PORT STEPHENS COUNCIL

TRAFFIC REPORT FOR PROPOSED RETAIL SUBDIVISION, SALAMANDER BAY

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1. INTRODUCTION

1.1. Colston Budd Hunt & Kafes Pty Ltd has been commissioned by Port Stephens Council to prepare a report examining the traffic implications of a proposed retail subdivision at Salamander Bay. The site location is shown in Figure 1.

1.2. The site is some 11 hectares in size and is zoned for retail and commercial use. Part of the site is occupied by a library, community centre and child care centre, with the remainder of the site undeveloped. The proposed development is for a seven lot subdivision, plus new roads connecting to Salamander Way and Town Centre Circuit.

1.3. This report assesses the traffic implications of the proposed development through the following chapters:

- Chapter 2 - describing the existing conditions; and
- Chapter 3 - assessing the traffic implications of the proposed subdivision.

2. EXISTING CONDITIONS

Site Location and Road Network

2.1 The site is north of Salamander Way and west of Bagnall Beach Road in Salamander Bay, as shown in Figure 1. Parts of the site have frontage to Town Centre Circuit. It is some 11 hectares in size and is zoned for retail and commercial use. Part of the site is occupied by a library, community centre and child care centre. These uses have access from Town Centre Circuit. The remainder of the site is undeveloped.

2.2 The site basically wraps around the northern, eastern and western sides of the existing Salamander Bay shopping centre. This centre provides some 22,300m^2 retail plus some 1,100 parking spaces. Vehicular access to the centre is provided in a number of locations from Town Centre Circuit.

2.3 There is other retail and commercial use between the shopping centre and Salamander Way and Bagnall Beach Road of about 5,000m^2. North of the site, with frontage to Bagnall Beach Road and Sandy Point Road, there are bulky goods uses. Further north there is residential development and tourist accommodation. There are schools to the east and south, and wetlands reserve to the west.

2.4 The road network in the vicinity of the site includes Salamander Way, Bagnall Beach Road, Nelson Bay Road, Sandy Point Road, Keel Street and Town Centre Circuit. Salamander Way forms part of a route connecting Nelson Bay Road in the east with Salamander Bay and Soldiers Point. In the vicinity of the site it provides for one traffic lane and one parking lane in each direction, clear of intersections, with a central median along part of the site frontage. There are bus stops on both sides of the road close to the site.

2.5 Bagnall Beach Road connects Salamander Way in the south with Government Road in the north. It provides two traffic lanes and one parking lane in each direction in the vicinity of the site. North of the site it provides access to residential areas in Corlette. The intersection of Bagnall Beach Road with Salamander Way is controlled by a two lane roundabout, although there is only one circulating lane for eastbound vehicles. The fourth (southern) approach to the intersection provides access to a school and church.

2.6 Nelson Bay Road is south and east of the site and forms part of the main east-west connection between Raymond Terrace and Port Stephens. The intersection of Nelson Bay Road with Salamander Way is controlled by a two lane roundabout.

2.7 Sandy Point Road is north of the site. It connects to Bagnall Beach Road at a two lane roundabout. Keel Street forms a fourth (eastern) approach to the roundabout and provides access to residential properties. Sandy Point Road provides one traffic lane and one parking lane in each direction, clear of intersections. It provides access to commercial and residential development.

2.8 Town Centre Circuit connects to Salamander Way and Bagnall Beach Road at unsignalised t-intersections. There are left and right turn bays on Salamander Way and Bagnall Beach Road for turns into Town Centre Circuit, as well as protected areas for right turns from Town Centre Circuit onto these roads. At its intersection with Salamander Way, Town Centre Circuit provides two approach lanes. Town Centre Circuit basically provides access to the shopping centre, as well as other commercial and retail development fronting Salamander Way and Bagnall Beach Road. It provides for one traffic lane in each direction. There are roundabouts on Town Centre Circuit which facilitate access to the shopping centre and other uses.

Traffic Flows

2.9 Traffic generated by the proposed subdivision will have its greatest effects during weekday afternoon and Saturday lunchtime peak periods when it combines with other retail and commuter traffic. In order to gauge traffic conditions, counts were undertaken during Friday afternoon and Saturday lunchtime peak periods at the following intersections:

- Salamander Way/Nelson Bay Road;
- Salamander Way/Bagnall Beach Road;
- Salamander Way/Town Centre Circuit;
- Bagnall Beach Road/Sandy Point Road/Keel Street; and
- Bagnall Beach Road/Town Centre Circuit.

2.10 The results of the surveys are shown in Figures 2 and 3, and summarised in Table 2.1. Traffic flows on Bagnall Beach Road were some 800 to 1,450 vehicles per hour two-way during the weekday afternoon and Saturday lunchtime peak hours. Nelson Bay Road, Salamander Way and Town Centre Circuit carried lower flows of some 800 to 1,100 vehicles per hour two-way.

2.11 Sandy Point Road carried some 600 to 800 vehicles per hour two-way. Keel Street carried low flows of less than 100 vehicles per hour two-way.

2.12 The traffic generation of the existing shopping centre and other retail/commercial uses in the precinct was some 1,735 and 2,135 vehicles per hour two-way during the Friday afternoon and Saturday peak periods respectively. Based on some 27,300m^2 development, this represents a rate of some 6.4 and 7.8 vehicles per hour per 100m^2 during the Friday and Saturday peak hours respectively.

Table 2.1: Existing two-way (sum of both directions) peak hour traffic flows			
Road	**Location**	**Friday afternoon peak hour**	**Saturday midday peak hour**
Nelson Bay Road	East of Salamander Way	895	915
	West of Salamander Way	895	890
Salamander Way	West of Nelson Bay Road	900	955
	East of Bagnall Beach Road	935	1,050
	West of Bagnall Beach Road	845	1,010
	West of Town Centre Circuit	950	1,010
Bagnall Beach Road	North of Salamander Way	815	905
	North of Town Centre Circuit	1,215	1,430
	North of Sandy Point Road	800	870
Town Centre Circuit	North of Salamander Way	825	1,040
	West of Bagnall Beach Road	910	1,095
Sandy Point Road	West of Bagnall Beach Road	595	805
Keel Street	East of Bagnall Beach Road	90	85

Intersections Operations

2.13 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 shown in Figures 2 and 3 have been analysed using the SIDRA program.

2.14 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.

2.15 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"	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

2.16 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.

2.17 The SIDRA analysis found that the roundabout controlled intersections of Salamander Way with Nelson Bay Road and Bagnall Beach Road, and of Bagnall Beach Road with Sandy Point Road/Keel Street, are operating with average delays for all movements of less than 15 seconds per vehicle during the weekday afternoon and Saturday peak periods. This represents level of service A/B, a good level of service.

2.18 The unsignalised intersection of Salamander Way with Town Centre Circuit is operating with average delays for the highest delayed movement of less than 25 seconds per vehicle during peak periods. This represents level of service B, a reasonable level of service.

2.19 The unsignalised intersection of Bagnall Beach Road with Town Centre Circuit is operating with average delays for the highest delayed movement of less than 35 seconds per vehicle during peak periods. This represents level of service C, a satisfactory level of service.

Public Transport

2.20 Local bus services are provided by Port Stephens Coaches. As previously discussed, there are bus stops on both sides of Salamander Way in the vicinity of the site. Buses also use Town Centre Circuit to set down and pick up passengers adjacent to the shopping centre.

2.21 Routes 30/31 connect Newcastle with Soldiers Point via Salamander Bay. A number of services operate in each direction.

2.22 Route 130 connects Newcastle with Newcastle Airport, Anna Bay, Salamander Centre, Nelson Bay, Shoal Bay and Fingal Bay. It operates on approximately a 60 minute headway on weekdays, with a limited weekend service.

2.23 The site is therefore accessible by bus services.

3. IMPLICATIONS OF PROPOSED DEVELOPMENT

3.1 The proposed development is for a seven lot subdivision, plus new roads connecting to Salamander Way and Town Centre Circuit. A layout of the proposed subdivision is shown in Figure 4.

3.2 At this stage it is envisaged that the lots would be developed for an Aldi store of some 1,500m^2 (lot 1), medical centre of some 3,100m^2 (lot 4) and Big W of some 8,000m^2 (lot 6). End users for lots 2, 3, 5 and 7 are not known at this stage. However, they could include retail and commercial uses, consistent with the zoning. It is anticipated that the existing uses on lot 3 (community centre, child care centre and library) would remain on this lot.

3.3 Parking will be provided in accordance with appropriate requirements at the time of applications for individual developments. This chapter examines the implications of the proposed subdivision through the following sections:

- public transport;
- access and internal layout;
- traffic generation and effects; and
- summary.

<u>Public Transport</u>

3.4 As previously discussed in Chapter 2, buses currently use Salamander Way and Town Centre Circuit to service the shopping centre.

3.5 The proposed subdivision, which provides for an increase in retail and commercial densities, will strengthen demand for public transport services.

3.6 Consideration should be given to providing shelters at the existing bus stops on Salamander Way close to the site.

3.7 Provision will be included in the new north-south road reserve from Salamander Way for a pedestrian and cycle link to connect to the existing link for the adjacent residential subdivision to the north.

Access and Internal Layout

3.8 Vehicular access to the subdivision is proposed to be provided from new roads connecting to Salamander Way and Town Centre Circuit. The main connection to Salamander Way, at the western end of the site, will provide a 20 metre road reserve. This will provide an appropriate carriageway width and verges on both sides, including the pedestrian and cycle link discussed above.

3.9 In additional to the main new access road, new internal roads will be provided as follows:

- for access to lots 1, 2 and 3 via the existing roundabout at the child care centre access on the western part of Town Centre Circuit. This road will effectively be an extension to the existing Town Centre Circuit and will therefore provide a 12 metre reserve width, the same as the existing road. The reserve will include a 1.2 metre wide footpath and drainage. No services will be required in this road;

- for access to lots 3 and 4 via a connection between the main access road and Town Centre Circuit, to connect with the western part of Town Centre Circuit in the location of the existing access to the shopping centre car park. This road will also have a 15.5 metre reserve, including footpath and drainage, with no other services required; and

- for access to lots 6 and 7 via an extension of the eastern part of Town Centre Circuit to the north. This connection will continue around the rear of lot 6 to connect with the main access road. This road is also effectively an extension of Town Centre Circuit and will therefore provide a 13 metre reserve width, the same as the existing road. The road will include benching and a retaining wall on the northern side. Street lighting and drainage will be included but no other services will be required in this road. The existing footpath and cycleway immediately north of this road will connect to the proposed new footpath and cycleway on the main western access road.

3.10 The provision of a link road on the northern boundary of the site, around lot six, will provide customers with the ability to reach all lots from either the Salamander Way or Bagnall Beach Road access points.

3.11 To cater for traffic generated by the proposed development, the intersection of Salamander Way with the main access road is proposed to be controlled by a roundabout. Where the western part of Town Centre Circuit meets the new road between lots 3 and 4 at the existing shopping centre access, a small roundabout or sign controlled intersection could be provided.

3.12 Subject to access requirements by users of lots 4 and 5, rights of way could be provided by effectively extending the western part of Town Centre Circuit north of its existing terminating point at the shopping centre entrance.

Traffic Generation and Effects

3.13 Traffic generated by the proposed development will have its greatest effects during weekday afternoon and Saturday periods when it combines with other retail and commuter traffic.

3.14 As the lots in the proposed subdivision are developed, the additional development will effectively operate with the existing development as one larger centre. The RTA's "Guide to Traffic Generating Developments" indicates that as retail centres become larger, their unit traffic generation rate reduces. For example, the Friday afternoon and Saturday peak hour generation rates recommended by the RTA fall from 12.5 and 16.3 vehicles per hour per 100m^2 for centres of less than 10,000m^2 to 3.7 and 6.1 vehicles per hour per 100m^2 for centres larger than 30,000m^2.

3.15 The RTA guidelines indicate that discount department stores generate some 2.3 and 1.3 vehicles per hour per 100m^2 on Fridays and Saturday peak hours respectively. We have adopted these generation rates for the Big W store.

3.16 Surveys of other similar sized Aldi stores have found peak hour generations of some 160 and 240 vehicles per hour two-way during weekday afternoon and Saturday peak periods respectively. We have adopted these generations for assessment.

3.17 Surveys of large medical centres have found a peak period traffic generation of one vehicle per 25m^2 GFA. We have adopted this rate for assessment.

3.18 As previously discussed, users for lots 2, 3, 5 and 7 are not known at this stage. However, they could include retail and commercial uses, consistent with the zoning.

3.19 We have assessed the potential traffic generation of lots 2, 3, 5 and 7 based on their use for retail purposes, which has a higher traffic generation than commercial uses. Our assessment is therefore conservative.

3.20 Based on retail floor space of some one third of the remaining site areas (similar to the anticipated uses on lots 1, 4 and 6), and some 7,000m^2 remaining developable area on lot 3, the potential retail floor space of these sites would be some 16,000m^2.

3.21 For these uses, we have adopted rates of 3.7 and 6.1 vehicles per hour per 100m^2 for the Friday afternoon and Saturday peak hours respectively, from the RTA guidelines. These rates, as previously discussed, are recommended by the RTA for centres greater than 30,000m^2. The additional development would effectively combine with the existing development as one larger retail centre.

3.22 Based on the above, potential future development in the subdivision would generate some 1,100 and 1,450 vehicles per hour two-way during the weekday afternoon and Saturday peak hours respectively.

3.23 The additional traffic has been assigned to the existing road network. Existing traffic flows plus the additional traffic from the proposed development are shown in Figures 2 and 3, and summarised in Table 3.1.

3.24 Table 3.1 shows that traffic increases on Town Centre Circuit (west of Bagnall Beach Road), Bagnall Beach Road (between Town Centre Circuit and Sandy Point Road) and the new access road from Salamander Way would be some would be some 450 to 800 vehicles per hour two-way during peak hours.

3.25 Increases on Nelson Bay Road, Salamander Way, other parts of Bagnall Beach Road and Sandy Point Road would be lower at some 100 to 450 vehicles per hour two-way. Town Centre Circuit (north of Salamander Way) would carry increases of some 50 vehicles per hour two-way or less.

3.26 The intersections previously analysed in Chapter 2 have been reanalysed with SIDRA for the additional development traffic flows shown in Figures 2 and 3.

Table 3.1: Existing two-way peak hour traffic flows plus development traffic					
Road	**Location**	**Friday afternoon peak hour**		**Saturday midday peak hour**	
		Existing	Plus development	Existing	Plus development
Nelson Bay Road	East of Salamander Way	895	+160	915	+220
	West of Salamander Way	895	+170	890	+210
Salamander Way	West of Nelson Bay Road	900	+330	955	+430
	East of Bagnall Beach Road	935	+330	1,050	+430
	West of Bagnall Beach Road	845	+160	1,010	+210
	West of Town Centre Circuit	950	+20	1,010	+40
	West of new access road	950	+330	1,010	+440
Bagnall Beach Road	North of Salamander Way	815	+170	905	+220
	North of Town Centre Circuit	1,215	+440	1,430	+580
	North of Sandy Point Road	800	+330	870	+430
Town Centre Circuit	North of Salamander Way	825	+20	1,040	+50
	West of Bagnall Beach Road	910	+610	1,095	+800
Sandy Point Road	West of Bagnall Beach Road	595	+110	805	+150
Keel Street	East of Bagnall Beach Road	90	-	85	-
New access road	North of Salamander Way	-	+470	-	+600

3.27 The analysis found that the roundabout controlled intersections of Salamander Way with Nelson Bay Road, and of Bagnall Beach Road with Sandy Point Road/Keel Street, would operate with average delays for all movements of less than 20 seconds per vehicle during the weekday afternoon and Saturday peak periods. This represents level of service B, a good level of service.

3.28 The analysis found that the Salamander Way/Bagnall Beach Road roundabout would operate with average delays for all movements of less than 20 seconds per vehicle during peak periods. This represents level of service B, a good level of service.

3.29 The unsignalised intersection of Salamander Way with Town Centre Circuit would operate with average delays for the highest delayed movement of less than 28

seconds per vehicle during peak periods. This represents level of service B, a reasonable level of service. This intersection would benefit from a reduction in traffic flows due to the introduction of the major intersection for access to the precinct to the west on Salamander Way.

3.30 The existing intersection configuration at Bagnall Beach Road and Town Centre Circuit would cater for traffic flows from the Aldi, Big W and medical centre developments. With these developments the intersection would operate with average delays of less than 35 seconds per vehicle during peak periods. This represents level of service C, a satisfactory level of service.

3.31 To accommodate further development (beyond the Aldi, Big W and medical centre), the intersection of Bagnall Beach Road with Town Centre Circuit would require upgrading to traffic signals. Traffic signals would also better cater for pedestrians at this intersection.

3.32 With traffic signals (including marking two approach lanes on Town Centre Circuit between Bagnall Beach Road and the internal roundabout, and lengthening the right turn bay in Bagnall Beach Road to 170 metres), the intersection would operate with average delays of less than 25 seconds per vehicle during peak periods. This represents level of service B, a good level of service.

3.33 The intersection of Salamander Way with the new access road would require a roundabout. With roundabout control, the intersection would operate with average delays of less than 20 seconds per vehicle during peak periods. This represents level of service B, a good level of service.

3.34 Therefore, with the identified road works, the road network will be able to cater for the additional traffic from the proposed development.

Summary

3.35 In summary, the main points relating to the proposed retail subdivision in Salamander Bay are:

(i) the proposed development comprises seven lots for retail/commercial purposes, including a Big W, Aldi store, medical centre and other retail purposes;

(ii) vehicular access to the proposed subdivision will be from new roads connecting to Salamander Way and Town Centre Circuit;

(iii) the new roads will provide appropriate verge and carriageway widths;

(iv) the following works are proposed:

- traffic signals at the intersection of Bagnall Beach Road and Town Centre Circuit (following development of the Aldi, Big W and medical centre);
- a roundabout on Salamander Way at the new access road;

(v) with these works, the road network will be able to accommodate traffic from the proposed development.

Location Plan

Colston Budd Hunt & Kafes Pty Ltd

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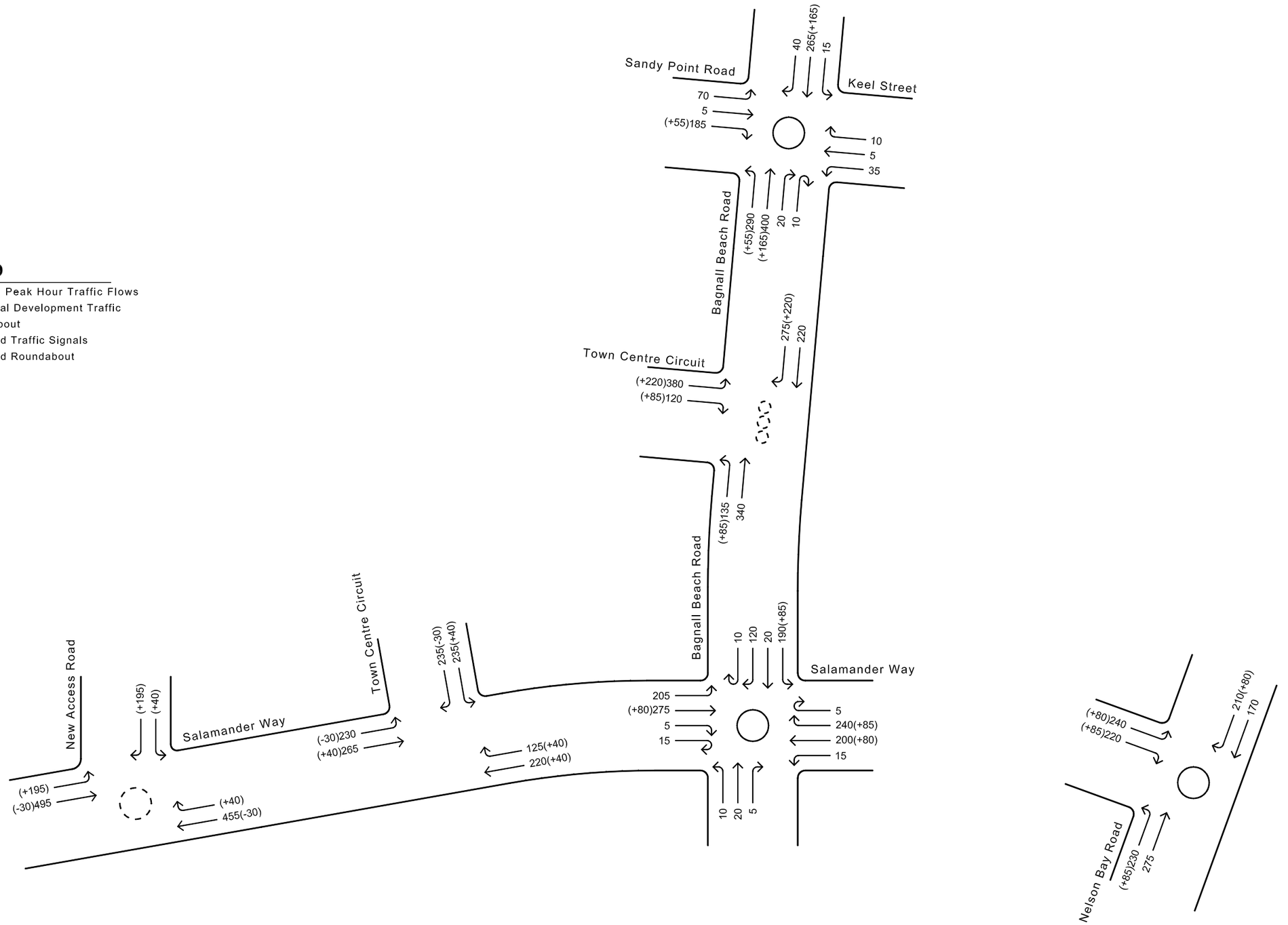
Figure 1

North

LEGEND

100 - Existing Peak Hour Traffic Flows
(+10) - Additional Development Traffic
○ - Roundabout
- Proposed Traffic Signals
- Proposed Roundabout



Existing Friday afternoon peak hour traffic flows plus development traffic

Colston Budd Hunt & Kafes Pty Ltd

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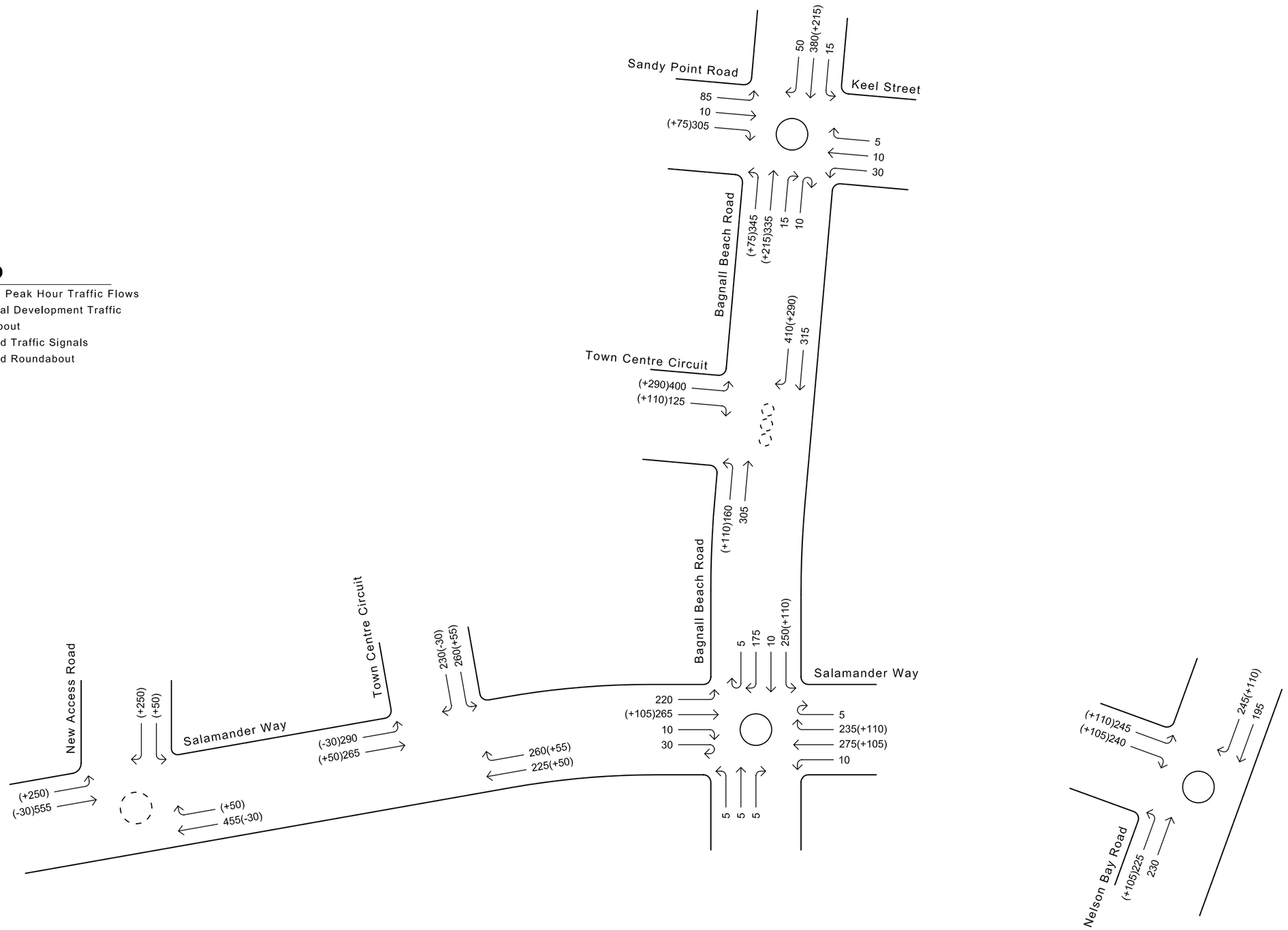
Figure 2

North

LEGEND

100 - Existing Peak Hour Traffic Flows
(+10) - Additional Development Traffic
◯ - Roundabout
- Proposed Traffic Signals
- Proposed Roundabout



Existing Saturday midday peak hour traffic flows plus development traffic

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Figure 3