HENROTH GROUP

TRAFFIC STUDY FOR PLANNING PROPOSAL FOR CHULLORA MARKETPLACE DEVELOPMENT, CHULLORA

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COLSTON BUDD ROGERS & KAFES PTY LTD
ACN 002 334 296
Level 18 Tower A
Zenith Centre
821 Pacific Highway
CHATSWOOD NSW 2067

Telephone: (02) 9411 2411
Facsimile: (02) 9411 2422
Email: cbrk@cbrk.com.au

REF: 10868/2

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1. INTRODUCTION

1.1 Colston Budd Rogers and Kafes Pty Ltd has been commissioned by Henroth Group to prepare a report examining the traffic implications of the planning proposal for the Chullora Marketplace site. The shopping centre is at 355-357 Waterloo Road at Greenacre, as shown in Figure 1.

1.2 The shopping centre provides some 24,600m^2 GFA with access from Waterloo Road. The planning proposal would provide for some 290 residential apartments in addition to the existing shopping centre. Vehicular access would be provided from Waterloo Road.

1.3 We previously prepared a report[1] in relation to the planning proposal. In association with the Gateway process, council has requested that the following matters be addressed:

Revised Traffic Study for the purposes of consultation with the Roads and Maritime Services

1. *Undertake traffic counts:*
   - *To establish the vehicle movements that the existing development on the site currently generates.*
   - *To establish the current performance of the surrounding road network and intersections.*

2. *Identify the existing and proposed number of parking spaces and delivery spaces on the site.*

[1] Transport Review of Planning Proposal for Proposed Mixed Use Development, Chullora Marketplace, Greenacre, April 2018.

3. *Identify the existing and proposed pedestrian / cycle network to and within the site.*

4. *Undertake SIDRA modelling to assess the impact of the proposal on the surrounding road network and intersections.*

5. *Based on the above tasks, recommend the improvement works required to the pedestrian, cycle and road networks to accommodate the proposal.*

1.4 The traffic aspects of the planning proposal, including the above maters raised by council, are assessed in the following chapter.

2. TRAFFIC IMPLICATIONS OF PLANNING PROPOSAL

2.1 The traffic implications of the planning proposal are set down through the following sections:

- site location and road network;
- potential scale of development;
- pedestrians and cyclists;
- parking provision;
- traffic generation and effects;
- matters raised by council; and
- summary.

Site Location and Road Network

2.2 Chullora Marketplace is at 355-357 Waterloo Road. The shopping centre provides some 24,600m^2 GFA including Woolworths and Aldi supermarkets, Big W and specialty shops. Access is from Waterloo Road in two locations: a priority controlled access at the northern end of the site and the main access at a roundabout at Como Road. On-site parking for some 870 cars is provided in at-grade and basement car parks.

2.3 The site includes the property at 353 Waterloo Road, which is occupied by a single dwelling, with access via a driveway from Waterloo Road.

2.4 There are schools north and south of the site and open space to the east and west. Other surrounding properties provide low density residential development.

2.5 The road network in the vicinity of the site includes Hume Highway, Waterloo Road, Como Road and Norfolk Road. Hume Highway is north and west of the site. It provides a major road link within the Sydney road network, connecting Parramatta Road at Ashfield in the east with the M5 Motorway at Prestons in the west. Through Chullora it provides a dual carriageway with three traffic lanes in each direction and additional lanes at major intersections.

2.6 Waterloo Road runs south from Hume Highway at a signalised intersection. It generally provides one traffic lane and one parking lane in each direction clear of intersections. There are bus stops on both sides of the road, adjacent to the site.

2.7 Como Road connects Waterloo Road with Hume Highway. It provides one traffic lane and one parking lane in each direction. The intersection of Como Road and Hume Highway is a priority controlled t-intersection with the right turn from Como Road prohibited. There is a roundabout at the intersection of Waterloo Road with Commo Road. The eastern leg of the roundabout provides access to the site.

2.8 Norfolk Road is south of the site and connects Waterloo Road with Roberts Road to the east. It provides one traffic lane and one parking lane in each direction. The intersection of Norfolk Road with Waterloo Road is controlled by traffic signals.

Potential Scale of Development

2.9 The planning proposal would provide for some 290 residential apartments in addition to the existing shopping centre. Vehicular access would be provided from Waterloo Road.

Pedestrians and Cyclists

2.10 Footpaths are provided on both sides of Waterloo Road, adjacent to the site. There are pedestrian crossings at the signalized intersections of Waterloo Road with Hume Highway and Norfolk Road, north and south of the site respectively. The roundabout at Waterloo Road/Como Road includes pedestrian refuges to cross both roads, as well as the access to the centre.

2.11 The planning proposal provides for new civic space at the front of the centre, opposite Como Road. This will include active frontages and improvements to facilitate pedestrian movement in this area.

2.12 The design principles also include a new pedestrian connection though Norfolk Reserve and the shopping centre.

2.13 The residential development will include appropriate bicycle parking, in accordance with the requirements in Bankstown Development Control Plan 2015.

Parking Provision

2.14 As previously noted, existing parking at the centre comprises a mix of at-grade and basement parking. There are some 870 spaces provided on the site, including some 720 at-grade spaces and 150 basement spaces. With minor change in the existing retail space, the existing some 860 parking spaces will be retained.

2.15 The existing shopping centre provides loading docks at the north-eastern corner of the building, the western side of the building and the south-eastern and south-western corners of the building. These docks will continue to cater for the scale of retail activities on the site which will stay similar to today.

2.16 Bankstown DCP 2015 includes the following parking requirements for residential development in B2 zones:

- one space per one bedroom apartment;
- 1.2 spaces per two bedroom apartment;
- 1.5 spaces per three or more bedroom apartment; and
- one space per five dwellings for visitors.

2.17 By comparison, RMS guidelines suggest the following parking requirements for high density residential in metropolitan sub-regional centres:

- 0.6 spaces per one bedroom apartment;
- 0.9 spaces per two bedroom apartment;
- 1.4 spaces per three bedroom apartment; and
- one space per five apartments for visitors.

2.18 Table 2.1 sets out the additional residential parking requirements based on DCP and RMS parking rates.

Table 2.1: Parking requirements

Component	Number of apartments	Rate		Required parking	
		DCP	RMS	DCP	RMS
Residential					
one bed	42	1	0.6	42	25
two bed	101	1.2	0.9	121	91
three bed	144	1.5	1.4	216	202
	visitor	1/5	1/5	57	57
Total				**436**	**375**

2.19 Based on the above, the provision of 375 parking spaces (RMS rates) and 435 parking spaces (council rates) would be appropriate, with the potential to share residential visitor and retail parking. The final residential parking provision will be determined at the development application stage, based on the above rates.

2.20 The development will have some overlapping parking demands. For example, retail parking spaces will be busier during the day and residential visitor parking demands will be higher at night. There is therefore the opportunity to share parking.

2.21 The residential buildings will include facilities for service vehicles, including garbage collection and deliveries.

Traffic Generation and Effects

2.22 Traffic generated by the proposed residential development envisaged in the planning proposal will have its greatest effects during weekday morning and afternoon peak periods when it combines with other traffic on the surrounding road network.

2.23 In order to gauge traffic conditions, counts were undertaken at these times at the following intersections:

- Hume Highway/Waterloo Road;
- Waterloo Road/shopping centre northern access;
- Waterloo Road/Como Road/shopping centre access; and
- Waterloo Road/Norfolk Road.

2.24 The results of the surveys are shown in Figures 2 and 3, and summarised in Table 2.2.

Table 2.2: Existing two-way (sum of both directions) peak hour traffic flows

Road	Location	Weekday AM	Weekday PM
Hume Highway	East of Waterloo Road	4,245	4,510
	West of Waterloo Road	4,160	4,270
Waterloo Road	South of Hume Highway	605	690
	South of northern centre access	985	640
	South of Como Road	1,365	1,150
	South of Norfolk Road	1,250	1,065
Northern centre access	East of Waterloo Road	340	335
Southern centre access	East of Waterloo Road	705	790
Norfolk Road	East of Waterloo Road	560	465

2.25 Table 2.2 shows that Hume Highway carried traffic flows of some 4,160 to 4,510 vehicles per hour two-way during the surveyed peak hours. Waterloo Road carried lower flows of some 605 to 1,365 vehicles per hour two-way and Norfolk Road carried some 465 to 560 vehicles per hour two-way.

2.26 The site access points on Waterloo Road carried some 335 to 340 vehicles (northern access) and some 705 to 790 vehicles (southern access) per hour two-way during the surveyed peak hours.

2.27 The capacity of the road network is largely determined by the capacity of its intersections to cater for peak period traffic flows. The surveyed intersections have been analysed using the SIDRA program for the traffic flows shown in Figures 2 and 3.

2.28 SIDRA simulates the operations of intersections to provide a number of performance measures. The most useful measure provided is average delay per vehicle expressed in seconds per vehicle. Based on average delay per vehicle, SIDRA estimates the following levels of service (LOS):

- For traffic signals, the average delay per vehicle in seconds is calculated as delay/(all vehicles), for roundabouts the average delay per vehicle in seconds is selected for the movement with the highest average delay per vehicle, equivalent to the following LOS:

0 to 14	=	“A”	Good
15 to 28	=	“B”	Good with minimal delays and spare capacity
29 to 42	=	“C”	Satisfactory with spare capacity
43 to 56	=	“D”	Satisfactory but operating near capacity
57 to 70	=	“E”	At capacity and incidents will cause excessive delays. Roundabouts require other control mode.
>70	=	"F"	Unsatisfactory and requires additional capacity

- For give way and stop signs, the average delay per vehicle in seconds is selected from the movement with the highest average delay per vehicle, equivalent to following LOS:

0 to 14	=	“A”	Good
15 to 28	=	“B”	Acceptable delays and spare capacity
29 to 42	=	“C”	Satisfactory but accident study required
43 to 56	=	“D”	Near capacity and accident study required
57 to 70	=	“E”	At capacity and requires other control mode
>70	=	"F"	Unsatisfactory and requires other control mode

2.29 It should be noted that for roundabouts, give way and stop signs, in some circumstances, simply examining the highest individual average delay can be misleading. The size of the movement with the highest average delay per vehicle should also be taken into account. Thus, for example, an intersection where all movements are operating at a level of service A, except one which is at level of service E, may not necessarily define the intersection level of service as E if that movement is very small. That is, longer delays to a small number of vehicles may not justify upgrading an intersection unless a safety issue was also involved.

2.30 The analysis found that the signalised intersection of Hume Highway with Waterloo Road operates with average delays of less than 25 seconds per vehicle during peak periods. This represents level of service B, a good level of service.

2.31 The signalized intersection of Waterloo Road with Norfolk Road is operating with average delays of less than 15 seconds per vehicle during peak periods. This represents level of service A/B, a good level of service.

2.32 The northern centre access point on Waterloo Road, and the roundabout on Waterloo Road at Como Road/shopping centre access, are operating with average delays for all movements of less than 15 seconds per vehicle. This represents level of service A/B, a good level of service.

2.33 RMS surveys of high density residential development with good access to public transport, services and facilities have found traffic generations of 0.19 and 0.15 vehicles per hour per dwelling during weekday morning and afternoon peak hours respectively. On this basis, the residential development envisaged in the planning proposal would generate some 45 to 55 vehicles per hour two-way. This is a modest generation, equivalent to less than one vehicle per minute at peak times.

2.34 The additional traffic has been assigned to the road network. Existing traffic flows plus the additional traffic from the proposed development are shown in Figures 2 and 3, and summarised in Table 2.3.

Table 2.3: Existing two-way peak hour traffic flows plus development traffic

Road	Location	Weekday AM		Weekday PM	
		Existing	Plus development	Existing	Plus development
Hume Highway	East of Waterloo Road	4,245	+25	4,510	+15
	West of Waterloo Road	4,160	+5	4,270	+10
Waterloo Road	South of Hume Highway	605	+30	690	+25
	South of northern centre access	985	-	640	-
	South of Como Road	1,365	+15	1,150	+10
	South of Norfolk Road	1,250	+15	1,065	+10
Northern centre access	East of Waterloo Road	340	+30	335	+25
Southern centre access	East of Waterloo Road	705	+25	790	+20
Norfolk Road	East of Waterloo Road	560	-	465	-

2.35 Table 2.3 shows that traffic increases on Hume Highway and Waterloo Road would be up to 30 vehicles per hour two-way at peak times.

2.36 The Waterloo Road intersections have been analysed with SIDRA for the additional development traffic flows shown in Figures 2 and 3. The analysis found that the signalized intersections at Hume Highway and Norfolk Road, and the site access points would continue to operate at their existing good levels of service B or better, with similar average delays per vehicle.

2.37 Therefore, the surrounding road network will be able to cater for the additional traffic from the development envisaged in the planning proposal.

Matters Raised by Council

2.38 The matters raised by council in the study brief are addressed below.

1. Undertake traffic counts:

- *To establish the vehicle movements that the existing development on the site currently generates.*
- *To establish the current performance of the surrounding road network and intersections.*

2.39 These matters are discussed in paragraphs 2.22 to 2.32.

2. Identify the existing and proposed number of parking spaces and delivery spaces on the site.

2.40 These matters are discussed in paragraphs 2.2 and 2.14 to 2.21.

3. Identify the existing and proposed pedestrian / cycle network to and within the site.

2.41 These matters are discussed in paragraphs 2.10 to 2.13.

4. Undertake SIDRA modelling to assess the impact of the proposal on the surrounding road network and intersections.

2.42 The results of the SIDRA analysis are discussed in paragraphs 2.27 to 2.32 and 2.36.

5. Based on the above tasks, recommend the improvement works required to the pedestrian, cycle and road networks to accommodate the proposal.

2.43 This matter is discussed in paragraph 2.37. No external works are required to accommodate the relatively small traffic generation of the proposed development.

Summary

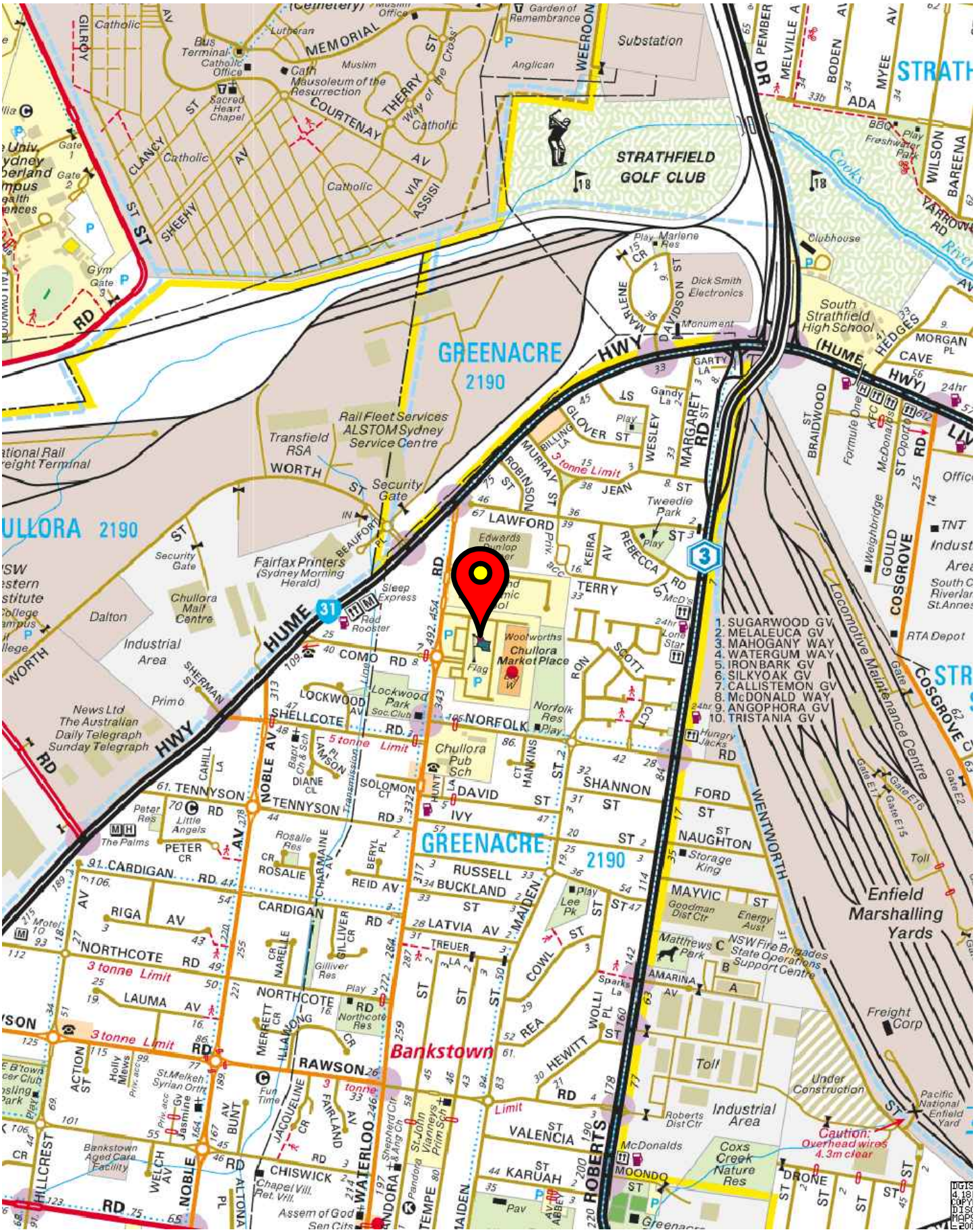
2.44 In summary, the main points relating to the traffic implications of the planning proposal are as follows:

i) the planning proposal would provide for some 290 residential apartments;

ii) appropriate on-site parking and servicing facilities will be provided;

iii) the road network will be able to cater for the additional traffic from development envisaged in the planning proposal; and

iv) matters raised by council in the study brief are addressed in paragraphs 2.38 to 2.43.



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Location Plan

Colston Budd Rogers & Kafes Pty Ltd

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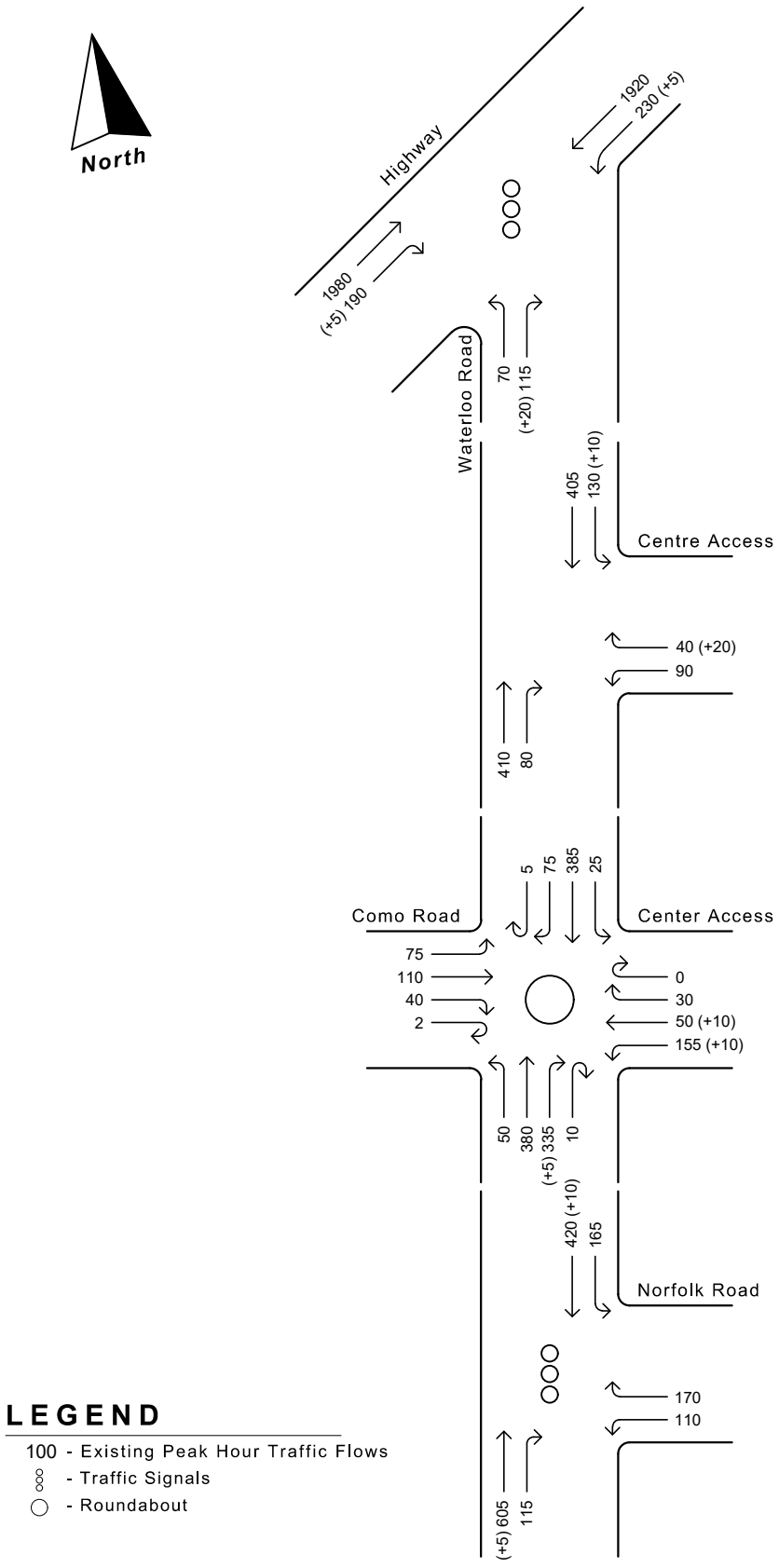
Figure 1



Existing weekday morning peak hour traffic flows plus development traffic

Figure 2

Colston Budd Rogers & Kafes Pty Ltd

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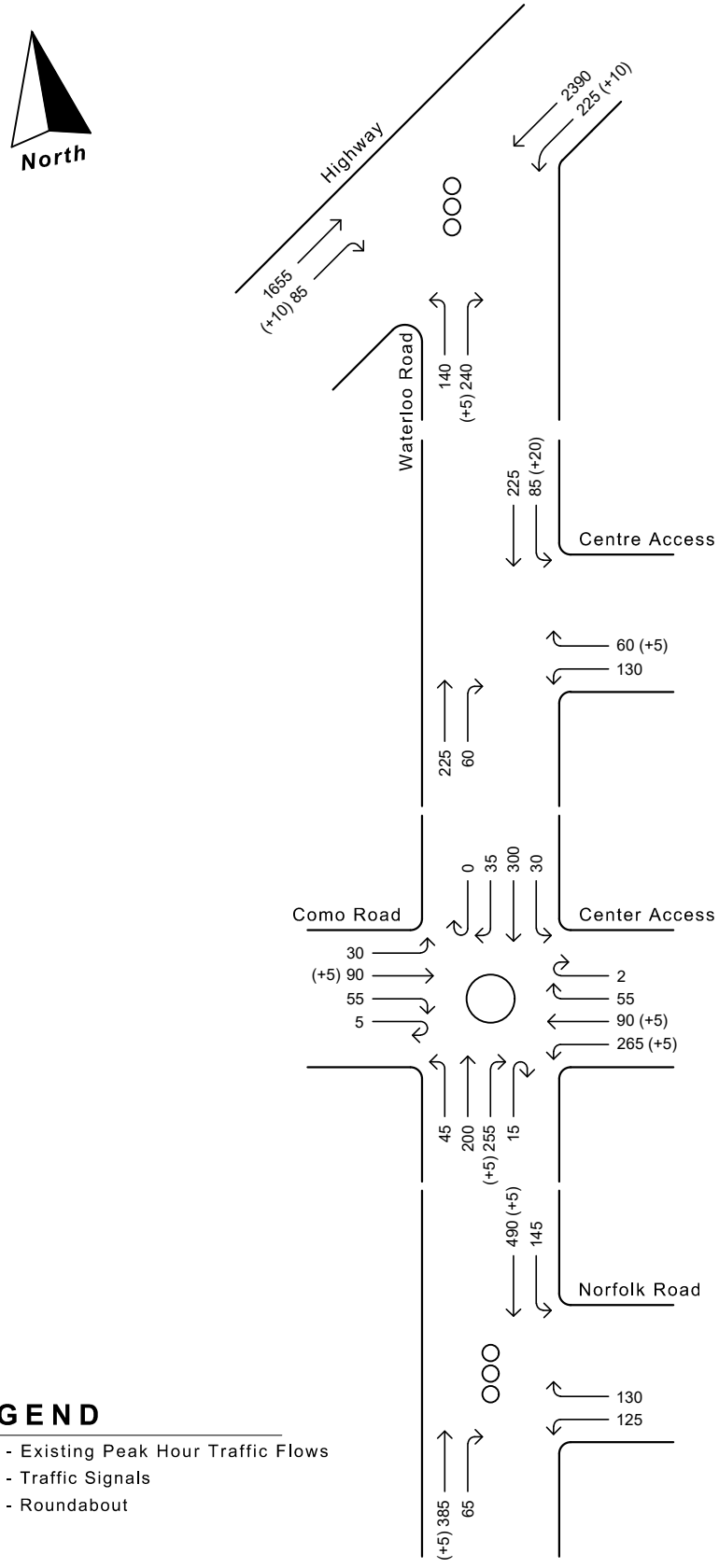

LEGEND

100 - Existing Peak Hour Traffic Flows

- Traffic Signals

◯ - Roundabout

Existing weekday afternoon peak hour traffic flows plus development traffic

Figure 3

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