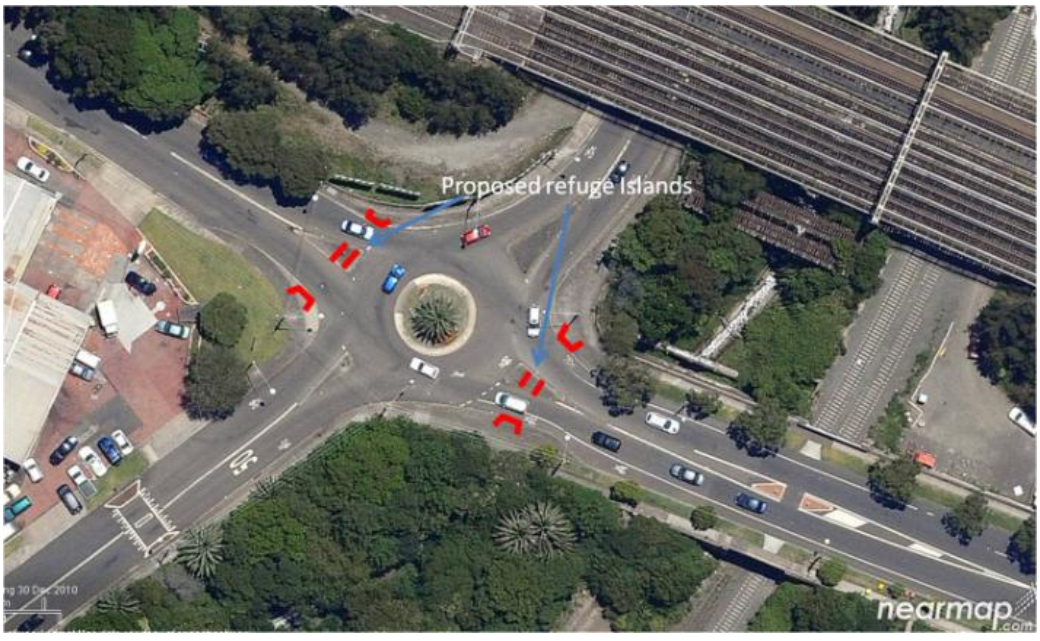
Scenario	Peak Period	LOS	DOS	AVD (sec)
Roundabout Control	AM Peak	B	0.65	15
	PM Peak	A	0.82	13
Traffic Signal Control	AM Peak	F	1.736	485
	PM Peak	F	1.878	543

The analysis in the above table shows that there will be a deterioration in operation with the introduction of traffic signals.

The roundabout allows cars to circulate freely from restricted driveways. A left – in/ left – out access is proposed on Longport Street for the McGill Street precinct. Future vehicles exiting the McGill Street site via Longport Street access, wishing to travel east, will get an opportunity to take a legal u – turn at the existing roundabout at Carlton Avenue/ Smith Street intersection. A signal control operation at this intersection will eliminate this opportunity.

To improve the north – south pedestrian connectively in the area, pedestrian refuge islands could be provided at the existing median islands located each side of the roundabout, as shown in Figure 18. The Greenway will also improve north-south pedestrian connectivity in the precinct.

Figure 18: Proposed Refuge Islands on Carlton Crescent & Longport Street



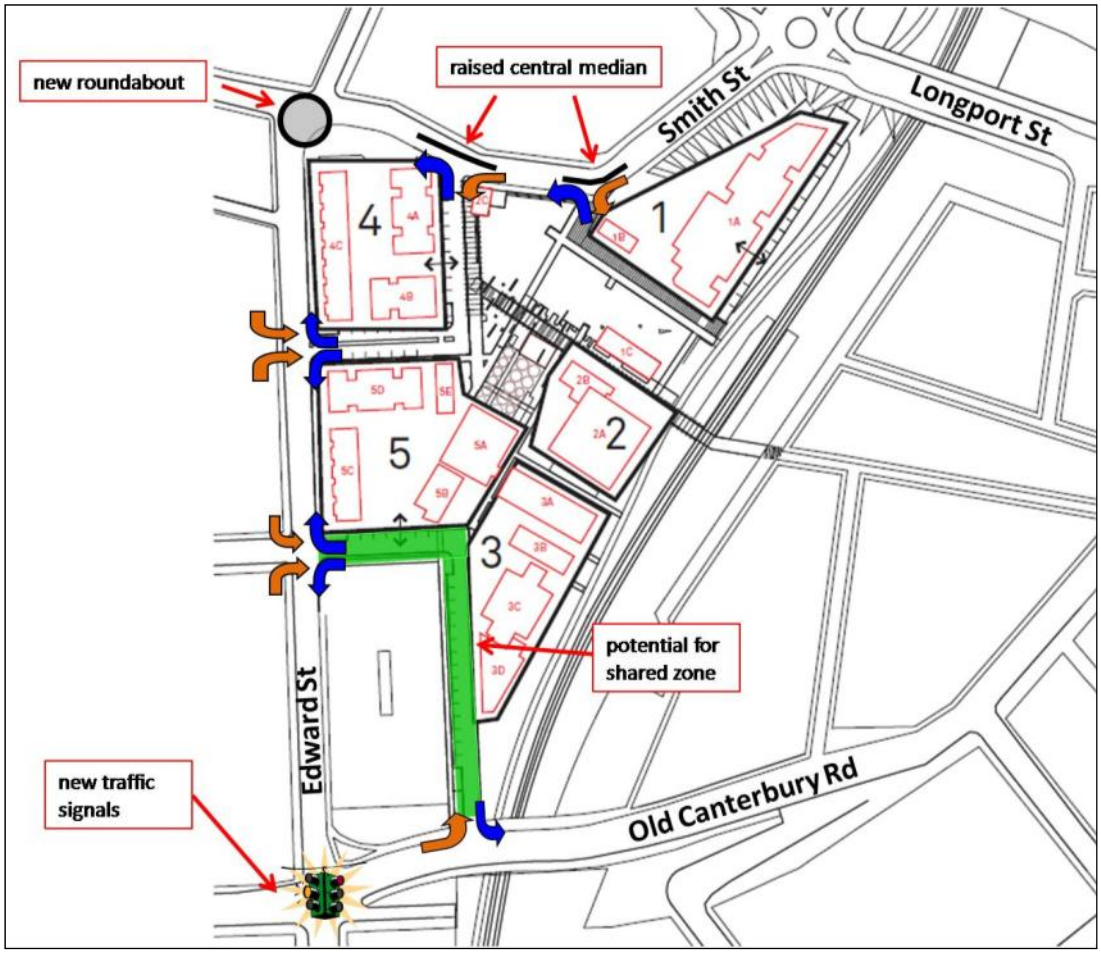
6.8 Recommended Vehicle Access Points and Traffic Management

The main access points to the precinct are proposed to be via Old Canterbury Road, Edward Street and Smith Street. These access points will need to be managed as follows:

- Given the significant levels of traffic along Old Canterbury Road, along with its location on a crest, it is recommended that access to the new street to precinct 3 (off Old Canterbury Road) be restricted to left-in/ left-out movements only.
- To alleviate the significant delays forecast for vehicles accessing the precinct via the Edward Street / Old Canterbury Road intersection, a new set of traffic signals is proposed. SIDRA modelling has forecast this intersection to operate satisfactorily following the introduction of traffic signals. This intersection will also assist pedestrians to cross Old Canterbury Road at this location. These traffic signals would be subject to RTA approval.
- All movements into and out of the minor access points on Edward Street (between Old Canterbury Road and Smith Street) would be permitted and controlled by give way signage.
- The two new access points along Smith Street would be restricted to left-in/left-out movements. A central raised median could be utilised to control this restriction, which would improve overall traffic circulation.
- Given the movement restrictions along Smith Street, a new roundabout could be constructed at the Edward Street / Smith Street / Chapman Street intersection. This would 'clean up' the intersection, which is currently offset slightly by the northern Chapman Street leg. Further, it would provide improved traffic circulation around the site, particularly given the proposed central medians preventing right turns off Smith Street into the precinct. This would be configured as a minor road roundabout in keeping with other traffic calming devices along Smith Street.
- Existing right turn bans during peak hours at the Railway Tce / Old Canterbury Rd intersection should be maintained.
- The Toothill Street / Old Canterbury Road intersection can remain in its current form as it currently functions well without causing delays to the flow of traffic.
- With traffic volumes on roads within the Summer Hill Flour Mill site expected to be low, there are opportunities to provide shared zones with a 10km/h speed limit.

These traffic management measures are illustrated in Figure 19.

Figure 19 Summer Hill Flour Mill Traffic Management



6.9 Site Servicing

All internal roads will be configured to enable access by garbage collection, delivery and emergency vehicles.

6.10 Construction Traffic Management Plan

A Construction Traffic Management Plan (CTMP) for the overall site development will need to be prepared by the appointed project construction contractor prior to the issuing of a Construction Certificate for the development. The construction contractor could be advised to consult with RTA and Ashfield Council in regards to the preparation of the CTMP for the site.

7 Transport Assessment

7.1 Future Mode Split

The traffic generation used in this analysis has not considered the introduction of the light rail extension to Dulwich Hill or the potential for improved train access at Lewisham and Summer Hill railway stations, and thus is considered a conservative analysis. Located adjacent to the heart of the Summer Hill Flour Mill site, the light rail will be an attractive option for people travelling to work, as well as people utilising the retail and commercial precincts within the development. It will increase the non-car mode share to and from the site, resulting in a reduced impact on the local road network.

Additionally to this, it can be expected that the type of residents living in a medium density development such as proposed on the site would have a greater focus on public transport usage and be less reliant on private vehicle use.

The existing mode split of residents departing the precinct to go to work was shown in Table 6 and is compared below in Table 22 with a possible future mode split when the light rail and additional heavy rail and bicycle use is considered.

Table 22 Possible Future Journey to Work Mode Split

Mode	Existing Mode Split	Potential Change	Future Mode Split
Car driver/passenger	48%	-9%	39%
Train	35%	+3%	38%
LRT	0%	+5%	5%
Walk	6%	-	6%
Bus	7%	-	7%
Bicycle	1%	+1%	2%
Motorbike	1%	-	1%
Other	2%	-	2%
TOTAL	**100%**	**-**	**100%**

The analysis indicates that public transport currently accounts for 42% of work related trips in the area surrounding the site but could be as high as 50% due to the transit oriented development nature of the two development precincts. This reduction in car mode share would decrease residential traffic generation by approximately 20% in the peak hours. This is equivalent to 60 vehicle movements being removed in each peak hour for both sites combined.

Based on 2.5 persons per household and 800 units across both precincts, a total population of 2,000 can be predicted. Assuming 70% are in the workforce and 60% travel in the peak hour, 840 people travel based on the mode split in Table 22. This equates to 320 by train, 42 by LRT and 60 by bus.

7.2 Rail

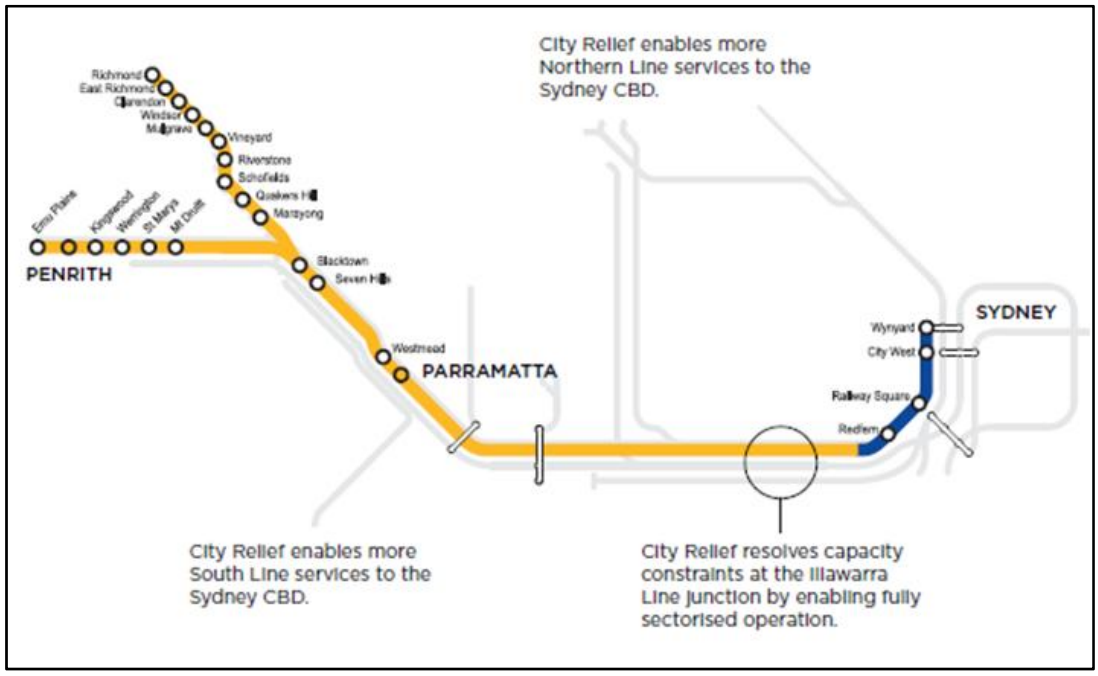
The Metropolitan Transport Plan discusses the following heavy rail projects: City Relief Line, Western Express Services, North West Rail Link, South West Rail Link. The Western Express Project has the potential to improve access to rail services at Lewisham and Summer Hill Stations. Whilst there is adequate capacity for the anticipated growth in rail patronage of up to 320 residents in the peak, the train stopping patterns could be improved.

Western Express Project

The City Relief Line and Western Express projects shown in Figure 20 will introduce express train services from Richmond, Penrith, Blacktown and Parramatta. A new five kilometre priority tunnel will be built to separate western services from inner city trains to provide shorter journey times. New platforms will be built at Redfern, Central, Town Hall and Wynyard to cater for these new services. There will be eight new platforms, each long enough to accommodate 12 car trains, between Redfern and Wynyard. Trains will initially be 10 cars long, with capacity for future growth. Ultimately there will be more than 5,000 extra seats from Parramatta in the peak hour.

This project will facilitate improved stopping patterns on the Inner West Line and encourage rail mode share at locations such as Summer Hill and Lewisham.

Figure 20: Western express project (City Relief Line and Western Express Services)



7.3 Light Rail

7.3.1 Public access to future light rail station

The Light Rail Extension report, prepared by PB, states that the preferred location for the Lewisham West station is between Longport Street and Old Canterbury Road. This location has been approved by the Department of Planning, Feb 2011, which will allow it to co-locate with the future urban development planned near the stop on the eastern side between Hudson Street and Longport Street. Access would be provided from Hudson Street to the east and linking into the SHFM site (former Mungo Scott Mills) to the west (refer to Figure 21). The McGill Street Master Plan improves pedestrian access by aligning the green space with the light rail access routes.

Figure 21: Indicative location of Lewisham West light rail station

Source: Sydney Light Rail Extension Stage 1 report, prepared by PB, October 2010

The internal road system proposed for the two precincts each side of the proposed light rail station allow passengers to be dropped off within easy walking distance.

7.3.2 Cumulative traffic impacts of proposed light rail station

PB report for the Sydney Light Rail extension project has estimated the forecast patronage number for Lewisham West station (refer to Table 23). The data in Table 23 shows that Lewisham Station is estimated to have only 5 park-and-ride

vehicles. The predicted 5 vehicles in the peak hour are insignificant and unlikely to have any major impact on the road network in the vicinity.

Table 23: Estimated light rail weekday passengers boarding by mode of access 2016

Light rail stop	Total passengers boarding	Mode of access to the proposed stops				
		Walk*	Bus	Car (kiss-and-ride)	Car (park-and-ride)	Rail
Leichhardt North	415	375	10	15	15	-
Hawthorne	375	360	-	5	10	-
Marion	390	160	180	35	15	-
Taverners Hill	255	150	95	5	5	-
Lewisham West	275	140	5	10	5	115
Waratah Mills	225	215	-	5	5	-
Arlington	185	170	-	10	5	-
Dulwich Grove	445	275	140	20	10	-
Dulwich Hill interchange	540	160	30	20	30	300
Total	**3105**	**2005**	**460**	**125**	**100**	**415**
Percentage	**100%**	**65%**	**15%**	**4%**	**3%**	**13%**

Source: Sydney Light Rail Extension Stage 1 report, prepared by PB, October 2010 (Table 10.1)

7.4 Bus

7.4.1 Bus Services

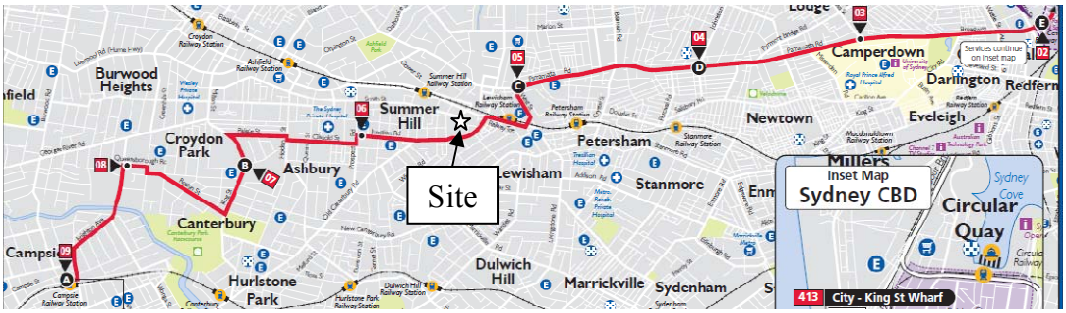
Route 413 runs directly adjacent to the site along Old Canterbury Road, from Campsie to the City via Ashbury. This bus route stops at the intersection of Edward Street and Old Canterbury Road. Five services are provided in the weekday morning peak hour (8am – 9am). It is predicted that one new bus load of passengers would be generated by both sites in the peak hour which can be accommodated by an increased service frequency.

7.4.2 Bus priority measures on Old Canterbury Road at Railway Terrace and proposed Edward Street traffic signals

Currently bus route 413 operates along Old Canterbury Road between Campsie Station and Sydney CBD (refer to Figure 22). The figure shows that the citybound buses turn right from Old Canterbury Road to Railway Terrace. There is a current part time right turn restriction from Old Canterbury Road to Railway Terrace ('No Right Turn' 6am – 10am and 3pm – 7pm; Mon – Fri; Buses Excepted').

A review of the current bus time table shows that there are only 5 city bound buses in the am (8am – 9am) peak hour and 2 city bound buses in the pm (5pm – 6pm) peak hour. With this low bus frequency bus priority measures may not be justified.

Figure 22: Bus Route 413



The PB light Rail assessment report (refer to Table 23) has estimated only 5 light rail passengers will travel to Lewisham Station by bus. The future bus service needs in the area following the full operation of both SHFM and McGill Street site has been estimated based on a mode target of 7% bus for journey to work, which results in 60 bus passengers (or one bus load).

There is therefore potential for additional bus service in the area and bus priority measures at the proposed traffic signal at Old Canterbury Road/ Edward Street and Old Canterbury Road/ Railway Terrace has been investigated.

During the site inspection in the am peak hour, it was observed that due to the existing parked vehicles on the kerbside lane on Canterbury Road (between Nowranie Street and Toothill Street), the eastbound traffic effectively utilise only one lane. Therefore, there are significant eastbound (citybound) traffic queue in the area. The traffic queue exceeded well beyond Junction Road intersection (refer to Photograph 8).

Buses (route 413) also experience significant delay after entering Old Canterbury Road from Junction Road. Therefore, there is merit of installing bus lane in the northern kerbside lane on Canterbury Road, at least in the am peak hour (e.g. 6am – 10am, Mon - Fri). In this way, buses will obtain an uninterrupted run on the Old Canterbury Road. A proposed bus lane is illustrated in Figure 23.

Photograph 8: Canterbury Road in the am peak hour

Looking north (at Junction Rd Intersection)

Looking South (from Edward Street Intersection)

Figure 23: Proposed Bus Lane in Old Canterbury Road

The installation of bus priority measures at the Old Canterbury Road/ Railway Terrace/ Longport Road is not possible due to site constraints.

The proposed Old Canterbury Road/ Edward Street traffic signal and Old Canterbury Road/ Toothill Street intersection have been reanalysed to identify the potential effect of the proposed bus lane. The result of the Sidra Analysis is presented in Table 24.

Table 24: Comparison of Intersection Results with and without Bus Lane (Existing + SHFM + McGill St (with 78-90 Old Canterbury Road) traffic)

Intersection	Scenario	Peak Period	LOS	DOS	AVD (sec)
Old Canterbury Rd/ Edward St	Without Bus Lane	AM Peak	B	0.81	18
		PM Peak	B	0.89	22
	With Bus Lane	AM Peak	B	0.89	21
		PM Peak	F	1.06	71
Old Canterbury Rd/ Toothill St	Without Bus Lane	AM Peak	C	0.86	29
		PM Peak	D	1.05	48
	With Bus Lane	AM Peak	F	1.28	246
		PM Peak	F	1.31	177

At Old Canterbury Road/ Edward Street traffic signal, Sidra Results show that the affect of bus lane will be minimal in the am peak period. The intersection will continue to operate at LOS B with slightly increased DOS and AVD. However, the effect of the bus lane will be significant in the pm peak period. The LOS will deteriorate to D and the intersection will operate over capacity. The AVD will also increase significantly.

In the Old Canterbury Road/ Toothill Street intersection the effect of bus lane will be significant in both the peak periods. In both the peak periods, the LOS will deteriorate to F and the intersection will operate about 20 – 30% over capacity. The AVD will also increase significantly.

Therefore according to Sidra intersection modelling, it is evident that a bus lane at this location will significantly affect the intersection operation in the locality. Hence, introducing bus priority on Old Canterbury Road at Toothill Street may not be feasible.

7.5 Sustainable Transport Initiatives

7.5.1 Cycling Facilities

To encourage cycling as a viable form of transport for residents, appropriate facilities are to be provided in the site. This will include a dedicated bicycle parking room or secure bicycle parking area in each building that would provide residents with secure and convenient access to the buildings. This area could offer direct access from the building foyer/lobby, and would provide an attractive option for residents who potentially may choose to cycle instead of using private vehicles.

The proposed Greenway will increase cycle access to the site linking both north and south and connecting into other east west routes.

7.5.2 Workplace Travel Plan

Travel demand management measures, e.g. Travel Plans, should be prepared for all future site retail and commercial developments and Transport Access Guides should be prepared for all future site community and residential developments to ensure full information regarding future site sustainable access and public transport access options is available to all future residents of and visitors to the site. More detail would be provided at the Project Application Stage.

7.5.3 Car Share

An opportunity to reduce the reliance on private vehicle would be to utilise the popular car sharing initiatives that are in place across Sydney. Independent studies by the University of Sydney have shown that each car share vehicle normally replaces about 7 private motor vehicles. Car share spaces could easily be provide on the sites internal streets.

Initial contact has been made with two of the larger car share companies. While no car share spaces or ‘pods’ currently exist within the Lewisham area, companies are expanding and it is likely the initiative will be introduced in the area in the near future. Current car share spaces/pods locations are shown in Figure 24 and Figure 25.

Figure 24: Current 'GoGet' Car Sharing Pick Up/Drop Off Locations

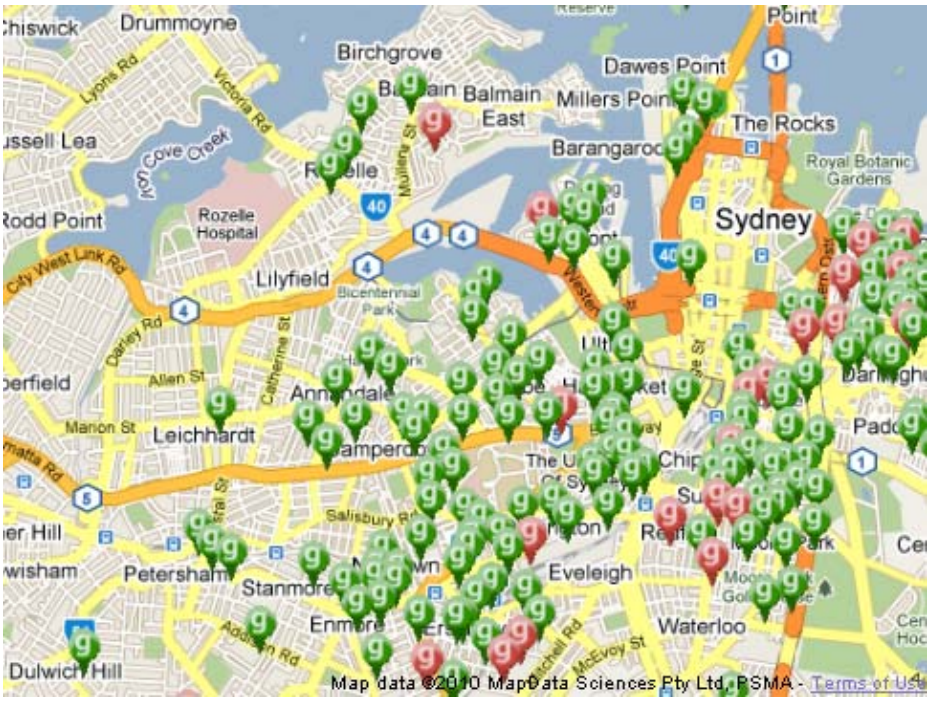
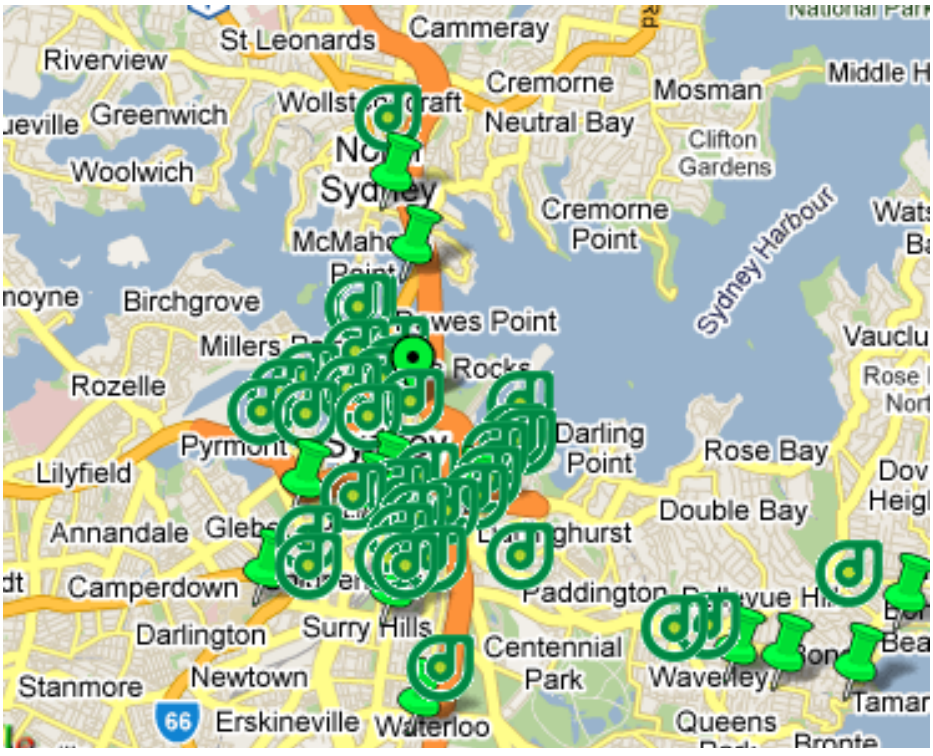


Figure 25: Current 'My Car Club' Car Sharing Pick Up/Drop Off Locations

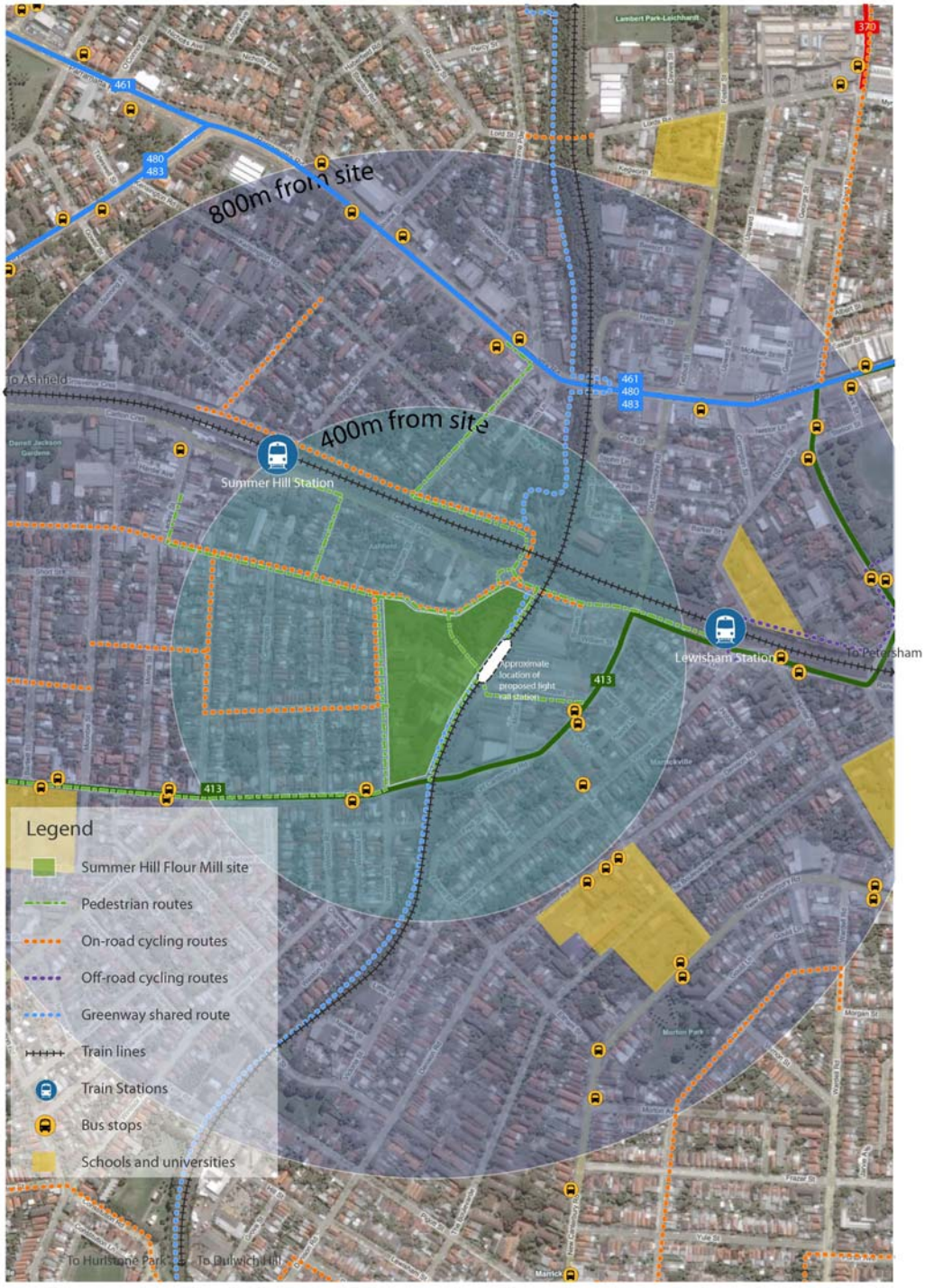


7.6 Transport Map

A Transport Map has been prepared outlining existing bus routes, bus stops, pedestrian and bicycle routes etc (refer to Figure 26). The map shows the existing bicycle ways, pedestrian paths, bus, train and the proposed light rail stations. The

map also shows that the Lewisham and Summer Hill stations are located within 400 – 450m radius of the site.

Figure 26: Transport Map



8 Conclusion

This report has discussed the transport and accessibility impacts relating to the proposed redevelopment of the Summer Hill Flour Mill site. The site is well located to operate as a transit oriented development with good access to heavy rail services, buses, future light rail and cycling facilities. The road system adjacent to the site comprises two sub-arterial routes which provide access to the area with minimal additional traffic on local streets. A number of traffic management devices are proposed on the access road system to facilitate access to the site.

The assessment has found no traffic constraint to the proposed development. Key findings of the study include:

- The proposed Summer Hill Flour Mill site involves medium density residential development, complemented by ancillary retail and commercial land uses.
- On-site observations of traffic conditions at key intersections surrounding the precinct indicate traffic flows satisfactorily, with all vehicles clearing signalised intersections in a single signal cycle, despite long queues forming in peak periods on Railway Terrace.
- The site is well connected to existing State Transit bus routes, with a number of public bus routes operating near the Summer Hill Flour Mill site.
- The site is well located for heavy rail use, with both Summer Hill and Lewisham stations located approximately 500m from the site offering direct access to the Sydney CBD.
- A planned 5.6km extension of the light rail service includes a station at Lewisham adjacent to the sites with connections to the existing heavy rail station. Provision of this infrastructure upgrade will increase public transport availability for future residents in the Summer Hill Flour Mill site.
- Local footpaths and the Greenway provide walking access to key destinations surrounding the site, with the site well served by a number of local and regional cycling routes.
- The Summer Hill Flour Mill development proposes to provide a total of 450 - 550 underground parking spaces, which would be allocated to residents and other regular users of the site. An additional 50 to 70 on-street parking spaces are to be provided within the site. These would be allocated to visitors and other short-stay users. All on-street parking will need to be time restricted with an appropriate allocation of Loading Zones. This complies with the parking provision outlined in the Ashfield Council DCP ensuring adequate on-site provision to prevent overspill onto surrounding streets.
- The Summer Hill Flour Mill development is forecast to generate approximately 289 vehicle movements in the peak hour. The majority of these trips are forecast to originate from the western end of the site where traffic volumes are relatively low.
- The site is currently underutilised. If the site remained fully operational for mixed industrial uses, it could be expected that traffic generation would be higher than the existing levels including heavy vehicle movements. For the consolidated site area of approximately 25,000m2 and applying the site FSR of 1:1 for the industrial zoning, the site could generate 1,250 vehicles / day

and 250 vehicles in the evening peak hour based on the rates outlined in the RTA Guide to Traffic Generating Developments for Industry. This level of traffic generation aligns closely with that anticipated from the planned levels of mixed use development and would therefore have a similar level of traffic impact on the nearby intersections.

- Modelling of the local road network has found that eleven of the thirteen key intersections surrounding the site are forecast to operate efficiently during the peak hour, following both the opening of the Summer Hill Flour Mill and the adjacent McGill Street developments.
- The Railway Tce/Old Canterbury Rd intersection currently experiences high levels of queuing, with signal phasing adjusted to allow vehicles to pass through the intersection in a single cycle. Construction of the proposed mixed use developments are forecast to increase delays at the intersection, however not to an unreasonable level where it will adversely impact on surrounding intersections.
- With increasing delays to traffic on the sub arterial roads, it could be expected that some through traffic may redistribute to alternative main road routes. There are no opportunities for traffic to divert to local streets to undertake these through trips due to the physical restrictions in the area primarily caused by the railway corridor and discontinuous local road system.
- The traffic generation used in this analysis has not considered the introduction of the light rail extension to Dulwich Hill, and thus is considered a conservative analysis. Provision of the upgrade will increase the non-car mode share to and from the site, resulting in a reduced impact on the local road network.
- Implementation of sustainable travel initiatives such as the provision of car share on the site, public transport accessibility and good bicycle parking provisions will further reduce the reliance on private vehicle.

This report addresses the traffic and transport issues raised by NSW DoP DGRs and different government and non-government agencies for the proposed SHFM development located at 2-32 Smith Street, Summer Hill. The key issues of this traffic assessment are summarised below:

- There is currently major traffic congestion on the main road network on the eastern and northern boundaries of the site, especially during the peak traffic periods. However, this poor peak hour performance of major intersections is no exception to most other intersections close to the Sydney CBD where the road network is heavily congested due to heavy inbound traffic flows in the am peak and outbound traffic flows in the pm peak period.
- Overall, the traffic impact due to the proposed 78-90 Old Canterbury Road developments (within the McGill Street development) will be significant at some intersections in the vicinity of the site. Some of the intersections are already over capacity (e.g. Parramatta Road/ West Street, Railway Terrace/ West Street) and 78-90 Old Canterbury Road traffic will further deteriorate the intersection performance.
- A number of traffic issues considered in the Traffix report needs to be clarified as stated in section 6.5 of this report before determining the full traffic impact of the 78 – 90 Old Canterbury Road development in the locality.

- Due to the 78 – 90 Old Canterbury Road development, a number of intersections are proposed to be upgraded in the shorter and longer terms. The benefits of the proposal would be marginal, especially in the longer term.
- The parking for the proposed development will be provided in accordance with Ashfield Council DCP (Part C11) which is considered reasonable.
- The existing locality on-street parking is mostly unrestricted in the vicinity of the site. With the introduction of the Lewisham West light rail stop, it could be expected that additional time restricted parking and resident parking schemes will need to be introduced to manage commuter parking. Drop-off and pick-up zones would be facilitated by the local streets in both the SHFM site and the McGill Street precinct.
- The parking provision proposed for each development allows for resident and visitor parking on-site. Additional on-street parking will be available on the new streets and it is expected that this would be time restricted to encourage turnover by visitors. There will also be underground parking for the retail and commercial uses on the sites.
- The development, located within easy walking distance of public transport facilities, are aligned with State Government initiatives and targets;
- An eastbound kerbside bus lane on the Old Canterbury Road has been investigated. Due to its adverse effect on the major intersections in the locality, this bus lane is unlikely to be beneficial.
- The introduction of traffic signal control at the intersection of Carlton Crescent/ Smith Street/ Longport Street/ Grosvenor Crescent has been investigated. Since it will further deteriorate the intersection performance, traffic signals at this intersection may not be feasible.

Appendix A

Intersection Survey Data

Appendix B

Sidra Intersection Results

Appendix C

Sidra Explanatory Notes

Appendix D

SHFM Site Forecast Vehicle Turning Movements