Proposed Costco Development, Auburn

Transport Assessment

30 September 2009

Prepared for

Costco Wholesale Australia

Halcrow MWT

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This report has been issued and amended as follows:

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V01	Draft for internal review	10/09/09	PT	BM
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1 Introduction

Halcrow has been commissioned by Costco Wholesales Australia to undertake a traffic and transport study for a proposed Costco Warehouse retail outlet and accompanying Regional Office. The purpose of the study is to assess the traffic and transport implications of the development as part of Costco Wholesale's planning submission under the Part 3A approval process with the State Government.

The site, referred to as the 'Linfox' site, is located at 17-21 Parramatta Road, Lidcombe; it is within the local government area of Auburn City Council.

This report presents the findings of the traffic and parking assessment in the following sections:

- Chapter 2 discusses the existing conditions of the site;
- Chapter 3 describes the proposed development;
- Chapter 4 examines the predicted traffic impacts;
- Chapter 5 presents the conclusions of study.

The Director General's Requirements (DGRs) for the Part 3A submission required that transport aspects of the application deal with the following as stated in items 5 and 6 of the DGRs:

5. Car Parking

The EA must demonstrate the provision of sufficient on-site car parking for the proposal having regard to local planning controls and RTA guidleines (Note: The Deapartment supports reduced car parking rates in areas well-served by public transport).

6. Traffic and Accessibility (Construction and Opertaional)

The EA shall provide a Traffic and Accessibility Study prepared in accordance with the RTA's Guide to Traffic Generating Developments, considering traffic generation, any required road / intersection upgrades, access, loading dock(s), car parking arrangements, measures to promote public transport usage and pedestrian and bicycle linkages.

The DGRs above are dealt with throughout this report.

In this regard, it is noted that discussions with the NSW Roads and Traffic Authority (RTA) took place throughout the design process. Necessarily the design continued to evolve during this time with operational and other engineering inputs influencing the design input up to the end. This report addresses the final design as submitted (see plans in **Appendix A**) as well as a change to access arrangements requested by the RTA immediately before submission. Sketch layouts which illustrate the consequences of the RTA's request are provided in this report in order to explain how the final design could be modified if the RTA's recommendations were adopted.

2 Existing Conditions

2.1 Site Location

2.1.1 Existing Linfox site

The subject site is located at 17-21 Parramatta Road at Auburn as indicated on **Figure 1** and is known as the "Linfox" site. The site fronts Parramatta Road to the southwest, Haslams Creek to the northwest, the M4 Western Motorway to the northeast and industrial development to the southeast.

The site currently comprises a storage warehouse and transport depot and is operated by Bevchain and Linfox. Primary access to the site is provided via a priority controlled entry/exit point east of the bridge over Haslams Creek and opposite Nyrang Street. A secondary driveway access is provided to the east of the site. Linfox Logistics provide warehousing and haulage services throughout Australia and the Asia-Pacific region. Linfox operate over 5,000 vehicles and as a result of the nature of the business, the site receives numerous large truck deliveries throughout the course of the day.

2.1.2 Local Development

The section of Parramatta Road local to the site supports predominantly industrial type land-uses, such as the current Linfox site and the Toohey's Brewery located at 29 Nyrang Street. In addition, there are a number of Bulky Goods Retail outlets, such as the Lidcombe Power Centre, 92 Parramatta Road (directly opposite the Linfox site) and the Bunnings Warehouse, 28 Short Street (approximately 100m west of the Linfox site).

Lidcombe Power Centre

The Lidcombe Power Centre is a bulky goods retail mall located directly opposite the Linfox site. The site covers the whole block bound by Parramatta Road to the north, Nyrang Street to the west, John Street to the east and Hastings Street to the south. The site consists of approximately 35,600m^2 of showrooms and restaurants and 29,400m^2 of covered parking (approximately 1,500 spaces).

The main stores located within the mall are:

- Spotlight – Fabric, Craft and Home Interior specialists (approx. 4,500m^2);
- Anaconda – Camping and Outdoor specialists (approx. 4,500m^2);
- Workout World – Fitness Equipment Specialists;
- Dick Smith Electronics.

2.2 Study Area and Existing Traffic Flows

2.2.1 Local Road Network

The following local road study network has been defined and assessed by this study:

- Parramatta Road-Silverwater Road/St Hilliers Road;
- Parramatta Road-Alan Street;
- Parramatta Road-Day Street;
- Parramatta Road-Nyrang Street;
- Parramatta Road-John Street;
- Parramatta Road-Hill Road/Bombay Street.

A description of the study road network is presented below:

Parramatta Road is the main east-west arterial road through the area, linking Sydney city in the east with Parramatta in the west. In the vicinity of the site, Parramatta Road generally has two travel lanes plus auxiliary turning lanes in each direction. It has a posted speed of 60km/hr.

St Hilliers Road/Silverwater Road is an arterial road which provides a north-south connection. The road generally consists of three travel lanes in each direction with a posted speed of 70km/hr in the vicinity of the site.

M4/Western Motorway is a toll road, which provides a parallel route to Parramatta Road between Strathfield and Emu Plains. It is generally a divided road with three travel lanes in each direction. The toll only applies to travel on it west of Silverwater Road so the section adjacent to the site is free.

Hill Road is a major feeder road between M4/Parramatta Road and Homebush Bay area. It is generally has two travel lanes in each direction.

John Street is also a collector road, which provides a connection between Parramatta Road to the north and Church Street to the south. It is generally a two-lane, two-way road with on-street parking allowed on either side of the road.

Bombay Street is a local road with a posted speed limit of 50km/hr. It is generally a two-lane, two-way road with on-street parking allowed on either side of the road.

Nyrang Street is also a local road with a posted speed limit of 50kmhr. It is generally a two-lane, two-way road with on-street parking allowed on either side of the road.

2.2.2 Existing Vehicular Traffic Volumes

In August 2008 Thursday evening and Saturday mid-day peak period surveys were conducted at the following intersections:

- Parramatta Road-Silverwater Road/St Hilliers Road;
- Parramatta Road-Alban Street;
- Parramatta Road-Day Street.

Further surveys were undertaken in May and June 2009 at the following intersections:

- Parramatta Road-Nyrang Street;
- Parramatta Road-John Street;
- Parramatta Road-Hill Road/Bombay Street.

Thursday evening peak period surveys were conducted from 4 to 7pm and Saturday peak period from 11am to 2pm. The peak hours were generally between 5 and 6pm and 12 and 1pm for the Thursday evening and Saturday peak hours, respectively.

By comparing the midblock flows on Parramatta Road for the 2008 and 2009 surveys, it has been possible to apply a growth factors to the 2008 flows to obtain a consistent 2009 baseline traffic flows for the study network. The 2009 peak hour baseline traffic flows are shown on **Figure 2** and are also summarised in Table 2.1.

Table 2.1 – Existing two-way Peak Hour Traffic Volumes (vph)

Location	Thursday Evening Peak	Saturday Mid-day Peak
Parramatta Road, east of Silverwater Road	2,570	2,870
Parramatta Road, west of Silverwater Road	3,040	3,550
Parramatta Road, west of Alban Street	2,840	2,960
Parramatta Road, west of Day Street	2,690	2,910
Parramatta Road, east of John Street	2,950	3,000
Parramatta Road, west of Hill Road	3,150	2,980
Silverwater Road, north of Parramatta Road	4,370	3,930
St Hilliers Road, south of Parramatta Road	3,630	2,930
Alban Street, north of Parramatta Road	240	110
Day Street, north of Parramatta Road	120	190
100 Parramatta Rd, south off Parramatta Road	270	240
John Street, south of Parramatta Road	750	810
Hill Road, north of Parramatta Road	1,450	820
Bombay Street, south of Parramatta Road	480	210

NOTE: The figures are rounded to the nearest ten units.

The surveyed traffic volumes are generally consistent with the role performed by each road in the local road hierarchy.

2.2.3 Pedestrian Volumes

Pedestrian counts were undertaken in August and September 2009 at the intersection of Parramatta Road with John Street. The surveys were carried out between 4 to 7pm on Thursday and from 11am to 2pm on Saturday; the survey counted pedestrian crossing John Street (south approach), Parramatta Road (east approach) and pedestrians using the northern footpath on Parramatta Road and opposite John Street. Table 2.2 summaries the results of the summary:

Table 2.2 – Existing Pedestrian Volumes at Parramatta Road/ John Street Intersection

Crossing	John St South Approach	Parramatta Rd East Approach	Parramatta Rd Northern Footpath
Thursday Evening			
1700 - 1800	10	2	0
1600 - 1900	21	5	2
Saturday			
1200 - 1300	24	9	0
1100 - 1400	90	28	0

The results show that at present there is very little pedestrian activity in the area.

2.3 Current Local Road Network Performance

The intersection analysis was undertaken using the SIDRA 4.0 Intersection analysis program. SIDRA determines the average delay that vehicles encounter, the degree of saturation of the intersection and the corresponding level of service (LOS). The degree of saturation is the ratio of the arrival rate of vehicles to the capacity of the approach. SIDRA provides analysis of the operating conditions which can be compared to the performance criteria set out in Table 2.3.

Table 2.3 – Level of Service Criteria

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

Adapted from RTA Guide to Traffic Generating Developments, 2002.

The results of the existing intersection performances are presented in Table 2.4.

Table 2.4 – 2009 Base Year Intersection Operation

Parramatta Road Intersection with:	Control	Thursday Evening		Saturday	
		Ave. Delay (sec/veh)	Level of Service	Ave. Delay (sec/veh)	Level of Service
Silverwater Rd-St Hilliers Rd	Signalised	47	D	42	C
Alban St	Signalised	6	A	3	A
Day St	Signalised	5	A	6	A
Nyrang St (1)	Priority	>120	F	>120	F
John St	Signalised	16	B	20	B
Hill Road-Bombay St	Signalised	50	D	31	C

From Table 2.4, it can be seen that the Parramatta Road-Silverwater Road and Parramatta Road-Hill Road/Bombay Street intersections currently operate the lower end of the desirable range during the Thursday evening periods with the level of service "D".

The Parramatta Road-Nyrang Street intersection, which is unsignalised, currently operates unsatisfactorily with long delays for traffic turning right out of Nyrang Street approach.

The other intersections currently operate at a good level of service "B" during both peak periods.

2.4 Non-Car Transport Network

2.4.1 Rail services

The nearest train stations are Lidcombe and Auburn, approximately 25 minutes walk from the site. Lidcombe is a major station providing access to frequent services on the following four suburban train lines:

- North Shore & Western Line – Providing access to Richmond, Penrith, Blacktown and Parramatta in the west to Hornsby and Chatswood in the north via the City CBD;
- South Line – Providing access to Campbelltown and Liverpool in the southwest to the City CBD in the east;
- Inner West Line – Providing access to Liverpool in the southwest to the City CBD in the east;
- Bankstown Line – Providing access to the City CBD in the east.

Auburn station also provides access to the North Shore & Western Line and the South Line. **Figure 3** shows the location of both stations in comparison to the site.

2.4.2 Bus services

The nearest bus stops to the site are on Parramatta Road in the east (approximately 12 minutes walk) and Station Road in the west (approximately 15 minutes walk). The following summarises the bus routes served by these stops:

- Parramatta Road bus stops – Service 401 serves Sydney Olympic Park Wharf to Lidcombe Station via Olympic Park Station;
- Station Road bus stops – Service 909 serves Bankstown to Parramatta via Regents Park & Auburn.

Figure 3 shows the location of these bus stops and the routes of the bus services local to the site; the following table 2.5 presents the frequencies for these two services.

Table 2.5 – Bus Frequencies

Route	Weekday		Saturday	Sunday
	Peak	Off-Peak		
401	20 minutes	30 minutes	hourly	-
909	30 minutes	30 minutes	30 minutes	hourly

2.4.3 Cycle Network

A number of recognised cycle routes both off and on road serve the general area local to the site; in particular, an existing off-road shared cycle/footpath that links into the Newington residential area on the northern side of the M4 Motorway on the western side of Haslams Creek. **Figure 3** presents the routes.

2.5 Land-use/Transport Context

2.5.1 Overview

From a top down perspective, several echelons of State Government pronouncements of recent years have set a broad and evolving framework for land use and transport policy and development.

Abstracting from these documents and looking at the current priorities which are the main focal point of planning, the main strategic planning themes to be considered are:

- Continued strong growth in Sydney of both population and employment.
- Major reform of the bus system over the past five years, with implementation on-going.
- On-going major capital investment to stabilise and improve the current heavy rail system, through Clearways and the recently completed Epping to Chatswood Rail Line.

The next section summarises the main formal strategic planning documents, whilst the subsequent section discusses the implications of the more immediate proposals.

Based on recent statements by the State Government, in particular the NSW's Mini-Budget[1] on 11 November 2008, it is expected that the strategic planning outlook would be adjusted further over the next six to 12 months.

2.5.2 Strategic Plans – Transport

Review of Strategic Bus Services in NSW (Unsworth Report) 2004

This report proposed a major re-arrangement of bus services in Sydney with a network of fast, frequent, direct and convenient bus services on "strategic" bus corridors connecting centres across Sydney.

The new network of 43 strategic bus corridor services would link Sydney's major centres, railway stations, hospitals, education facilities and other community facilities, improving access to important destinations. The strategic network would be integrated with local bus services through bus contract reform to create larger, integrated contract regions. The new integrated network of 43 strategic bus corridors is being progressively implemented from 2006, supported by improved bus priority on all corridors by 2012.

The physical infrastructure measures, focused on key bottlenecks, could include dedicated bus lanes on the approaches to congested intersections (with cameras increasingly being used for enforcement), bus bypass lanes (e.g. 'left turn only, buses excepted'), bus priority traffic signals, bus only links and additional Bus Lanes, Transit Lanes and Clearways.

In the three years to 2008, nine corridors serving the regional cities of Parramatta and Liverpool and the major centres of Bankstown, Strathfield, Burwood and Hurstville would benefit from these measures. The first corridors for bus priority infrastructure measures would be Hurstville-Miranda, Liverpool-Bankstown and Parramatta-Sydney CBD via Victoria Road routes.

The bus network would be supported by improved passenger facilities at bus stops such as shelters, information, signage and lighting, improved walking access to bus stops, and interchanges.

[1] Refer to http://www.treasury.nsw.gov.au/?a=12713 for a link to the Mini Budget and the NSW Treasurer's speech; these include changes to planning responsibilities for some lands

In the Parramatta Road growth corridor (strategic corridor 13), a new strategic bus corridor may be needed to serve high growth areas between Parramatta and Strathfield/Burwood, in addition to the planned strategic bus corridors in the area (see **Figure 4**). Local bus services would also be needed within the Parramatta-Burwood corridor high growth areas to improve north-south access. Grade separated crossings of Parramatta Road may be required in the longer term to reduce delays to buses.

Metropolitan Strategy (December 2005)

This Strategy set the long term direction for Sydney's land use and economic development when it was released. It focuses on residential and economic development in centres and along corridors linked by improved transport infrastructure and services. However, it now appears to be dated and has lost its primacy in setting the long term direction for planning, especially for transport.

One of the few changes to statutory plans affecting transport that accompanied the Metropolitan Strategy was the withdrawal of Draft SEPP 66 (Land Use and Transport), but the continuance of the Integrated Land Use and Transport Policy Package that had accompanied the Draft SEPP. This continuance was given effect through Section 117 directions issued by the Planning Minister in September 2005[2].

The release of the Urban Transport Statement (see separate section below) has reinforced some of the concepts in the Metropolitan Strategy, such as strategic bus corridors and rail clearways. This document has changed priorities of projects and supplanted other concepts.

State Infrastructure Strategy (May 2006)

This Strategy sets out State investment commitments for infrastructure beyond the budget cycle, out to a ten year horizon. The State Infrastructure Strategy informs the Subregional Strategies with regard to planned infrastructure upgrades, which include road bridge replacement on Parramatta Road at Auburn North.

[2] The September 2005 Section 117 direction was superseded by July 2007 Section 117 direction #3.4

Urban Transport Statement (November 2006)

This document provides a comprehensive outline of the transport improvement projects planned for Sydney, with a year-by-year schedule of rail system upgrades.

The Urban Transport Statement provides a concise summary of travel patterns in Sydney's major corridors, many of which are anchored on the CBD.

West Central Draft Subregional Strategy (December 2007)

This Strategy identifies an employment capacity target of 55,300 jobs for the Auburn LGA to 2031, an increase of 12,000 jobs (27.7%) over 2001 levels. The subject site lies within the Parramatta Road utilities/urban services corridor, for which the NSW government has identified the need to improve built form consistent with its employment character. The Strategy foresees that the prevailing land use pattern of urban services and other employment land activities would continue throughout the period to 2031.

The Metropolitan Strategy set the West Central a housing capacity target of 95,500 new dwellings, of which 17,000 would be in the Auburn LGA. Significant residential growth is expected within centres including Olympic Park, Auburn, and Lidcombe.

The Department of Planning would work with councils to align their LEPs with directions from the Subregional Strategy. The Parramatta Road corridor is to be the subject of a LEP transport study by Auburn Council.

Mini Budget (11 November 2008)

Main transport-related measures of relevance:

- Indefinite deferment of the North West Metro;
- Provide 300 additional buses by 2010/11, to increase service capacity and frequency;
- Accelerate the delivery of 150 articulated buses by 2011/12;
- Development of lower cost capacity increases and improvements to service levels on CityRail's network. This is potentially the most significant proposal, which might address issues with rolling stock design which reduces effective system capacity at busy times of operation.

2.5.3 West Metro

A new metro rail system is proposed as an integral part of the NSW Government's transport plan for Sydney's future. The CBD Metro is the first step towards building the metro network and detailed planning for that line between Rozelle and Central is well underway, with construction planned to start in 2010.

The West Metro linking the CBD with Parramatta and western Sydney is proposed as the next step in building the network. It is proposed to serve strategically located stations between Sydney CBD, Parramatta and Westmead.

The West Metro preliminary environmental assessment (August 2009) envisages stations at Olympic Boulevarde at Sydney Olympic Park and north of Carnarvon Street, Silverwater. This is based on a route preliminary alignment and indicative station locations. These are located within walking distance of the subject site.

2.5.4 Forward Plans and Trends

Population Growth

The most recent projections of population growth by the state at Local Government level were published in 2007 (designated the 2005 Release[3]), whereas the most recent regional level forecasts were published in 2008. The 2008 release of regional level population projections show that the population of the Sydney region is projected to grow from 4.3 million in 2006 to 6.0 million by 2036, an increase of 1.7 million or 40% over this period.

The population of the Auburn SLA is projected to increase from 58,680 in 2001 to 111,440 in 2031, an increase of 52,760. Auburn SLA has the sixth highest projected increase in population in NSW, and fifth highest projected rate of population increase in NSW over the period 2001 to 2031.

[3] New South Wales Statistical Local Area Population Projections 2001-2031, 2005 Release, NSW Government Department of Planning, 2007 and New South Wales State and Regional Population Projections, 2006-2036, 2008 Release, NSW Government Department of Planning, 2008

2.5.5 Comments on Strategic Context

Against this background of population growth and transport system development it is noted that Costco stores are large format stores that aim to sell large quantities of goods at discount prices. They operate as wholesale merchants that are only open to members who pay a joining fee.

As such they tend to:

- Draw customers from a wide trade area;
- Sell quantities of goods in large volumes or large sizes that are not amenable to transport on public transport;
- attract customers making purpose trips or on the way home rather than customers making multipurpose visits to a single centre;
- Be car oriented.

In contrast to conventional retail, such stores are best located in corridor type or Greenfields area in which large sites are available close to arterial roads. The need for these attributes has been recognised by the Department of Planning and Auburn Council in identifying the section of Parramatta Road in which the subject site is located as being suitable candidate area for investigation to be rezoned for large format stores.

A Costco store in this location would respond to the strong population growth in the central west and provide significant employment and retail opportunities in this important pot of Sydney. Its location would avoid excessive traffic build up in the centres that are being fostered along the corridor while providing excellent arterial road access to Parramatta Road, the M4 Motorway and Metroads 3 and 6.

While a Costco Store would not be dependent on good public transport proximity, nevertheless its presence would assist in making a regular bus service viable along Parramatta Road where there is presently not one. It would do this partly through the potential patronage of staff and a limited number of customers and partly by acting as a catalyst to other development in the corridor. As such it would supportive of the initiation of proposed strategic Bus Route 13 along Parramatta Road between Parramatta and Burwood.

In terms of Department of Planning land use/transport policies, a Costco Store on the site would be the "right development in the right place" and additionally it would materially enhance retail competition and choice in the important West Central part of Sydney.

3 Proposed Development

3.1 Costco Warehouse and Regional Office

3.1.1 Concept Plan and Development Schedule

The proposal is for the demolition of existing warehouse buildings and construction of a three-storey Costco warehouse with basement. The warehouse would consist of two levels of parking over the basement and ground floor, a Tyre Centre (sales and installation) also located on the ground floor levels, the main Costco store retail area with ancillary dining, office and loading/receiving uses across the first floor and a second floor (mezzanine) accommodating the proposed Costco Regional office.

The full development schedule is contained in the accompanying EA; the following summarises the development schedule in terms of the traffic relevant uses:

- Total Costco warehouse of 13,686m^2 of Gross Floor Area (GFA), which includes the proposed Tyre Centre (of 464m^2 GFA);
- Gross Leasable Floor Area (GLFA, excluding Tyre Centre and area for exterior walls) of 12,966m^2;
- Costco Regional office of 1,960m^2;
- 771 car parking spaces.

Relevant architectural plans have been prepared by MulvannyG2 and Group GSA. The plans are contained within the main EA report; for completeness, plans of the ground floor level and basement level are attached at **Appendix A**.

3.1.2 Store Operation and Employee Numbers

The store would operate three shifts, details of which are summarised below:

- AM shift – 4.00am to 1.00pm;
- Cash shift – 10.00am to 6.00pm;
- Closing shift – 2.00pm to 10.00pm.

The store would employ a total of 270 full and part time staff; however, each shift would consist of approximately 50 staff members. Therefore, the peak number of store

employees would be approximately 100 staff between 10.00am - 1.00pm and 2.00pm - 6.00pm.

The Regional office would operate normal 9.00am – 5.00pm business hours and it is anticipated that staff levels would grow from 70 members during the first year of opening, to a full staffing level of 90, three years after opening.

Finally, retail hours would be as follows:

- Monday to Friday – 10:00am to 8:30pm;
- Saturday – 9:30am to 6.00pm;
- Sunday – 10.00am to 5.00pm.

3.2 Vehicular Access Arrangement

3.2.1 Application Plans

As indicated on the relevant architectural plans, the design as originally formulated provides access as follows:

- Primary access to the site is proposed via a new signalised intersection located to the west of the site and incorporating the existing priority intersection of Parramatta Road and Nyrang Street;
- A secondary left-in (with associated deceleration lane), left-out access is proposed midway along the site;
- A tertiary (exit-only) access to the east of the site is also proposed. This access would be restricted for use by service vehicle traffic and a limited amount of staff traffic. It should be noted that the tertiary access is located in line with the existing driveway access currently used by Linfox trucks.

3.2.2 Modified Access Arrangement

Discussions with the RTA have indicated that they may not favour the proposed secondary midblock left-turn only egress onto Parramatta Road. The effect of this would be to transfer all exiting traffic to the main access at the western end of the site.

As this arrangement would provide the most severe test of the operation of the main site access intersection, it was assessed for the purposes of operational analysis. This

additional traffic would require a slight reconfiguration of the main access intersection with a new left-turn only lane to be added to the exit. A sketch showing this arrangement is provided on **Figure 5**.

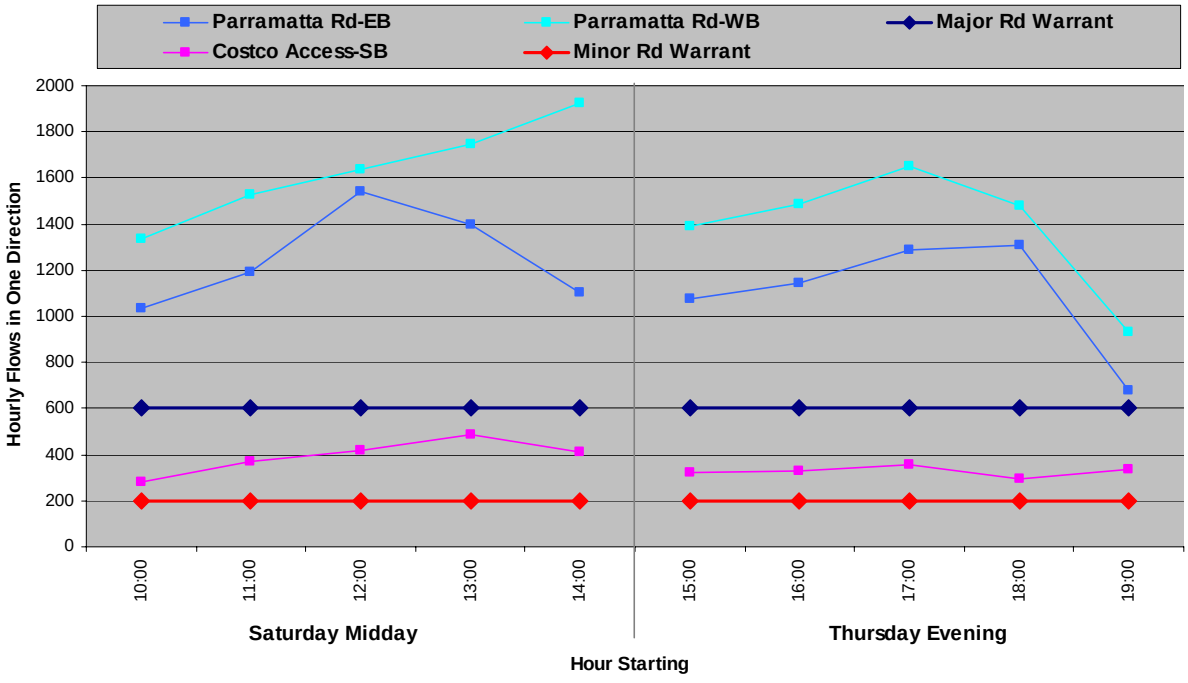
3.3 Traffic Signals Warrant

As requested by the RTA, the proposed main access intersection has been assessed to check that it meets the warrants as specified in Section 1.5 of Austroads Guide to Traffic Engineering Practice Part 7 – 'Traffic Signal'. In this regard, Austroads states the following:

> *As a guide, installation of signals may be considered at an intersection if one of the following warrants is met.*
>
> *(a)* ***Traffic demand volumes:*** *For each of four one-hour periods of an average day, the major road flow exceeds 600veh/h in both directions, and the highest volume approach on the minor road exceeds 200 veh/h.*

Using the survey data, RTA volume data and the trip generation analysis (undertaken in the following sections of this report), the following Diagram 3.1 presents a plot of the eastbound and westbound traffic on Parramatta Road and the traffic exiting the proposed Costco main access, anticipated during the 2011 year of opening.

Diagram 3.1 – Signalised Intersection Warrant at Costco Main Access



As Diagram 3.1 shows, the anticipated traffic flows in both directions on Parramatta Road and from the proposed Costco access would exceed the requirements to meet the 'Traffic Demand Volume' signal warrant.

3.4 Car Parking

3.4.1 Layout

As previously mentioned, the proposal includes a total of 774 parking spaces consisting of:

- 344 covered basement parking spaces;
- 316 covered ground floor parking spaces;
- 111 uncovered parking spaces.

For the covered parking, both levels propose a one-way clockwise vehicle circulation around the outer edge of the parking area, providing access to external parking bays around the perimeter and two-way aisles and parking bays running in an east-west orientation, within the circulatory corridor.

As shown on the architectural plans a two-way ramp would provide access between the two levels of parking. It is noted that this arrangement proposes right-hand traffic flow on the ramp. This assignment should improve circulation at ground floor level, with vehicles right-turning on to and down the ramp no longer opposing vehicles right-turning up and off the ramp. The implementation of a kerbed island, appropriate pavement marking and signage would eliminate confusion arising from the right-hand traffic flow on the ramp. In addition, priority would be given to vehicles exiting the ramp to reduce the potential for traffic queuing on the ramp.

The separation of entry and exit points on the basement level, combined with appropriate pavement marking and signage should ensure that there is no confusion for vehicles entering and exiting the ramp at this level and reduce the potential for traffic queuing on the ramp.

With regard to the uncovered parking, the proposed pedestrian crossing approximately 80m along the access road from the new Parramatta Road intersection would be

designed, using traffic calming measures such as a raised platform, to act as a threshold treatment, delineating the access road from the car park. As such, driver mentality should adjust at the threshold in recognition of the change to a car park environment. This would assist with the safe operation of the car park for customers and the manoeuvring of vehicles to/from the Tyre Centre.

It is noted that seven parking spaces are proposed on the exit lanes of the access road outside the threshold treatment. This parking has been designed with kerb extensions to provide adequate manoeuvring space in line with on-street parking guidance.

3.4.2 Compliance with Australian Standards (AS) and Auburn DCP

All parking spaces have been designed to meet or exceed the geometric requirements of Australian Standard AS2890.1-2004. In fact, Costco has its own standard parking layout which is more generous than the standard within the AS. Relevant geometric details for the proposed parking are as follows:

- Parking bay widths of 2.7m;
- Parking bay lengths of 5.5m;
- Aisle widths of 6.5 - 7.0m.

The Auburn DCP requires 5.6 parking spaces per 100m^2 of GLFA for shopping centres of between 10,000-20,000 of GLFA. On this basis the proposed retail component would require 726 parking spaces.

The peak demand for the retail related parking occurs on a Saturday afternoon when the office is closed; therefore, the peak retail parking demand would not coincide with the peak demand for office parking. Notwithstanding this, the office space of 1,960m^2 of GFA would require a further 49 spaces (@ 1 spaces/100m^2 of GFA). Therefore, a conservative application of the Auburn DCP would require 775 spaces.

On the other hand, RTA Guidelines provide a series of parking multiples for different types of retail floor space. The proposed development has characteristics of both supermarkets and discount department stores. Indicatively, the composition might be considered one-third supermarket and two-thirds discount department store, plus the tyre centre. On this basis the RTA Guidelines can be used to determine the following parking requirement.

- Supermarket 4322m^2 @ 4.2 spaces/100m^2 of GLFA = 182 spaces;
- Discount Department store 8644m^2 @ 4.0 spaces/100m^2 of GLFA = 346 spaces;
- Tyre Bay 4 bays @ 3 spaces per bay = 12 spaces.

Thus on this basis, the retail component would require 540 spaces.

The office space of 1,960m^2 of GFA would require a further 49 spaces (@ 2.5 spaces/100m^2 of GFA). Therefore, this interpretation of the RTA Guide would require 589 spaces.

The proposed provision of 771 spaces would satisfy this requirement with some additional capacity for very busy periods.

3.5 Servicing Arrangements

The loading/receiving dock is located to the northeast of the site, with the area along the eastern edge of the building dedicated to servicing. Heavy service vehicles would access this area via the primary access and through the uncovered parking towards the rear of the building. Access to the service area would be controlled to avoid customer traffic from accessing this area and potentially using the proposed tertiary exit-only access.

Swept-path analysis of the relevant accesses and through the car park has been undertaken and is shown on the plan attached at **Appendix B**. These show that the proposal provides suitable access for heavy service vehicles.

3.6 Provision For Non-Car Travel Modes

By its nature as a retail centre stocking predominantly bulky type goods, or selling goods in bulk quantities only a small proportion of customers of the store would arrive by means other than by car. Therefore, whilst the proposed measures to support alternative transport modes such as walking, cycling and public transport, would be of benefit of customers, the primary focus of these measures would be to encourage staff, both store and regional office, to use alternative transport modes.

3.6.1 Walking

The proposed new site access intersection includes pedestrian crossings on all approaches. This would provide direct access to all existing pedestrian footpaths in all directions. In addition, a new footpath would be provided along the frontage of the site. At present there is no existing footpath along the edge of the Linfox site; therefore, the provision of this footpath provides a useful improvement in the local footway network along the northern edge of Parramatta Road.

The main customer pedestrian 'desire line' local to the site would be across the east approach of the proposed intersection as this would provide a direct link between the Costco store and the existing Lidcombe Power Centre retail outlet. Not only would this provide shoppers with easy access between both retail centres, it could also reduce trips on the local and wider road network by allowing shoppers to link trips by providing a wider range of retail choice within the local area.

It is noted that there is an existing shared cycle/footpath that links into the Newington residential area on the northern side of the M4 Motorway on the western side of Haslams Creek. In due course this shared path would form part of a convenient pedestrian and cycle route to the proposed West Metro station near Silverwater Road.

There would be significant benefits if a shared cycle/pedestrian path could be developed along the bank of Haslams Creek to connect the existing shared cycle/pedestrian path to Parramatta Road, as shown on **Figure 4**. This together with the proposed traffic signals at the Nyrang Street/Parramatta Road intersection would create a significant improvement to pedestrian and cycle movements in the area.

3.6.2 Public Transport

As indicated above, public transport services are not presently highly convenient in the area. However it is expected that the advent of the Costco Store plus other similar new developments along Parramatta Road (in the corridor designated for large format stores) would act as a catalyst to bring forward the initiation of the Unsworth Strategic Bus Route 13 along Parramatta Road between Parramatta and Burwood.

3.6.3 Cycling

The development proposes a cycle parking area adjacent to the Level 1 car parking of 105m^2 in area. Based on AS2890.3-1993 Guidelines (Part 3: Bicycle parking facilities) this area could accommodate up to 68 bicycles. This bicycle parking area is covered and will be available for use by customers and staff members. In addition, the proposal includes shower and locker facilities for staff use.

3.6.4 Green Travel Plan

To encourage the use of Public Transport, walking, cycling and other measures to reduce car traffic (such as car sharing), it is proposed that a Green Travel Plan (GTP) be prepared for the Costco site prior to it opening.

A GTP is a package of measures produced predominantly by employers to encourage staff to use alternatives to single-occupancy car-use. For the Costco site, these measures could include:

- **Car sharing scheme** – A car-sharing database would be compiled that stores residential address data for staff and identifies opportunities for car-sharing.
- **Bicycle facilities** – Staff bicycle storage facilities plus lockers and showers for persons travelling to work by bicycle would be provided.
- **Travel Plan Noticeboards** – Noticeboards located in highly visible areas to staff (and customers) would present relevant alternative transport information such as, local walk routes, bus stops/rail station locations, service timetables and dedicated cycle routes. These noticeboards would be updated at regular intervals.

3.7 Construction Traffic Management

In summary, the construction of the site will involve: demolition of existing buildings, excavation for the basement car parking, perimeter edge support walling, construction of the warehouse and fit-out.

A separate Construction Traffic Management Plan is to be submitted for the proposal once a Building Contractor has been chosen. At this stage of planning, the formal construction methodologies have not been determined as this will depend on the selected contractors approach to the work. However, the following principles should be

considered given the site is located on the busy Parramatta Road Regional Arterial corridor.

- The Construction Management Plan shall include proposed truck parking areas, construction zones, crane usage, truck routes, etc;
- Trucks will enter and exit the site by left-turns from/to Parramatta Road until such time as the new signalised access intersection at Nyrang Street is operational;
- Trucks must enter and leave the site in a forward direction unless accredited flag persons are in place to control traffic and pedestrians;
- Access to the site for construction heavy vehicles (trucks) will be restricted during construction to any proposed construction zone;
- The Building Contractor will maintain strict traffic management procedures to ensure the safety of the public road users and pedestrians utilising traffic wardens;
- All vehicles carrying materials to/from the site must have their loads covered with tarpaulins or similar covers;
- Tyres of trucks leaving the site will be appropriately cleaned;
- Openings in the construction fencing at the construction access driveways will be managed and controlled by qualified site personnel;
- Pedestrian warning signs are to be erected adjacent to all construction access driveways;
- All major contractors are aware of inefficient double handling and material wastage. Government initiatives have provided incentives for recycling, reuse and source separation of waste materials. As much as possible, the construction process will involve source separation of materials to facilitate the recycling objectives.

3.8 Compliance with Metropolitan and NSW Plans

This aspect is addressed in Section 2.5 above. In summary it is submitted that the location of the proposed is appropriate heaving regard to its transport needs and its ability to bring forward the timing of Strategic Bus Routes between Parramatta and Burwood which will run past the site.

4 Transport Analysis

4.1 Forecast Peak Hour Traffic Levels

4.1.1 Background Traffic Growth

The Costco store is scheduled to open late 2010; therefore, for traffic assessment purposes the year of opening is assumed to be 2011. In accordance with RTA guidance, a future assessment year of 2021 (10 years post opening) has been conducted.

In order to determine the likely background traffic growth, growth rates have been derived from an assessment of historic Annual Average Daily Traffic (AADT) volumes. The following presents the results of our assessment of local RTA sample (SCS) and permanent (PCS) count stations on Parramatta Road; the values shown correspond to the annual average growth in AADT flows between 1996 and 2005:

- 0.8% per annum - 00.455(SCS) located at the John Street intersection;
- 1.4% per annum - V27.143(PCS) located approximately 1.8km southeast of the site;
- -1.1% per annum - V49.002(PCS) located approximately 2.4km northwest of the site.

The PCS data appears to be inconclusive with one PCS site indicating traffic increases over the nine year period and the other PSC showing traffic reductions over the same period. Therefore, because of the proximity of the John Street SCS, it is considered appropriate to use the 0.8% growth factor for the purpose of calculating background traffic growth.

This 0.8% corresponds to the average growth in average daily traffic flows on Parramatta Road local to the site. On a congested corridor such as Parramatta Road, it is most likely that the majority of this growth has occurred outside the peak hour periods, with increased traffic flows during the shoulder and inter-peak periods.

Furthermore, this 0.8% growth includes traffic arising from development such as that proposed by the Costco store. Thus the overlay of Costco traffic on background traffic growth presents a cautious approach to the assessment of traffic implications.

In summary, applying the 0.8% traffic growth factor to the peak hour traffic flows can be considered robust. By applying the 0.8% annual growth factor to the 2009 base traffic flows, future 2021 baseline traffic flows have been calculated and are presented on **Figure 6**.

4.1.2 Trip Generation Rates

Costco Retail Trip Rates

The RTA's Guide to Traffic Generating Developments (Oct. 2002), does not contain trip rate data for Discount Club retail stores. The retail use covered by the document that would most closely correspond to a Costco store is bulky goods retail; however, the RTA's surveys of bulky goods provides traffic generation rates that are lower than Costco believes would apply for the subject proposal.

Relevant considerations in relation to Costco stores are that its customers generally visit these stores less frequently compared to standard supermarkets, undertaking fewer, but bigger quantity, shops. On the other hand the store would be open until 8.30pm Monday to Friday; therefore, it would not experience the traditional Thursday evening retail shopping peak period, but would rather have a regular evening trading pattern throughout the week.

Costco stores are prevalent in North America; therefore, trip generation rates from the U.S. Institute of Transportation Engineers (ITE) Trip Generation Handbook were considered as part of this study. The average trip generation rates for discount club stores are 4.76 and 6.85 vehicle trips per 1000ft^2 for the weekday evening and Saturday peak hours, respectively. This is equivalent to 5.12 and 7.37 vehicle trips per 100m^2.

Finally, trip rate data was obtained for the Chingford, London store in the UK. Similar to the proposed Auburn store, the Chingford store is located off a Regional Arterial Road (A406 North Circular) and is located in a fairly industrial area of north London.

The following table compares the ITE trip rate, the Chingford store trip rate and an average trip rate for Costco stores that have been surveyed in the UK

Table 4.1 – Weekday Evening Peak Hour Trip Rates (per 100m^2 of GFA)

	Arrivals	Departures	TOTAL
ITE Discount warehouse	2.51	2.61	5.12
Chingford Costco	1.54	1.84	3.38
UK AVERAGE Costco	1.25	1.31	2.56

Table 4.2 – Saturday Peak Hour Trip Rates (per 100m^2 of GFA)

	Arrivals	Departures	TOTAL
ITE Discount warehouse	3.83	3.54	7.37
Chingford Costco	2.93	2.96	5.89
UK AVERAGE Costco	3.00	2.68	5.68

As can be seen from Tables 4.1 and 4.2, the ITE average trip rates are higher than the average UK trip rates and generally higher than the trip rates for each store, (except the Manchester store on a Saturday).

For the purpose of the traffic analysis undertaken for this study, the ITE trip rates have been used as it is considered these trip rates would provide a robust assessment of the likely traffic generation for the first Costco store in Sydney. However, it is considered that in time as more Costco stores were developed in Sydney the traffic generation of the store would be more in line with that of the Chingford store in London.

Finally, although Costco recently opened a store at Docklands, Melbourne, it was concluded that the store would require between 3-6 months before shoppers would become familiar with the new store and traffic levels would balance out. Therefore, basing the trip generation on current surveys of the Docklands store has not been used.

Costco Office Trip Generation

Trip generation rates from the RTA's Guide to Traffic Generating Developments have been used for the regional office component of the scheme. The average trip generation rate for the evening peak is 2.00 vehicle trips per 100m^2 and it is assumed these trips would be distributed 20:80 between arrival and departure trips. The office would be closed on the weekend and would not generate any traffic; the following table presents the Thursday evening peak trip rates.

Table 4.3 – Regional Office Peak Hour Trip Rates (per 100m^2 of GFA)

Period	Arrivals	Departures	TOTAL
Thursday Evening	0.40	1.60	2.00

Costco Trip Generation

The development schedule for the Costco proposal is set out in Section 3.1; for clarity, the relevant traffic generating uses are reproduced below:

- Total Costco warehouse of 13,686m^2 of GFA;
- Costco Regional office of 1,960m^2.

By applying the relevant trip rates from Tables 4.1, 4.2 and 4.3 to the development schedule above, the Thursday evening and Saturday peak hour trip generation for the Costco proposal can be calculated. These trips are shown in the following table.

Table 4.4 – Predicted Peak Hour Trip Generation

Period	Arrivals	Departures	TOTAL
Thursday Evening			
Retail	303	315	618
Office	7	29	36
TOTAL	**310**	**344**	**654**
Saturday			
Retail	519	479	998
Office	-	-	-
TOTAL	**519**	**479**	**998**

4.1.3 Future Traffic Volumes

The trip generation estimates provided in Table 4.4 represent traffic that would enter and exit site. In practice some of this would be diverted from passing trips on Parramatta Road and some would be diverted from traffic that would otherwise have visited an alternative retail destination along Parramatta Road.

The distribution of the Costco retail and office traffic has been based on the traffic patterns of the wider study network. In summary, generated trips are expected to be distributed as follows:

- North – 33%;
- South – 27%;
- East – 19%;
- West – 21%.

The nearest major corridor bringing traffic from the south is St. Hilliers Road. However, traffic is banned from right-turning on to Parramatta Road from St Hilliers Road. Therefore, the likely arrival traffic from the south has been distributed via Nyrang Street and Centenary Drive (east of the Parramatta Road intersection with Hill Road).

The predicted Costco development traffic is indicated on **Figure 7** and the future combined flows in 2021 on **Figure 8**.

As mentioned earlier, the forecasts produced and the analysis conducted for the proposal were based on the omission of the proposed midblock egress, as requested by the RTA and in order to examine a likely most severe outcome.

For completeness, an assessment of the proposal scheme as currently designed with the midblock car park exit is provided at **Appendix C**. This was presented to the RTA in a Technical Note during the consultation process.

4.2 Forecast Daily Traffic and Service Traffic Levels

4.2.1 Daily Traffic Levels

Daily traffic profiles have been developed on the basis of the data provided for the Chingford, London store and are presented on Tables 4.5 and 4.6.

Table 4.5 – Assumed Thursday Traffic Profile

Period	Factors from Chingford, London survey			Assumed Daily Traffic Profile Costco store, Auburn		
	Percentage Arrivals	Percentage Departures	Percent of Peak Hour	Arrivals	Departures	Total
8:00 - 9:00	59%	41%	4%	16	11	27
9:00 - 10:00	83%	17%	22%	118	24	142
10:00 - 11:00	67%	33%	65%	283	142	425
11:00 - 12:00	53%	47%	90%	314	275	589
12:00 - 13:00	56%	44%	117%	428	336	764
13:00 - 14:00	**47%**	**53%**	**118%**	**363**	**410**	**773**
14:00 - 15:00	45%	55%	108%	322	385	707
15:00 - 16:00	51%	49%	100%	329	322	651
16:00 - 17:00	47%	53%	96%	298	331	629
17:00 - 18:00	***45%***	***55%***	***100%***	***296***	***358***	***654***
18:00 - 19:00	53%	47%	96%	331	294	625
19:00 - 20:00	43%	57%	89%	250	334	584
					TOTAL =	**6570**

Note: Percentages are relevant to the 5.00 to 6.00pm hour

Table 4.6 – Assumed Saturday Traffic Profile

Period	Factors from Chingford, London survey			Assumed Daily Traffic Profile Costco store, Auburn		
	Percentage Arrivals	Percentage Departures	Percent of Peak Hour	Arrivals	Departures	Total
9:00 - 10:00	85%	15%	31%	260	47	307
10:00 - 11:00	59%	41%	69%	404	281	685
11:00 - 12:00	55%	45%	83%	460	373	833
12:00 - 13:00	***52%***	***48%***	***86%***	***445***	***417***	***862***
13:00 - 14:00	50%	50%	97%	482	486	968
14:00 - 15:00	55%	45%	92%	508	409	917
15:00 - 16:00	**51%**	**49%**	**100%**	**506**	**492**	**998**
16:00 - 17:00	45%	55%	90%	406	489	895
17:00 - 18:00	35%	65%	82%	289	529	818
					TOTAL =	**7283**

Note: Percentages are relevant to the 3.00 to 4.00pm hour

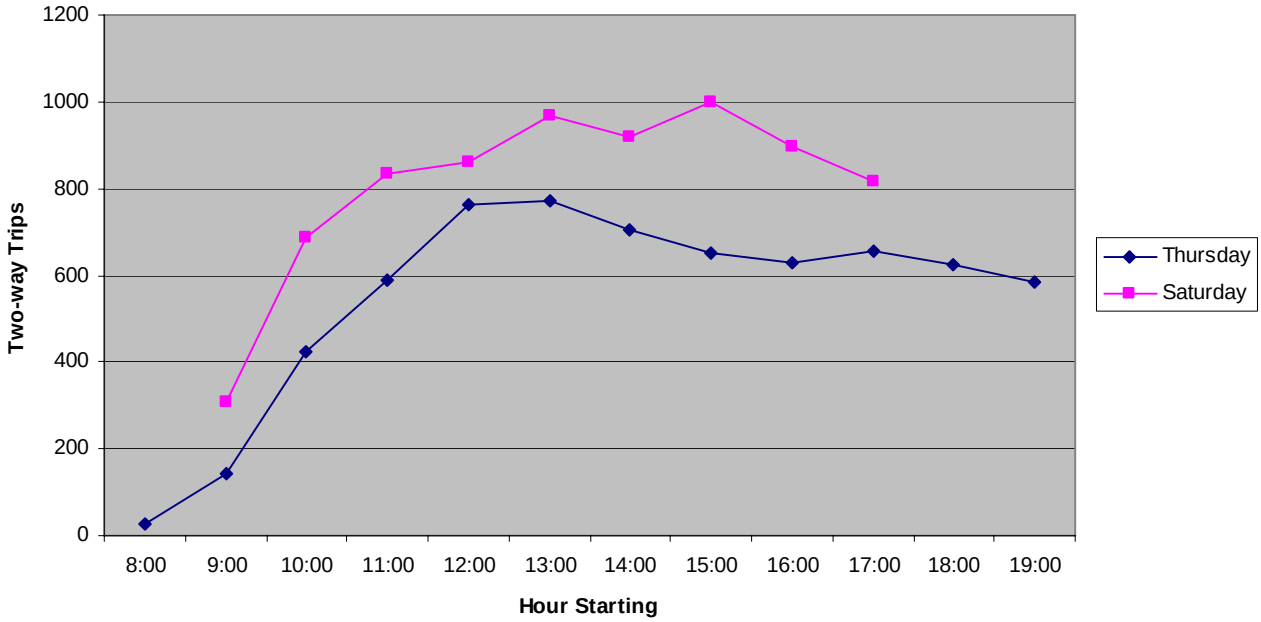
Table 4.5 shows that on a Thursday the proposed store would generate daily traffic flows in the vicinity of 6,570 two-way movements. In addition, the busiest period for the store would most likely be between 12.00-1.00pm and not during the evening peak period for traffic on Parramatta Road of 5.00-6.00pm.

Table 4.6 shows that on a Saturday the proposed store would generate daily traffic flows in the vicinity of 7,280 two-way movements. In addition, the busiest period for the store would most likely be between 3.00-4.00pm and not during the busiest period for traffic on Parramatta Road of 12.00-1.00pm.

Again to be cautious, for the Saturday peak hour traffic analysis, we have assumed that the peak generation of the store would coincide with the peak traffic flows within the study network. The profile assessment above concludes this would not be the case. This does however incorporate a safety factor in case the proportion of trips comprising pass-by and diverted trips were not as high as would be suggested by the RTA Guidelines.

The assumed daily profiles in Tables 4.5 and 4.6 have been plotted and are shown on the following Diagram 4.1.

Diagram 4.1 – Predicted Daily Vehicle Traffic Profiles



4.2.2 Service Traffic Levels

Costco Australia has indicated deliveries would start at 5.00am and continue until approximately 1.00pm. The majority of deliveries would occur during the week and it is anticipated that the store would receive between 50 to 70 deliveries per day. Saturday deliveries are comparatively light consisting mainly of delivery of fresh items before 8.00am. Sunday is normally closed to large deliveries, just milk, bread and other fresh products in small trucks; generally between 5 to 10 deliveries.

Vehicle sizes would vary ranging from 19m articulated trucks to smaller delivery vans. In general, half of the deliveries would be large trucks and the other an assortment of medium size trucks to smaller vans.

The majority of the large trucks would be received before 9.00am containing mainly produce and fresh items. 75% of the larger trucks would be unloaded before 9.00am.

In summary, most deliveries would occur before the stores opening hours of 10:00am; therefore, the majority of service traffic would not coincide with customer traffic and there would be negligible (if any) delivery traffic during the weekday evenings or weekend peak periods.

4.3 Future Local Road Network Performance

4.3.1 2021 Baseline Assessment

SIDRA Intersection analysis has been undertaken of the study network intersections. Preliminary analysis concluded that the intersections of Silverwater Road/St. Hilliers Road and Hill Road/Bombay Street would experience capacity issues even without the development of Costco but that the other signalised intersections would operate satisfactorily.

Table 4.7 presents the results of the SIDRA Intersection analysis of these two intersections under the baseline 2021 traffic conditions. This indicates that both intersections would experience capacity issues during the Thursday evening peak and

the Silverwater Road/St. Hilliers Road intersection would experience capacity issues during the Saturday peak also.

Table 4.7 – 2021 Base Year Intersection Operation

Parramatta Road Intersection with:	Thursday Evening		Saturday	
	Ave. Delay (sec/veh)	Level of Service	Ave. Delay (sec/veh)	Level of Service
Silverwater Rd-St Hilliers Rd	71	F	63	E
Hill Road-Bombay St	70	E	31	C

NOTE: Figures shown in parenthesis indicate 2021 background traffic without the development

The State Government's "Action For Transport 2010 – An Integrated Transport Plan for New South Wales" identified a $70 million Parramatta Road upgrade, involving major intersection improvements. Previously in 2002, the RTA commissioned a study of the Parramatta Road corridor. The study report, "Traffic Study For Upgrading of Parramatta Road from Broadway to Woodville Road (Masson Wilson Twiney, 2002) recommended the following possible improvement works for both of these Parramatta Road intersections.

Parramatta Road / Silverwater Road / St. Hilliers Road:

- Additional left-turn lane on Silverwater Road southbound;
- Additional left-turn lane on Parramatta Road westbound;

Parramatta Road / Hill Road / Bombay Street:

- Additional left and right-turn lanes on Parramatta Road;
- Reconfigure Bombay Road to provide three lanes on approach;
- Widen Hill Road to provide additional short left-turn lane and additional right-turn lane.

4.3.2 2021 Baseline plus Proposal

SIDRA Intersection analysis of the study network intersections (including the improvements schemes for Silverwater Road and Hill Road intersections) under the 2021 Design (with Development) traffic flow scenario has been undertaken and is presented in Table 4.8.

Table 4.8 – 2021 Design Year Intersection Operation

Parramatta Road Intersection with:	Thursday Evening		Saturday	
	Ave. Delay (sec/veh)	Level of Service	Ave. Delay (sec/veh)	Level of Service
Silverwater Rd-St Hilliers Rd	73	F	81	F
Alban St	6	A	3	A
Day St	6	A	6	A
Costco Access-Nyrang St	14	A	16	B
John St	20	B	28	B
Hill Road-Bombay St	44	D	28	B

From Table 4.8, it can be seen that the proposed new signalised intersection of Parramatta Road, Nyrang Street and the Costco access would operate satisfactorily, as would the Parramatta Road intersections with Alban Street, Day Street and John Street.

The improved Parramatta Road-Hill Road/Bombay Street intersection would also operate satisfactorily within capacity.

Even with the proposed improvements, the Parramatta Road-Silverwater Road intersection would continue to experience capacity issues under the predicted 2021 Design Year flows. However, as identified in the MWT 2002 report, this level of improvement is considered appropriate as any significant enhancement of capacity may result in increased M4 Motorway toll avoidance.

The Parramatta Road/Silverwater Road/St. Hilliers Road intersection is a key throttle point on Parramatta Road that regulates flow along its western section. It suffers to some extent from M4 Motorway toll avoidance traffic. Overtime, as Parramatta Road in general and this intersection in particular become busier the incentive to avoid tolls will become increasingly diminished and it is expected that traffic volumes through this intersection will stabilise at a very busy, but workable level.

Because this intersection does operate as a throttle point, it is not considered appropriate to make any further improvements to it in isolation. Rather any upgrading should appropriately be undertaken as part of an overall route study that achieved balanced capacity throughout the system. Having regard to the planned West Metro

railway along the Parramatta Road it is considered that any major transport funding for the corridor would best be directed towards the railway rather than to spot improvements to the road system. This approach would be consistent with the recommendation in the Parramatta Road study that most of the forecast traffic demand growth along this section of the note be dealt with through travel demand management rather than through trying to keep augmenting road capacity.

4.3.3 Ongoing Consultation with the RTA on Access

At the time of writing, discussions and liaison with the RTA was ongoing as to the optimum design for access. **Appendix D** contains a Technical Note that sets out the most recent detailed assessment of the main Costco site access intersection with Nyrang Street that has been undertaken and submitted to the RTA.

4.4 Mode of Travel Assessment

4.4.1 Customer traffic

Costco retail consists primarily of bulk purchases and/or bulky goods purchases; as such, the majority of customers would arrive via private car. However, the survey data provided by Costco UK shows that not all of these trips are single-occupancy trips. From the data provided, the following could be concluded:

- Of all the customers who arrived by car on a Thursday, 63% were car drivers and 37% were car occupants;
- Of all the customers who arrived by car on a Saturday, 50% were car drivers and 50% were car occupants.

It is anticipated that the Auburn store would achieve similar levels of car occupancy. It is expected that most customer traffic during the Thursday evening peak would be car based while the Saturday peak, the store would generate more pedestrian customers due to walk in business from other local stores in the area.

4.4.2 Staff traffic

It is considered that the main alternative travel modes that would be used by staff are:

- Car passenger – Through car-sharing with other staff members;
- Pedestrian and Cyclist – From residential areas local to the site;

- Rail users – Although the stations of Auburn and Lidcombe are further from the site than the nearest bus stops, studies show that the greater reliability afforded by trains means commuters are willing to walk greater distances to use them;
- Bus users – Using route 401, 909 or future strategic Route 13.

4.4.3 Mode Split

The following table provides a breakdown of the anticipated mode split that could be achieved by the Costco development.

Table 4.9 – 2021 Design Year Intersection Operation

Mode	Thursday		Saturday	
	Customer	Staff	Customer	Staff
Car driver	60%	80%	46%	80%
Car passenger	35%	15%	45%	15%
Pedestrian	1%	1%	4%	1%
Cyclist	1%	2%	2%	2%
Bus	3%	2%	3%	2%
Rail	<1%	<1%	<1%	<1%

5 Summary and Conclusion

The following are the key findings of the investigation.

The Proposal

- Costco proposes to develop a 13,686m^2 Discount Club warehouse store on a site between Parramatta Road and the M4 Motorway at Auburn (see **Figure 1** for location);
- It is proposed to provide about 12,923m^2 of lettable floor area, a tyre fitting centre, a 1,960m^2 regional head office and some 774 parking spaces;
- The proposed store would sell to members only but membership would be open to anyone who wishes to join;
- It will be a discount operation aiming to sell large quantities of large items and therefore needs to have good car access;
- The proposal as currently designed has a midblock left-turn entry/exit to provide direct access to and from the car park. At the request of the RTA, which does not favour an exit at this point, analysis was conducted for options with and without the exit and both were found to be workable from a traffic perspective.

Existing Situation

- The site is well served by the arterial road system, this being comprised of Parramatta Road, the M4 Motorway, Ring Road 3 and Silverwater Road/St. Hilliers Road;
- The road system is busy in peak periods but operates satisfactorily;
- Because the site is located in a predominantly industrial area, there are only limited public transport services in the area;
- It is however noted that Strategic Bus Route 13 is proposed by the State Government to run past the site and the future West Metro railway is proposed by the State Government to serve the Parramatta Road corridor.

Proposed Site Arrangements

- In formulating the design, extensive liaison was held with the NSW Roads and Traffic Authority;
- Arising from this it is proposed to provide a principal entry/exit opposite Nyrang Street at the western end of the site with the four-way intersection so formed to be controlled by a new set of traffic signals;
- A loop road is provided around the perimeter of the site leading to a large service area at the eastern end. Service vehicles will be able to exit directly from this left into Parramatta Road;
- Two parking levels are proposed beneath the trading floor. The upper level is proposed to have a left-turn entry off Parramatta Road.

Traffic Generation and Impact

- The proposed development is expected to generate the following traffic during peak times on a weekday evening and Saturday afternoon:
  - Thursday evening 654 veh/hr;
  - Saturday afternoon 998 veh/hr.
- These are estimates for opening. The traffic generation is likely to reduce over time as the full complement of Costco stores in Sydney are developed;
- Analysis was conducted for the Year 2021 for cases with and without the Costco store;
- This found that all intersections in the study network would operate satisfactorily as presently configured except for those at Hill Road/Bombay Street and Silverwater Road/St. Hilliers Road. These would require improvement irrespective of the Costco development and potential improvements to cater for additional traffic are discussed in the report;
- However, it is considered that only minor improvements in the corridor would in fact be appropriate with transport funds most beneficially being directed to travel demand management and to the other transport improvements proposed by the State Government for the corridor;
- The analysis found that vehicles would be able to exit the site satisfactorily even if the proposed midblock exit was deleted.

Other Transport Implications

- The amount of parking proposed to be provided is considered to be satisfactory;
- Although the nature of the goods bought are most likely to engender visits by car, nevertheless the proposed development will contribute to the viability of public transport services in the area;
- Bicycle parking and showers/changing facilities for staff are proposed to be provided on the site. Bicycle parking will also be provided for customers;
- It is proposed to develop a Green Travel Plan to encourage travel by non-car means, especially for staff.

Conclusions

It is concluded that the subject site provides a suitable location for the proposed store. Site access arrangements have been carefully planned and will have minimal impact on the adjacent road network. Traffic impacts are considered to be satisfactory in the context on the expectations for the regional road system in the future and the proposed parking provision will be appropriate. Overall transport aspects of the proposal are considered to be satisfactory.

Figures

SITE LOCATION

COSTCO LINFOX SITE - TRANSPORT ASSESSMENT

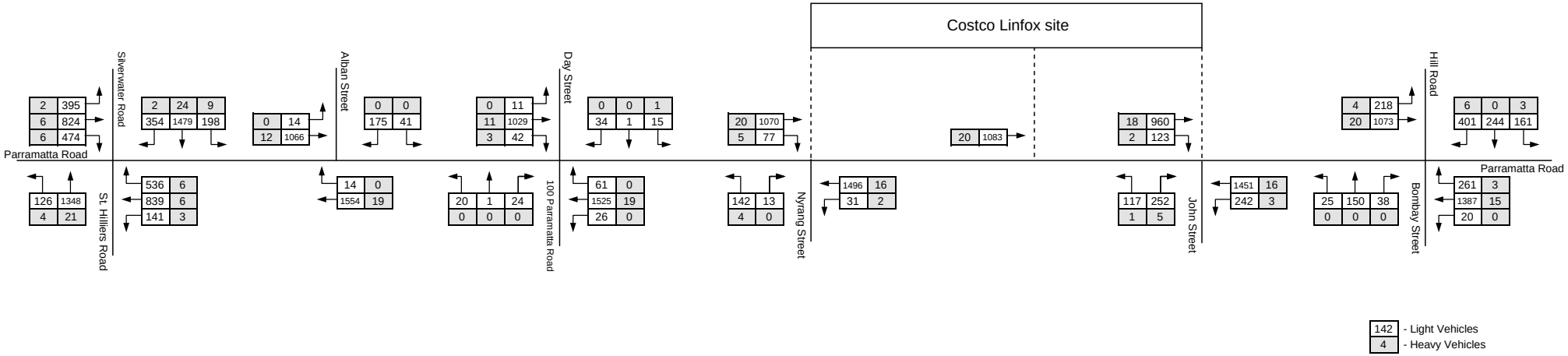
Halcrow MWT

Figure 1

Filename: CTLCHKdi02.ai

Date: 11 September 2009

Thursday Evening Peak



Saturday Midday Peak

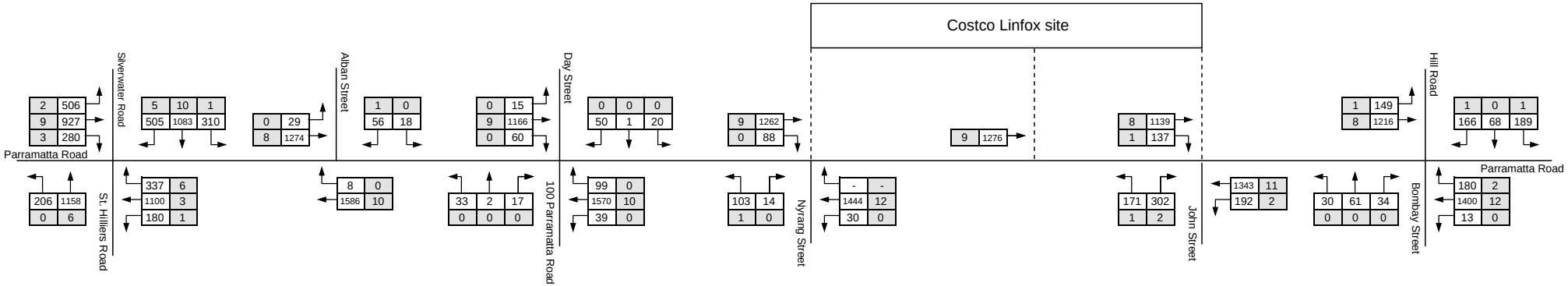


Figure: 2 **Title:** 2009 Background traffic flows

NON CAR ALTERNATIVE TRANSPORT NETWORK

COSTCO LINFOX SITE - TRANSPORT ASSESSMENT

North

Key

- Bus Route 909
- Bus Route 401
- Cycle Path
- Site
- Bus Stop
- Railway Station

Halcrow MWT

Figure 3

Filename: CTLCHKdi04.ai

Date: 1 September 2009

FUTURE NON CAR TRANSPORT NETWORK

COSTCO LINFOX SITE - TRANSPORT ASSESSMENT

North

Key

- Bus Route 909
- Bus Route 401
- Cycle Path
- Desirable Shared Path Extension
- Proposed West Metro
- Future Strategic Bus Corridor 13
- Site
- Bus Stop
- Railway Station
- Proposed Metro Station

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Figure 4

Filename: CTLCHKdi05.ai

Date: 1 September 2009

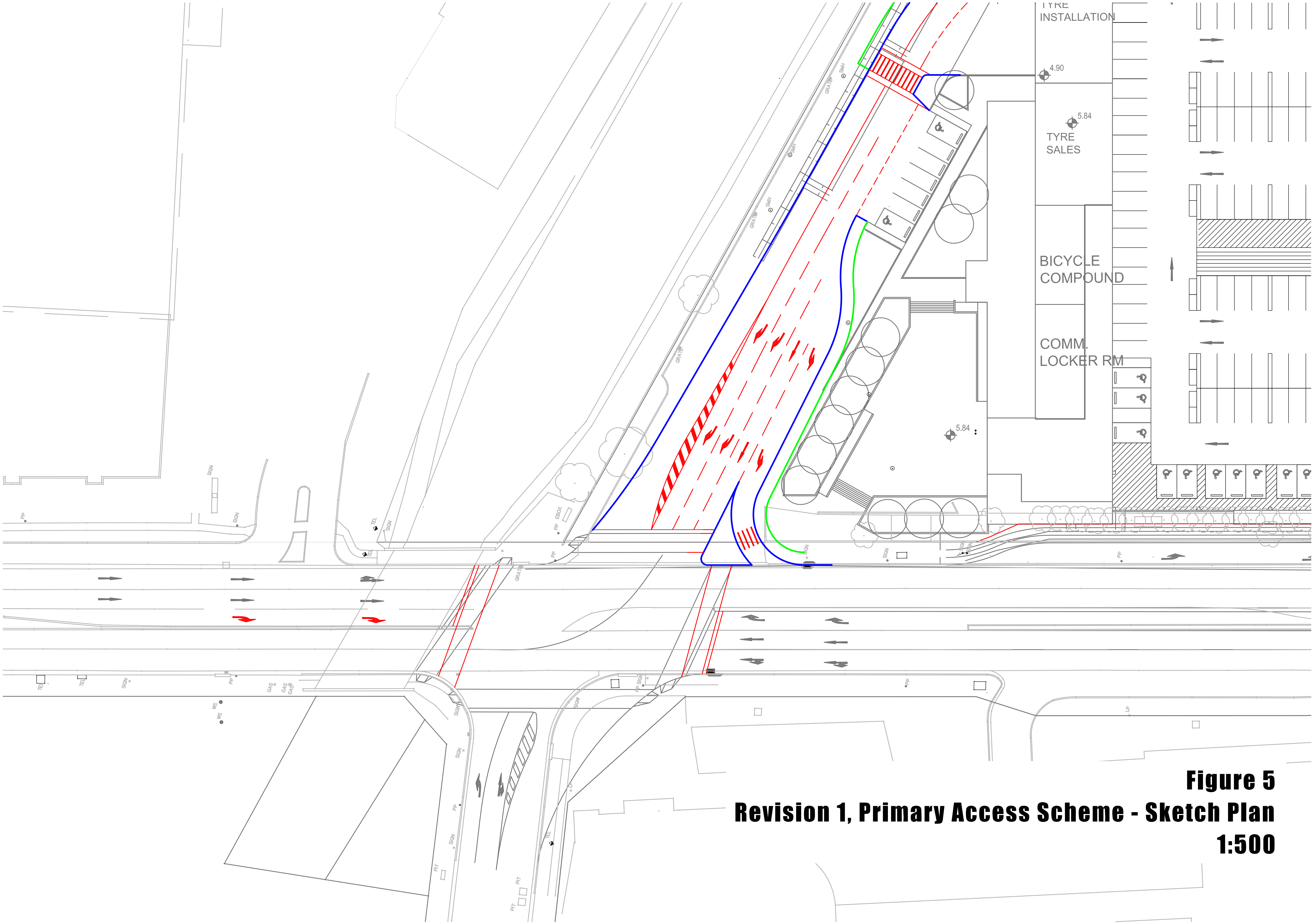
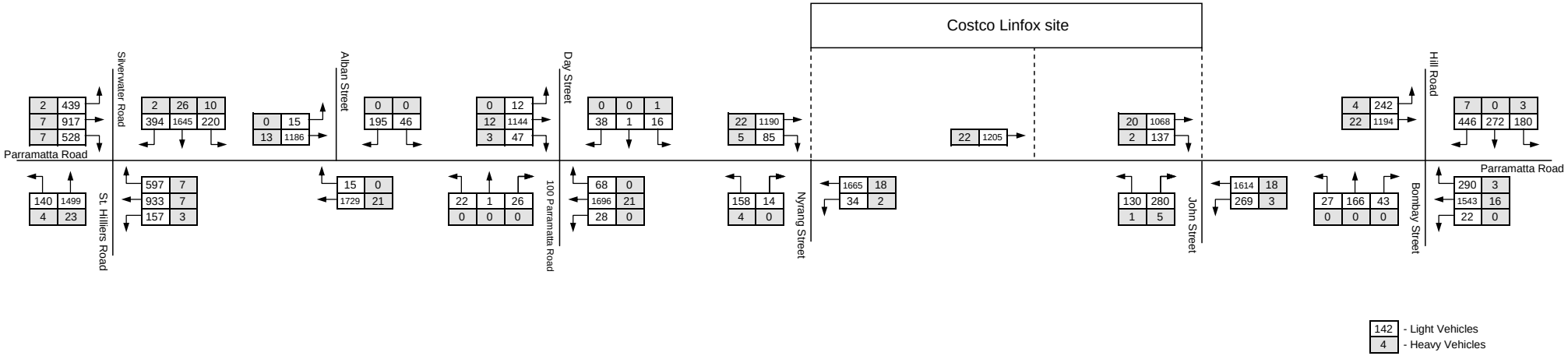


Figure 5

Revision 1, Primary Access Scheme - Sketch Plan

1:500

Thursday Evening Peak



Saturday Midday Peak

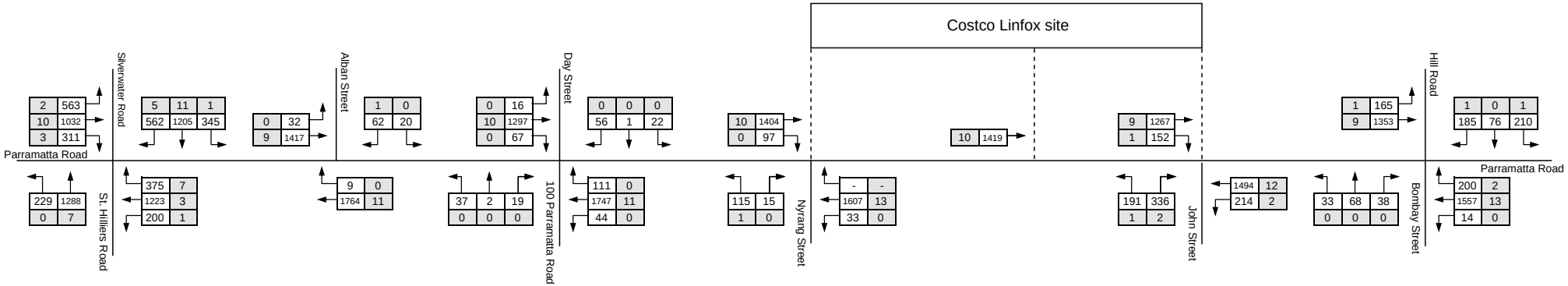
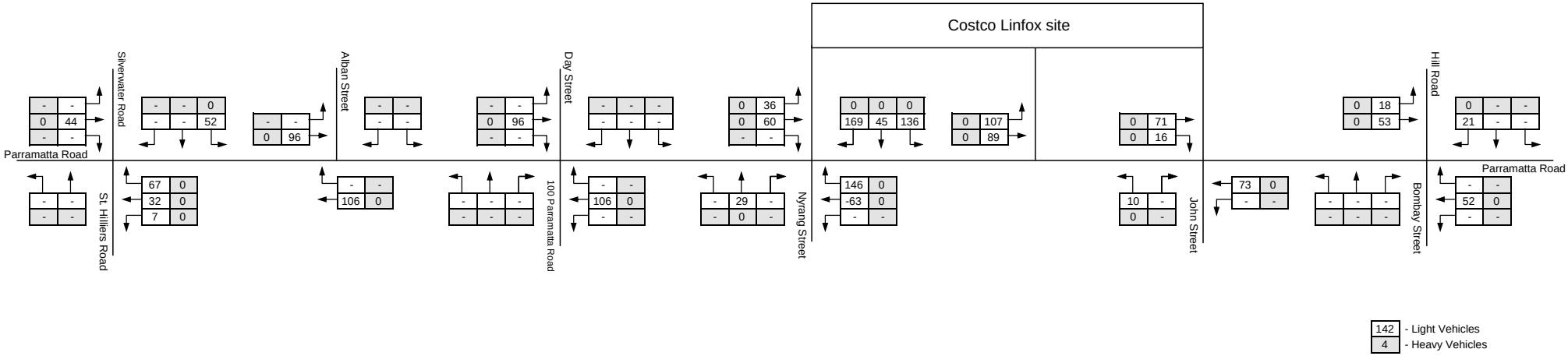


Figure: 6 **Title:** 2021 Background traffic flows

Thursday Evening Peak



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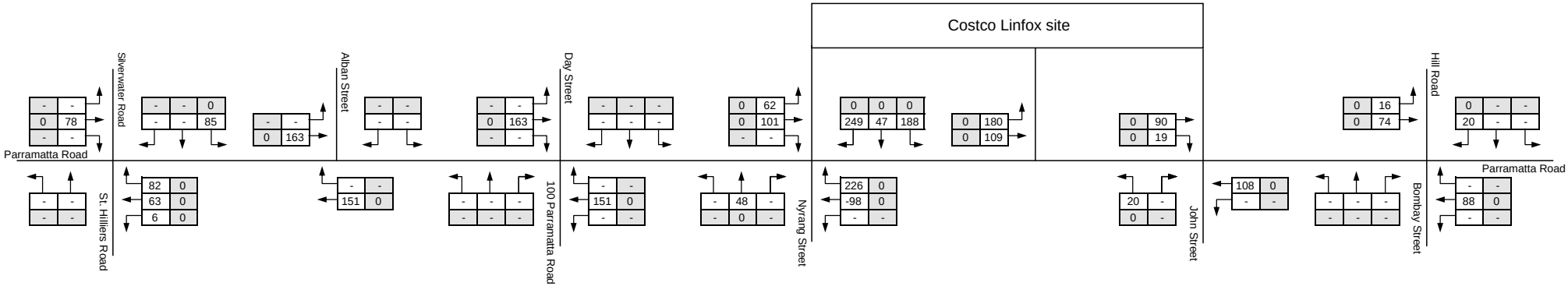

Figure: 7 **Title:** Total Costco development traffic flows

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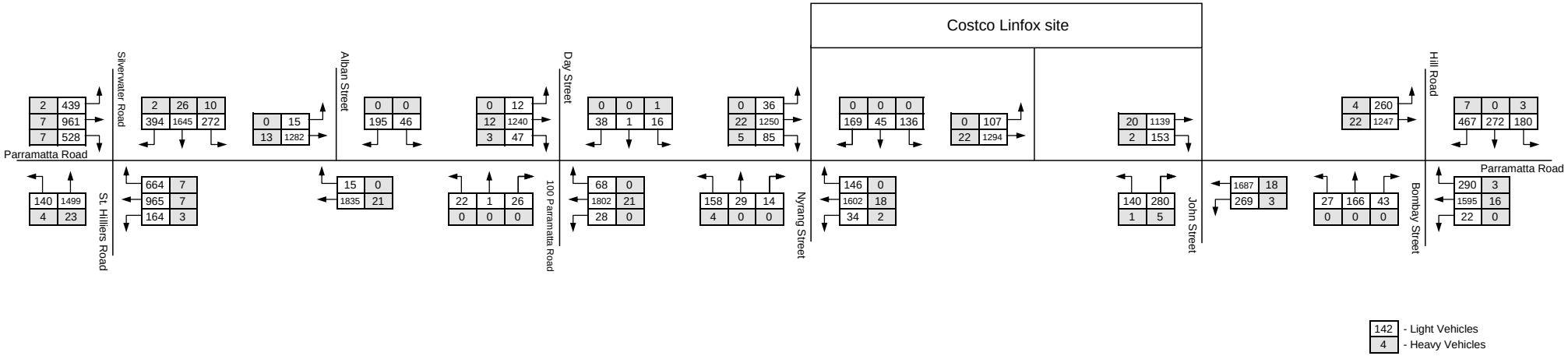
Thursday Evening Peak



Saturday Midday Peak

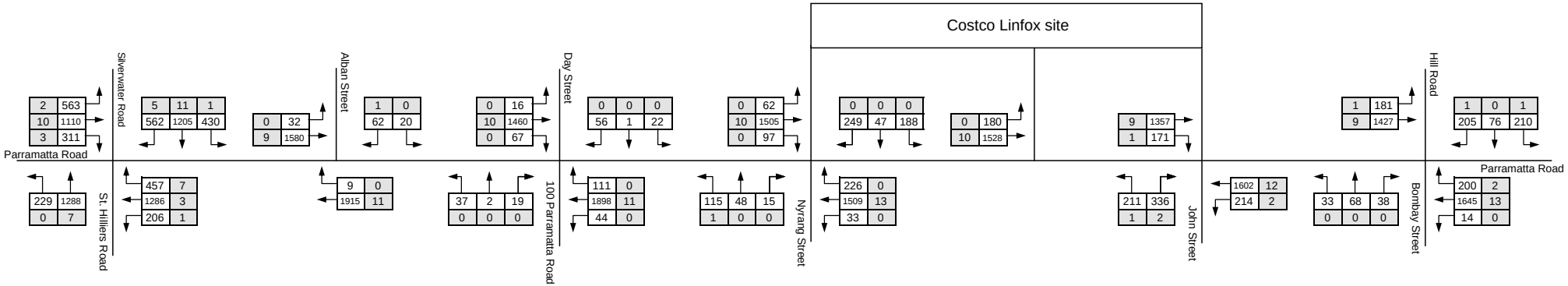


Figure: 8 **Title:** 2021 Design year traffic flows

Appendix A Relevant Architectural Plans