Transport Impact Assessment

Planning Proposal
393 Pacific Highway, Belmont North

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Info@asongroup.com.au | +61 2 9083 6601 | Suite 5.02, Level 5, 1 Castlereagh Street. Sydney, NSW 2000

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Revision History

Revision	Date	Details	Author	Approved by
Draft	15/01/2019	Draft	S. Hu	T. Lewis
I	19/02/2019	Issue I	A. Reisch	A. Reisch
II	26/02/2019	Issue II	A. Reisch	A. Reisch
III	20/03/2019	Issue III	S. Hu	T. Lewis
IV	21/03/2019	Issue IV	S. Hu	

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1 Introduction

1.1 Overview

Ason Group has been engaged by BWP Trust to prepare a Transport Impact Assessment (TIA) in support of a Planning Proposal (the Proposal) to rezone land at 393 Pacific Highway, Belmont North (the Site) to provide for retail development. The Proposal provides for:

- An amendment to Lake Macquarie Local Environmental Plan 2014 (LEP 2014) for an Additional Permitted Use (APU) within the B7: Business Park zone (in which the Site lies) that provides for 'Shops' as currently provided for in other zones under LEP 2014.
- In turn, the APU would provide for the development of:
  - A Kaufland supermarket with a gross floor area (GFA) of 3,921m^2;
  - An additional retail tenancy with a GFA of 525m^2;
  - A 'Shopping Street' with a GFA of 330m^2;
  - Kaufland offices with a GFA of 1,825m^2; and
  - At-grade parking and servicing areas.

From the outset, it is important to state that the Proposal would entirely replace the Bunnings Warehouse (Bunnings) which currently occupies the Site.

1.2 Transport Impact Assessment Tasks

This TIA provides an assessment of the relevant access, traffic and parking characteristics of the Proposal, and the potential impacts of the Proposal on the local road and parking environment. This has included a detailed assessment of:

- Existing Site and local road network conditions, including the trip generation and distribution of the existing Bunnings, and the operation of key local intersections providing access to the Site;
- Parking requirements;
- The peak period trip generation and distribution of the Site further to the Proposal, and the potential impact of those trips on the key local intersections; and
- The design of access driveways, parking aisles and spaces, and servicing areas.

1.3 Reference Documents

In preparing this TIA, Ason Group has referenced Lake Macquarie Council's planning documents, noting that the Site lies within the Lake Macquarie LGA, and as such is subject to that Council's planning controls. Key Council references include:

- LEP 2014
- Lake Macquarie Development Control Plan 2014 (DCP 2014)
- Lake Macquarie Cycling Strategy 2012 (Cycling Strategy)
- Lake Macquarie Council Traffic Impact Statement & Access Guidelines (TIS Guidelines)

This TIA also references general access, traffic and parking guidelines, including:

- Roads and Maritime Services (RMS) Guide to Traffic Generating Developments (RMS Guide)
- RMS Guide to Traffic Generating Developments – Updated Traffic Surveys TDT 2013/04a (RMS Guide Update)
- Australian Standard 2890.1: Parking Facilities – Off-Street Car Parking (AS 2890.1)
- Australian Standard 2890.2: Parking Facilities – Off-Street Commercial Vehicle Facilities (AS 2890.2)
- Australian Standard 2890.6: Parking Facilities – Off-Street Parking for People with a Disability (AS 2890.6)

1.4 Consultation

In the preparation of the TIA, Ason Group has had the opportunity to discuss the current and future operation of the Pacific Highway in the vicinity of the Site with officers from Council and the RMS; Ason Group acknowledges the insights provided by these officers in regard to local and sub-regional traffic and transport operations.

1.5 Report Structure

This TIA is structured as follows:

- Section 2 provides an Executive Summary.
- Section 3 provides a summary of the Proposal.
- Section 4 describes the existing Site.
- Section 5 describes existing local road network conditions.
- Section 6 describes available public and active transport service and infrastructure.
- Section 7 outlines the parking requirements applicable to the Proposal.
- Section 8 assesses the potential traffic impacts of the Proposal.
- Section 9 provides a summary of the key TIA conclusions.

2 Executive Summary

Further to a detailed assessment of the Planning Proposal, Ason Group provides the following conclusions:

- While the local road network currently operates at an appropriate Level of Service (LoS) – assisted by the coordination of the key Pacific Highway signalised intersections from Wommara Avenue through Floraville Road - there are existing capacity constraints; the most significant of these constraints is the provision of only 2 Pacific Highway southbound lanes through these key intersections.
- By 2029, the Ason Group assessment indicates that background traffic increases are such that a poor LoS is reported at the Pacific Highway & Wommara Avenue intersection (in the weekday PM and Saturday peak hour); and at the Pacific Highway & Floraville Road intersection (in the weekday AM peak hour). **These conditions will occur regardless of the Proposal**.
- Further to the addition of the Proposal's traffic to the Base 2029 traffic flows, the Pacific Highway & Wommara Avenue intersection remains at a LoS F, but generally with increased average vehicle delay (AVD); while the Pacific Highway & Floraville Road intersection retains the same LoS E during the weekday AM peak hour with no significant increase in average delay.
- At the Pacific Highway & Site intersection, average delay increases marginally, resulting in a LoS change from LoS C to LoS D; however, it should be noted that the Base 2029 AVD is on the cusp of a LoS D (reporting AVD of 42.0 seconds, where LoS D is reported from 42.5 seconds). Notwithstanding, a LoS D is acceptable on a major highway (particularly given a 10-year forecast).
- Based on our discussions with Council and the RMS, it has been determined that there are no current plans to upgrade this section of the Pacific Highway to cater for the forecast base flows (per the Base 2029 traffic flows), though Ason Group understand that the RMS is currently (2019) developing a scope of work for a Lake Macquarie wide traffic study; the timeframe (and indeed final scope) of this study is unknown.
- Ason Group has undertaken preliminary testing of a number of potential upgrades of the Pacific Highway (between Wommara Avenue and Floraville Road) designed to increase capacity such as to accommodate both Base 2029 traffic increases and the Proposal. **This testing indicates that key upgrades – and perhaps most significantly additional southbound capacity in the Pacific Highway - will be required by 2029 regardless of the Proposal**, **while relatively moderate additional works (compatible with the key upgrades) would provide for the additional traffic generation of the Proposal**.

- There is no question that further detailed investigations and consultation with Council and the RMS will be required to finalise any future upgrades. Notwithstanding, **it is the conclusion of Ason Group that essential upgrades which appropriately accommodate both the Base 2029 demand; and additional upgrades which would accommodate the Proposal; can be determined further to these additional investigations and consultation**.
- The Proposal will provide a level of car parking which meets the requirements of DCP 2014, as well as an appropriate allocation of bicycle, accessible and motorcycle parking. All access, parking and servicing areas would necessarily be designed to provide compliance with the relevant Australian Standards.

3 Overview of Proposal

A detailed description of the Planning Proposal is included in the Statement of Environmental Effects (SEE) which this TIA accompanies. In summary, the Proposal provides for a retail development including:

- A Kaufland supermarket with a GFA of 3,921m^2;
- A separate retail tenancy with a GFA of 525m^2;
- A 'Shopping Street' – shared mall including a café and seating areas, largely ancillary to the other major tenancies- with a GFA of 330m^2;
- Kaufland offices with a GFA of 1,825m^2; and
- Ancillary on-site parking and service areas, including 458 parking spaces and 3 loading bays.

A reduced copy of the Site Plan is provided below for context.

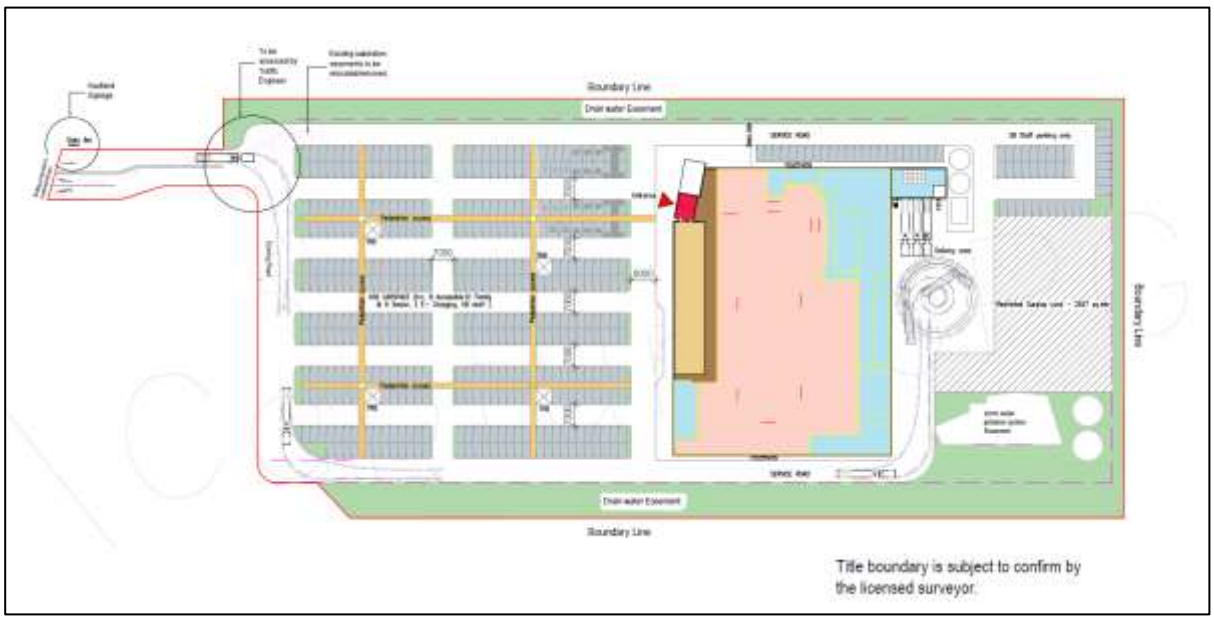

Figure 1: Proposed Site Plan

It is noted that there is no significant difference between GFA and gross leasable floor area (GLFA) in regard to the proposed Site components.

4 Existing Site Conditions

4.1 Site Location

The Site is legally described as Lot 101 in DP 1021186, with a street address of 393 Pacific Highway, Belmont North, approximately 20km south of the Newcastle CBD. It is bordered by residential dwellings to the north; industrial (storage) lots to the south; the Belmont Wetlands State Park to the east; and a retail services centre to the west. The Site has an area of some 40,380m^2 and is currently zoned B7: Business Park.

The Site is shown in its local context in **Figure 2**.

Figure 2: Site Location

4.2 Existing Site Characteristics

As stated, the Site is currently occupied by Bunnings which has a GFA of approximately 10,000m^2 plus an outdoor garden area of approximately 2,000m^2.

4.3 Access

Site access is provided directly from the Pacific Highway via a signalised T intersection with the on-site access road (termed Access Road 1 for ease of reference). A small internal roundabout then provides access to car parking and service areas in the northern and southern part of the Site respectively.

While Access Road 1 is located entirely within the Site, the southern leg of the internal roundabout (termed Access Road 2 for ease of reference) also provides access to a service station, Hungry Jacks and Coffee Shop (termed the Service Centre for ease of reference) to the immediate west of the Site (i.e. between the Site and the Pacific Highway). In practice – given that there are No Right Turn restriction to/from the Pacific Highway from/to the Service Centre - Access Road 2 provides for arrival trips to the Service Centre from the south; and departure trips from the Service Centre to the north.

4.4 Traffic Generation

4.4.1 Traffic Surveys

In order to determine the existing traffic generation of the Site, Ason Group commissioned traffic surveys of the Site and key adjacent Pacific Highway intersections on Friday 8th February 2019 and Saturday 9th February 2019, noting that Fridays and Saturdays represent the days of peak retail traffic generation. The survey data is provided in **Appendix A**.

4.4.2 Existing Site Trip Generation

With reference to the traffic surveys, the existing traffic generation of the Site (Bunnings) is summarised in **Table 1** below, noting that the Saturday network peak hour was between 11:45am and 12:45pm.

Table 1: Existing Site Trip Generation

Existing Site Trip Generation	AM Peak	PM Peak	Saturday
Surveyed Traffic Generation	219	245	626
Trip Rate (per 100m$^{2)}$	2.19	2.45	6.26

5 Local Road Network

The key roads and intersections in the vicinity of the Site are shown in **Figure 3**, and described further in sections below.

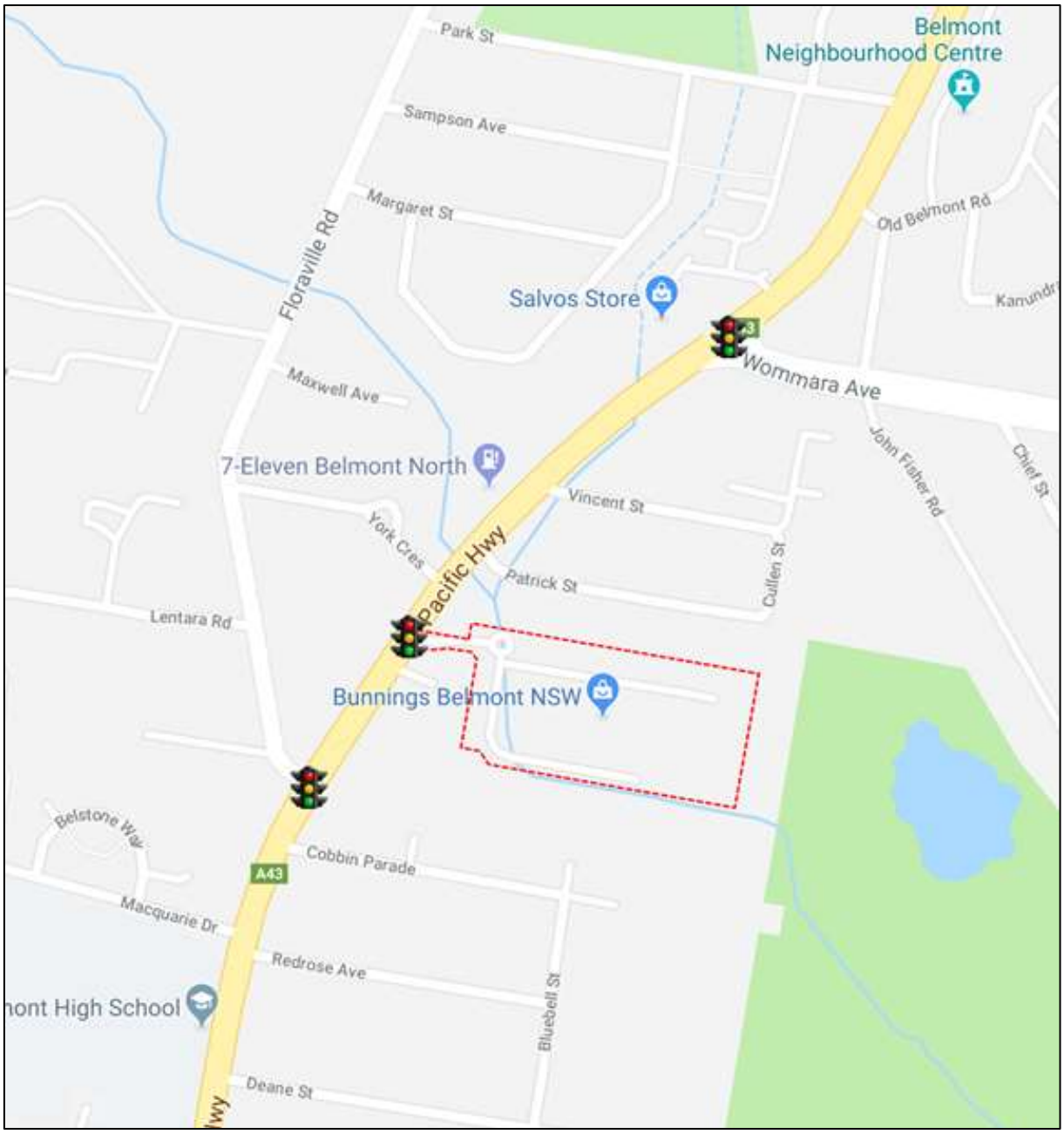

Figure 3: Local Road Network

5.1 Key Roads

5.1.1 Pacific Highway

The Pacific Highway is a Regional Highway (Route A43) which runs between the Hexham Bridge in the north (north of which it becomes National Route A1) to Gosford in the south. In the vicinity of the Site, the Pacific Highway provides 4 traffic lanes for two-way traffic (2 lanes per direction) with additional lane infrastructure at key intersections. The Pacific Highway has a posted speed limit of 60km/h.

5.1.2 Floraville Road

Floraville Road is a residential collector road which runs between Violet Town Road in the north and the Pacific Highway in the south. Floraville Road generally provides 2 traffic lanes for two-way traffic (1 lane per direction) and parking lanes on both sides of the road. Floraville Road has a posted speed limit of 60km/h.

5.1.3 Wommara Avenue

Wommara Avenue (and then Kalaroo Road) is a local collector road which runs between Redhead in the north, through the Redhead industrial estate to Pacific Highway in the south. Wommara Road generally provides 2 traffic lanes for two-way traffic (1 lane per direction) and parking lanes on both sides of the road. Wommara Avenue has a posted speed limit of 60km/h.

5.2 Key Intersections

5.2.1 Pacific Highway & Access Road 1

The intersection of Pacific Highway & Access Road 1 provides a signalised T intersection with auxiliary lane infrastructure and is shown below in **Figure 4**.

Figure 4: Intersection Pacific Highway & Access Road 1

5.2.2 Internal Site Roundabout

As discussed, the internal Site roundabout acts as a distributor for internal trips to and from the different parking and servicing areas of the Site, as well as providing for trips to/from the Service Centre to the north and south respectively. The internal Site roundabout is shown in **Figure 5**.

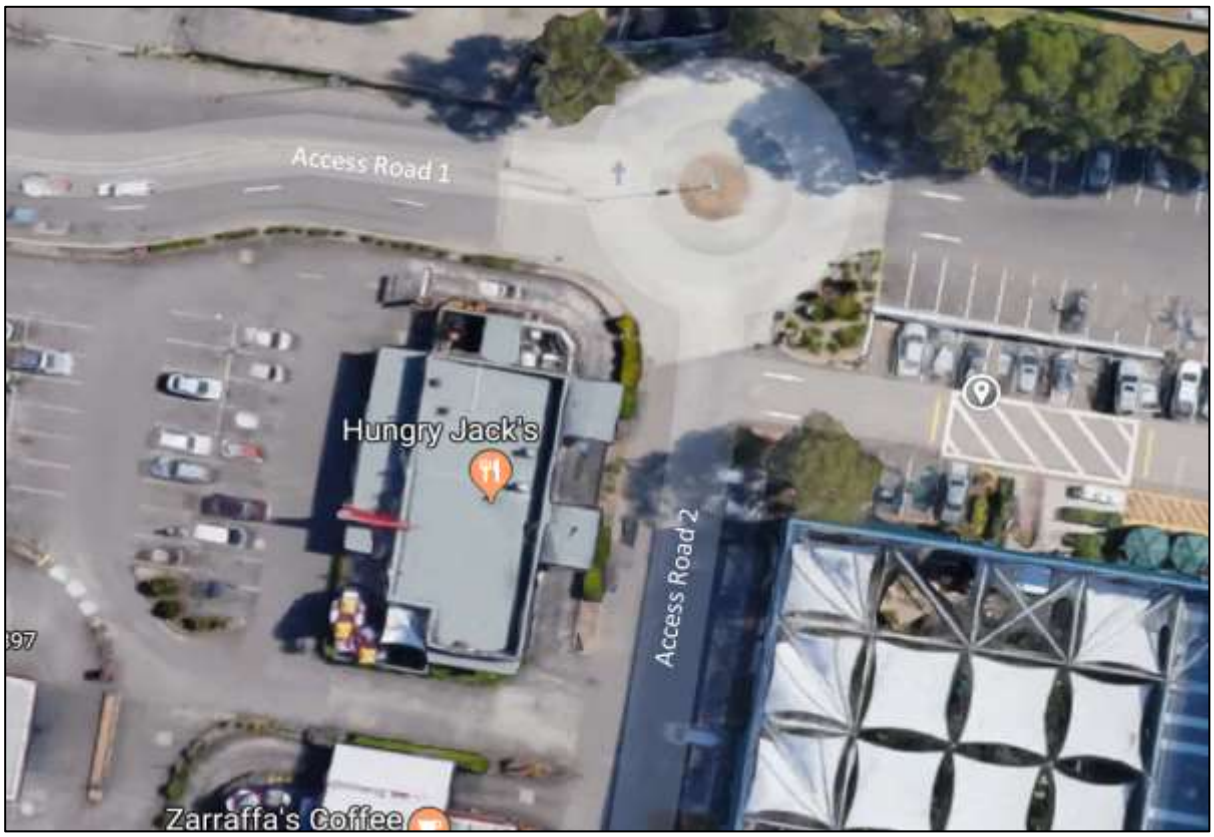

Figure 5: Internal Site Roundabout

5.2.3 Pacific Highway & Wommara Avenue

The intersection of Pacific Highway & Wommara Avenue provides a signalised T intersection with auxiliary lane infrastructure and is shown in **Figure 6**.

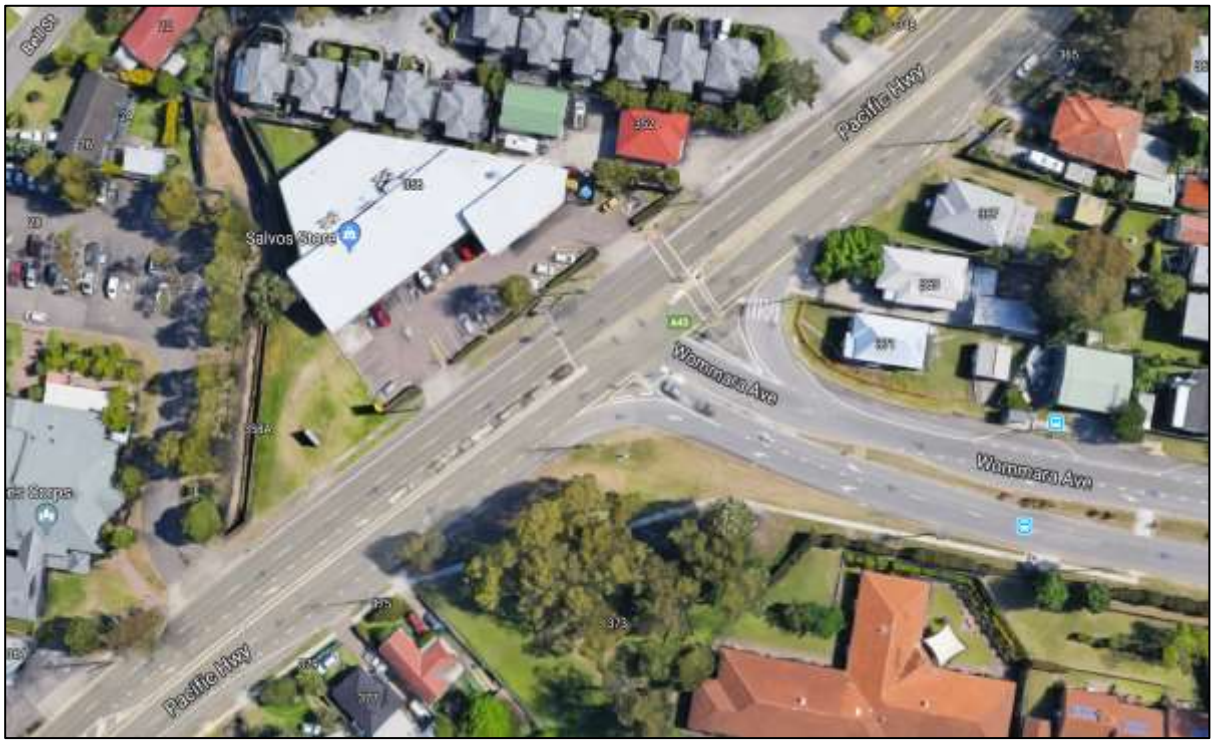

Figure 6: Intersection Pacific Highway & Wommara Avenue

5.2.4 Pacific Highway & Floraville Road

The intersection of Pacific Highway & Floraville Road provides a signalised T intersection with auxiliary lane infrastructure and is shown in **Figure 7**.

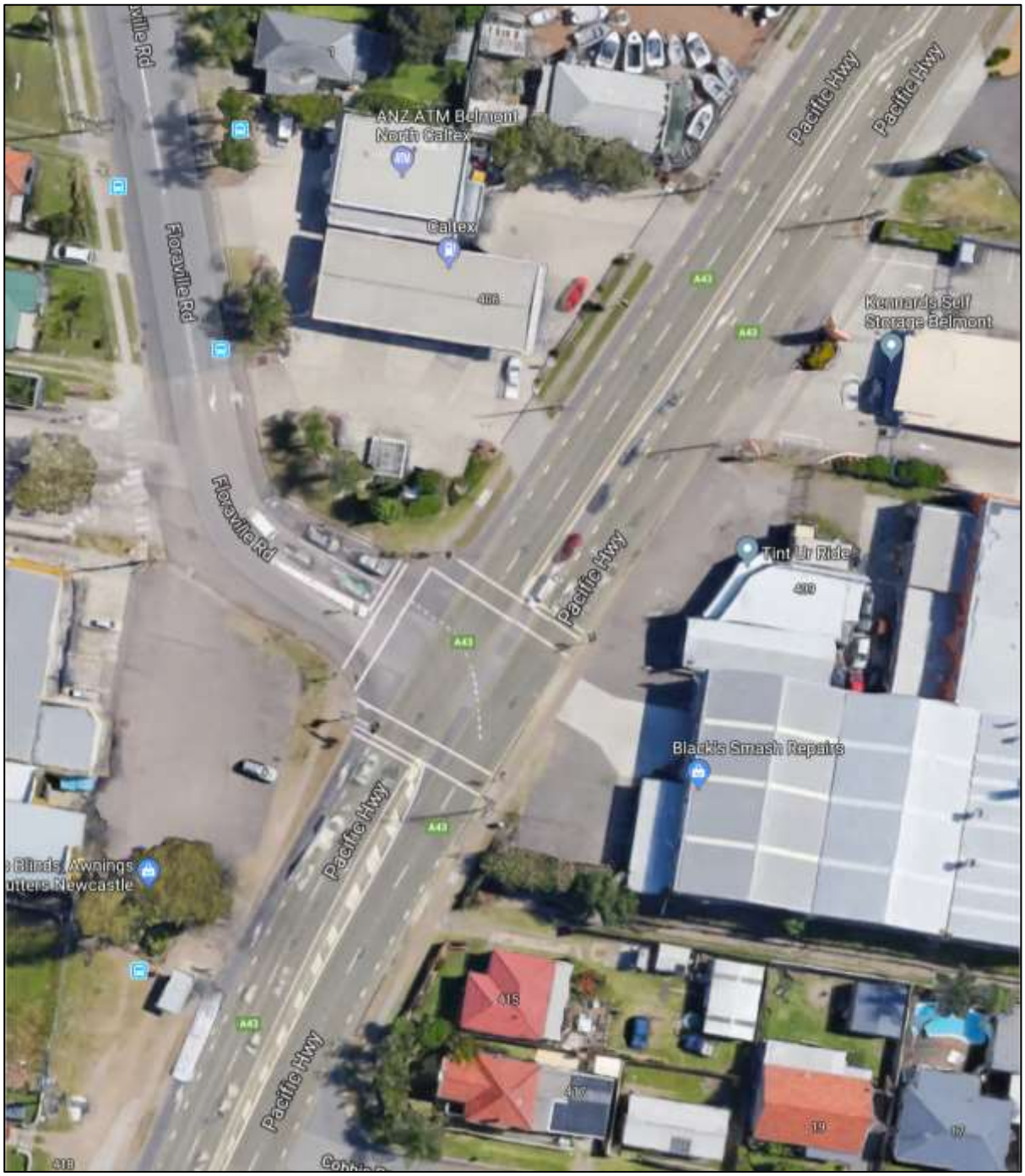

Figure 7: Intersection Pacific Highway & Floraville Road

5.3 Existing Traffic Flows

5.3.1 Traffic Surveys

As stated, traffic surveys were undertaken at the key intersections as detailed above in February 2019 and summarised in sections below.

5.3.2 Friday Peak Period Traffic Flows

Friday AM and PM peak hour traffic flows at the key intersections are shown in **Figure 8** and **Figure 9** respectively.

5.3.3 Saturday Peak Period Traffic Flows

Saturday peak hour traffic flows at the key intersections are shown in **Figure 10**.

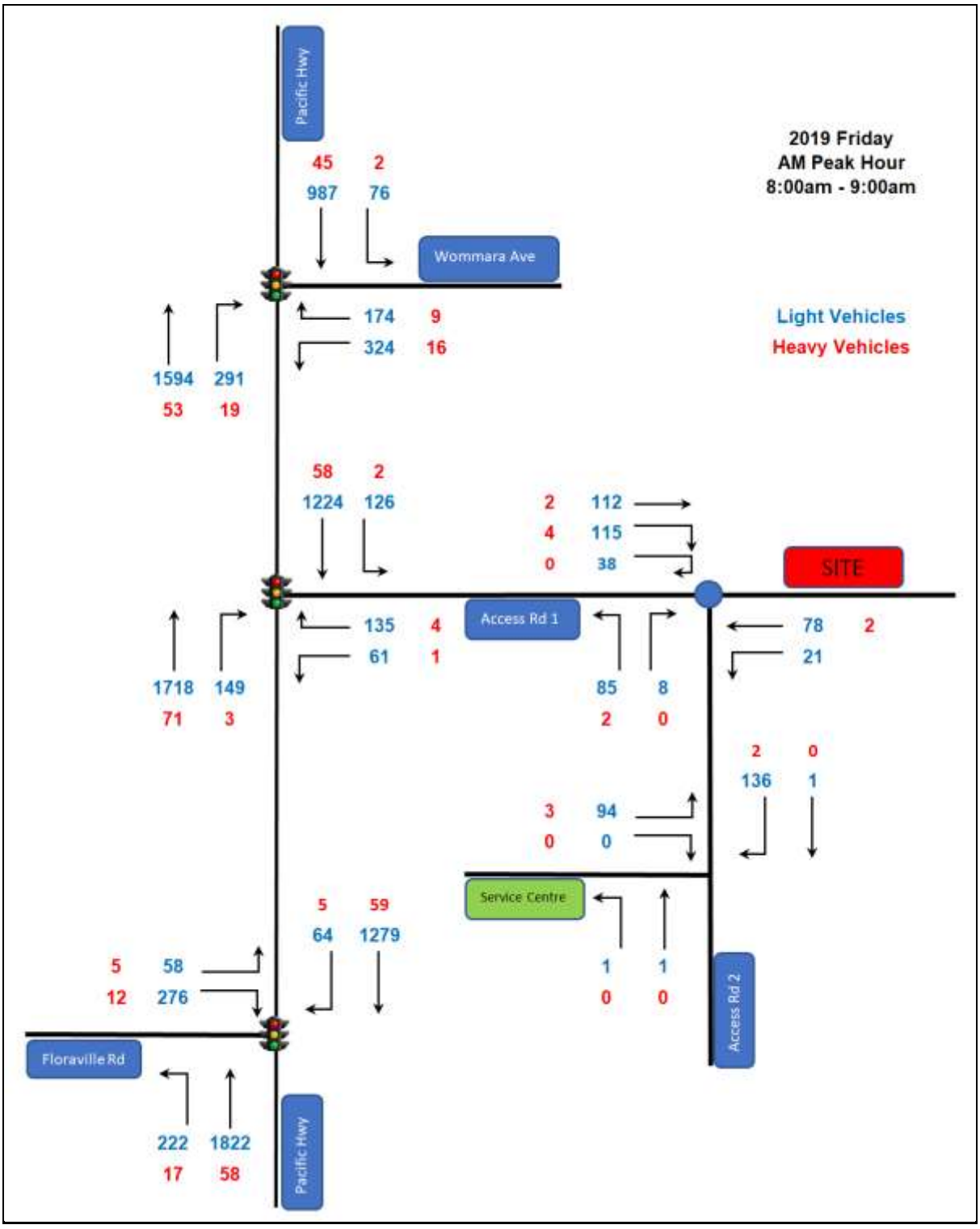

Figure 8: 2019 Friday AM Peak Hour (8:00am – 9:00am) Traffic Flows

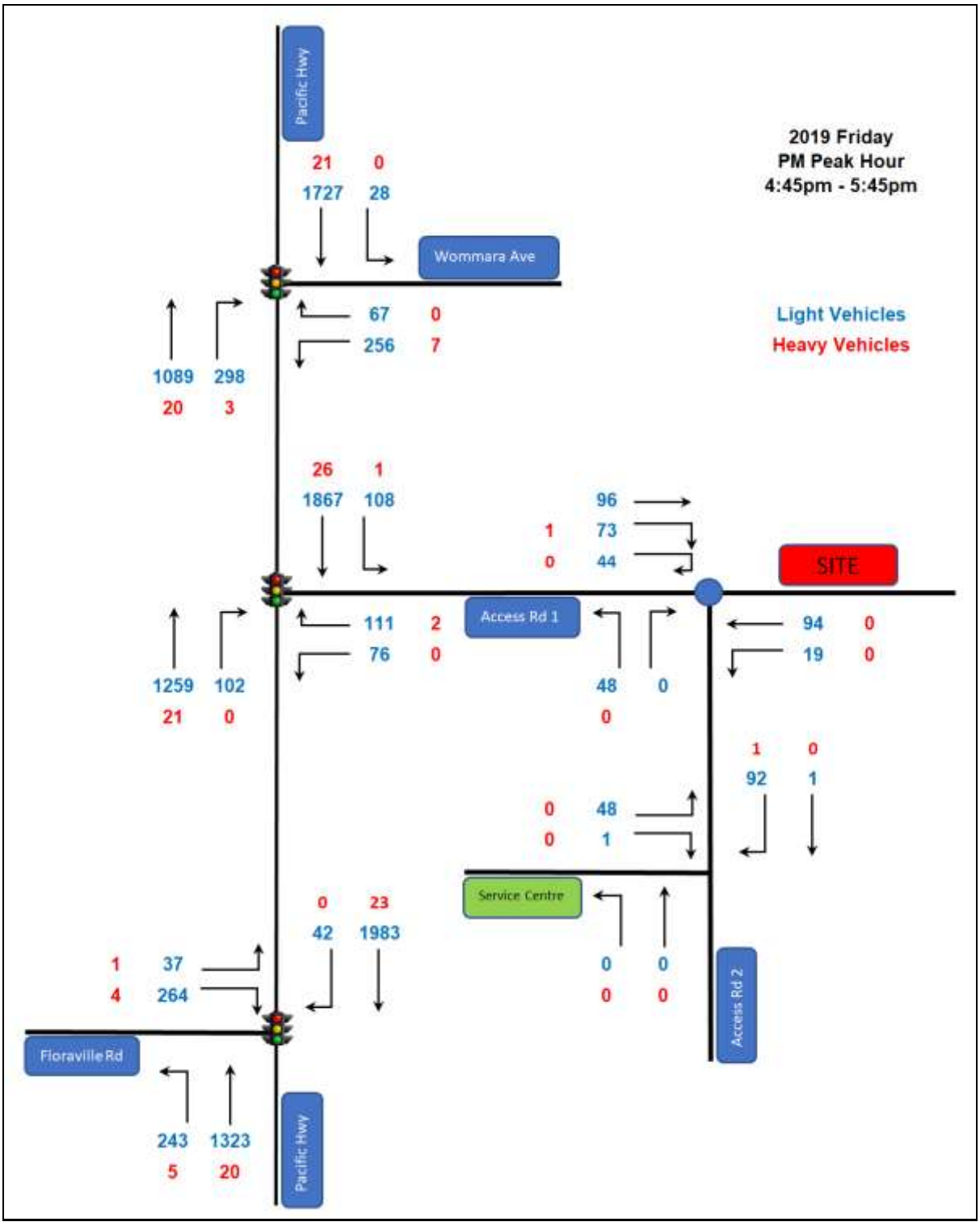

Figure 9: 2019 Friday PM Peak Hour (4:45pm – 5:45pm) Traffic Flows

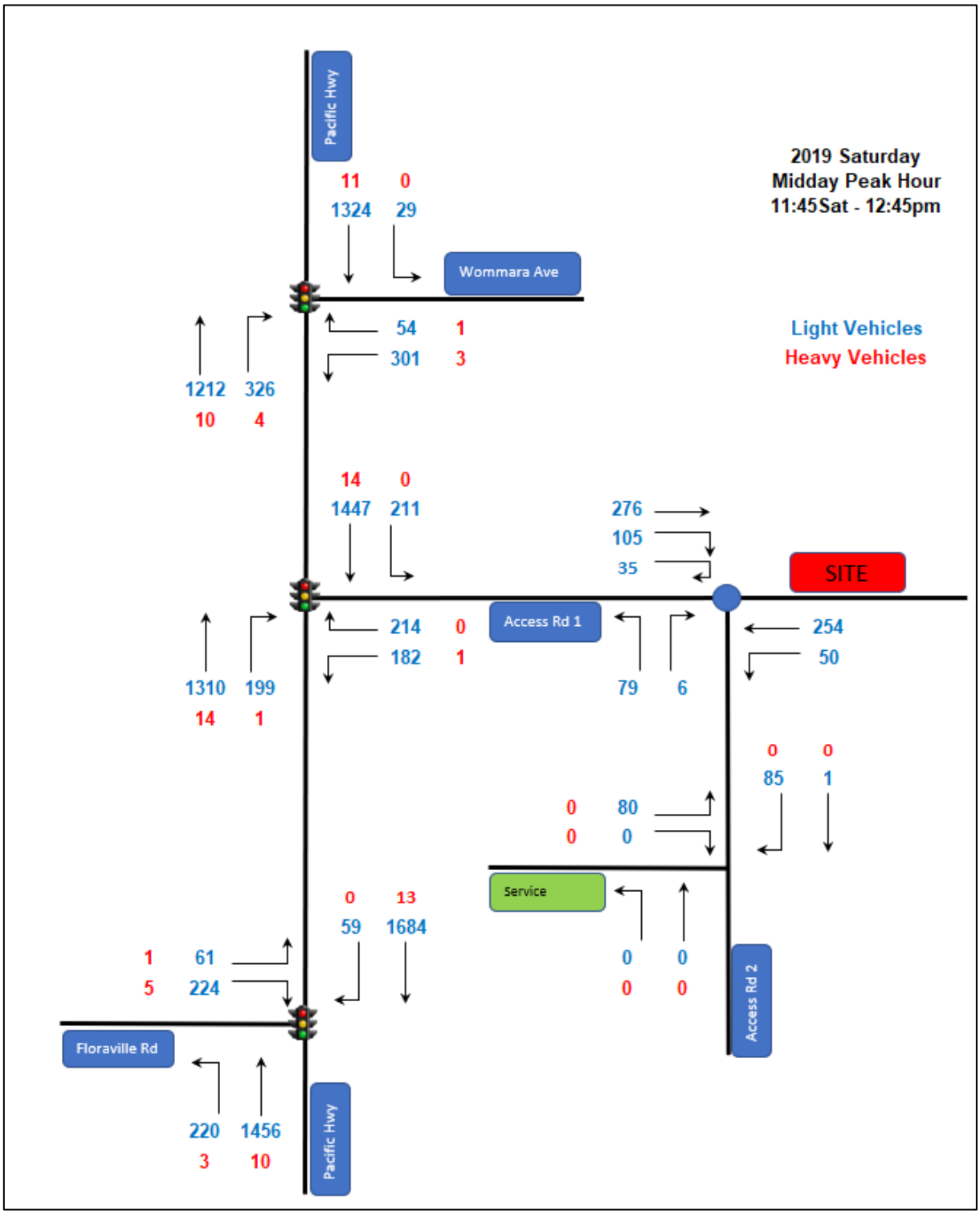

Figure 10: 2019 Saturday Peak Hour (11:45am – 12:45pm) Traffic Flows

5.4 Intersection Analysis

5.4.1 SIDRA

The performance of the key intersections has been analysed using the RMS approved SIDRA modelling software. SIDRA modelling outputs a range of performance measures, in particular:

- *Degree of Saturation (DOS)* – The DOS is defined as the ratio of demand (arrival) flow to capacity. The DOS is used to measure the performance of intersections where a value of 1.0 represents an intersection at theoretical capacity, above 1.0 represent over-saturated conditions (demand flows exceed capacity) and degrees of saturation below 1.0 represent under-saturated conditions (demand flows are below capacity). As the performance of an intersection approaches DOS of 1.0, queue lengths and delays increase rapidly. It is usual to attempt to keep DOS to less than 0.9, with satisfactory intersection operation generally achieved with a DOS below 0.8.
- *Average Vehicle Delay (AVD)* – Delay represents the difference between interrupted and uninterrupted travel times through an intersection and is measured in seconds per vehicle. Delays include queued vehicles accelerating and decelerating from/to the intersection stop lines, as well as general delays to all vehicles travelling through the intersection. The AVD (or average delay per vehicle in seconds) for intersections also provides a measure of the operational performance of an intersection and is used to determine an intersection's Level of Service (see below). For signalised intersections, the AVD reported relates to the average of all vehicle movements through the intersection. For priority (Give Way, Stop & Roundabout controlled) intersections, the AVD reported is that for the movement with the highest AVD.
- *Level of Service (LOS)* – This is a comparative measure that provides an indication of the operating performance, based on AVD. For signalised and roundabout intersections, LOS is based on the average delay to all vehicles, while at priority-controlled intersections LOS is based on the worst approach delay.

Table 2 outlines the relevant performance criteria in accordance with the RMS Guide.

Table 2: Intersection Assessment Criteria

Level of Service	Average Delay per Vehicle (sec/veh)	Traffic Signals, Roundabout	Give Way and 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	More than 70	Unsatisfactory and requires additional capacity.	Unsatisfactory and requires other control mode or major treatment.

5.4.2 Existing Intersection Operations

With reference to sections above, the existing performance of the key intersections is summarised in **Table 3**.

Table 3: Existing Intersection Operations

2019 Existing Intersection Operations	Peak Period	Delay	LoS
Pacific Hwy & Wommara Ave	AM	19	B
	PM	19	B
	Sat	17	B
Pacific Hwy & Site Access	AM	12	A
	PM	6	A
	Sat	21	B
Pacific Hwy & Floraville Rd	AM	16	B
	PM	11	A
	Sat	13	A
Internal Site Roundabout	AM	24	B
	PM	24	B
	Sat	24	B

With reference to Table 3:

- All intersections operate at a good LoS in both the AM and PM peak periods, with only minor delays and no significant queueing on any approaches.
- It is noted that the signal coordination - which controls all three Pacific Highway intersections - is observed to provide good efficiency through Belmont North.

5.5 Future Base Intersection Operations

5.5.1 2029 Forecast Year

A future baseline traffic scenario has been assessed to provide a 'benchmark' from which to appropriately assess the impacts of the Proposal compared to a long term 'do nothing' scenario, i.e. future conditions without the Proposal (but with the Bunnings retained).

Average annual growth has been determined with reference to available RMS Count Station data north and south of the Site, including:

- Count Station 05201: Pacific Highway south of Smart Street;
- Count Station 05213: Croudace Bay Road north of Belmont Crescent;
- Count Station 05210: Red Head Road south of White Cap Close; and
- Count Station 05002: Pacific Highway south of Nioka Place.

Further to a review of this data, an annual growth rate of 2% has been applied to the existing traffic flows in the Pacific Highway. The resulting Base 2029 traffic flows are shown in the figures below.

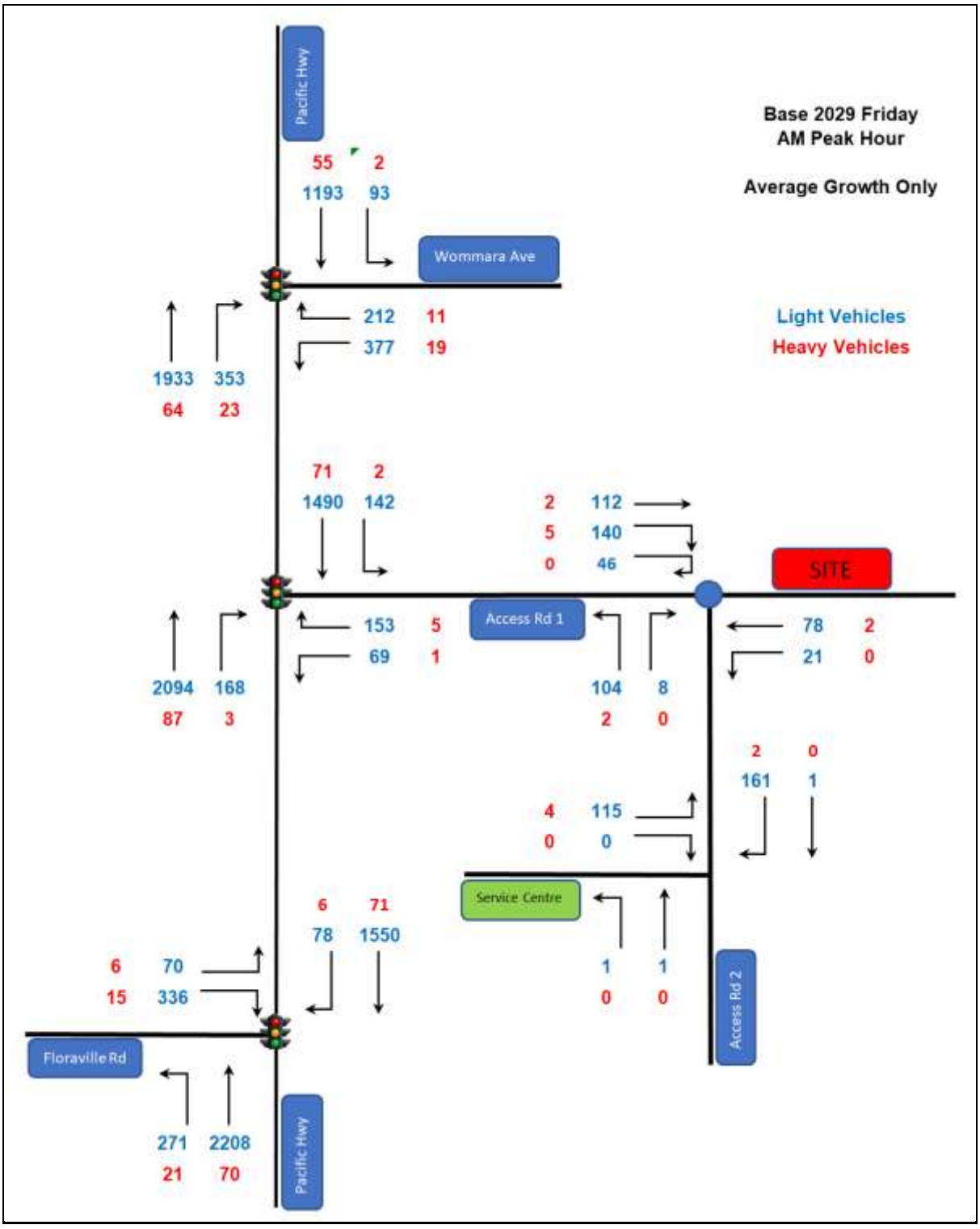

Figure 11: Base 2029 Friday AM Peak Hour Traffic Flows

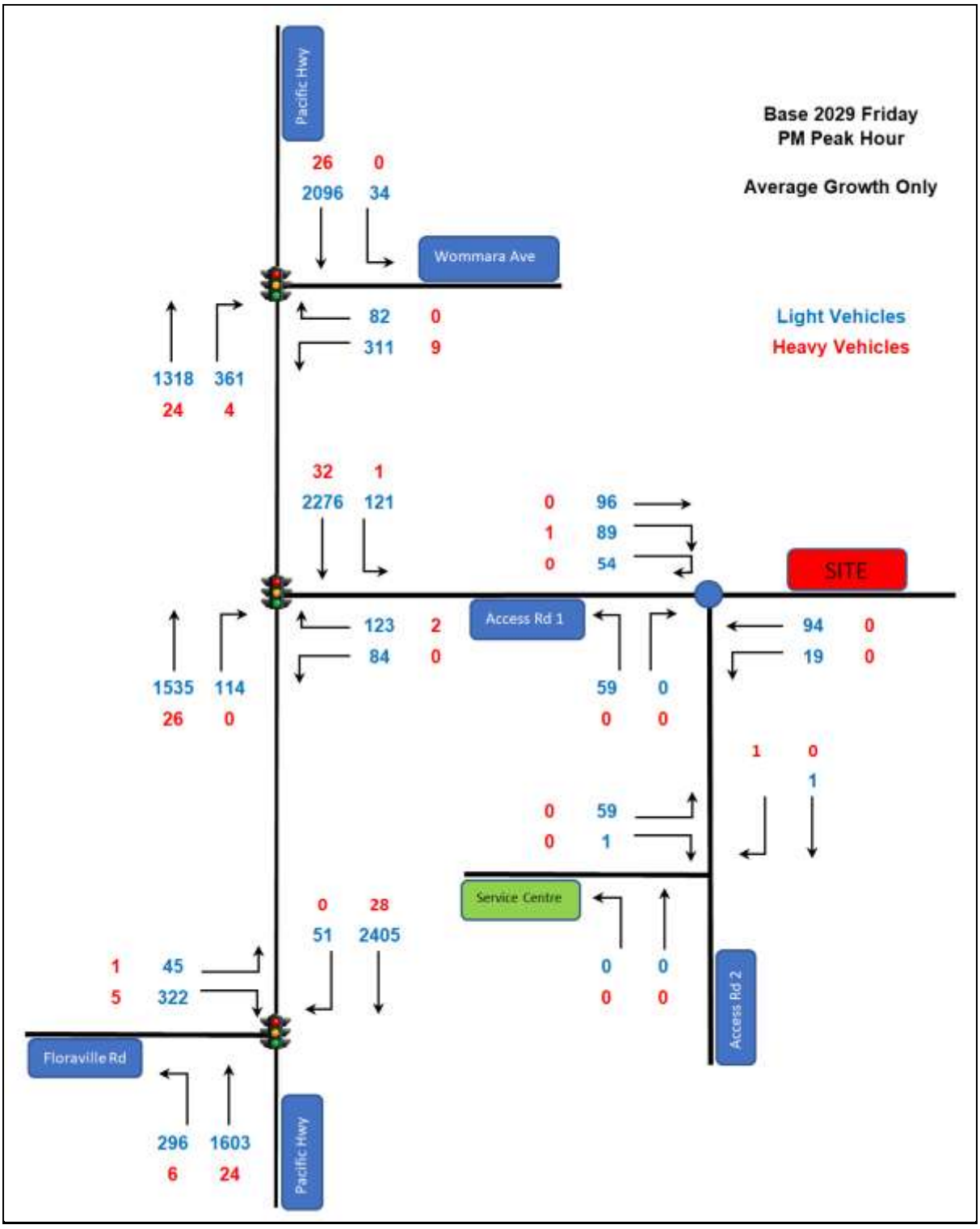

Figure 12: Base 2029 Friday PM Peak Hour Traffic Flows

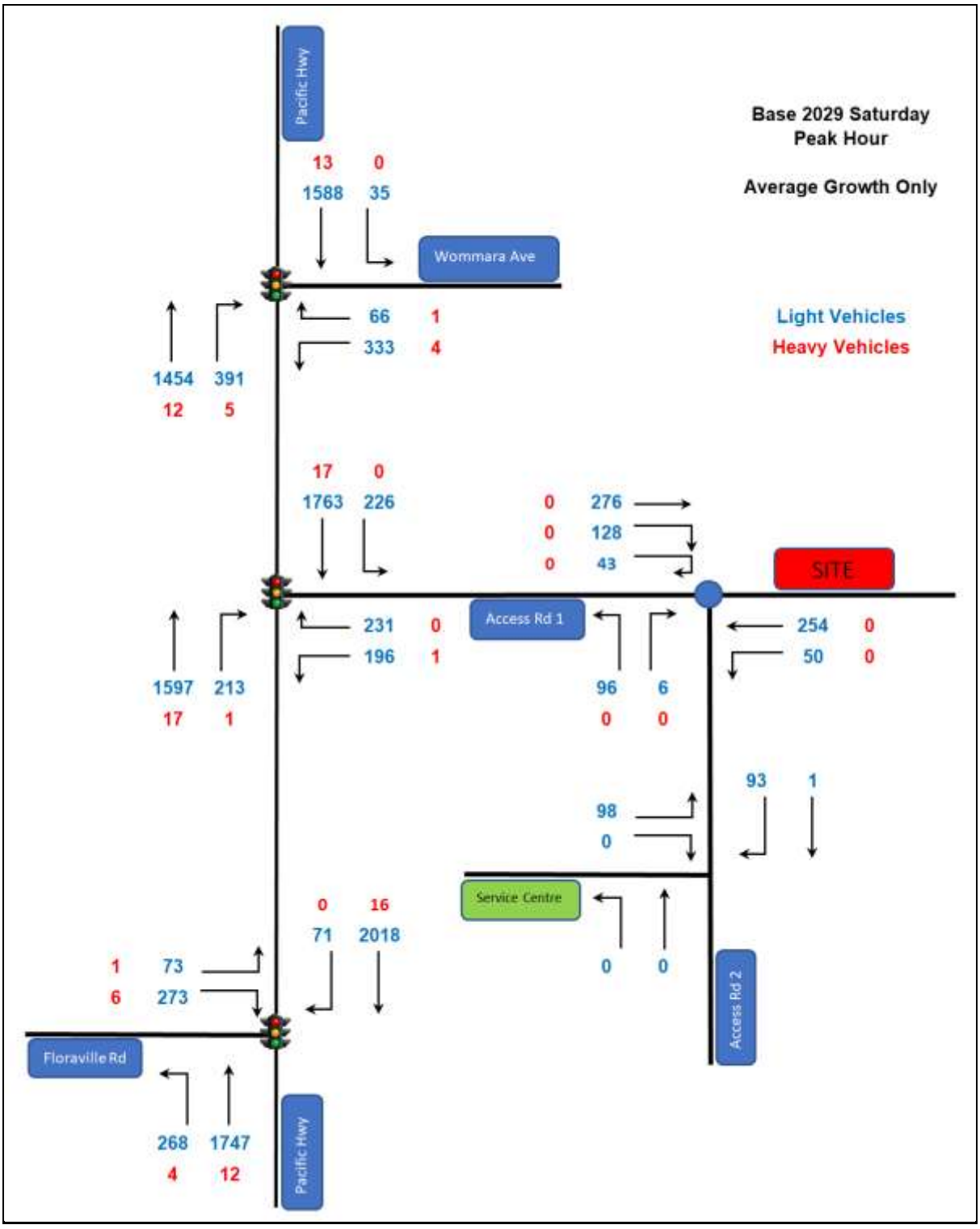

Figure 13: Base 2029 Saturday Peak Hour Traffic Flows

5.5.2 Base 2029 Base Intersection Operations

SIDRA has again been used to assess the future performance of the key intersections under Base 2029 traffic flow conditions. The results of this analysis are summarised in **Table 4**.

Table 4: Base 2029 Intersection Operations

Base 2029 Intersection Operations	Peak Period	Delay	LoS
Pacific Hwy & Wommara Ave	AM	23	B
	PM	126	F
	Sat	115	F
Pacific Hwy & Site Access	AM	13	A
	PM	21	B
	Sat	42	C
Pacific Hwy & Floraville Rd	AM	58	E
	PM	15	B
	Sat	16	B
Internal Site Roundabout	AM	24	B
	PM	24	B
	Sat	24	B

With reference to Table 4:

- The intersection of Pacific Highway & Wommara Avenue operates at a LoS F in both the Friday PM and Saturday peak hours, with the primary delay during both peaks is to the Pacific Highway southbound approach to Wommara Avenue.
- The intersection of Pacific Highway & Floraville Road operates at a LoS E in the AM peak hour, with the primary delay being to the Pacific Highway northbound approach to Floraville Road.
- Both the intersections of Pacific Highway & Site, and the internal Site roundabout, operate at a good LoS during all peak periods.

5.6 Base Traffic Conditions Summary

With reference to sections above, by 2029 a number of the key Pacific Highway intersections will operate at a poor LoS and with little spare capacity. The major constraint observed on-site is the provision of only 2 southbound lanes in the Pacific Highway servicing a significant demand flow, particularly in the PM peak hour.

Based on our recent discussions with Council and the RMS, the congestion in the Pacific Highway through Belmont North (and indeed from Bennetts Green in the north through to Swansea in the south) has been an issue for some time. The issue was specifically addressed in August 2015 in the NSW Parliament, with the Minister for Transport & Infrastructure asked the following questions:

1. *What steps have been taken to ease traffic congestion along the Pacific Highway at Belmont to alleviate the frustrations of local commuters?*

2. *Does the Government have any plans to address the growing traffic congestion along the Pacific Highway at Belmont, considering the amount of growth the local area has experienced in recent years?.*

In response, the Minister stated the following:

I am advised that:

Roads and Maritime Services will start work on a Lake Macquarie traffic study later this year, which will assess current traffic performance.

This study will help determine priorities for future upgrade of the Lake Macquarie road network and is expected to be completed by the end of 2016. The study will include a community consultation process where the community can have their say.

Both Council and the RMS have confirmed that this study was not undertaken at the time. Moreover, both Council and the RMS have confirmed to Ason Group that there are currently no proposals to upgrade this section of the Pacific Highway.

Notwithstanding, Ason Group understands that an RMS study of the Lake Macquarie traffic and transport network is currently being discussed (between the RMS, Council and other stakeholders). The scope and timeframe for the study is unknown at this time, though based on our discussions there is an expectation that the operation of the Pacific Highway will be an issue for investigation.

6 Public Transport, Cycling and Pedestrian Access

6.1 Bus Services

Transport for NSW guidelines state that bus services influence the travel mode choices of sites within 400 metres (approximately 5 minutes) of a bus stop.

In this regard, the Site is well serviced by buses operated by Newcastle Transport, including the following routes:

- Route 14: Newcastle to Swansea via Charlestown (20-minute headway);
- Route 29: Glendale to Swansea via Cardiff and Warners Bay (60-minute headway);
- Route 43: Charlestown to Belmont (60-minute headway); and
- Route 48: Warners Bay to Belmont via Charlestown and Redhead (60-minute headway).

These bus routes are shown in Figure 14.

6.2 Pedestrian Accessibility

Formal pedestrian footpaths are provided on both sides of the road in each of the key roads in the vicinity of the Site, other than at the intersection of Pacific Highway & Wommara Avenue, where no crossing of Wommara Avenue is available.

6.3 Cycle Routes

There are currently limited cycling facilities and routes provided within the proximity of the Site. However, with reference to **Figure 15** below, Council's Cycling Strategy provides for the introduction of on road cycleways in the Pacific Highway directly past the Site, which would link to both existing and proposed on and off road cycleway to the north and south of the Site.

Figure 14: Bus Network

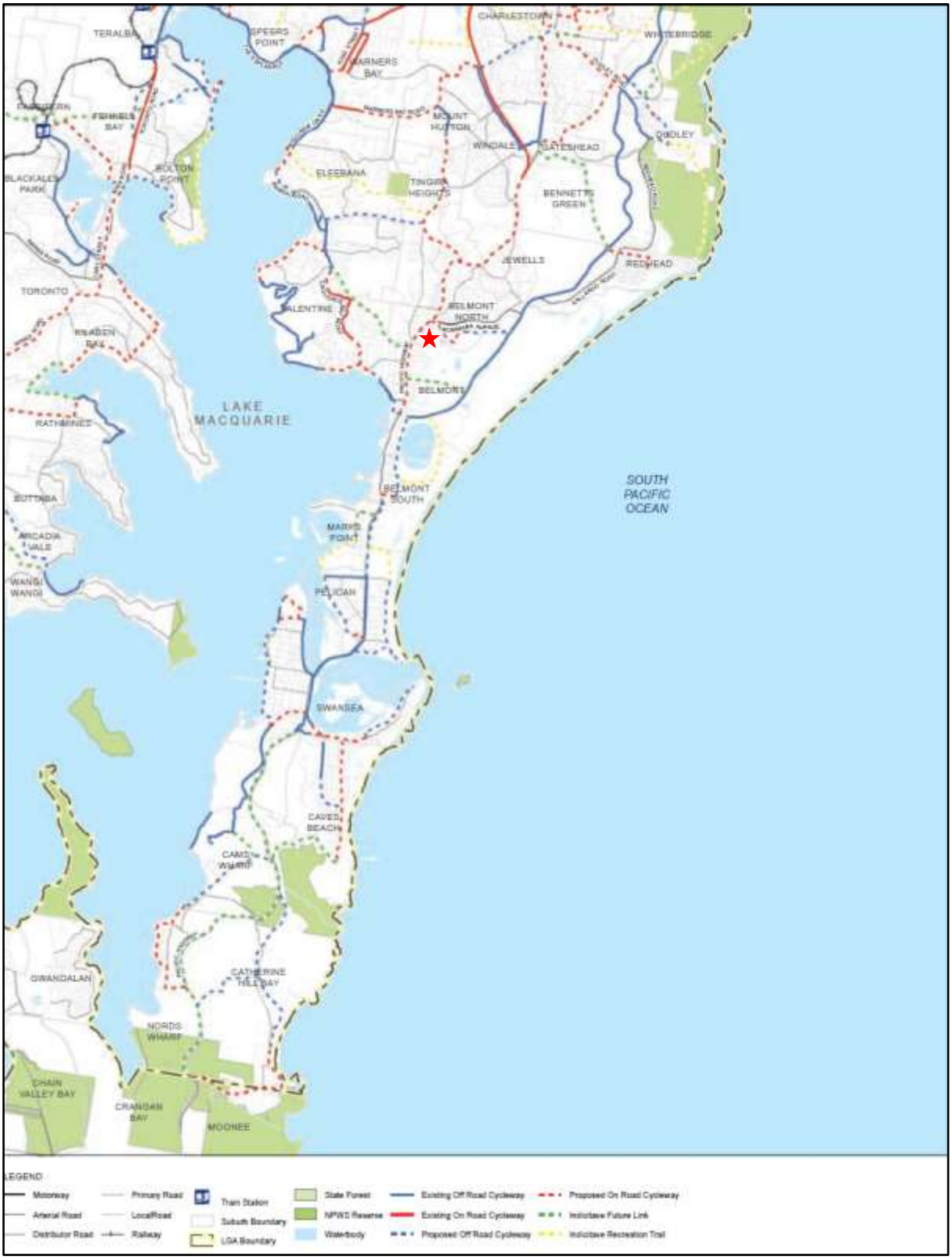

Figure 15: Lake Macquarie Council Cycling Strategy - East Ward

7 Parking & Servicing Requirements

7.1 DCP 2014 Car Parking Rates

7.1.1 Retail Parking Rates

Part 5, Table 7 of DCP 2014 provides the following parking rates for Neighbourhood Shops within a B7 zone, noting that these same rates apply to cafes such as proposed within the Shopping Street:

- 1 space per 25m^2 for development under 5,000m^2
- 1 space per 40m^2 for development over 5,000m^2

These parking rates are the same rates as applied to shops within local centres per Part 4, Table 7 of DCP 2014. It is noted that the rate of 1 space per 25m^2 for retail development under 5,000m^2 GFA has been applied in the assessment.

7.1.2 Office Parking Rates

As the B7 zoning of the Site does not currently permit office use, Part 5, Table 7 of DCP 2014 does not provide parking rates for office floorspace. As such Ason Group has referenced Part 4 (Business Parks), Table 7 of DCP 2014, which provides the following parking rates for office and commercial floorspace:

- 1 space per 40m^2 GFA.

7.1.3 Total Parking Requirement

Table 5 below provides a summary of the parking requirements of the Site further to the application of the DCP 2014 parking rates.

Table 5: Parking Requirement: DCP 2014 Rates

Site Component	GFA	Parking Rate (spaces per 100m^2 GFA)	Parking Required
Supermarket	3,921	4	157
Retail	525	4	21
Shopping Street	330	4	13
Office	1,825	2.5	46
Total			**237**

7.1.4 RMS Parking Rates

Section 5.7 of the RMS Guide provides the following summary parking rates for Shopping Centres with Gross Leasable Floor Area (GLFA) under 10,000m^2:

- 6.1 spaces per 100m^2 GLFA

While this rate includes office space within a shopping centre, it is our opinion more appropriate to consider the RMS Guide office parking rate (2.5 spaces per 100m^2 GFA, i.e. as per DCP 2014) for the office component.

Table 6 below provides a summary of the parking requirements of the Site further to the application of the RMS Guide parking rates

Table 6: Parking Requirement: RMS Guide Summary Rates

Site Component	GFA	Parking Rate(spaces per 100m^2 GFA)	Parking Required
Supermarket	3,921	6.1	239
Retail	525	6.1	32
Shopping Street	330	6.1	20
Office	1,825	2.5	111
Total			337

7.2 Proposed Car Parking

The Proposal provides for a total of 458 parking spaces across the Site, which meets the requirements of DCP 2014 and RMS Guide suggested provisions.

7.3 Additional Parking Considerations

7.3.1 Bus Shelters

Part 5, Table 7 of DCP 2014 requires the provision of bus shelter where more than 20 car spaces are required for office development, and the Site is within 400m of a designated bus route. The provision of a bus shelter is in lieu of 1 car space in every 40 spaces, or part thereof, of the onsite parking requirement.

In this regard, the most readily available northbound bus stop is located in the Pacific Highway south of Floraville Road; and the most readily available southbound bus stop is located in the Pacific Highway immediate north of Patrick Street. It is note that a southbound bus stop is also provided in the Pacific Highway south of Floraville Road.

Both of the bus stops south of Floraville Road already provide a bus shelter, while the bus stop north of Patrick Street provides only a bench seat. As such, it is proposed that BWP Trust consult with Council at the appropriate time during the approval process to determine the means by which a bus shelter can be provided at the bus stop to provide compliance with DCP 2014.

7.3.2 Accessible Parking

Part 5, Table 7 of DCP 2014 provides the following parking rates for accessible parking:

- 1 accessible parking space per 50 car parking spaces

The application of this rate to the proposed 458 parking spaces suggests a requirement for 10 accessible parking spaces. The Proposal will provide a minimum of 10 accessible parking spaces so as to provide compliance with DCP 2014, and all accessible parking spaces will be designed with reference to AS 2890.6.

7.3.3 Motor Bike Parking

Section 3.14 of Part of 5 of DCP 2014 provides the following parking rates for motor bike parking:

- 1 motor bike parking space per 20 car parking spaces

The application of this rate to the proposed 458 parking spaces suggests a requirement for 23 motor bike parking spaces. The Proposal will provide a minimum of 23 motor bike parking spaces so as to provide compliance with DCP 2014, and all bike parking spaces will be designed with reference to AS 2890.1.

7.3.4 Bicycle Parking

Section 3.13 of Part 5 of DCP 2014 provides the following parking rates for bicycle parking:

- 3 bicycle parking spaces or 1 bicycle parking space per 20 car parking spaces, whichever is greater, for customers and short-term users.
- 1 bicycle parking space per 20 employees or part thereof.

The application of the customer/short-term user rate to the proposed 458 parking spaces suggests a requirement for 23 bicycle parking spaces. The Proposal will provide a minimum of 23 bicycle parking spaces so as to provide compliance with DCP 2014.

The number of office employees is unknown at the time; however, the Proposal will provide employee bicycle parking spaces such as to provide compliance with DCP 2014.

With regard to bicycle parking, it is noted that DCP 2014 provides additional controls in regard to:

- The provision of customer/short-term users' bicycle spaces in close proximity to pedestrian entrances, with a minimum of 50% of spaces being covered; and
- The provision of lockers, changerooms and showers for employees, with all bicycle parking spaces provided in secure covered areas.

It is proposed that the final design will provide full compliance with these additional DCP 2014 requirements, and that all bicycle parking spaces will be designed with reference to AS 2890.6.

7.4 Servicing

While DCP 2014 does not provide any specific requirements in regard to the provision of service/loading bays, the TIS Guidelines provide the following:

A Traffic Impact Statement should address:

- *The suitable location and adequate provision of loading, unloading, manoeuvring and parking of vehicles within that development or on the land.*
- *Movements of freight carrying vehicles associated with the proposal and how (the negative impact of) these movements are to be minimised – e.g. Limiting movements during busier working hours.*

The proposed provision of 3 loading bays at the rear of the Site is based on the experience of loading/servicing requirements at other Kaufland supermarkets, and is expected to provide more than adequate capacity to meet peak loading/servicing demands. In addition:

- The loading areas are entirely separated from the public parking areas.
- Service vehicle will use a dedicated service road along the southern boundary of the Site to access the service area, noting that this is a similar servicing proposal to that currently provided at Bunnings.

More broadly, all service areas will be designed to provide compliance with AS 2890.2.

8 Traffic Assessment

8.1 Trip Generation

8.1.1 RMS Trip Rates – Supermarket

The traffic generation of the supermarket component of the proposed development has been assessed with reference to trip rates provided in the RMS Guide:

- Weekday PM Peak Hour:
  - Supermarket: 13.8 veh/hr per 100m^2 GLFA
  - Department / Discount Department Store: 5.1 veh/hr per 100m^2 GLFA
- Saturday Midday Peak Hour:
  - Supermarket: 14.7 veh/hr per 100m^2 GLFA
  - Department / Discount Department Store: 3.8 veh/hr per 100m^2 GLFA

It is noted that, according to the information provided by the Kaufland, Kaufland supermarkets generally include approximately 80:20 split of food/non-food items in their product offering, compared to a typical 95:5 split of food/non-food items offered in a standard major supermarket in Australia (Coles/Woolworths). Therefore, a refined trip generation rate for the Kaufland supermarket is effectively an 85:15 split of supermarket/discount department store rates to account for the 5% non-food offering that are already contained in standard major supermarkets (and therefore reflected in the base RMS Guide generation rate).

Additionally, the RMS Guide do not provide trips rates for the weekday AM peak period; based on our past experience of similar sites, the weekday AM peak period trip rates generally represent approximately 30% of the weekday PM peak period trip rate.

Accordingly, the following blended trip generation rates are adopted for the supermarket component of the proposed development:

- Weekday AM Peak Hour: 3.8 veh/hr per 100m^2 GLFA
- Weekday PM Peak Hour: 12.5 veh/hr per 100m^2 GLFA
- Saturday Midday Peak Hour: 13.1 veh/hr per 100m^2 GLFA

8.1.2 RMS Trip Rates – Retail and Shopping Street

For the general retail and 'shopping street' component of the proposed development, the trip generation has been also been assessed with reference to trip rates provided in the RMS Guide.

Similar to the supermarket component, the weekday AM peak period trip rates is adopted as 30% of the weekday PM peak period trip rate in the absence of specific rates provided in RMS Guide and RMS Update:

- Weekday AM Peak Hour: 1.7 veh/hr per 100m^2 GLFA
- Weekday PM Peak Hour: 5.6 veh/hr per 100m^2 GLFA
- Saturday Midday Peak Hour: 10.7 veh/hr per 100m^2 GLFA

8.1.3 RMS Trip Rates - Office

The RMS Guide provides the following summary trip rates for office floorspace:

- 2 vph per 100m^2 GFA during the PM peak hour.

It is noted that this rate has historically been adopted for the AM peak hour also.

The RMS Guide Update provides the following summary trip rates for office floorspace:

- 1.6 vph per 100m^2 GFA in the AM peak hour; and
- 1.2 vph per 100m^2 GFA in the PM peak hour.

To provide a conservative assessment, specifically noting the availability of on-site staff parking, the assessment has adopted the RMS Guide trip rates.

8.1.4 Trip Generation Summary

With reference to section above, Table 7 below provides a summary of the trip generation of the Site further to the application of the RMS trip rates.

Table 7: Site Trip Generation Summary

Land use	GFA (m^2)	AM Trip Rate ($100m^2$)	AM Trips (veh/hr)	PM Trip Rate ($100m^2$)	PM Trips (veh/hr)	Sat Trip Rate ($100m^2$)	Sat Trips (veh/hr)
Supermarket	3921	3.8	147	12.5	490	13.1	514
Retail	525	1.7	9	5.6	29	10.7	56
Shopping Street	330	1.7	6	5.6	18	10.7	35
Office	1825	2.0	37	2.0	37	0.0	0
Total			198		575		605

8.1.5 Passing Trade

The RMS Guide states that for retail centres under 10,000m^2 GLFA, approximately 25% of trips are 'linked trips', for example someone diverting to the centre on the way to/from work. As such, the *additional* traffic generated by the Site further to the Proposal would actually represent 75% of the total traffic generation of the Site per **Table 7** above.

8.2 Trip Distribution & Assignment

8.2.1 Directional Distribution

There is no information available to suggest that the directional distribution of trips currently observed as the Site would be significantly altered further to the change in Site usage.

8.2.2 Arrival & Departure Distribution

Based on our past assessments of retail and commercial developments, **Table 8** provides a summary of the assigned arrival and departure distribution of trips for the different components of the Site.

Table 8: Arrival & Departure Distribution

Trip Distribution	AM Arrival	AM Departure	PM Arrival	PM Departure	Sat Arrival	Sat Departure
Supermarket	60%	40%	40%	60%	50%	50%
Retail	60%	40%	40%	60%	50%	50%
Shopping Street	60%	40%	40%	60%	50%	50%
Office	80%	20%	20%	80%	50%	50%

8.2.3 Trip Assignment

With reference to sections above, the peak hour trip generation of the Site has been assigned to the key local intersections for the forecast year 2029, as shown in the figures below.

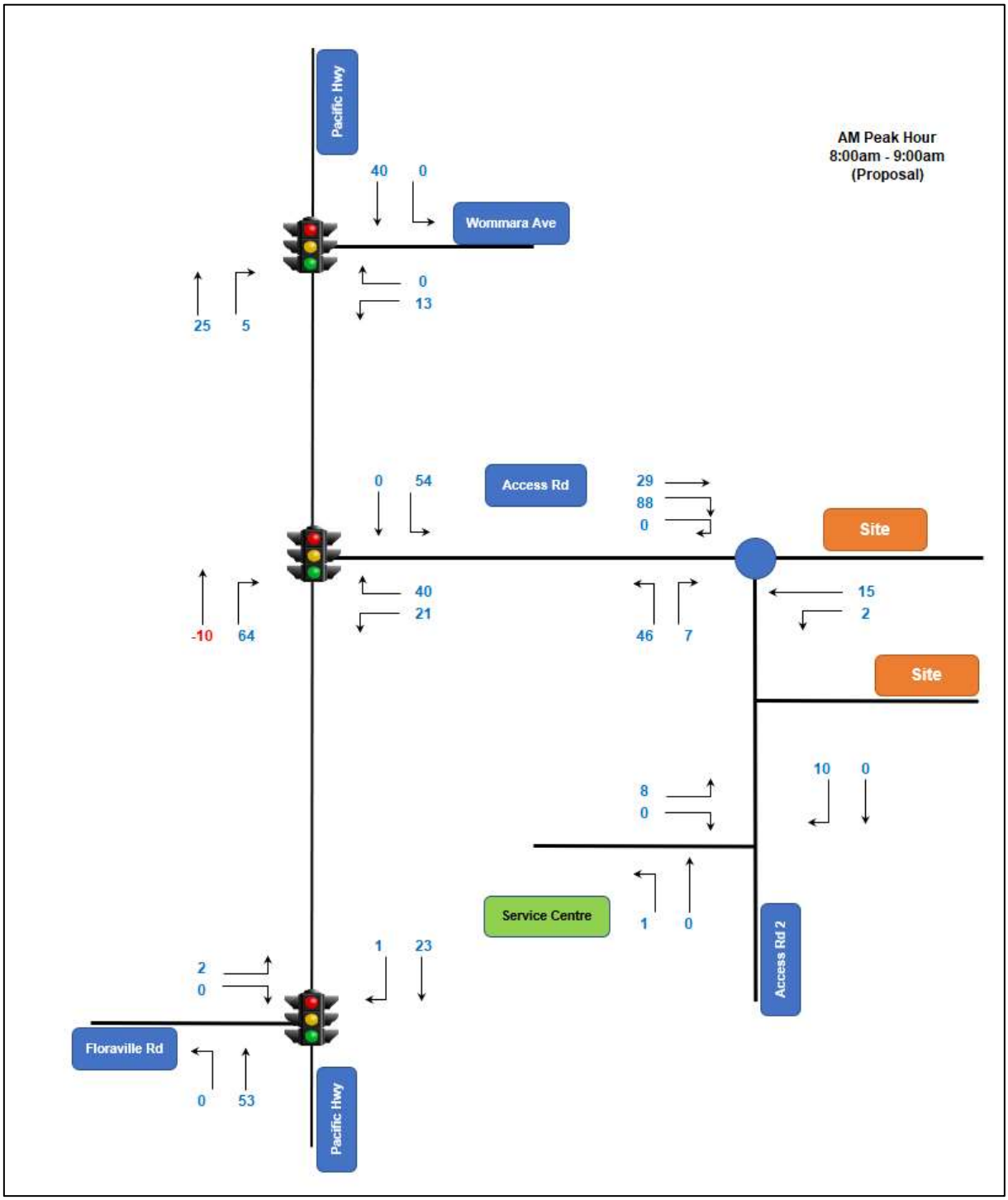

Figure 16: Proposal Friday AM Peak Hour Traffic Flows

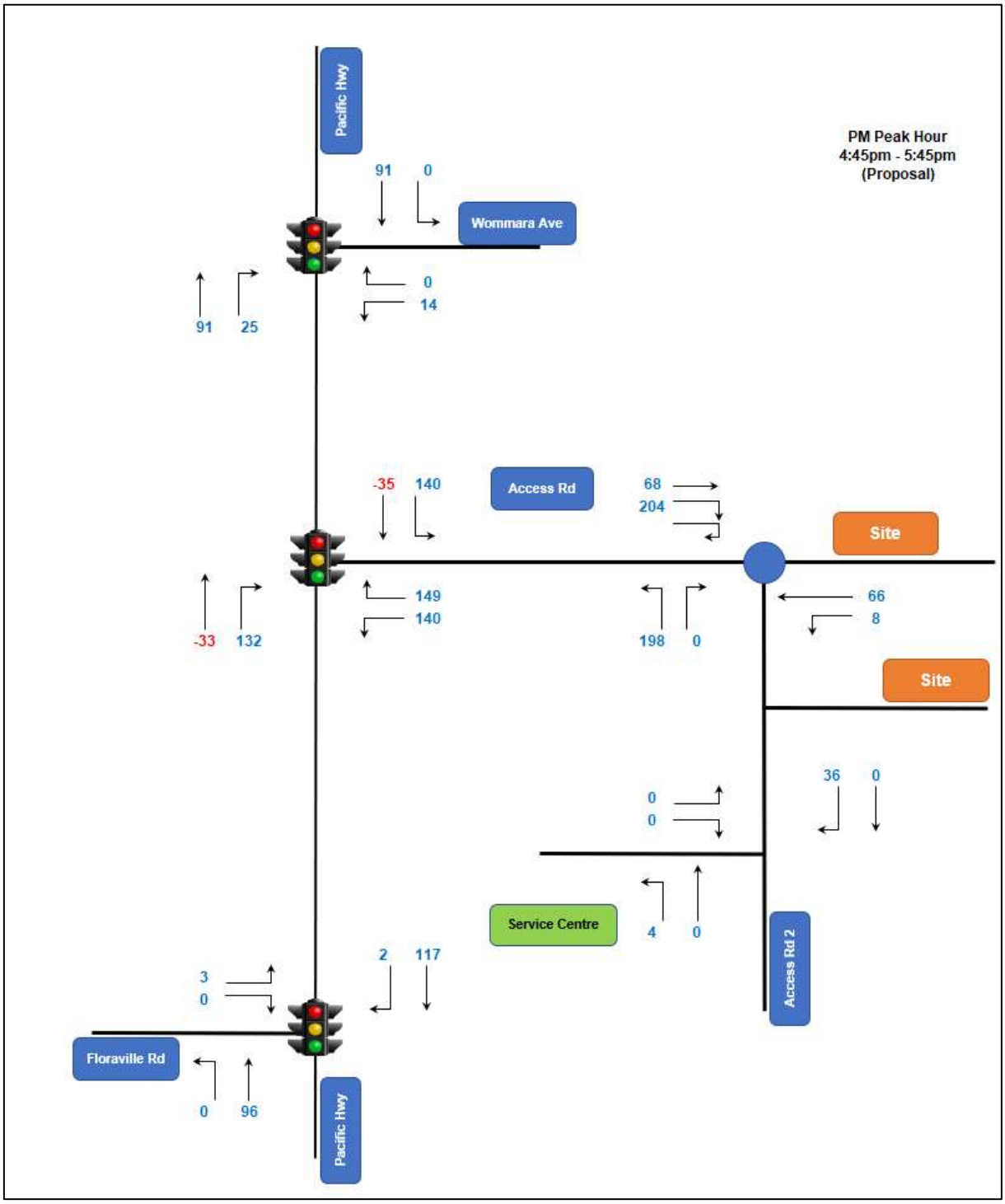

Figure 17: Proposal Friday PM Peak Hour Traffic Flows

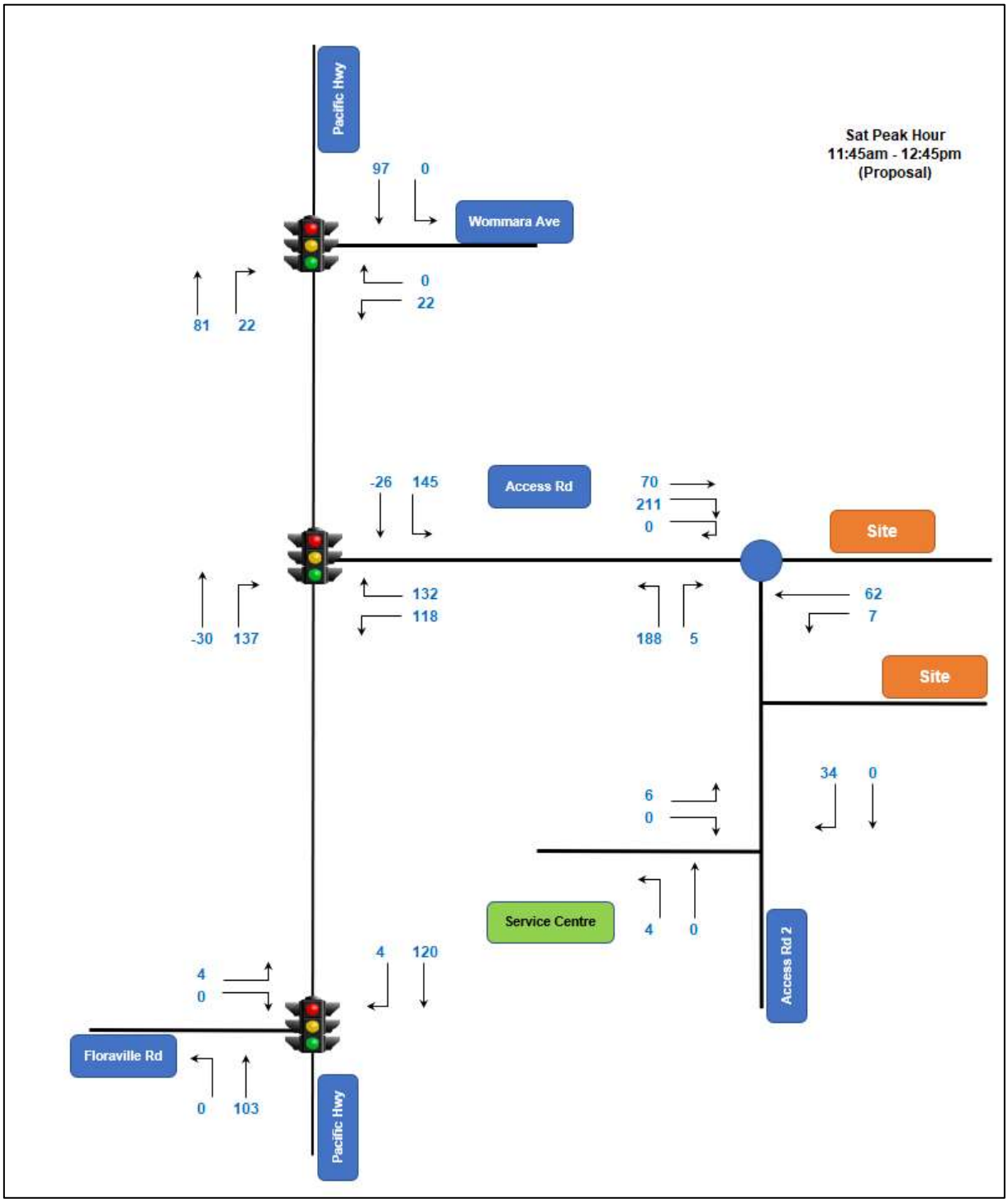

Figure 18: Proposal Friday Saturday Peak Hour Traffic Flows

8.3 Traffic Impacts

8.3.1 Comparative Trip Generation

An initial means of examining the relative impacts of the Proposal is a comparison of the traffic generation of the Site further to the Proposal with the existing Bunnings traffic generation. With reference to sections above, the comparative traffic generation of the Site during the key peak periods in summarised in **Table 9**.

Table 9: Trip Generation – Comparison (veh/hr)

Period	Existing	Proposed	Net Increase
Weekday AM Peak Hour	219	198	- 21
Weekday PM Peak Hour	245	575	+ 330
Saturday Midday Peak Hour	626	605	- 21

Table 9 indicates that the Proposal will result in a higher number of trips being generated by the Site during weekday evening peak hours when compared to existing operations; however, it will generate slightly less trips during weekday morning and Saturday midday peak hours.

8.3.2 Future Intersection Operations

The operation of the key intersections in the forecast year 2029 further to the Proposal has again be assessed using the SIDRA model. The results of the analysis are provided in **Table 10** below, while **Table 11** provides a summary of the Existing 2019, Base 2029 and Base 2029 + Proposal SIDRA results.

Table 10: Base 2029 + Proposal Intersection Operations

Base 2029 + Proposal Intersection Operations	Peak Period	Delay	LoS
Pacific Hwy & Wommara Ave	AM	22	B
	PM	150	F
	Sat	130	F
Pacific Hwy & Site Access	AM	12	A
	PM	22	B
	Sat	49	D
Pacific Hwy & Floraville Rd	AM	58	E
	PM	13	A
	Sat	15	B
Internal Site Roundabout	AM	29	C
	PM	29	C
	Sat	29	C

Table 11: SIDRA Intersection Operations Summary

Intersection Operations Summary	Peak Periods	2019 (Existing)		Base 2029		Base 2029 + Proposal	
		Delay	LoS	Delay	LoS	Delay	LoS
Pacific Hwy & Wommara Ave	AM	19	B	23	B	22	B
	PM	19	B	126	F	150	F
	SAT	17	B	115	F	130	F
Pacific Hwy & Site Access	AM	12	A	13	A	12	A
	PM	6	A	21	B	22	B
	SAT	21	B	42	C	49	D
Pacific Hwy & Floraville Rd	AM	16	B	58	E	58	E
	PM	11	A	15	B	13	A
	SAT	13	A	16	B	15	B
Internal Site Roundabout	AM	24	B	24	B	29	C
	PM	24	B	24	B	29	C
	SAT	24	B	24	B	29	C

With reference to the tables above:

- AVD at the intersection of Pacific Highway & Wommara Avenue increases in the weekday PM and Saturday peak hours. Again, the primary delay relates to the southbound Pacific Highway approach to Wommara Avenue.
- The AVD and LoS - whilst nearing capacity in both future year (within and without development) scenarios - remain unchanged at the intersection of Pacific Hwy & Floraville Rd during weekday AM peak hours. Again, the primary delay relates to the northbound Pacific Highway approach to Floraville Road.
- A minor increase in AVD is reported at the Pacific Highway & Site intersection in the Saturday peak hour (7 seconds), which results in LoS being reduced to LoS D. However, a LoS D is considered acceptable on a regional route during the peak hour.

8.4 Impact Minimisation

While the Proposal in and of itself generates only a moderate number of additional vehicle trips to the key intersections north and south of the Site, the impact of those additional trips disproportionally impacts future levels of service given the poor background (Base 2029) intersection operations.

As such, Ason Group has examined the benefits arising from a number of different upgrade options for the Pacific Highway, again noting that upgrades will be required regardless of the Proposal to accommodate base traffic flows by 2029. These potential upgrades are described below.

8.4.1 Pacific Highway Upgrade: 3 Southbound Lanes Site to Floraville Road

This upgrade (termed Option 1) would provide for an additional Pacific Highway southbound through lane from north of the Site through Floraville Road, as shown in **Figure 19** below.

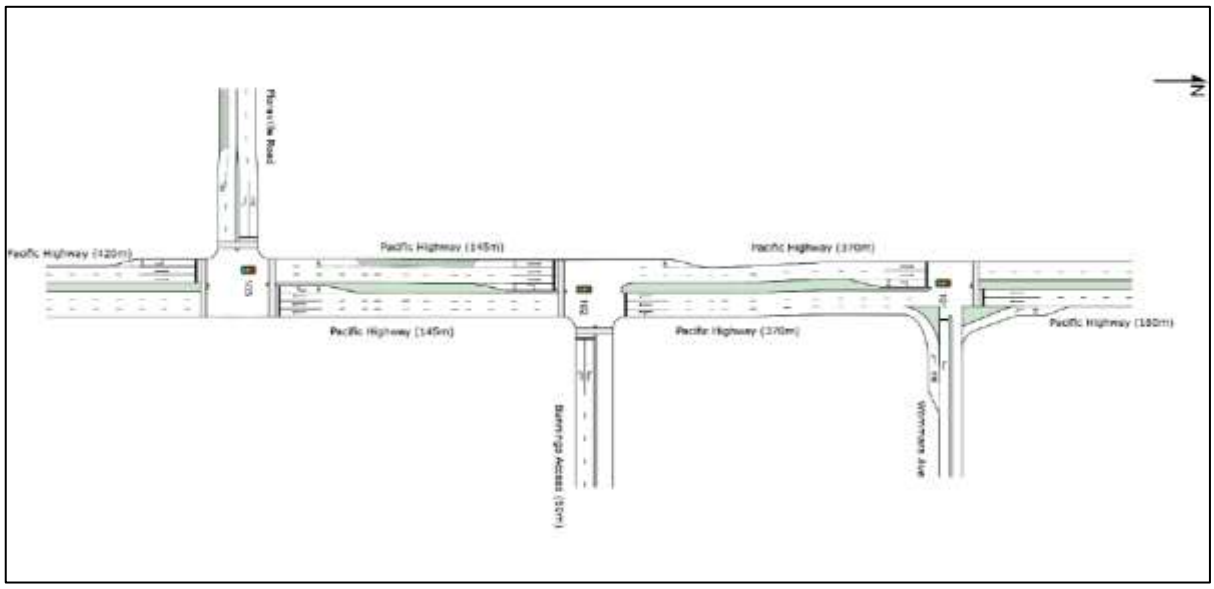

Figure 19: Pacific Highway Upgrade: 3 Southbound Lanes Site to Floraville Road

Intersection operations further to this upgrade are detailed in **Table 12**.

Table 12: Intersection Operations, Pacific Highway Upgrade Option 1

Intersection Operations Upgrade Option 1	Peak Periods	Base 2029		Base 2029 + Proposal	
		Delay	LoS	Delay	LoS
Pacific Hwy & Wommara Ave	AM	23	B	22	B
	PM	45	D	59	E
	SAT	20	B	20	B
Pacific Hwy & Bunnings Access	AM	13	A	14	A
	PM	7	A	18	B
	SAT	24	B	24	B
Pacific Hwy & Floraville Rd	AM	58	E	58	E
	PM	12	A	12	A
	SAT	14	A	14	A

This standard of upgrade would be required to accommodate the Base 2029 traffic flows, regardless of the Proposal.

8.4.2 Pacific Highway Upgrade: 3 Southbound Lanes, Wommara Avenue to Floraville Road

This upgrade (termed Option 2) would provide for an additional Pacific Highway southbound through lane from just north of Wommara Avenue (generally utilising the existing left turn lane length) through Floraville Road, as shown in **Figure 20** below.

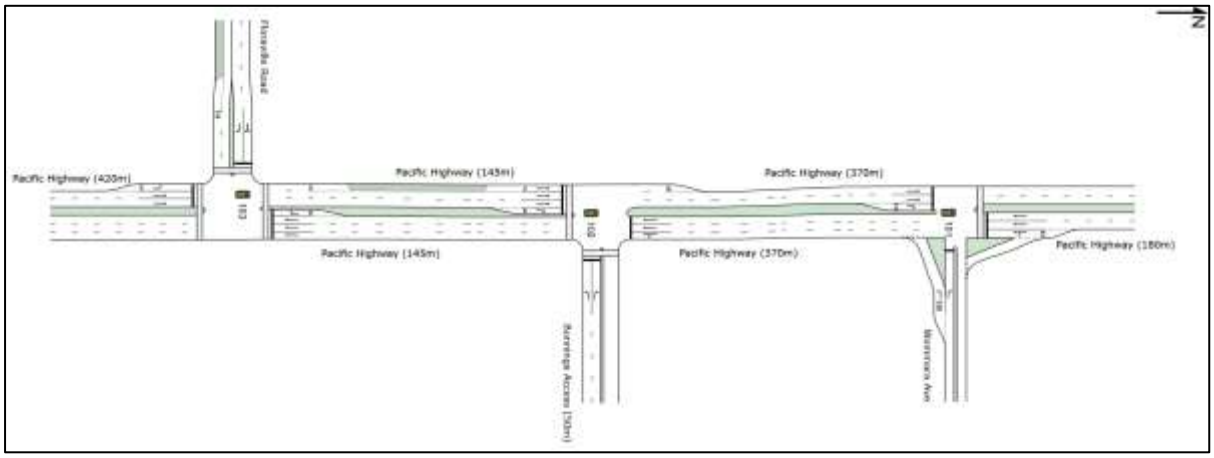

Figure 20: Pacific Highway Upgrade: 3 Southbound Lanes Wommara Avenue to Floraville Road

Intersection operations further to this upgrade are detailed in **Table 13**.

Table 13: Intersection Operations, Pacific Highway Upgrade Option 2

Intersection Operations Upgrade Option 2	Peak Periods	Base 2029		Base 2029 + Proposal	
		Delay	LoS	Delay	LoS
Pacific Hwy & Wommara Ave	AM	23	B	23	B
	PM	28	B	33	C
	SAT	19	B	19	B
Pacific Hwy & Bunnings Access	AM	14	A	14	A
	PM	7	A	13	A
	SAT	23	B	23	B
Pacific Hwy & Floraville Rd	AM	58	E	58	E
	PM	12	A	12	A
	SAT	14	A	14	A

This additional upgrade would therefore accommodate both Base 2029 and Base 2029 + Proposal conditions.

8.4.3 Additional Upgrade Options

Additional upgrade options have been examined which would further improve the operation of the Pacific Highway & Wommara Avenue intersection (under both Base 2029 and Base 2029 + Proposal conditions). These include:

- The removal of the on-street parking currently available in the Pacific Highway northbound kerbside lane (all day) between Floraville Road and the Narellan Pools driveway (south of Access Road 1).
- Further to the above, at the Pacific Highway & Floraville Road intersection, the introduction of a new (likely unsignalised) left turn slip lane, Pacific Highway to Floraville Road; this would in turn allow the existing left turn lane to be provided as an additional Pacific Highway northbound approach lane linking with the existing Pacific Highway northbound kerbside lane. With reference to the removal of on-street parking (as discussed above), the Pacific Highway would therefore provide three northbound lanes from south of Floraville Road to north of York Crescent.

- Further to the above, the additional extension of the Pacific Highway kerbside northbound lane from its current terminus north of York Crescent to a point north of Wommara Avenue. With reference to the options list above, the Pacific Highway would therefore provide three northbound lanes from south of Floraville Road to north of Wommara Avenue.

Additional detailed investigations of the future operation of the Pacific Highway through Belmont North will need to be undertaken in consultation with Council and the RMS so as to determine upgrades that would appropriately accommodate the Base 2029 traffic flows and the Proposal.

Notwithstanding, based on our analysis it is the view of Ason Group that upgrades which would accommodate the Base 2029 traffic flows must be determined simply to maintain efficient movements through this section of the Pacific Highway; and that the additional traffic generated by the Proposal could also be provided for through the introduction of additional upgrades which could be agreed with Council and the RMS.

9 Conclusions

Further to a detailed assessment of the Planning Proposal, Ason Group provides the following conclusions:

- The Site is currently a relatively high traffic generator (Bunnings) particularly during the weekday PM and Saturday peak hours. As such, the additional traffic generation of the Site is proportionally less than would generally be the case further to the introduction of retail development as proposed.
- While the local road network currently operates at an appropriate Level of Service (LoS) – particularly further to the coordination of the key Pacific Highway intersections from Wommara Avenue through Floraville Road - there are existing capacity constraints; the most significant of these constraints is the provision of only 2 Pacific Highway southbound lanes through the study area.
- By 2029, background traffic increases – assessed with reference to historical RMS count data – are such that a poor LoS F is reported at the Pacific Highway & Wommara Avenue intersection (in the weekday PM and Saturday peak hours); and LoS E at the Pacific Highway & Floraville Road intersection (in the weekday AM peak hour). **These conditions will occur regardless of the Proposal**.
- Further to the addition of the Proposal's traffic to the Base 2029 traffic flows:
  - The Pacific Highway & Wommara Avenue intersection continues to operate at a LoS F in the weekday PM and Saturday peak hours, but with generally increased average vehicle delay (AVD).
  - The Pacific Highway & Floraville Road intersection also retains the same LoS E during the weekday AM peak hour. The intersection is generally unaffected by the Proposal.
  - The Pacific Highway & Site intersection AVD increases by 7 seconds in the Saturday peak hour, resulting in a LoS change from LoS C to LoS D; however, it should be noted that the Base 2029 AVD is on the cusp of a LoS D (reporting AVD of 42.0 seconds, where LoS D is reported from 42.5 seconds). Notwithstanding, a LoS D is acceptable on a major highway (particularly given a 10-year forecast).
- Based on our discussions with Council and the RMS, it has been determined that **there are no current plans to upgrade this section of the Pacific Highway to cater for future traffic flows** (i.e. the Base 2029 traffic flows). While commitments have been made in the past to examine the existing constraints, Ason Group understands that the RMS is only now (2019) developing a scope of work for a Lake Macquarie wide traffic study; the timeframe (and indeed final scope) of this study is unknown.

- Notwithstanding, Ason Group has undertaken preliminary testing of a number of potential upgrades of the Pacific Highway (between Wommara Avenue and Floraville Road) designed to increase capacity to accommodate both Base 2029 traffic flows and the Proposal.
- The primary constraint identified in the SIDRA modelling is the southbound capacity in the Pacific Highway, particularly during the weekday AM and Saturday peak hours. **The provision of an additional Pacific Highway southbound lane from south of Wommara Avenue through to south of Floraville Road has been determined as an essential upgrade requirement to appropriately cater for Base 2029 traffic flows**. Further to this upgrade, both the Pacific Highway & Wommara Avenue and Pacific Highway & Access Road 1 intersections operate at LoS C or better through all key peak periods.
- **To appropriately accommodate the Proposal's traffic generation (and further improve Base 2029 conditions) an additional short southbound lane north of Wommara Avenue (i.e. a third approach lane in the Pacific Highway) would be required**. Further to this additional upgrade, both the Pacific Highway & Wommara Avenue and Pacific Highway & Access Road 1 intersections operate at LoS C or better through all key peak periods for Base 2029 + Proposal traffic flows.
- The intersection of Pacific Highway & Floraville Road operates at a LoS E in the AM peak hour under both Base 2029 and Base 2029 + Proposal conditions even further to the upgrades discussed above, with the primary constraint being the capacity of the Pacific Highway southern approach. Background testing by Ason Group indicates that AVD could be further reduced at this intersection (and through all the key intersections) further to the following additional upgrades:
  - The removal of the existing on-street parking available in the Pacific Highway northbound kerbside lane between Floraville Road and the Narellan Pools driveway;
  - Further to the above, the provision of a new left turn slip lane, Pacific Highway south to Floraville Road, which in turn would provide for 3 northbound through lanes from south to Floraville Road to north of York Crescent; and
  - Further to the above, the extension of this third northbound through lane from its current terminus north of York Crescent to a location north of Wommara Avenue.
- There is no question that further detailed investigations and consultation with Council and the RMS will be required to finalise any future upgrades. Notwithstanding, **it is the conclusion of Ason Group that essential upgrades which appropriately accommodate the Base 2029 demand, and additional upgrades which would accommodate the Proposal, can be determined further to these investigations and consultation**.
- Finally, the Proposal will provide a level of car parking which meets the requirements of DCP 2014, as well as an appropriate allocation of bicycle, accessible and motorcycle parking. All access, parking and servicing areas would necessarily be designed to provide compliance with the relevant Australian Standards.

[end]