www.bgeeng.com

711 HUNTER ST NEWCASTLE

TRAFFIC IMPACT ASSESSMENT

FOR: Luke McNamara – Development Manager
CLIENT: Hunter Street JV Co Pty Ltd
DOCUMENT NO: N21112_RPT_001 REV / B
DATE: 17/05/2023

TABLE OF CONTENTS

TABLE OF FIGURES

LIST OF TABLES

Document Control

Revision	Date	Description	Prepared	Reviewed	Approved
A	02/11/2022	Issued for DA submission	WL/MK	MK	SP
B	19/05/2023	Revised with updated modelling for DA submission	WL/MK	MK	SP

1 INTRODUCTION

BG&E has been engaged to undertake a Traffic Impact Assessment (TIA) of the proposed mixed use development at 711 Hunter Street, Newcastle.

The TIA has been prepared by BG&E on behalf of Hunter Street JV CoP/L (the applicant. It accompanies a Statement of Environmental Effects (SEE) in support of a Development Application (DA) at 711 Hunter Street, Newcastle West (the site).

This TIA comprises the following:

- A traffic study of the area surrounding the site;
- A traffic impact assessment of the proposed development including the predicted traffic generation and its impact on existing road and intersection capacities; and
- A car parking demand assessment including bicycle parking for the proposed development against statutory requirements.

The development has undergone an Architectural Design Competition where three competitors put forward their designs in accordance with the brief. The Plus Architecture scheme was recommended by the Jury as the winning scheme in the competitive design process.

The overall outcome of the proposal aims to develop a mixed-use precinct with high quality tower forms providing a positive relationship to the immediate surrounds and acknowledging the surrounding heritage context. The proposal intends to act as a landmark for Newcastle West with a curated mix of eclectic and creative retail, F&B and business/retail opportunities activating the ground levels.

The key features are summarised below:

- Demolition of the existing business/retail premises and ancillary structures on-site;
- Construction of a mixed-use precinct forming active ground and podium levels reaching 5 storeys of retail and business/retail tenancies, with two tower forms for residential apartments reaching 26 storeys comprising of 258 apartments;
- Podium level car park for 300 cars incorporated within the podium levels;
- Communal open space for residents located on level 5 and 17;
- Vehicle access to the site via Little King Street;
- Associated landscaping with the public domain improvements;
- An urban plaza fronting National Park Street providing opportunities for activation and public art; and
- Construction of ancillary infrastructure and utilities as required.

It is noted that the overall development will form two separate concurrent DA's. Stage 1 will form the northern tower and podium elements and Stage 2 will form the southern tower and podium elements. These separate DA components are explored further below.

1.1 Stage 1

The northern tower will include business/retail and retail tenancies at ground level which will be accessible via National Park Street, Little King Street and Hunter Street. The podium levels will be situated above ground and contain car parking for both visitors and residents, accessed via Little King Street. Level 5 to Level 25 will contain a mixture of residential apartments ranging from 1 bedroom to 3 bedrooms. A numerical breakdown of Stage 1 is shown below:

- 136 apartments including: 35 one bedroom, 74 two bedroom, 26 three bedroom, 1 four bedroom.
- Total GFA: 13,581 sqm
- Floor space ratio: 5.41:1
- Total car parking spaces: 165 spaces over 4 podium levels

1.2 Stage 2

The southern tower will include business/retail and retail tenancies at ground level which will be accessible via National Park Street, Little King Street and Hunter Street. The podium levels will be situated above ground and contain car parking for both visitors and residents, accessed via Little King Street. Level 1 to Level 25 will contain a mixture of residential apartments ranging from 1 bedroom to 3 bedrooms.

- 122 apartments including: 35 one bedroom, 72 two bedroom, 15 three bedroom.
- Total GFA: 12,027 sqm
- Floor space ratio: 5.43:1
- Total car parking spaces: 135 spaces over 4 podium levels

Both stages will include surrounding landscaping, public domain works and green spaces. The strata and stratum approach are detailed further in the SEE.

1.3 Site Details

Site address: 711 Hunter Street, Newcastle West.

Lot and DP: as Lot 1 in DP 867617.

Site area: 4,724 m^2.

Boundaries: The site has frontages of 48m to Hunter Street to the north, 113m to National Park Street to the east and 43m to King Street to the south.

Heritage Significance: Not identified as a heritage item but is adjoining an identified local heritage item to the south-west, namely the Army Drill Hall (I508) located at 498 King Street and is diagonally adjacent to the Bank Corner which is a locally listed heritage item located at 744 Hunter Street. The site is also located within the Newcastle City Centre Heritage Conservation Area

Figure 1 - Site Location (Urbis, 2022)

2 BACKGROUND & EXISTING CONDITIONS

2.1 Location and Land Use

As presented in Section 1.3, the subject site is located at 711 Hunter Street, Newcastle. The site is bound by Hunter Street, National Park Street and the King Street Service Road.

The existing site is currently occupied by two adjoining 3-storey buildings. The existing business/retail operations comprise of two musical instrument stores in the northern building and a retail (Slimes Boardstore) and a fitness centre (Anytime Fitness) in the southern building.

The location of the subject site and surrounding area is presented in Figure 2 and an aerial photograph is presented in Figure 3.

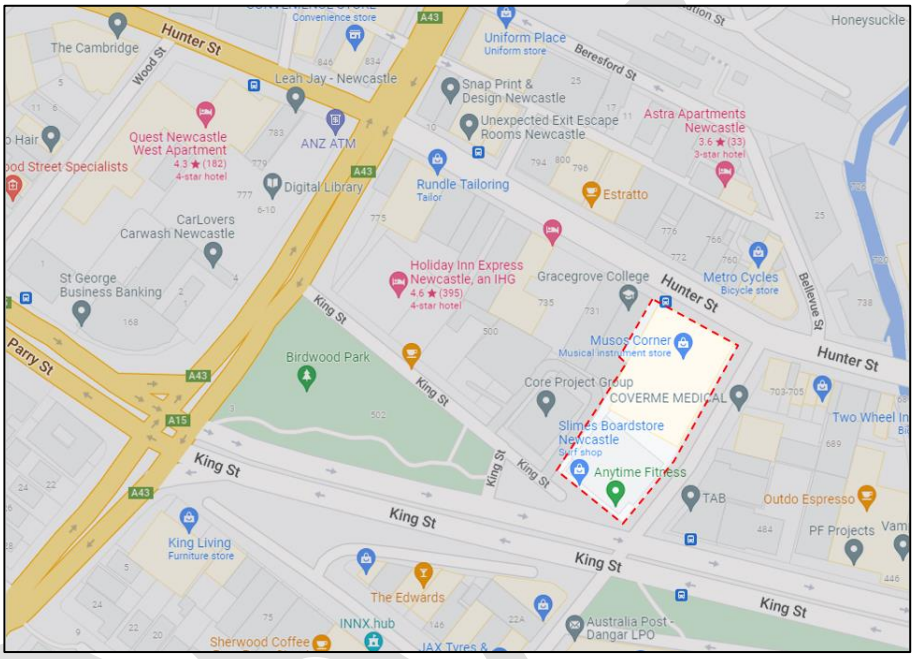

Figure 2 - Subject Site Locality (Google Maps, 2022)

Figure 3 - Subject Site (Nearmap, 2022)

Currently, the subject site has one vehicular access at National Park Street which leads to an off-street carpark as illustrated in Figure 4.

Figure 4 - Existing Vehicular Access via National Park Street (Google Maps, 2022)

2.2 Planning Zones

The total site area is approximately 4724 m^2 and is zoned B3 – Business/retail Core in accordance with Newcastle LEP (2012) within the Newcastle City Centre area, as presented in Figure 5.

The surrounding area is generally business/retail whist a SP2 - Road Infrastructure Zone is located approximately 180m west of the site and a SP2 – Railway is about 110m north of the subject site.

Figure 5 - Planning Scheme Zones (NSW Government, 2022)

2.3 Road Network

2.3.1 National Park Street

National Park Street is a local collector road under the authority of Newcastle City Council. The road runs in a southwest–northeast orientation between Glebe Road to the south and Hunter Street to the north.

The road features a carriageway width of approximately 12.7m. The road features a single traffic lane in each direction with kerbside parallel parking, a footpath on both sides of the road and several large trees on the eastern side of the road. The on-road parking features restricted 1P and 2P parking between 9AM-5PM Monday to Friday and 9AM-12PM on Saturdays. There is also a loading zone located on the eastern side of the road.

Adjacent to the subject site, National Park Street is subject to a posted speed limit of 50km/hr. A street view representation of the National Park Street is presented in Figure 6.

Figure 6 - National Park Street - Facing Northeast (Google Maps, 2022)

2.3.2 Hunter Street

Hunter Street is a major collector road under the authority of Newcastle City Council. The road runs a west-east orientation between Stewart Avenue to the west and Pacific Street to the east.

Adjacent to the subject site, Hunter Street features two traffic lanes in each direction with a carriageway width of approximately 12m and is subject to a posted speed limit of 60km/h. Kerbside ticketed parking is available with a time restriction of 2P between 9AM-5PM Monday to Friday and 9AM-12PM on Saturday. There is also a bus stop located on Hunter Street fronting the subject site.

A street view representation of the Hunter Street, near the development site, is presented in Figure 7.

Figure 7 - Hunter Street - Facing West (Google Maps, 2022)

2.3.3 King Street

King Street is a major Regional Road under the authority of Newcastle City Council. It runs in an east-west orientation between Stewart Avenue to the west and Darby Street to the east. King Street provides a connection to the inner suburbs of Hamilton and Cooks Hill.

In the vicinity of the development site, King Street features a five-lane, split carriageway and is subject to a posted speed limit of 60km/h. The eastbound carriageway features a two-lanes with an approximate carriageway width of 8.3m whilst the westbound carriageway features a three-lanes with an approximate carriageway width of 9.8m.

A street view representation of King Street in vicinity of the development site facing west and east is presented in Figure 8 and Figure 9 respectively.

Figure 8 – King Street – Facing West (Google Maps, 2022)

Figure 9 – King Street – Facing East (Google Maps, 2022)

2.3.4 King Street – Service Road

The King Street 'Service Road' (Little King Street) runs parallel to King Street and provides access to several businesses and residences. Access to the service road is provided at intersections with Stewart Avenue and King Street.

The Service Road features a single carriageway with a traffic lane in each direction and an approximate width of 11.8m. The road is subject to a posted speed limit of 50 km/hr and feature kerbside, ticketed parking is available with restrictions varying from ¼P to 2P.

A street view representation of the King Street Service Road is presented in Figure 10.

Figure 10 – King Street Service Road (Google Maps, 2022)

2.3.5 Stewart Avenue

Stewart Avenue is a major Arterial Road under the authority of the NSW State Government. The road runs a northeast – southwest orientation through Newcastle West and Hamilton South.

In the vicinity of the development site, Stewart Avenue features a 4 lane, split carriageway arrangement and is subject to a posted speed limit of 60km/h. The northeast bound carriageway has a width of approximately 7.2m whilst the southwest bound carriageway has a width of approximately 8m. The road also features an on-road bike lane and dedicated turning lanes for the adjacent intersections.

A street view representation of Stewart Avenue in vicinity of the development site facing northeast and southwest is presented in Figure 11 and Figure 12 respectively.

Figure 11 - Stewart Avenue – Facing Northeast (Google Maps, 2022)

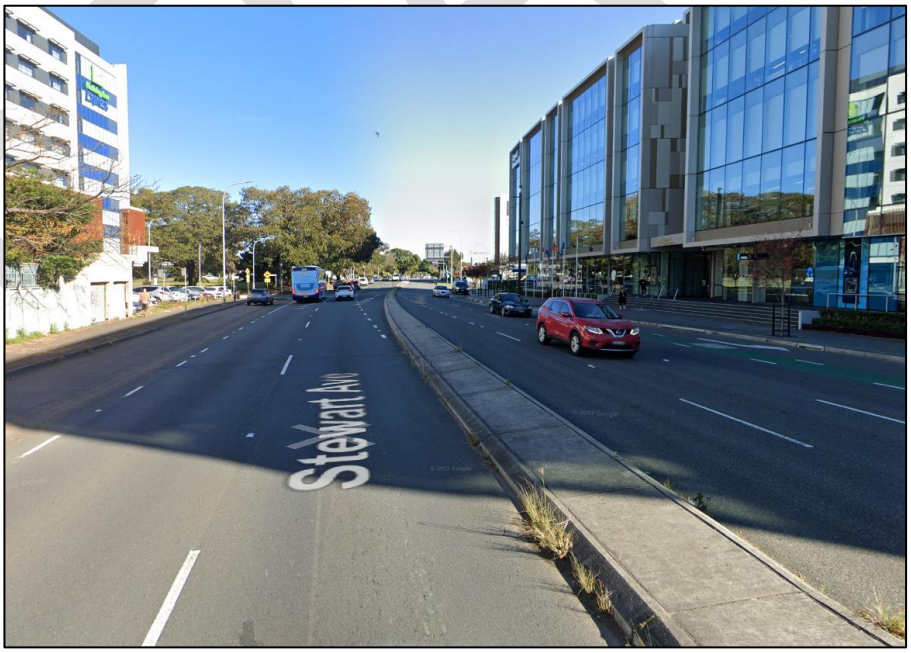

Figure 12 – Stewart Avenue – Facing Southwest (Google Maps, 2022)

2.4 Public Transport

The development site has excellent access to all forms of public transport including light rail, heavy rail, bus services and ferry services.

Newcastle Transport (Keolis Downer) runs the current public transport services in the area adjacent to the site. There are two bus stops in close vicinity to the current site; one located at the northern frontage of the site along Hunter Street, which services the Route 11, 12, 13, 22, 24 & 47 bus services . The other is located at the northeast corner of the intersection of National Park Street and King Street and services the Route 22, 23, 10X, 714 & 836 bus services.

Further, Newcastle Interchange is located 300m away and provides access to Central Coast & Newcastle Line and Hunter Line.

The public transport provisions adjacent to the site are illustrated in Figure 13.

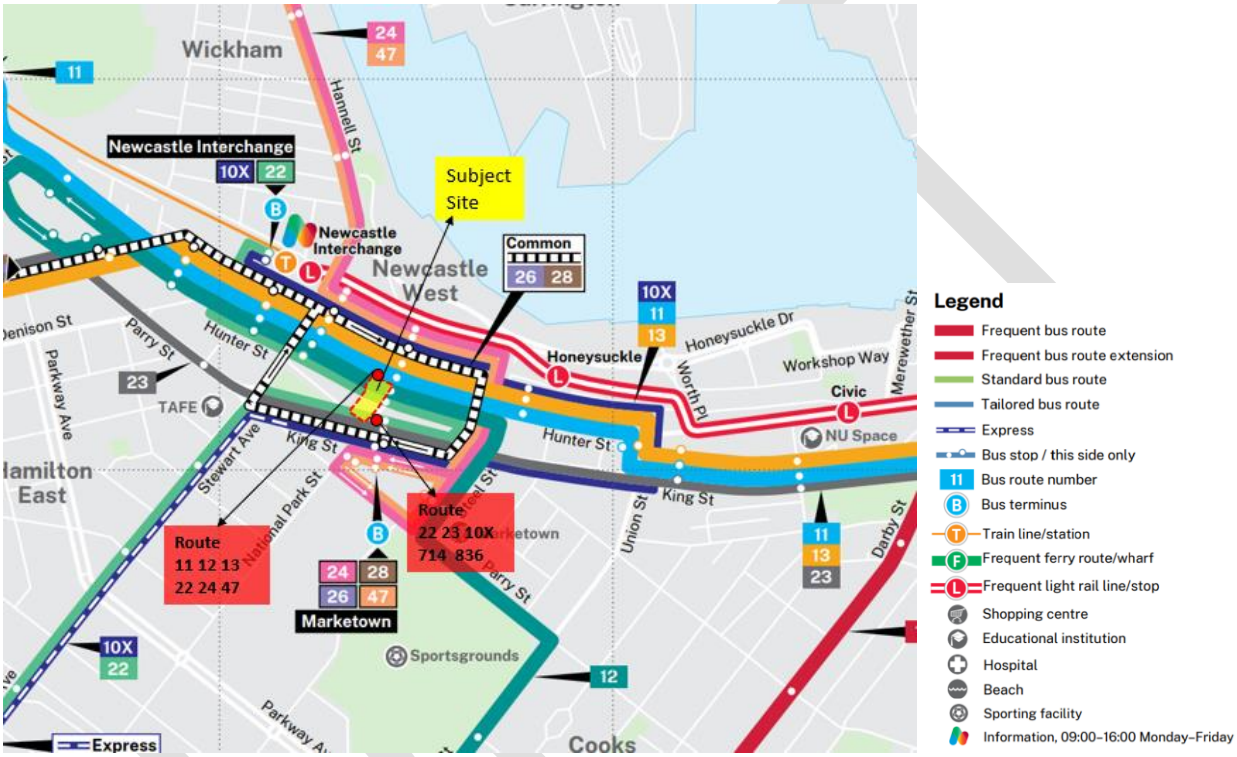

Figure 13 - Newcastle Transport Network Map (NSW Government, 2022)

2.5 Bicycle Facilities

There are some dedicated bicycle provisions within the vicinity of the site as presented in Figure 14. Cycle routes can be found along sections of the following roads:

- King Street
- National Park Street
- Stewart Avenue
- Hunter Street
- Corlette Street
- Laman Street
- Auckland Street
- Dumaresq Street
- Parkway Avenue

Adjacent to the site, King Street has marked, on-road cycle lanes in both directions as illustrated in Figure 15. Further, as mentioned in Section 2.3. of this report, Stewart Avenue also has on-road bike lanes in both directions.

Bicycle parking facilities, in the form of bicycle racks, are also available along the King Street Service Road and Hunter Street.

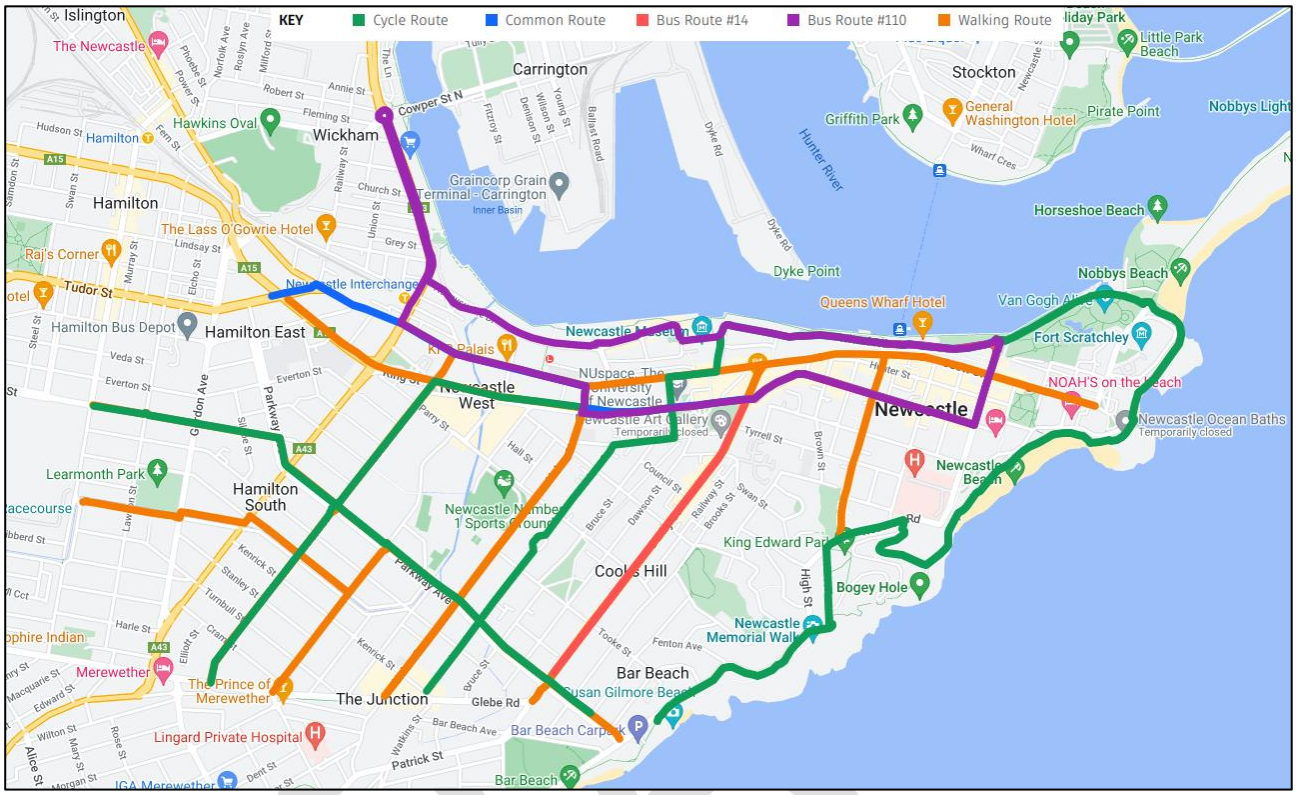

Figure 14 – Active Travel Map (UON, 2022)

Figure 15 - On-Road Bike Lane Along King Street (Google Maps, 2022)

3 DEVELOPMENT PROPOSAL

As specified in Section 1 of this report, the proposal involves the demolition of the existing two adjoining 3-storey buildings and the construction of a shop top housing development. Overall, the proposed development comprises two, multi-storey buildings with carparking from Level 1 to Level 4, business/retail tenancies from the ground floor to Level 2 and residential units over Level 1 to Level 25.

The construction of the development is proposed to be staged and it is envisaged that the northern portion of the building will be constructed first with the southern portion to follow.

Specifically, the development involves:

- The demolition of the 2 adjoining 3-storey buildings and the associated carpark.
- Two stages of construction:
    - Stage 1: Construction of the northern side building comprising:
        - 35 x one-bedroom units
        - 74 x two-bedroom units
        - 26 x three-bedroom units
        - 1 x four-bedroom unit
        - Approx. 614m^2 of business/retail space
    - Stage 2: construction of the southern side building comprising:
        - 35 x one-bedroom units
        - 72 x two-bedroom units
        - 15 x three-bedroom units
        - Approx. 529m^2 of business/retail space
- Removal of the existing vehicular access at National Park Street.
- Construction of new internal roadways and driveway, and a new vehicular access to the King Street Service Road.

4 TRAFFIC GENERATION

4.1 SEPP Considerations

Based on the criteria stipulated in Section 2.121 and Schedule 3 of the State Environmental Planning Policy (SEPP), it is anticipated that the development application will not need to be referred to TfNSW based on the following:

- The development does not have access directly from a classified road or within 90m from a road classified road.
- The business/retail (commercial) premises associated with the development is less than 10,000m^2 in GFA under both stages.
- The residential portion of the development is less than 300 dwellings under both stages.

4.2 Existing Traffic Conditions

As part of this assessment, BG&E engaged Trans Traffic Survey to undertake traffic data collection for a number of intersection adjacent to the development site. The collection of data is considered essential in this assessment to understand the existing traffic condition and set a base line to compare the post-development scenario to. Further, the intersection turning counts serve as input into the SIDRA analysis which aims to quantify the traffic impact the development will have on the adjacent intersections.

Data collection was undertaken for the AM & PM peak on the 10th of August 2022 for the following intersections:

- King Street & National Park Street.
- Stewart Avenue & King Street.
- King Street & King Street Service Road.
- Hunter Street & National Park Street.

Peak hour volumes for the above roads are presented below in Table 1.

Table 1 – 2022 Peak Hour Volumes

ROAD	SECTION	AM V/HR	PM V/HR
King Street	West of Little King Street (WB)	1448	1183
King Street	East of Little King Street (EB)	1080	1460
Little King Street	North of King Street (WB)	234	238
National Park Street	North of King Street	26	441
National Park Street	South of King Street	58	520
Stewart Avenue	North of King Street	973	1218
Stewart Avenue	South of King Street	1250	823
Hunter Street	West of National Park Street	752	508
Hunter Street	East of National Park Street	477	695

4.3 Road Capacity

Though the capacity of roads is generally determined by assessing the capacity of intersections, Table 4.3 of the RMS' RTA Guide to Traffic Generating Developments provides some guidance on mid-block capacities for urban roads and likely levels of service as presented in Table 2.

Table 2 – Mid-Block Capacoty (RTA, 2002).

Typical mid-block capacities for urban roads with interrupted flow

Type of Road	One-Way Mid-block Lane Capacity (pcu/hr)	
Median or inner lane:	Divided Road	1,000
	Undivided Road	900
Outer or kerb lane:	With Adjacent Parking Lane	900
	Clearway Conditions	900
	Occasional Parked Cars	600
4 lane undivided:	Occasional Parked Cars	1,500
	Clearway Conditions	1,800
4 lane divided:	Clearway Conditions	1,900

Based on the RTA mid-block capacities, the capacity of the roads located within the vicinity of the sites has been determined and is presented in Table 3.

Table 3 – 2022 Mid-block Capacity (ADD)

ROAD	SECTION	CAPACITY (V/HR)
King Street	West of Little King Street (WB)	3800
King Street	East of Little King Street (EB)	3800
Little King Street	North of King Street (WB)	900
National Park Street	North of King Street	900
National Park Street	South of King Street	900
Stewart Avenue	North of King Street	3800
Stewart Avenue	South of King Street	3800
Hunter Street	West of National Park Street	3000
Hunter Street	East of National Park Street	3000

4.4 Traffic Generation

Both the RMS' Guide to Traffic Generating Developments and Technical Direction (TD) provide specific advice on the traffic generation potential of various land uses.

With respect to business/retail premises and high-density residential buildings, the RMS TD is considered to be more appropriate with respect to land-use descriptions for the proposed development. Therefore, the listed rates in the NSW RMS TD have been adopted in this assessment.

4.4.1 High-Density Residential Flat Dwellings

Table 4 presents the weekday rates for the high density residential dwellings from the RMS TD.

Table 4 - Weekday Generation Rates (RMS, 2013)

Weekday Rates	Sydney Average	Sydney Range	Regional Average	Regional Range
AM peak (1 hour) vehicle trips per unit	0.19	0.07-0.32	0.53	0.39-0.67
AM peak (1 hour) vehicle trips per car space	0.15	0.09-0.29	0.35	0.32-0.37
AM peak (1 hour) vehicle trips per bedroom	0.09	0.03-0.13	0.21	0.20-0.22
PM peak (1 hour) vehicle trips per unit	0.15	0.06-0.41	0.32	0.22-0.42
PM peak (1hour) vehicle trips per car space	0.12	0.05-0.28	0.26	0.11-0.40
PM peak (1 hour) vehicle trips per bedroom	0.07	0.03-0.17	0.15	0.07-0.22
Daily vehicle trips per unit	1.52	0.77-3.14	4.58	4.37-4.78
Daily vehicle trips per car space	1.34	0.56-2.16	3.22	2.26-4.18
Daily vehicle trips per bedroom	0.72	0.35-1.29	1.93	1.59-2.26

For the proposed development, the regional rates presented in the RMS TD have been adopted and include:

Daily vehicle trips = 4.58 per unit
Morning peak hour vehicle trips = 0.53 per unit
Evening peak hour vehicle trips = 0.32 per unit

4.4.2 Business/retail Space

Though the future use of the business/retail space is unclear, the generation rates for 'Office Blocks' has been adopted. The generation rates, as presented in the RMS TD, include:

Daily vehicle trips = 11 per 100 m2 gross floor area (GFA)
Morning peak hour vehicle trips = 1.6 per 100 m2 gross floor area (GFA)
Evening peak hour vehicle trips = 1.2 per 100 m2 gross floor area (GFA)

4.4.3 Development Traffic Generation

As the construction of the development is proposed to be staged, the estimated traffic generation for the development has also been staged and is explored in the following sections of this report.

4.4.4 Stage 1 Development Traffic Generation

The estimated traffic generation associated with the Stage 1 development is presented in Table 5.

A daily traffic generation of 691 vehicles per day is expected with 82 vehicle trips in the AM peak and 51 in the PM peak.

Table 5 - Stage 1 Traffic Generation

USE	SIZE	RATES			TRAFFIC GENERATION		
		Daily	AM peak	PM peak	Daily (v/pd)	AM peak (v/ph)	PM peak (v/ph)
Residential	136	4.58 per unit	0.53 per unit	0.32 per unit	623	72	44
Business/Retail	614m^2 GFA	11 per 100m^2 GFA	1.6 per 100m^2 GFA	1.2 per 100m^2 GFA	68	10	7
				TOTAL	**691**	**82**	**51**

4.4.5 Combined Development Traffic Generation

The estimated traffic generation associated with the overall development (Stage 1 & 2 combined) is presented in Table 6.

A daily traffic generation of 1308 vehicles per day is expected with 155 vehicle trips in the AM peak and 96 in the PM peak.

Table 6 - Combined Traffic Generation

USE	SIZE	RATES			TRAFFIC GENERATION		
		Daily	AM peak	PM peak	Daily (v/pd)	AM peak (v/ph)	PM peak (v/ph)
Residential	258	4.58 per unit	0.53 per unit	0.32 per unit	1182	137	83
Business/Retail	1143m^2 GFA	11 per 100m^2 GFA	1.6 per 100m^2 GFA	1.2 per 100m^2 GFA	126	18	14
				TOTAL	**1308**	**155**	**96**

4.5 Traffic Distribution

In order to undertake the traffic assessment, the peak hour traffic generation associated with the site must be distributed through the adjacent road network.

As the exact distribution of traffic will vary in practise, a number of assumptions need to be applied in this process. The assumptions adopted in the traffic distribution from the site include:

- For the residential traffic generation component, 70% outbound and 30% inbound trips will occur in the AM peak. In the PM peak, this is mirrored so 30% inbound trips and 30% outbound trips occur.

- For the business/retail traffic generation component, 70% inbound and 30% outbound trips will occur in the AM peak. In the PM peak, this is mirrored so 70% outbound trips and 30% inbound trips occur.

In addition, the assumed percentage of inbound and outbound traffic distribution is presented in Figure 16 and Figure 17 respectively.

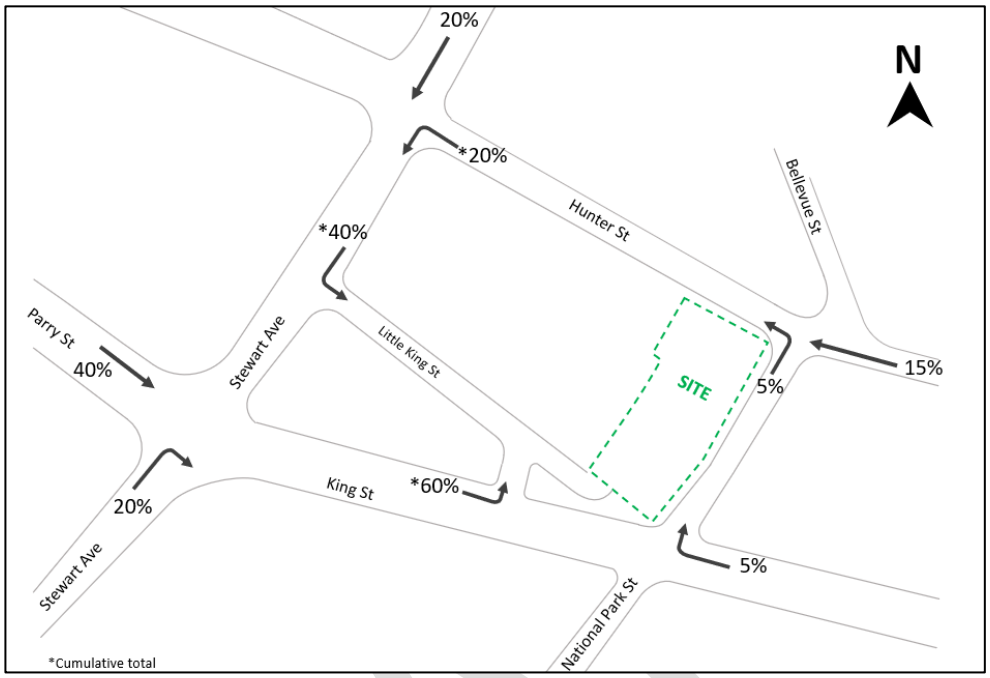

Figure 16 – Assumed Inbound Percentage Distribution

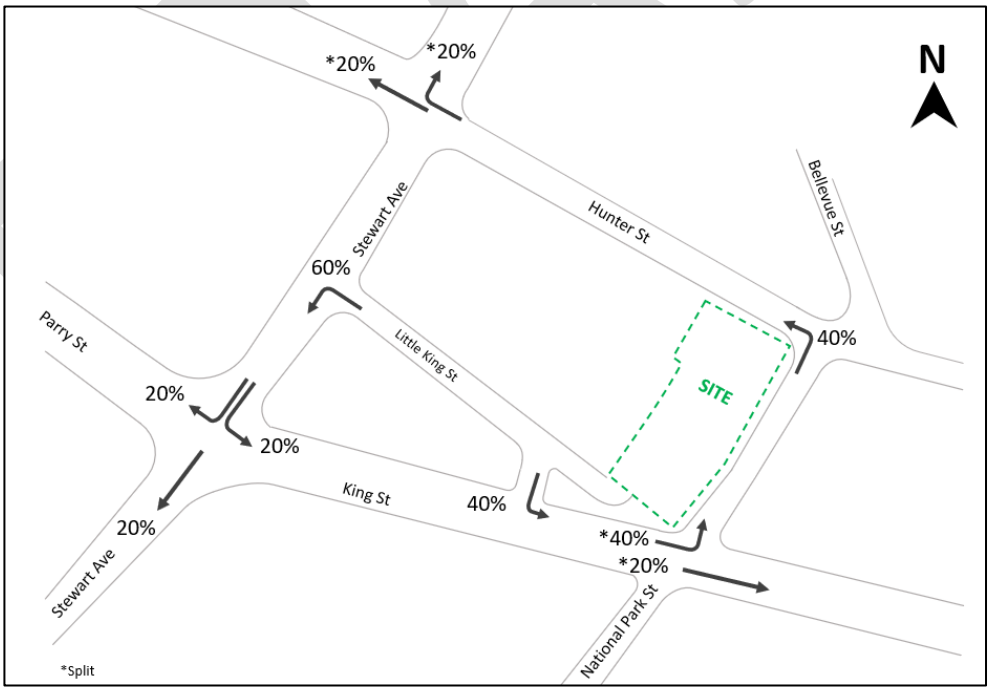

Figure 17 – Assumed Outbound Percentage Distribution

4.5.1 Combined Development Traffic Distribution

The AM and PM traffic distribution for the combined development, for both inbound and outbound is presented in Figure 18 and Figure 19 respectively.

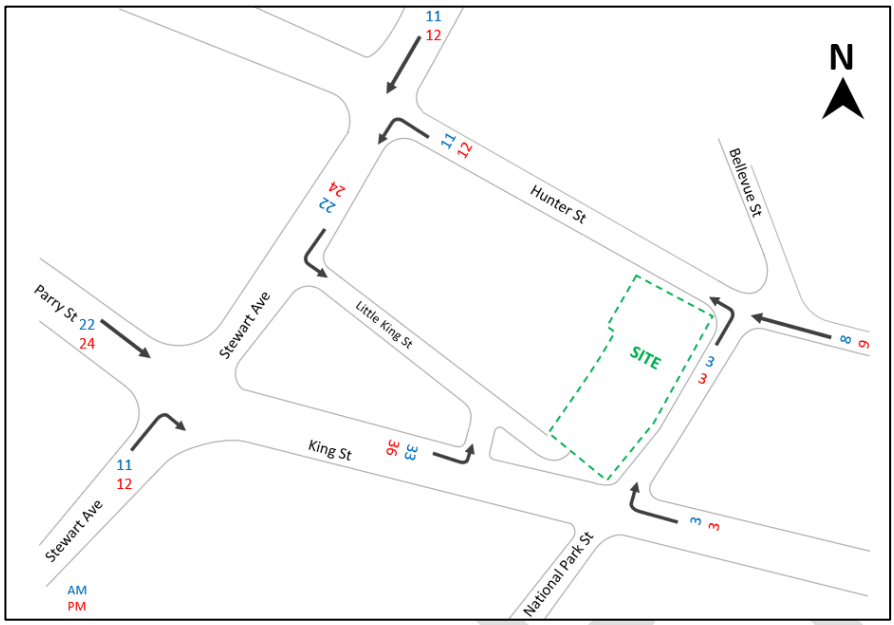

Figure 18 – Combined Development Inbound Traffic Distribution

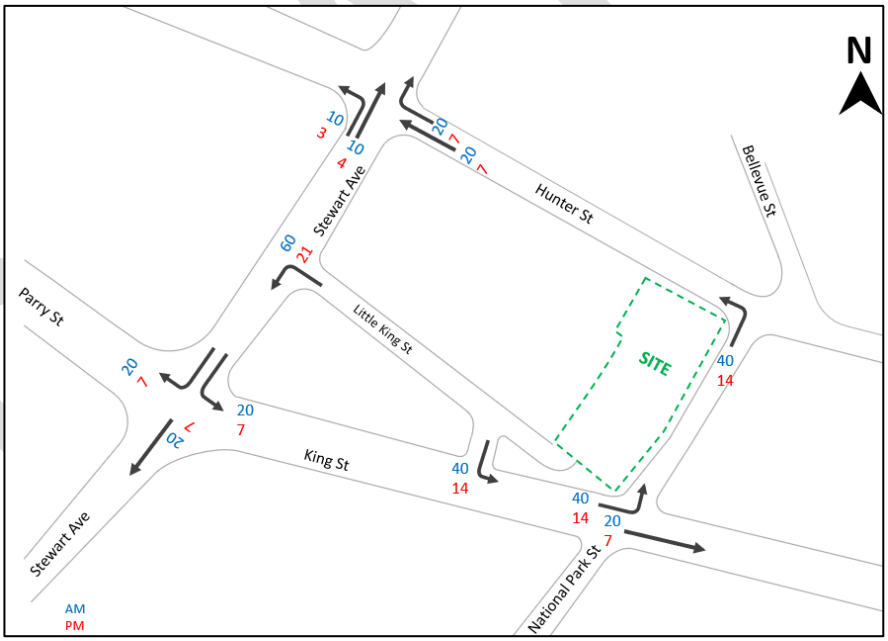

Figure 19 – Combined Development Outbound Traffic Distribution

5 TRAFFIC IMPACT

The proposed development is anticipated to have an effect on the surrounding road network. To understand and quantify the traffic impact of the proposed development, a SIDRA network assessment has been undertaken considering adjacent intersections which may be impacted by the proposed development including:

- Stewart Avenue & Little King Street.
- Stewart Avenue and King Street.
- King Street & Little King Street.
- King Street and National Park Street.
- Hunter Street and National Park Street.

5.1 Performance Metrics

The intersections have been analysed using the traffic modelling software, SIDRA.

SIDRA is a micro-analytic software package which is widely used and accepted as a tool to evaluate signalised and unsignalised intersections.

5.2 Performance Metrics

Key performance metrics used to analyse the performance of the intersection assessed include the Degree of Saturation (DoS), Level of Service (LoS), Average Delay and 95th Percentile Queue.

The target DoS and LoS criteria is in accordance with the RMS Traffic Modelling Guidelines. The target DoS for the signalised intersections within the vicinity of the site is 0.9 while the target LoS is LoS D. The adopted DoS and LoS parameters adopted in this assessment are presented in Figure 20 and Figure 21 respectively.

Table 14.2 Maximum practical degree of saturation

Intersection type	Maximum practical degree of saturation
Signals	0.90
Roundabouts	0.85
Sign-controlled	0.80
Continuous lanes	0.98

Figure 20 – Maximum Practical Degree of Saturation (RMS Traffic Modelling Guidelines, 2013)

LoS	Control delay per vehicle in seconds (d) (including geometric delay)
	All intersection types
A	d < 14
B	d < 15 to 28
C	d < 29 to 42
D	d < 43 to 56
E	d ≤ 57 to 70
F	d > 70

Figure 21 - Control Delay for Vehicle LoS Calculations (RMS Traffic Modelling Guidelines, 2013)

5.3 SIDRA Network Layout

The adopted overall SIDRA network is presented in Figure 22. Detailed layout plans for each intersection can be found in Appendix A of this report.

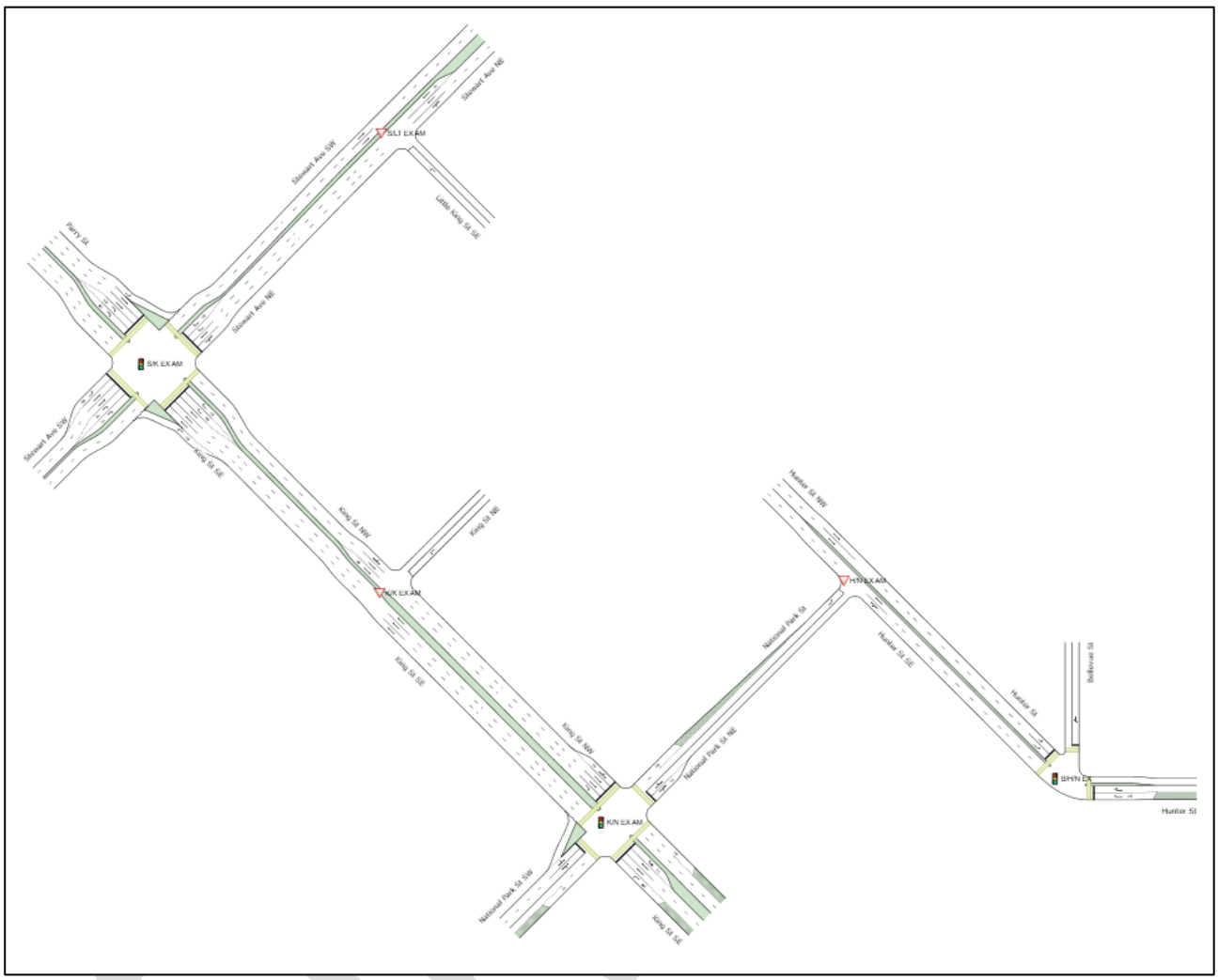

Figure 22 - SIDRA Network Layout

5.4 Modelling Assumptions

- The existing intersection configuration, layout and lane lengths/widths have been adopted as observed on aerial imagery.
- Adopted traffic volumes are in accordance with the calculations as presented in Section 4 and the survey undertaken by Trans Traffic Survey.
- A first principals process has been adopted to estimate traffic volumes at the Stewart St & Little King Street intersection including an assumption that the volumes entering/existing Little King Street are similar to those entering Little King Street at the King Street intersection.
- It has been assumed that the combined development (Stage 1 & 2) will be open in 2025.
- A 1.5% compounded traffic growth has been assumed and projected to the assumed opening year.
- A flow period of 60 minutes has been adopted in this assessment to ensure input volumes match demand volumes.
- Site level of Service (LoS) Method has been adopted as Delay (RTA NSW) and therefore the delay experienced dictates the LoS of the intersection.
- SIDRA default gap acceptance has been adopted in the assessment.
- All other SIDRA default parameters have been maintained.

5.5 Results

Summary result tables are presented for the intersections listed in Section 5.0 of this report, in Table 7 to

Table 11 respectively. It is noted that the results from the modelling have been updated since Revision A of this report with updated trip distributions and the use of the latest SIDRA program version, which has an effect on reported results.

The summary results tables highlight key performance parameters such as the DoS, LoS, Average Delay and 95th Percentile Queue for each intersection, considering both the existing and future scenario. Detailed SIDRA outputs can be found in Appendix A of this report.

Table 7 – Stewart Avenue & Little King Street Results

INTERSECTION	SCENARIO	PEAK	DoS	LoS	AVG DELAY (s)	95th%ile QUEUE (m)
Stewart Avenue & Little King Street	Base 2025	AM	0.480	A*	7.8*	27.7*
		PM	0.551	A*	9.0*	66.1*
	2025 + Stage 1 Development	AM	0.541	A*	8.0*	34.3*
		PM	0.572	A*	9.0*	65.8*
	2025 + Stage 1 & 2 Development	AM	0.589	A*	8.2*	40.3*
		PM	0.588	A*	9.1*	76.6*
	Base 2035	AM	0.585	A*	8.7*	58.7*
		PM	0.688	A*	10.6*	177.0
	2035 + Stage 1 & 2 Development	AM	0.700	A*	9..4*	81.0*
		PM	0.727	A*	10.9*	144.1*
** Representative of the minor road approach*						

Table 8 – Stewart Avenue & King Street Results

INTERSECTION	SCENARIO	PEAK	DoS	LoS	AVG DELAY	95th%ile QUEUE
Stewart Avenue & King Street	Base 2025	AM	0.97	F	80.6	644.3 (NW)
		PM	0.939	E	64.9	361.2 (NW)
	2025 + Stage 1 Development	AM	0.985	F	82.6	655.6 (NW)
		PM	0.993	E	70.3	365.6 (NW)
	2025 + Stage 1 & 2 Development	AM	0.994	F	89.4	698.9 (NW)
		PM	0.953	E	70.0	400.9 (NW)
	Base 2035	AM	1.136	F	199.4	1040.3 (NW)
		PM	1.090	F	144.6	749.5 (NW)
	2035 + Stage 1 & 2 Development	AM	1.141	F	203.0	1123.9 (NW)
		PM	1.035	F	105.7	675.6 (NW)

Table 9 – King Street & Little King Street Results

INTERSECTION	SCENARIO	PEAK	DoS	LoS	AVG DELAY	95th%ile QUEUE
King Street & Little King Street	Base 2025	AM	0.325	A*	5.8*	11.6*
		PM	0.283	A*	4.7*	10.1*
	2025 + Stage 1 Development	AM	0.339	A*	5.8*	12.9*
		PM	0.273	A*	4.6*	9.7*
	2025 + Stage 1 & 2 Development	AM	0.359	A*	6.0*	14.5*
		PM	0.293	A*	4.6*	10.6*
	Base 2035	AM	0.411	A*	6.4*	16.2*
		PM	0.359	A*	5.3*	14.2*
	2035 + Stage 1 & 2 Development	AM	0.446	A*	6.7*	20.0*
		PM	0.361	A*	5.3*	13.9*
** Representative of the minor road approach*						

Table 10 – King Street & National Park Street Results

INTERSECTION	SCENARIO	PEAK	DoS	LoS	AVG DELAY	95th%ile QUEUE
King Street & National Park Street	Base 2025	AM	1.109	F	138.9	124.1 (SE)
		PM	0.928	D	48.7	191.7 (SE)
	2025 + Stage 1 Development	AM	1.116	F	145.8	122.4 (SE)
		PM	1.049	F	84.1	171.0 (SE)
	2025 + Stage 1 & 2 Development	AM	1.122	F	153.7	122.3 (SE)
		PM	0.938	D	49.7	192.1 (SE)
	Base 2035	AM	1.212	F	220.5	152.5 (SE)
		PM	1.036	F	241.3	241.3 (SE)
	2035 + Stage 1 & 2 Development	AM	1.230	F	239.1	153.0 (SE)
		PM	1.072	F	106.5	238.4 (SE)

Table 11 – Hunter Street & National Park Street Results

INTERSECTION	SCENARIO	PEAK	DoS	LoS	AVG DELAY	95th%ile QUEUE
Hunter Street & National Park Street	Base 2025	AM	0.206	A*	5.7*	3.5*
		PM	0.194	A*	6.2*	4.3*
	2025 + Stage 1 Development	AM	0.206	A*	5.4*	4.1*
		PM	0.195	A*	6.3*	4.6*
	2025 + Stage 1 & 2 Development	AM	0.206	A*	5.8*	4.7*
		PM	0.196	A*	6.3*	4.8*
	Base 2035	AM	0.239	A*	5.9*	4.0*
		PM	0.225	A*	6.6*	5.4*
	2035 + Stage 1 & 2 Development	AM	0.239	A*	6.0*	5.2*
		PM	0.227	A*	6.7*	5.4*

** Representative of the minor road approach*

5.6 Traffic Impact

Following the updates to the modelling (initially presented in Revision A of this report), the updated modelling shows that the following intersections will not operate within acceptable limits in the pre-development base scenario:

- **Stewart Avenue & King Street**
  - 2025 AM
  - 2025 PM
- **King Street & National Park Street**
  - 2025 PM
  - 2025 PM

The differences between reported results can be attributed to the amendment to the King Street & National Park Street intersection configuration (as requested by TfNSW), the network nature of the analysis in which the SIDRA program considers the effects of queuing and congestion within the analysed network and the use of an updated version of the SIDRA program (SIDRA 9.1).

All intersections analysed will operate acceptably in the post-development scenarios as well as the 2035 extended horizon year scenarios with the exception of the Stewart Avenue & King Street and King Street & National Park Street intersections. It is noted that these intersections are envisaged to operate above acceptable limits in the pre-development base scenario (2025) and the influence that the traffic generated by the development has on the performance of these intersections is minor. Within the SIDRA environment, it is noted that relatively small increases to traffic volumes (such as the development volumes) may have unstable effects on already congested intersections such as the Stewart Avenue & King Street and King Street & National Park Street intersections.

It is also noted that traffic growth has been assumed using a compounded 1.5% growth rate. This form of extrapolation does not consider the impacts of land use changes over time or transport modal changes which may occur due to infrastructure improvements.

5.7 Servicing

In accordance with the Newcastle DCP, waste collection for the proposed development is envisaged to be undertaken from the dedicated waste collection zone, within the ground level of the development (associated with Stage 1). The waste collection vehicle is anticipated to enter and exit in a forward direction with appropriate space available to undertake turning manoeuvres within the development. As waste is to be collected, emptied and bins returned within the site, on-street garbage collection is not anticipated which accords with the requirements of the DCP. Waste collection will also be programmed appropriately to ensure it does not coincide with peak period traffic generating periods. For detailed information relating to waste management associated with the proposed development, refer to the Operational Waste Management Plan prepared by Elephants Foot (Report No: 3469).

The business/retail premises within both stages of the development are likely to be serviced by small or medium rigid vehicles, typically courier vans, with short turnover periods. It is expected that these vehicles will be able to make use of the available off-street parking in addition to the dedicated loading bay on the ground level of the Stage 1 development. The vehicles servicing the business/retail premises located within Stage 2 of the development are also proposed to make use of the loading zone associated with Stage 1 of the development. Further, there is available on-street parking/loading zones on National Park Street which could also be utilised for servicing purposes.

It is also noted that the project team will engage with Council regarding the opportunity to introduce loading zones and short drop-off pickup areas on National Park Street.

In addition to allowing loading for the business/retail uses, the increased residential population will need these areas to safely support the Gig economy users (Uber eats/Deliveroo etc) and for general pick-up/drop-off including for taxi/Uber. The removal of all driveway crossings from National Park Street proposed as part of the Development should help facilitate this without the need to minimise the level of on-street parking.

Overall, it is considered that the proposed development can be adequately serviced using the proposed on-site parking/loading bay provisions or utilise the available on-street parking on National Park Street.

5.8 Pedestrian Facilities

The proposed development is anticipated to generate pedestrian demands from residents, visitors, and business/retail premises patrons. Within the proposed development area, a comprehensive network of concrete footpaths already exists including pedestrian crosswalks at the nearby intersections.

As such, it can be concluded that additional pedestrian facilities are not required as part of this proposed development. It is noted however that footways across the frontages of the proposed development will be embellished as part of the development in accordance with the requirements of the DCP.

5.9 Alternative Transport Facilities

The proposed development is anticipated to generate an increase in alternative transport modes from residents, visitors, and business/retail premises patrons.

As explored in Section 2.4 of this report, the site has excellent access to public transport facilities including bus routes/stops, light rail and heavy rail. As such, it can be considered that the existing alternative transport facilities and provisions within the area are suitable for the development.

It is also noted that the landscape design incorporates flexibility in the location of the Hunter Street bus stop in order to facilitate future bus seating within the property boundary, or additional footpath width should TfNSW seek to erect new bus stop infrastructure within the footpath/road reserve.

5.10 Construction Routes

Access/Egress to the site for delivery vehicles and associated construction vehicles is proposed to be undertaken from either King Street or Stewart Avenue, leading to the Little King Street and ultimately to the site. The proposed access/egress options are presented in Figure 23.

Both King Street & Stewart Avenue are major, multi-lane roads and can acceptably provide access/egress for large construction/delivery vehicles.

Details pertaining to final construction vehicle routes, entry/egress, parking and hoarding are anticipated to be finalised as part of the Construction Traffic Management Plan (CTMP). It is also envisaged that dialogue will be maintained with TfNSW to maintain the bus stop on Hunter Street during construction.

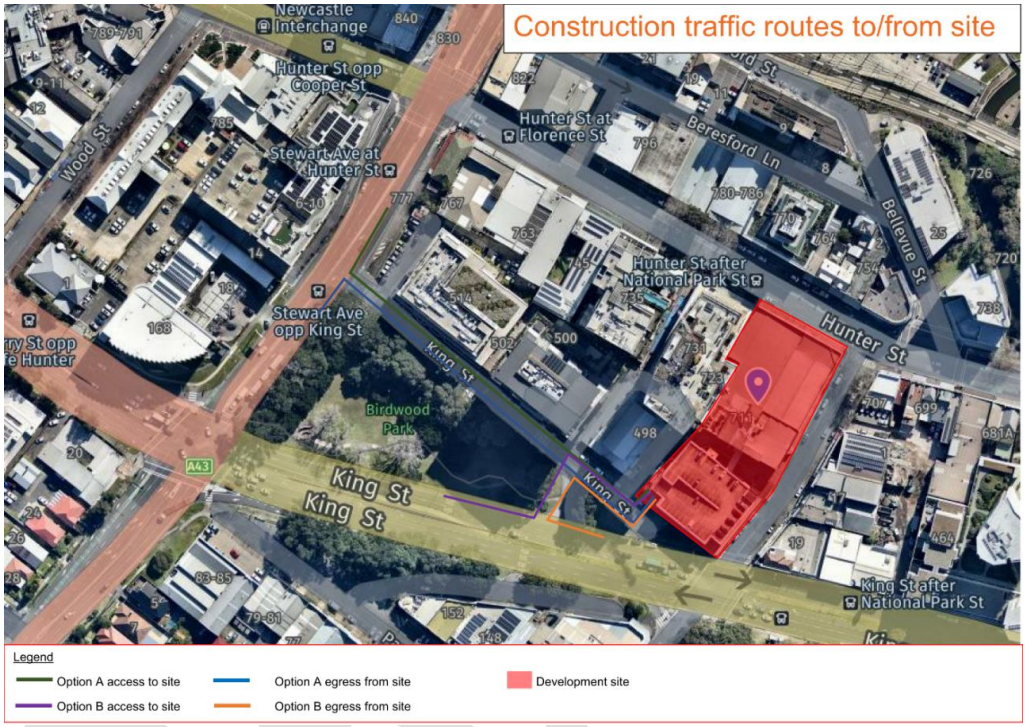

Figure 23 – Proposed Access/Egress Options

6 PARKING CONSIDERATIONS

The parking policy and requirements applicable to the proposed development are specified in Chapter 7.03 Traffic Parking and Access of Newcastle City Council's Development Control Plan and approved amendments to the DCP. As the subject site is located within the City Centre area, the assessment is subject to the requirement of Council's DCP.

6.1 Stage 1 Development Car Parking

The car parking requirements for Stage 1 of the proposed development has been summarised in Table 12.

Table 12 - Stage 1 Planning Scheme Car Parking Requirement

USE	SIZE	PLANNING SCHEME PARKING RATE	CAR PARKING	AVG RATE PROVIDED	COMPLIANT?
Residential	35 x 1-bed	Small (<75m^2 or 1-bed) - Max average of one space per dwelling	22	0.63 per dwelling	Yes
	74 x 2-bed	Medium (<75m^2-100m^2 or 2-bed) - Max average of one space per dwelling	67	0.9 per dwelling	Yes
	27 x 3 or more bed	Large (>100m^2 or 3-bed) - Max average of two space per dwelling	38	1.4 per dwelling	Yes
Residential (visitor)	137 dwellings	No minimum or maximum rate	28	0.2 per dwelling	Yes
Business/Retail	613.84m^2 GFA	1 space per 60m^2	10	1 space per 60m2	Yes
		TOTAL	**165**		

As presented in Table 12**Error! Reference source not found.**, Stage 1 of the development is proposed to provide 165 car parking spaces including 13 accessible spaces which complies the DCP parking requirement.

6.2 Combined Development Car Parking

The car parking requirements for the combined development has been summarised in Table 13.

Table 13 - Combined Development Planning Scheme Car Parking Requirement

USE	SIZE	PLANNING SCHEME PARKING RATE	CAR PARKING	AVG RATE PROVIDED	COMPLIANT?
Residential	70 x 1-bed	Small (<75m^2 or 1-bed) - Max average of one space per dwelling	42	0.6 per dwelling	Yes
	146 x 2-bed	Medium (<75m^2-100m^2 or 2-bed) - Max average of one space per dwelling	131	0.9 per dwelling	Yes
	42 x 3 or more be	Large (>100m^2 or 3-bed) - Max average of two space per dwelling	59	1.4 per dwelling	Yes
Residential (visitor)	259 dwellings	No minimum or maximum rate	49	0.37 per dwelling	Yes
Business/Retail	1143.27m^2 GFA	1 space per 60m^2	19	1 space per 60m2	Yes
		TOTAL	**300**		

As presented in Table 13**Error! Reference source not found.**, the combined development proposed to provide 300 car parking spaces including 20 accessible spaces which complies the DCP parking requirement.

6.3 Bicycle Provisions

The bicycle parking requirement applicable to the proposed development is also specified in the Newcastle DCP. It is noted that the bicycle provisions for the proposed site are subject to the following assumptions:

- The bicycle parking provision for the residential dwellings in the Newcastle City Centre area is not listed in the Newcastle DCP 2012 or approved amendments. Therefore, the city-wide residential rate has been adopted. i.e. 1 space per dwelling plus 1 space per 10 dwellings; and
- The bike parking requirement for a specialised retail premises is 1 space per 20 staff (Class 2), however, it is difficult to predict the number of staff for the proposed development at this stage. Therefore, a bicycle rate for an office premises has been adopted i.e. 1 space per 200m^2 GFA.

6.4 Stage 1 Development Bicycle Parking

The bicycle parking requirement for Stage 1 of the proposed development has been summarised in Table 14.

Table 14 - Stage 1 Planning S cheme Biycle Parking Requirement

USE	SIZE	PLANNING SCHEME BICYCLE PARKING RATE	BIKE PARKING
Residential	136 dwellings	1 space per dwelling	136
Residential (visitor)	136 dwellings	1 space per 10 dwellings (Class 3) for visitors.	14
Business/Retail	613.84m2 GFA	1 space per 200m2	3
		TOTAL	**153**

As presented in Table 14**Error! Reference source not found.**, the proposed development has a planning scheme bicycle parking requirement of 153 bicycle parking spaces under the Newcastle DCP. As Stage 1 of the proposed development is proposed to provide 160 bicycle parking spaces, the DCP parking requirement is satisfied.

6.5 Combined Development Bicycle Parking

The bicycle parking requirements for the combined development has been summarised in Table 15.

Table 15 - Combined Development Planning Scheme Biycle Parking Requirement

USE	SIZE	PLANNING SCHEME BICYCLE PARKING RATE	BIKE PARKING
Residential	258 dwellings	1 space per dwelling	258
Residential (visitor)	258 dwellings	1 space per 10 dwellings (Class 3) for visitors.	26
Business/Retail	1143.27m2 GFA	1 space per 200m2	6
		TOTAL	**290**

As presented in Table 15**Error! Reference source not found.**, the proposed development has a planning scheme bicycle parking requirement of 290 bicycle parking spaces under the Newcastle DCP whilst the combined development is proposed to provide 297 bicycle parking spaces including 9 on the publicly accessible ground floor area.

As such the DCP parking requirement with respect to bicycle parking is considered satisfied.

6.6 Stage 1 Development Motorcycle Parking

The motorcycle parking requirements for Stage 1 of the proposed development has been summarised in Table 16.

Table 16 - Stage 1 Planning Scheme Motorcycle Parking Requirement

USE	CAR SPACES	PLANNING SCHEME MOTORCYCLE PARKING RATE	MOTORCYCLE PARKING
Motorcycle (Resident)	155	1 space per 20 car spaces	8
Motorcycle (Business/Retail)	10	1 space per 20 car spaces	0
		TOTAL	**8**

As presented in Table 16, the proposed development has a planning scheme motorcycle parking requirement of 8 spaces. Stage 1 of the development is proposed to provide 8 motorcycle parking spaces and as such, the DCP motorcycle parking requirement is considered satisfied.

6.7 Combined Development Motorcycle Parking

The bicycle parking requirements for the combined development has been summarised in Table 17.

Table 17 - Combined Development Planning Scheme Motorcycleycle Parking Requirement

USE	CAR SPACES	PLANNING SCHEME MOTORCYCLE PARKING RATE	MOTORCYCLE PARKING
Motorcycle (Resident)	258	1 space per 20 car spaces	14
Motorcycle (Business/Retail)	19	1 space per 20 car spaces	0
		TOTAL	**14**

As presented in Table 17**Error! Reference source not found.**, the proposed development has a planning scheme motorcycle parking requirement of 14 spaces. The combined development is proposed to provide 17 motorcycle parking spaces and as such, the DCP motorcycle parking requirement is considered satisfied.

6.8 Stage 1 Development Electric Vehicle Charing Point

The Electric Vehicle (EV) charging point requirement for Stage 1 of the proposed development has been summarised in Table 18.

Table 18 - Stage 1 Planning Scheme EV Charging Point Requirement

USE	CAR SPACES	EV CHARGING POINT REQUIREMENT	EV CHARGING POINTS
Electric Vehicle Charging Point	165	1 or 5% of car spaces	9

As presented in Table 18, the proposed development has a planning scheme EV charging point requirement of 9 spaces. As Stage 1 of the development is anticipated to meet this requirement, the DCP EV charging point requirement is considered satisfied.

6.9 Combined Development Electric Vehicle Charing Point

The EV charging point requirement for the combined development has been summarised in Table 19.

Table 19 - Combined Development Planning Scheme EV Charging Point Requirement

USE	CAR SPACES	EV CHARGING POINT REQUIREMENT	EV CHARGING POINTS
Electric Vehicle Charging Point	300	1 or 5% of car spaces	15

As presented in Table 19**Error! Reference source not found.**, the proposed development has a planning scheme EV charging point requirement of 15 spaces. As the combined development is anticipated to meet this requirement, the DCP EV charging point requirement is considered satisfied.

7 CAR PARK DESIGN & CIRCULATION

7.1 Car Park Access

On-site car parking for the development is proposed to be provided through a combined entry/exit access crossing from Little King Street as presented in Figure 24.

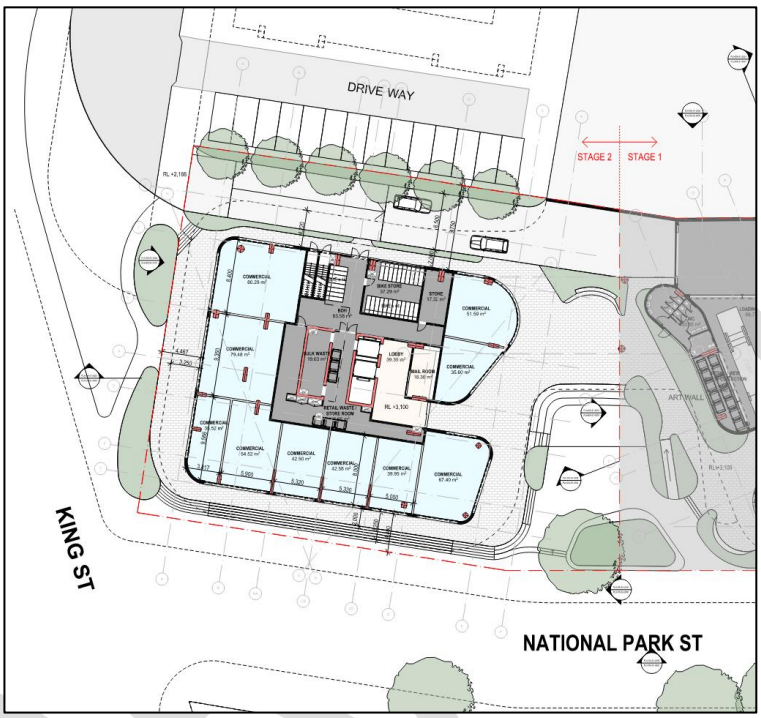

Figure 24 – Proposed Site Access

As per the requirements of AS2890.1-2004, a carpark with between 101 to 300 car parking spaces, accessed via a local road and providing long term parking for residential, domestic and employee purposes (Class 1A) requires a Category 2 access facility. A Category 2 access facility pertains to an entry width of between 6.0-9.0m without the need for driveway separation.

As the proposed access is a combined entry/exit driveway of approximately 6.5m wide, the access requirements of AS2890.1-2004 are satisfied.

In addition, the provision of a 6.5-metre-wide combined entry/exit driveway with forward entry and exit will ensure suitable pedestrian and vehicular sight lines are achieved in accordance with AS2890.1-2004. Vehicular sight lines from the proposed access have been observed to be in excess of the AS2890.1-2004 requirement of 45 metres to 69 metres within a 50 km/h speed zone.

7.2 Car Park Design

Overall, the proposed parking layout is considered to comply with AS2890.1-2004 and the Newcastle City Council's DCP. The Newcastle DCP this document stipulates the following:

- Parking area dimensions and parking layout shall comply with Australian Standard 2890.1-2004 User Class 1A - Bays at 90 degrees - (being 2.4 metres wide and 5.4 metres long). A minimum aisle width of 5.8 metres shall be provided.

From the proposed development plans, the following is noted:

- Parking spaces are generally 5.4m long by 2.4m wide.
- Isle widths are a minimum 5.8m wide.
- Minimum headroom requirement of 2.2m is achieved.
- A flat landing of 5.0m is provided inside the property.
- A HRV can enter in a forward direction, undertake turning manoeuvrers on the ground floor, load/unload contents and exit in a forward direction.
- Whilst no turning area is provided at the end of long blind aisles, it is proposed that these car parking spaces be allocated as residential car parking. Turning areas within the residential car parking can be considered as unnecessary as the traffic using the car park will have a known and secured car parking space available. Therefore, forward entry and exit from the site is still ensured.
- Though it is expected that there may be amendments to the car parking design throughout the DA process, currently, the proposed development plans comply of the requirements of AS2980.1-2004 and the Newcastle DCP.

7.3 Car Park Circulation

A swept path assessment has also been undertaken for the proposed development entry/exit and internal circulation roads and illustrated in Figure 25 to Figure 28.

Figure 25 – Passenger Vehicle Entry/Exit

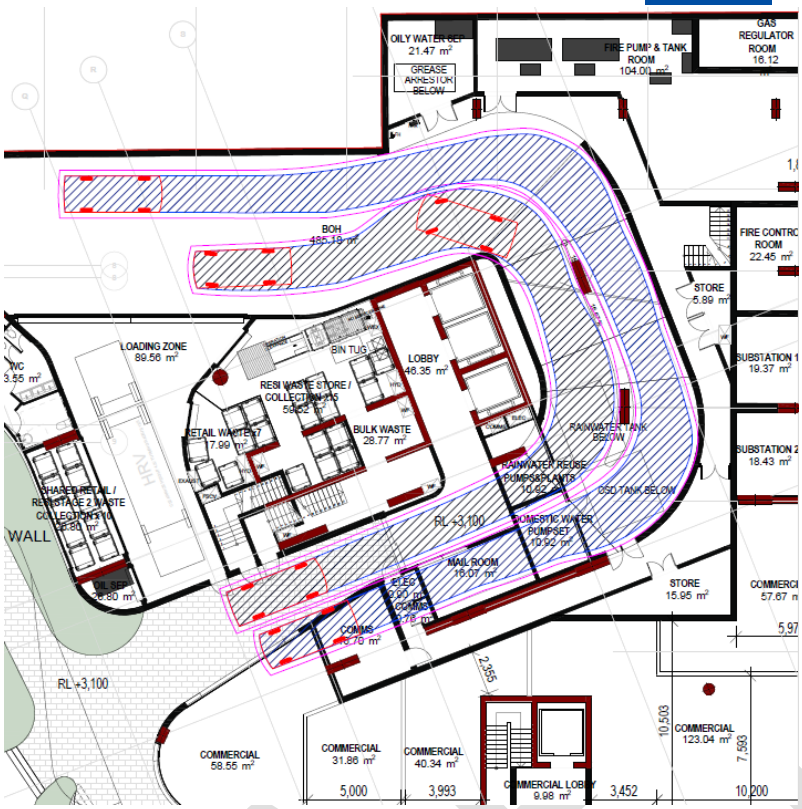

Figure 26 – Passeneger Vehicle Circulation

Figure 27 – Waste Collection Vehicle Entry/Exit

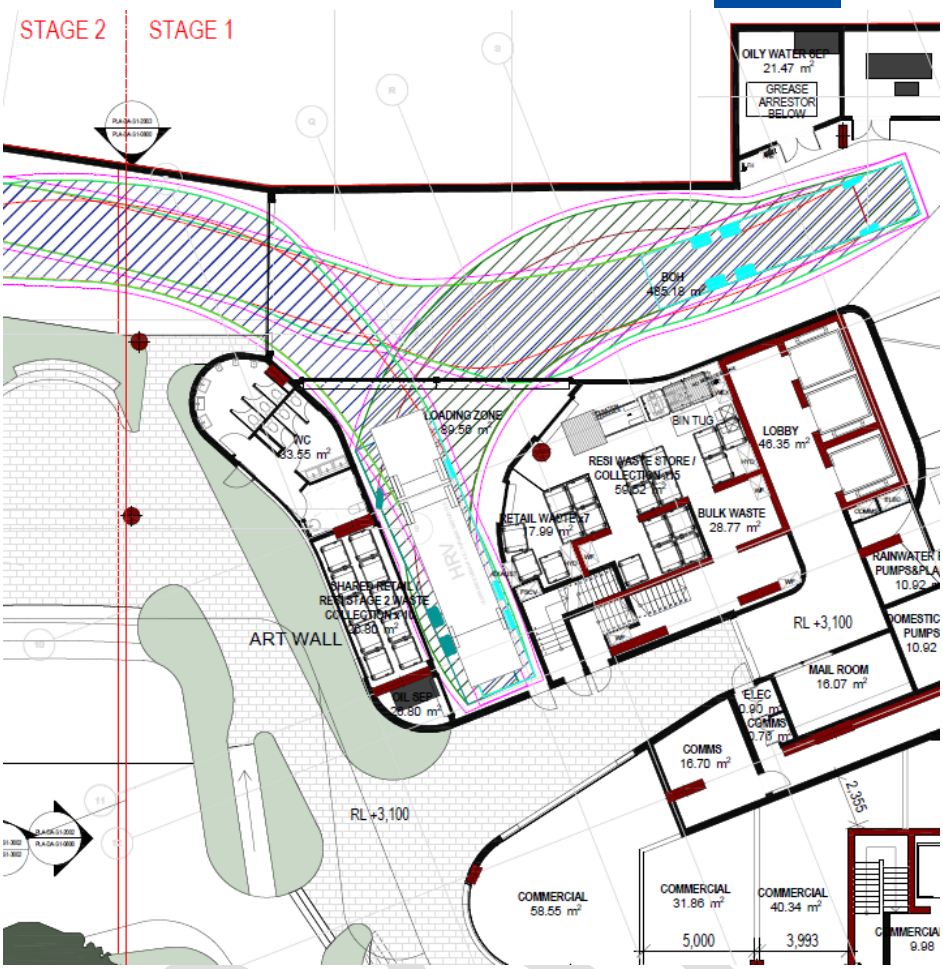

Figure 28 – Waste Collection Vehicle Maneuvering

Generally, the swept path analysis indicates that the entry/exit and internal circulation provisions are acceptable however, it is noted that there is a slight overlap of passenger vehicle clearance offsets at the toe of the car parking ramp, as illustrated in Figure 26.

Though not ideal, the overlap can be considered minor and is proposed to be effectively mitigated through the use of line marking, signage and convex mirrors.

7.4 Overall Development Sightlines

The overall development is anticipated to enhance driver sightlines and around-corner visibility particularly at the intersection of King Street & National Park Street and Hunter Street & National Park Street.

In accordance with DCP requirements, corner splays in excess of 3.0m x 3.0m have been provided at the aforementioned intersection to improve driver sightlines as compared to the existing configuration.

8 CONCLUSION

A TIA of the proposed mixed -use development at 711 Hunter Street, Newcastle has been undertaken by BG&E. Key findings from the TIA include:

- All intersections analysed will operate acceptably in the post-development scenarios as well as the 2035 extended horizon year scenarios with the exception of the Stewart Avenue & King Street and King Street & National Park Street intersections.
- It is noted that these intersections are envisaged to operate above acceptable limits in the pre-development base scenario (2025) and the influence that the traffic generated by the development has on the performance of these intersections is minor.
- Stage 1 of the proposed development complies with the requirement of Section 7.03 of the Newcastle DCP and approved amendments with respect to car parking requirement.
- The combined development with the requirement of Section 7.03 of the Newcastle DCP and approved amendments with respect to car parking requirement.
- The proposed development complies with the requirement of Section 7.03 of the Newcastle DCP with respect to bicycle parking requirements under both Stage 1 and the Combined Development scenario.
- The proposed development complies with the requirement of Section 7.03 of the Newcastle DCP with respect to EV charging points.
- The proposed development is considered to adequately cater for service and delivery vehicle through off-street parking, off-street loading zones and on-street parking.
- Where access driveways have been removed, additional loading or 2-minute pick-up or drop-off areas can be introduced.
- A thorough existing concrete footpath existing currently exists within the vicinity of the site including pedestrian crosswalks at the nearby intersections. In addition, pedestrian facilities abutting the development will be embellished as part of the construction. As such, additional pedestrian facilities are not considered to be required.
- The site has excellent access to public transport facilities including bus routes/stops, light rail and heavy rail. As such, it can be considered that the existing alternative transport facilities and provisions within the area are suitable for the development.
- The development team maintain dialogue with TfNSW and Newcastle City to ensure the operations of the Hunter Street bus stop are not impacted as outlined in the Construction Management Plan.

APPENDIX A – SIDRA OUTPUTS

APPENDIX B – SWEPT PATHS