

Section 75W Modification to Costco Auburn
(MP 09_0184) – Hours of Operation

Traffic Assessment

2 March 2012

Prepared for
Costco Wholesale Australia

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1 Introduction

On the 7th April 2010, the Minister for Planning approved a Concept Plan (MP09_0102) for the use of a Costco Wholesale Retail Warehouse building, Australian Regional Headquarters and associated works at 17-21 Parramatta Road, Auburn (see **Figure 1**). The Planning Assessment Commission subsequently granted consent for a Project Application (MP09_0184) for the construction of the building on the 23rd April 2010.

A Section 75W modification was approved on the 13th July 2011 to permit the occupation of the Costco Regional Headquarters Office portion of the development for a short period of time under an interim Occupation Certificate prior to the completion of the Costco Retail Warehouse and the subsequent issuing of a final Occupation Certificate for the development.

On 21st July 2011 the Costco Wholesale Warehouse began operation.

Halcrow has been commissioned by Costco Wholesale Australia as lead traffic and transport consultant for all relevant stages of the Auburn development. This commission has been extended to cover the latest Section 75W Modification to Costco Auburn (MP 09_0184).

Halcrow has been appointed to assess the traffic implications of extending the hours of trading which were intended to help alleviate car parking issues. This study is therefore in accordance with the request (via email of 18/11/2011) made by the Department of Planning and Infrastructure (DP&I) that the, “*flow-on impacts that could result from an extension of the operating hours of the site*” be assessed.

In accordance with a further request of the DP&I, this report (at Section 4.4) includes a review of Costco’s Opening Period Traffic & Parking Management Plan, in light of the proposed modification.

Halcrow has discussed the proposal with Roads & Maritime Services (RMS) and on 16/01/2012 Halcrow issued a letter to RMS that set out the preliminary traffic findings

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COSTCO, AUBURN



of the analysis of the proposed modification. Following submission of the letter, Halcrow discussed the findings with RMS (via telephone conversation with James Hall) and it was agreed with RMS that Halcrow proceed with advancing the preliminary findings for the means of preparing a Traffic Assessment report for issue with the Environmental Assessment report covering the proposed modification.

The remainder of this report is set out as follows:

- Chapter 2 describes the existing Costco Auburn site and includes a description of the proposed modification;
- Chapter 3 describes the existing traffic conditions and current staff/customer travel patterns;
- Chapter 4 presents the traffic analysis that has been undertaken to assess the proposed modification and includes a review of the OPTPMP Report; and
- Chapter 5 presents a summary and conclusion.

2 Costco Warehouse and Regional Office

2.1 Existing Development

The following summarises the development schedule that was contained within the Environmental Assessment (EA) Report issued in 2010:

- Total Costco warehouse of 13,727m² of Gross Floor Area (GFA), which includes a proposed 4-bay Tyre Centre (of 484m² GFA);
- Gross Leasable Floor Area (GLFA, excluding Tyre Centre and area for exterior walls) of 12,986m²;
- Costco Regional office of 1,999m²;
- 745 car parking spaces for retail and offices uses.

The development above has since been completed and, as mentioned above, opened for trading on 21st July 2011.

The current trading hours for the store are as follows:

- Monday to Friday; opens at 10.00am and closes at 8.30pm;
- Saturday, opens at 9.30am and closes at 6.00pm;
- Sunday, opens at 10.00am and closes at 5.00pm.

2.2 Proposed Modification

The proposed modification seeks to amend Condition F3 – Hours of Operation to allow longer trading hours, thus spreading patronage across a longer period of time.

In summary, the proposed modification seeks to allow longer trading hours, as follows:

- Monday to Friday;
 - o Proposed opening time of 8.00am (currently opens at 10.00am);
 - o Proposed closing time of 9.00pm (currently closes at 8.30pm);
- Saturday;
 - o Proposed opening time of 8.00am (currently opens at 9.30am);
 - o Proposed closing time of 9.00pm (currently closes at 6.00pm);

- Sunday;
 - o Proposed opening time of 8.00am (currently opens at 10.00am);
 - o Proposed closing time of 9.00pm (currently closes at 5.00pm).

For further details of the proposal, please refer to JBA Planning's Section 75W modification to which this traffic report is appended.

2.3 Implications of the Proposed Changes

The weekday evening (Thursday evening) and weekend midday (Saturday) peak hour periods were assessed as part of the original Part 3A submission. The proposed later closing time on Monday to Friday and the proposed weekend changes occur outside of these previously assessed periods. Therefore, it is unlikely that these changes would affect traffic during the weekday evening and weekend midday peak periods. Moreover, these changes could benefit the operation of the surrounding road network by 'spreading' patronage out of these peak hours.

Therefore, from our review of the proposed amendments, only the proposal to open at 8.00am Monday to Friday requires assessment as this would advance the first hour of trading in to the commuter peak hour of 8.00 – 9.00am.

Therefore, the following analysis within this report focuses on the morning peak period.

3 Existing Conditions

3.1 *Traffic Surveys*

In order to comply with the traffic analysis that supported the original Part 3A submission, traffic surveys were undertaken on Thursday the 1st December 2011, at the same intersections that comprised the Part 3A's study network.

These intersections are:

- Parramatta Road with Silverwater Road;
- Parramatta Road with Alban Street;
- Parramatta Road with Day Street;
- Parramatta Road with Nyrang Street (and Costco Main Access);
- Parramatta Road with John Street; and
- Parramatta Road with Hill Road.

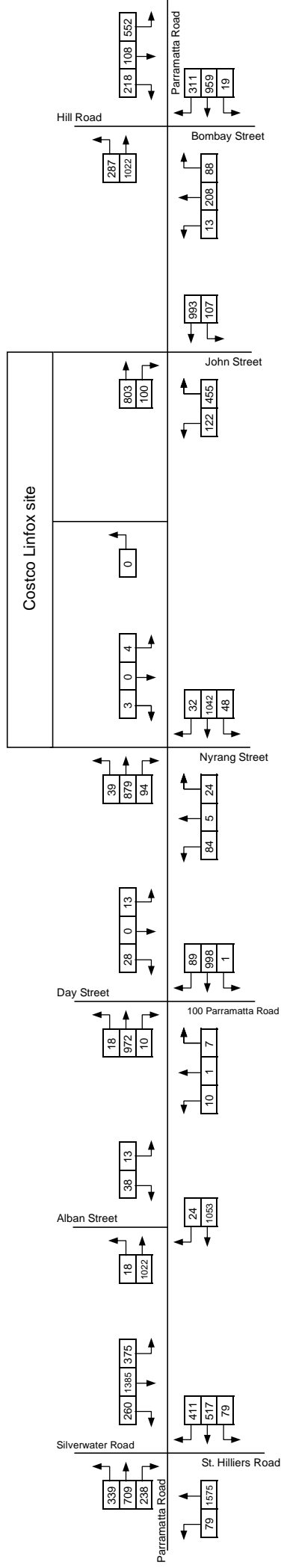
In addition, surveys were undertaken at the following secondary Costco accesses:

- The eastbound left-slip entry to the Basement car park; and
- The eastern loading dock exit.

Full turning count surveys of all the intersections and accesses were undertaken for the hours of 7.00 – 10.00am. In addition, the surveys at the 3 Costco accesses were continued until 12.00-noon (7:00am through to 12:00pm (noon)). Furthermore, IDM (Intersection Diagnostic Monitor) data for the new Costco access intersection and the Parramatta Road intersection with Silverwater Road was obtained from Roads & Maritime Services (RMS).

The survey results indicated that the busiest morning peak hour was between 7.45 – 8.45am (only marginally busier than the traditional 8.00 – 9.00am peak hour). The morning peak hour traffic flows are presented on **Figure 2**.

Total Vehicles



HGVs

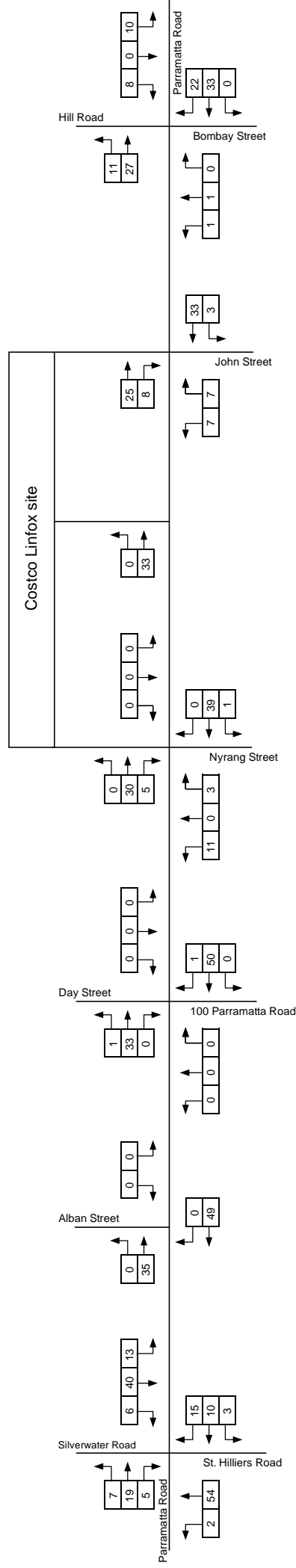


Figure: 2

Title: Existing Morning Traffic Flows, Thursday 7:45 - 8:45 AM

3.2 *Current Road Network Performance*

The existing operation of the surveyed intersections was analysed using the SIDRA intersection analysis programme.

SIDRA determines the average delay that vehicles encounter and the corresponding level of service. For roundabouts and sign posted intersections, the assessed intersection delay is the delay for the worst movement at the intersection.

SIDRA provides analysis of the operating conditions which can be compared to the performance criteria set out in the following **Table 3.1**.

Table 3.1 – Level of Service Criteria

Level of Service (LoS)	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 SIDRA models used for the analysis are the same models that were used for the Part 3A study. However, it should be noted that the two SIDRA models of the Main Costco access intersection with Nyrang Street and Parramatta Road and the model for John Street and Parramatta Road, were based on the proposed intersection layouts.

As part of the construction of the Costco Warehouse, these two intersections have been built (as in the case of the main Costco access intersection) or modified (as in the case

of the John Street intersection). Accordingly, these two models have been amended to reflect their existing layout ‘on the ground’.

Furthermore, the IDM data has been used to determine the cycle time for the Parramatta Road study network and for the average phase times at the Costco Access intersection and Silverwater Road intersection.

The results of the existing intersection performances are presented in **Table 3.2**.

Table 3.2 – Existing Intersection Operating Conditions, Morning Peak Hour

Parramatta Road Intersection with:	Control	Ave. Delay (sec/veh)	Level of Service (LoS)
Silverwater Rd-St Hilliers Rd	Signalised	39	C
Alban Street	Signalised	3	A
Day Street	Signalised	4	A
Costco Access (w Nyrang St)	Signalised	12	A
John Street	Signalised	29	C
Hill Road-Bombay Street	Signalised	48	D

From Table 3.2, it can be seen that all intersections within the study network are currently operating satisfactorily (or better) with levels of service “D” (or better); except for the intersection of Parramatta Road with Hill Road and Bombay Street, which operates near capacity with an LoS of D.

3.3 Surveyed Traffic Generation and Employee / Customer Travel Patterns

From the traffic survey data, the following summarises relevant details about Costco’s existing traffic generation:

- 87 trips to/from Costco between 7.45 – 8.45am;
- 91 trips to/from Costco between 8.00 – 9.00am; and
- 539 trips to/from Costco between 10.00 – 11.00am (first hour of opening).

The trips above can be defined as follows:

- Costco Regional Office staff trips;
- Costco Warehouse staff trips; and
- Customer trips.

From discussions with Costco it is understood that prior to 9.30am, the majority of traffic to/from the site is regional office staff traffic. Following 9.30am, it is a combination of warehouse staff traffic (which is comprised of staff arriving for the 10.00am shift and staff on the 3.00am shift departing) and customer traffic.

4 Traffic Analysis

4.1 *Forecasted Traffic Generation*

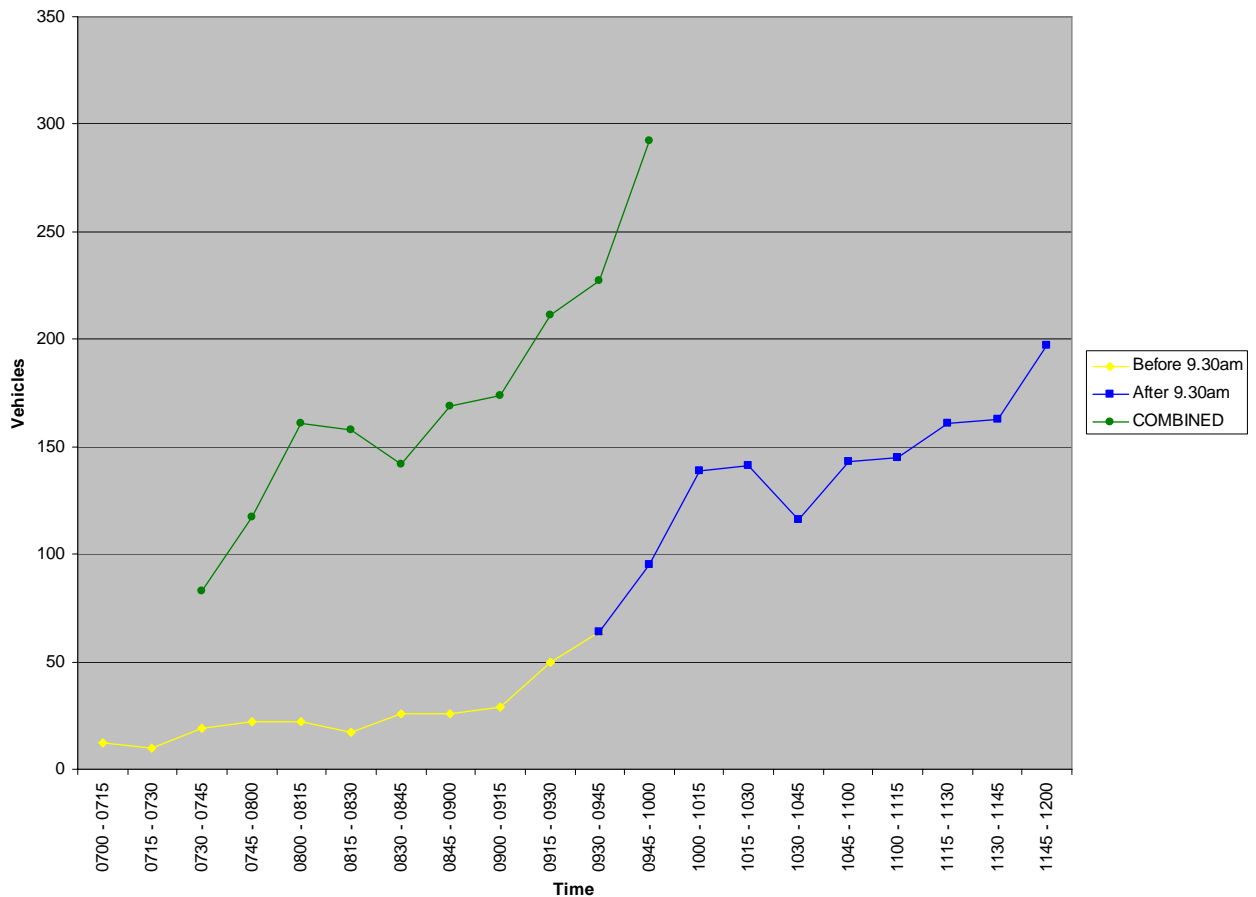
The proposed amendments do not make any changes to the operation of the regional office. Therefore, existing traffic to/from the site prior to 9.30am (which, as mentioned above, is predominantly regional office staff trips) would generally remain unchanged.

However, advancing the opening time on weekdays by 2 hours to 8.00am would most likely result in all warehouse staff related traffic advancing 2 hours (from about the period of 9.30-10am to 7.30-8am), as well as the majority of customer traffic.

For the purpose of this assessment, we have assumed that all surveyed traffic to/from the site after 9.30am to 12-noon would arrive from 7.30am to 10.00am. Whilst all warehouse traffic would shift, 'advancing' all 'post 9.30am' traffic is considered to be a conservative approach to forecasting the future traffic generation as not all customer traffic would shift with the change in opening times.

Therefore, to forecast the future traffic generation once the opening time has been amended to 8.00am, the volumes of existing traffic to/from the site after 9.30am have been overlaid on to the existing surveyed traffic volumes from 7.30am.

Figure 3 presents the existing surveyed site traffic volumes as well as the forecasted traffic volumes resulting from the combination of the existing traffic with the overlaid traffic.

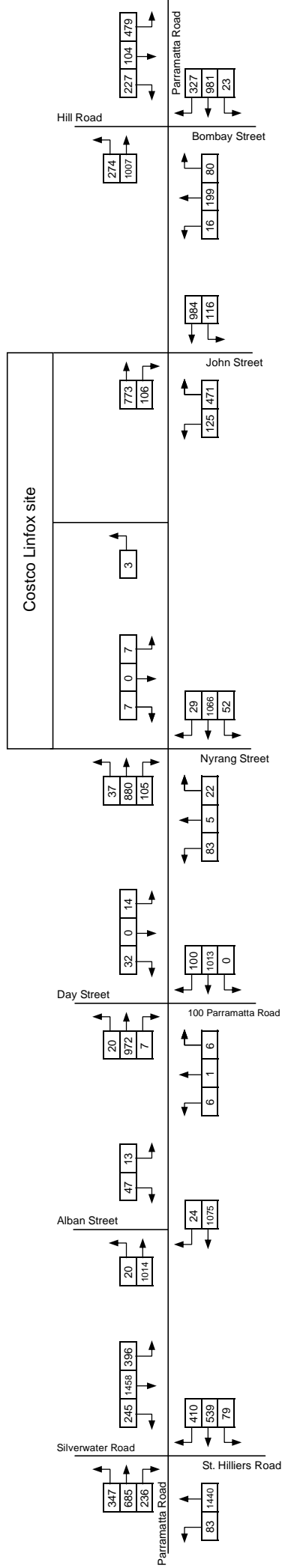
Figure 3 – Existing and Future Site Traffic Volumes

Adding the forecasted future (combined) development traffic generation to the existing road network traffic volumes indicates that the future morning network peak hour would be between 8.00 – 9.00am. As such, the surveyed network traffic flows during this peak hour are presented on **Figure 4**.

During the 8.00 – 9.00am peak hour, the future site traffic generation would be 630 vehicles consisting of:

- 91 mainly Costco Regional Office staff trips (existing); and
- 539 mainly Customer trips and some Costco Warehouse staff trips (additional trips, currently arriving/departing between 10.00 – 11.00am).

Total Vehicles



HGVs

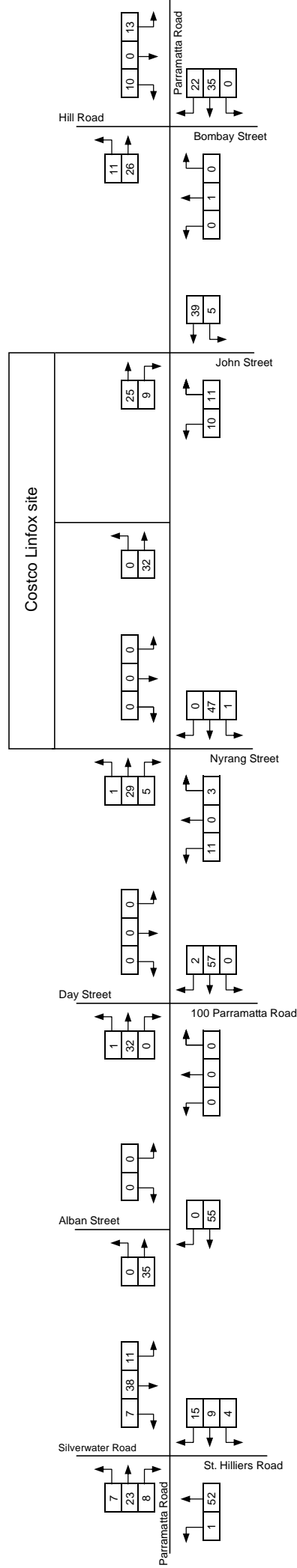


Figure: 4 Title: Existing Morning Traffic Flows, Thursday 8:00 - 9:00 AM

Furthermore, these additional 539 trips would be split as follows:

- 406 arrival trips; and
- 133 departure trips.

4.2 *Trip Distribution and Future Traffic Flows*

The latest peak hour traffic surveys (as shown on Figure 4) provide the direction of approach/departure for the above 539 trips (i.e. to/from the west, east and south) at the point of access.

However, the distribution on the wider road network could not be determined from the surveys. Therefore, trip distribution assumptions from the Part 3A traffic study have been used to assign these trips to the wider study road network. **Figure 5** presents the assumed assignment of these 539 trips on the study road network.

Finally, by combining the surveyed traffic flows in Figure 4 with the additional traffic generation in Figure 5, future network traffic flows have been calculated; these are presented on **Figure 6**.

4.3 *Study Network Performance*

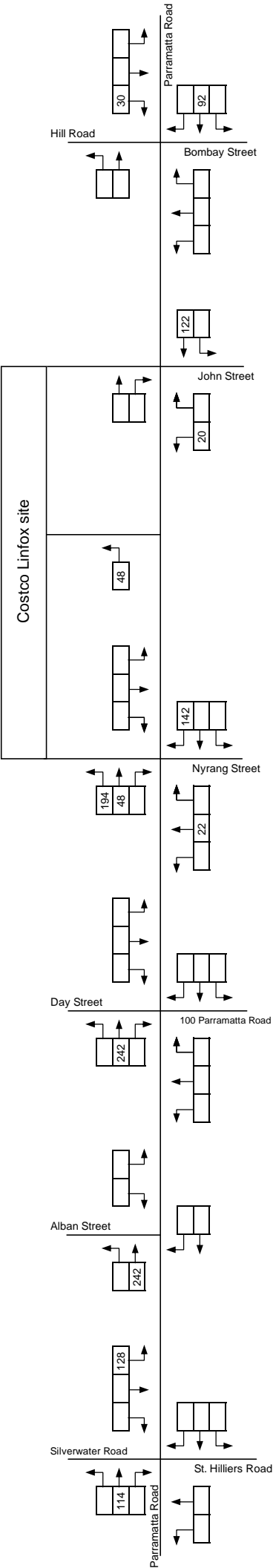
4.3.1 *General Analysis – Full Study Network*

Table 4.1 presents the SIDRA results for the existing surveyed traffic flows and future traffic flows, post amendment of the opening time to 8.00am.

Table 4.1 – Existing and Future SIDRA Results, Morning Peak Hour

Parramatta Road Intersection with:	Control	EXISTING		FUTURE	
		Ave. Delay (sec/veh)	Level of Service (LoS)	Ave. Delay (sec/veh)	Level of Service (LoS)
Silverwater Rd-St Hilliers Rd	Signalised	39	C	47	D
Alban Street	Signalised	3	A	3	A
Day Street	Signalised	4	A	4	A
Costco Access (w Nyrang St)	Signalised	12	A	15	B
John Street	Signalised	29	C	31	C
Hill Road-Bombay Street	Signalised	48	D	47	D

Total Vehicles - Arrival Trips



Total Vehicles - Departure Trips

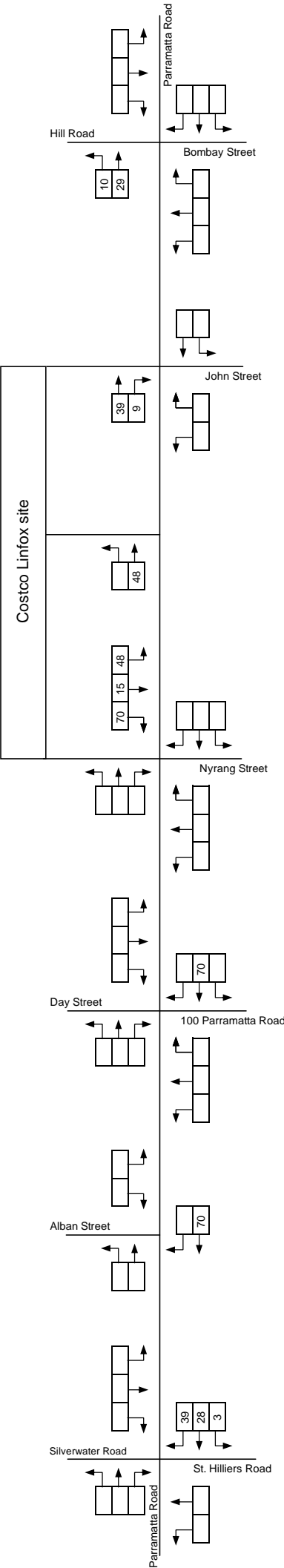
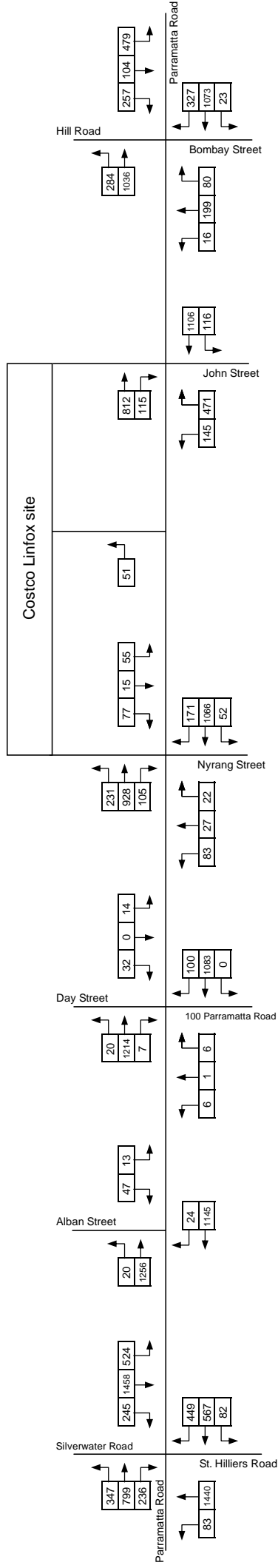


Figure: 5 Title: Costco Future Morning Peak Hour Traffic Flow 8:00 - 9:00 AM



Total Vehicles



HGVs

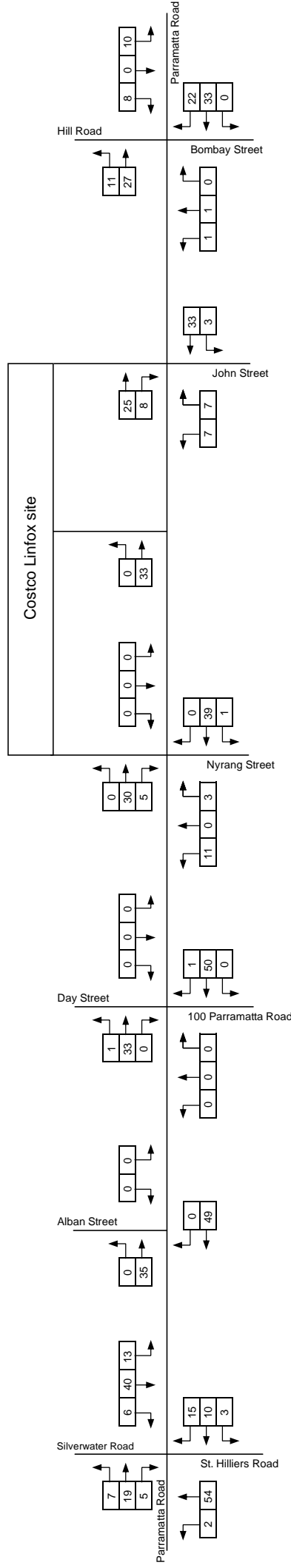


Figure: 6 Title: Future Network Traffic Flows, 8:00 - 9:00 AM



The results above show that proposed amendment to opening hours would result in marginal increases in average delays and (in some cases) corresponding levels of service.

Average delays increase most noticeably at the Silverwater Road intersection. However, it should be noted that the future year modelling maintains the phase times from the IDM data; therefore, future optimisation at this intersection could improve its performance. Nevertheless, the SIDRA analysis indicates that all intersections within the study road network would continue to work satisfactorily with Levels of Service of D or better.

Finally, it should be noted that the IDM data indicates that the Costco Access intersection currently runs a standard diamond phase for Parramatta Road, without (on average) an extension for either approach. However, the increase in traffic entering the store from the right-turn bay on the east approach would warrant an extension of this movement and a corresponding early start for westbound through and left-turn movements.

Accordingly, this phase-option has been included in the future year modelling. Cycle time has been maintained at 130 seconds; however, SIDRA was allowed to optimise the phase splits. Accordingly, the results show that the Costco Access intersection would only experience a minor increase in average delay from 12 to 15 seconds per vehicle.

4.3.2 *Detailed Analysis – Costco Access intersections*

As a result of the extensive negotiations with the RMS (formerly RTA) during the Part 3A application process, a significantly more detailed assessment of the main Costco access intersection was undertaken. In addition, the SIDRA results were also reported in greater detail.

Table 4.2 presents the detailed SIDRA Intersection results for the Costco access intersection following the amended opening time. In addition to Level of Service performance measures, the RMS was particularly interested in the predicted 95th percentile queues and their relationship with available queuing space. Therefore, the following table includes this information.

Table 4.2 – Costco Access Intersection SIDRA Results, Morning Peak Hour

Approach	Mvt	LoS	95% Queue (m)	Available Distance (m)
Nyranng St - South	L	E	34	90
	T	F	24	-
	R	F	24	-
Parramatta Rd - East	L	A	24	206
	T	A	24	206
	R	F	71	110
Costco Access - North	L	A	3	44
	T	E	7	70
	R	F	17	-
Parramatta Rd - West	L	A	60	196
	T	A	64	196
	R	F	47	90
All Vehicles		B	-	-

The results presented in Table 4.2 above show that:

- All forecasted 95th percentile queue lengths would be accommodated within the available queuing space. Of particular note are;
- The 95th percentile queue length on the Parramatta Road west approach at the Costco site access intersection is 47-64m, compared with the available queuing distance between the Costco Access intersection and the Day Street intersection of approximately 196m; and
- The 95th percentile queue length for the right-turn movement on Parramatta Road east to the Costco store is 71m versus a bay length of 110m.

The detailed SIDRA results indicate that the Costco access intersection would operate satisfactorily in terms of queues and delays following the amendment to the opening time.

4.4 *Opening Period Traffic & Parking Management Plan*

Halcrow has reviewed the Opening Period Traffic & Parking Management Plan (OPTPMP Report) as requested by DP&I. Issue III of the report was issued to RMS on 30/06/2011.

In accordance with the requirements of RMS, the OPTPMP Report provided traffic management plans for the following four periods:

1. One week prior to the VIP Party (13th to 19th July, 2011);
2. Day of the VIP Party (20th July, 2011);
3. Opening Month (month following the Opening Day of 21st July, 2011); and
4. Future Busy Periods (such as Mother's Day, Easter, Christmas, etc).

Of these periods, the first three have passed, and only 'Future Busy Periods' covers ongoing periods of high activity.

We have reviewed Section 4 of the OPTPMP Report that covers future busy periods and we confirm that the traffic management measures recommended within the report, which are satisfactory for busy evening and weekend peak periods, would also be satisfactory for future busy morning peak periods following implementation of the extended trading hours proposed by the current modification proposal.

5 Conclusion

The following are the key findings of the assessment:

- The proposal would generate an additional 539 trips during the 8-9am morning peak hour, taking the site's total traffic generation to 630 trips during this period;
- SIDRA analysis of the surrounding road network indicates that all intersections within the study network would continue to operate satisfactorily with Levels of Service of D or better;
- The detailed SIDRA results for the Costco Access intersection indicate that all forecasted 95th percentile queues would be accommodated within the available existing queuing space; and
- The traffic management measures detailed within the OPTPMP Report would remain appropriate for the Costco Auburn site following implementation of the extended trading hours.

Overall, it is concluded that traffic aspects of the proposed modifications would be satisfactory.