Heffron Centre

Concept and Detailed Development Applications
Transport Impact Assessment

Prepared by: GTA Consultants (NSW) Pty Ltd for CO-OP Studio
on 01/09/2020
Reference: N186090
Issue #: A

GTAconsultants

Heffron Centre

Concept and Detailed Development Applications
Transport Impact Assessment

Client: CO-OP Studio

on 01/09/2020

Reference: N186090

Issue #: A

Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By	Signed
A	01/09/2020	Final	Mackenzie Brinums	Rhys Hazell	Rhys Hazell	

GTAconsultants

Melbourne | Sydney | Brisbane
Adelaide | Perth

EXECUTIVE SUMMARY

The Heffron Centre is subject to two separate Development Applications as follows:

- Concept Development Application which addresses matters set out in Clause 6.12 of the Randwick Local Environmental Plan 2012, including seeking consent for land uses, indicative building envelopes and site access arrangements.
- Detailed Development Application which seeks consent for construction and use of the Heffron Centre, including:
    - Demolition of existing buildings and structures within the site.
    - Site preparation works, including termination or relocation of site services and infrastructure, tree removal and the erection of site protection fencing.
    - Construction of the new Heffron Centre, including:
        - A Community and High-Performance Facility (CHPC).
        - An indoor multi-purpose sporting facility.
        - A local indoor gymnastics centre.
        - Installation of floodlighting to the Showcase Field.
    - Car parking for 143 vehicles, including a combination of staff and visitor spaces, accessed via the existing signalised intersection of Bunnerong Road and Flint Street.
    - Building identification signage.
    - Public domain works within the site, including new landscaping and tree planting.

An empirical assessment of the anticipated parking demands of the Centre has been completed given the unique mix of uses, nature and scale of the project, and is critical to delivering an appropriate quantum of parking, together with understanding how demand will vary across the day and week. In this regard, Table E.1 sets out the anticipated peak parking demand on the peak weekday afternoon and Saturday periods.

Table E.1: Summary of typical peak parking requirements

User	Weekday afternoon parking demand	Saturday parking demand
Indoor Multi-purpose Facility	20	60
Gymnastics Facility	25	75
Community and High Performance Centre	73	8
Total	**118 spaces**	**143 spaces**

The plans currently indicate a provision of 143 parking spaces including three accessible parking spaces which is considered suitable for meeting the anticipated peak parking demand of the site.

The DCP bicycle parking rate for recreational land uses is one space per 10 car parking spaces. Based on the 143 parking spaces, this equates to a requirement of 14 bicycle spaces. It is recommended that six of these be secure spaces for use by staff at the community and high performance facility based on the anticipated 107 staff and Journey to Work data indicating a six per cent mode share towards cycling.

The above requirement is met with the provision of six secure spaces in the community and high performance centre along with eight visitor spaces near the main entrance.

A generous drop-off/ pick-up area is proposed adjacent to the public domain and close to the main entrance. This area would be available for use by a range of users though most importantly, buses and coaches on competition days and during event periods. The layout allows for entry and exit by buses and coaches with circulation north to south through the site noting that no designated on-site bus parking is proposed. Emergency services would also make use of the drop-off/ pick-up area. Swept paths have been completed and confirm the concept design is suitable for accommodating a range of vehicles from cars through to 14.5 metre long coaches.

Considering the proposed uses, at least one dedicated loading area is required to accommodate the servicing demands of the Centre. The plans indicate a loading area suitable for access by 8.8 metre long medium rigid trucks noting that most deliveries are anticipated to be by small delivery vehicles such as vans/ utes and 6.4 metre small rigid trucks which would also largely use the drop-off/ pick-up area outside peak operational periods. Maintenance vehicle access to the training field and services area has also been considered.

Based on the anticipated parking demands of the Centre, Table E.2 sets out the likely traffic generation during the critical weekday and Saturday peak periods. Overall, Saturdays are expected to be the busiest days of the week with some lower demand during weekday afternoons/ evenings.

Table E.2: Summary of peak hour traffic generation (vehicle movements per hour)

Use	Weekday AM	Weekday PM	Saturday
Indoor Multi-Purpose Facility	0	40	120
Gymnastics Facility	0	40	110
Community and High Performance Centre	50	50	0
Total	**50**	**130**	**230**

SIDRA intersection modelling has been completed at the Bunnerong Road/ Flint Street intersection which will function as the main access to and from the Centre. The modelling results indicate that the additional traffic generated by the proposal can be adequately accommodated on the surrounding road network.

Overall, the proposed development can be supported from a traffic and transport perspective.

CONTENTS

1. Introduction 1
   1.1. Introduction 2
   1.2. Background 2
   1.3. Purpose of this Report 2
   1.4. References 2
2. Existing Conditions 3
   2.1. Location 4
   2.2. Transport Network 6
   2.3. Traffic Volumes 7
   2.4. Intersection Operation 8
   2.5. Car Parking 9
   2.6. Public Transport 10
   2.7. Walking and Cycling Infrastructure 11
   2.8. Existing Travel Behaviour 12
   2.9. Crash History 13
3. Development Proposal 15
   3.1. Overview 16
   3.2. Parking and Pick-Up and Drop-Off 17
   3.3. Walking and Cycling Infrastructure 17
4. Parking Assessment 18
   4.1. Car Parking 19
   4.2. Bicycle Parking 21
   4.3. Motorcycle Parking 22
   4.4. Bus/ Coach Parking 22
   4.5. Loading and Servicing 22
5. Traffic Impact Assessment 23
   5.1. Traffic Generation 24
   5.2. Distribution and Assignment 25
   5.3. Traffic Impact 27
6. Preliminary Construction Traffic Management Plan 29

6.1. Overview 30
6.2. Principles of Traffic Management 30
6.3. Work Hours 30
6.4. Site Access and Loading 30
6.5. Construction Staff Parking 31
6.6. Heavy Vehicle Traffic Generation 31
6.7. Heavy Vehicle Access Routes 31
6.8. Pedestrian and Cyclist Access 32
6.9. Overview of CTMP Requirements 32
7. Conclusion 33

Appendices

A. SIDRA Modelling Results
B. Swept Path Assessment

Figures

Figure 2.1: Subject site and its environs 4
Figure 2.2: Aerial photograph of the site 5
Figure 2.3: Locational context of the site 5
Figure 2.4: Bunnerong Road (looking north) 6
Figure 2.5: Bunnerong Road (looking south) 6
Figure 2.6: Existing AM peak hour traffic volumes 7
Figure 2.7: Existing PM peak hour traffic volumes 8
Figure 2.8: Off-street car park adjacent to the Heffron Centre site 10
Figure 2.9: Surrounding public transport network 11
Figure 2.10: Surrounding cycling network 12
Figure 2.11: 2016 Destination Zones 12
Figure 2.12: Existing travel mode share 13
Figure 2.13: TfNSW Centre for Road Safety historical crash data 14
Figure 3.1: Proposed site layout 17
Figure 5.1: Weekday AM peak hour site generated traffic volumes 26
Figure 5.2: Weekday PM peak hour site generated traffic volumes 26
Figure 5.3: Saturday peak hour site generated traffic volumes 27
Figure 6.1: Construction vehicle routes 32

Tables

Table E.1:	Summary of typical peak parking requirements	i
Table E.2:	Summary of peak hour traffic generation (vehicle movements per hour)	ii
Table 2.1:	SIDRA level of service criteria	8
Table 2.2:	Existing intersection operating conditions	9
Table 2.3:	Existing primary mode of travel	13
Table 4.1:	Indoor multi-purpose facility parking demand	19
Table 4.2:	Summary of typical peak parking requirements	21
Table 5.1:	Summary of peak hour traffic generation	25
Table 5.2:	Post development intersection operating conditions	27

1. INTRODUCTION

01

1.1. Introduction

This report supports two Development Applications for development of the Heffron Centre at Heffron Park, 417-439 Bunnerong Road, Maroubra. The Heffron Centre is a proposed indoor multi-purpose facility, gymnastics facility and Community and High-Performance Centre (CHPC) which forms a major part of the ongoing upgrade works in Heffron Park and enables the community to have access to high-quality sporting facilities into the future.

Randwick City Council is the proponent for both development applications.

1.2. Background

Randwick City Council has been investigating the provision of new and improved community and elite sporting facilities at Heffron Park for some time. In 2019, Council entered into an Agreement for Lease and License with the South Sydney District Rugby League Football Club (the Rabbitohs) under a Public Private Partnership to accommodate administration, training and community facilities within a Community and High-Performance Facility to be delivered as one component of the Heffron Centre.

1.3. Purpose of this Report

This report sets out an assessment of the anticipated transport implications of the proposed development, including consideration of the following:

- existing traffic and parking conditions surrounding the site
- suitability of the proposed parking in terms of supply (quantum) and layout
- service vehicle requirements
- pedestrian and bicycle requirements
- the traffic generating characteristics of the proposed development
- suitability of the proposed access arrangements for the site
- the transport impact of the development proposal on the surrounding road network.

1.4. References

In preparing this report, reference has been made to the following:

- an inspection of the site and its surrounds
- Randwick Development Control Plan (DCP) 2013
- Randwick Local Environmental Plan (LEP) 2012
- Australian Standard/ New Zealand Standard, Parking Facilities, Part 1: Off-Street Car Parking AS/NZS 2890.1:2004
- Australian Standard, Parking Facilities, Part 2: Off-Street Commercial Vehicle Facilities AS/NZS 2890.2:2018
- Australian Standard / New Zealand Standard, Parking Facilities, Part 6: Off-Street Parking for People with Disabilities AS/NZS 2890.6:2009
- plans for the proposed development prepared by CO-OP Studio, Drawing Number DA112, Revision D, dated 31 August 2020
- other documents and data as referenced in this report.

2. EXISTING CONDITIONS

02

2.1. Location

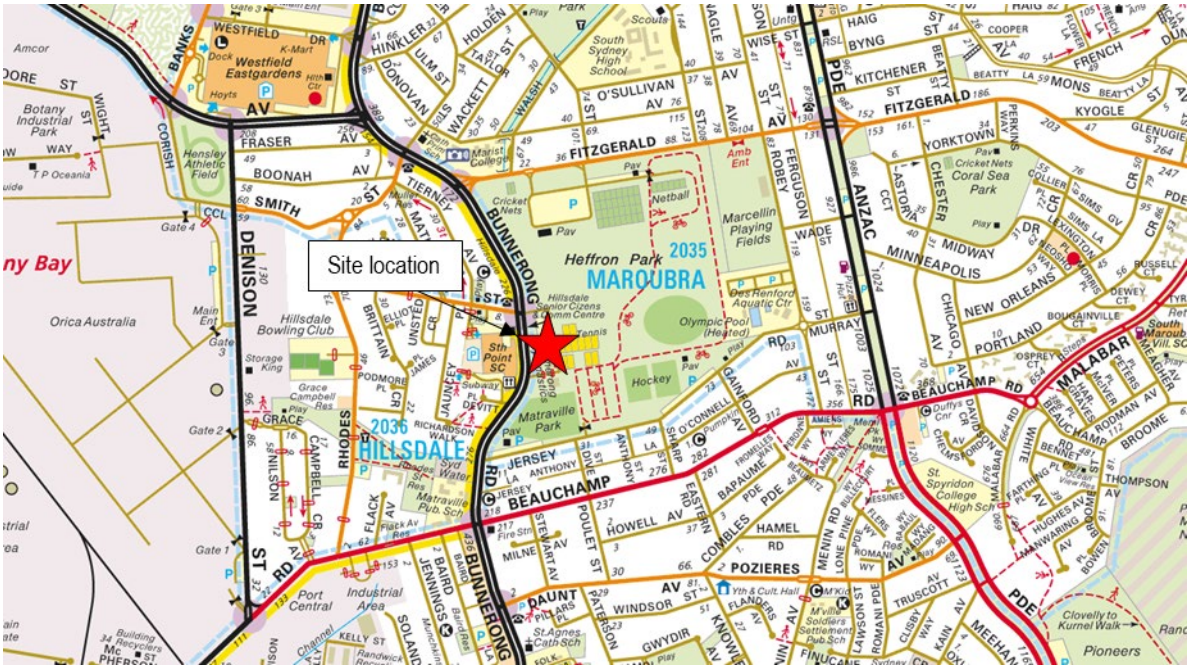
The subject site is within the south-western corner of Heffron Park, at 417-439 Bunnerong Road, Maroubra as illustrated in Figure 2.1 to Figure 2.3. The site is legally known as Lot 7026 DP 1026884 and on the western edge of Randwick LGA with a primary frontage to Bunnerong Road to the west. Bayside LGA is west of Bunnerong Road.

The site is Crown Land owned by the NSW Department of Primary Industries, with Randwick City Council acting as the Reserve Manager.

Heffron Park is the largest recreational park in Randwick and includes playing fields, tennis and netball courts, a cycling criterium track, and an aquatic and leisure centre. The park is bound by Bunnerong Road to the west, Fitzgerald Avenue to the north, Robey Street to the east and Jersey Road to the south.

The surrounding land uses are dominated by low and medium density residential dwellings, with Southpoint Shopping Centre and several small business premises and shop-top housing immediately to the west of the site on the western side of Bunnerong Road. Matraville Public School is 300 metres to the south-west and Champagnat Catholic College 400 metres to the north.

Figure 2.1: Subject site and its environs



Base image source: Sydway

Figure 2.2: Aerial photograph of the site

Source: NS Group

Figure 2.3: Locational context of the site

Source: CO-OP Studio, annotation by Ethos Urban

2.2. Transport Network

Roads are classified according to the functions they perform. The main purpose of defining a road's functional class is to provide a basis for establishing the policies which guide the management of the road according to their intended service or qualities.

In terms of functional road classification, State roads are strategically important as they form the primary network used for the movement of people and goods between regions, and throughout the State. Transport for NSW (TfNSW) responsible for funding, prioritising and carrying out works on State roads. State roads generally include roads classified as freeways, state highways, and main roads under the Roads Act 1993, and the regulation to manage the road system is stated in the Australian Road Rules, most recently amended on 19 March 2018.

TfNSW defines four levels in a typical functional road hierarchy, ranking from high mobility and low accessibility, to high accessibility and low mobility. These road classes are:

Arterial Roads – Controlled by TfNSW, typically no limit in flow and designed to carry vehicles long distance between regional centres.

Sub-Arterial Roads – Managed by either Council or TfNSW under a joint agreement. Typically, their operating capacity ranges between 10,000 and 20,000 vehicles per day, and their aim is to carry through traffic between specific areas in a sub region or provide connectivity from arterial road routes (regional links).

Collector Roads – Provide connectivity between local sites and the sub-arterial road network, and typically carry between 2,000 and 10,000 vehicles per day.

Local Roads – Provide direct access to properties and the collector road system and typically carry between 500 and 4,000 vehicles per day.

In relation to the site, Bunnerong Road is a TfNSW State Road that functions as a key collector road along the western boundary of the site. It is a two-way road with two to three lanes in each direction and a central median separates the directions of travel. Unrestricted kerbside parking is permitted on the eastern side of the road (including some 20 spaces along the western site frontage), while 1P parking restrictions are in place on the western side of the road from 8:30am - 6pm on weekdays, and 8:30am - 12:30pm Saturdays. Bunnerong Road has a posted speed limit of 60km/h and is shown in Figure 2.4 and Figure 2.5.

Figure 2.4: Bunnerong Road (looking north)

Figure 2.5: Bunnerong Road (looking south)

The key intersection in the vicinity of the site is the Bunnerong Road/ Flint Street signalised intersection which forms the primary site access.

2.3. Traffic Volumes

Given ongoing global events related to COVID-19, it is acknowledged that current traffic conditions are not considered 'normal' and as such traffic surveys completed at this time would not be considered representative of typical conditions. In light of this, GTA has obtained historical SCATS detector data from TfNSW for Thursday 14 November 2019 to better understand typical traffic volumes through the Bunnerong Road/ Flint Street signalised intersection. It is noted that there are some limitations with using SCATS detector data for modelling purposes, with assumptions required to be made for the percentage of heavy vehicles through the intersection and the directional split of traffic for lanes that allow for more than two movements (e.g. the kerbside lane which allows for both left turns and through movements). As such, the following assumptions have been made as part of this assessment:

- Heavy vehicles make up two per cent of the total volumes through the intersection, as is considered typical for similar areas throughout metropolitan Sydney.
- Directional distributions for travel lanes that allow for more than movement were estimated based on the directional distributions observed on-site.

GTA has been in consultation with TfNSW and is awaiting feedback on this methodology and any further recommendations in regard to ensuring the traffic assessment is as robust as possible.

Considering the above, the weekday AM and PM peak hours from the SCATS detector data were found to occur between 8:30am and 9:30am, and between 4:45pm and 5:45pm respectively, with traffic volumes summarised in Figure 2.6 and Figure 2.7.

Figure 2.6: Existing AM peak hour traffic volumes

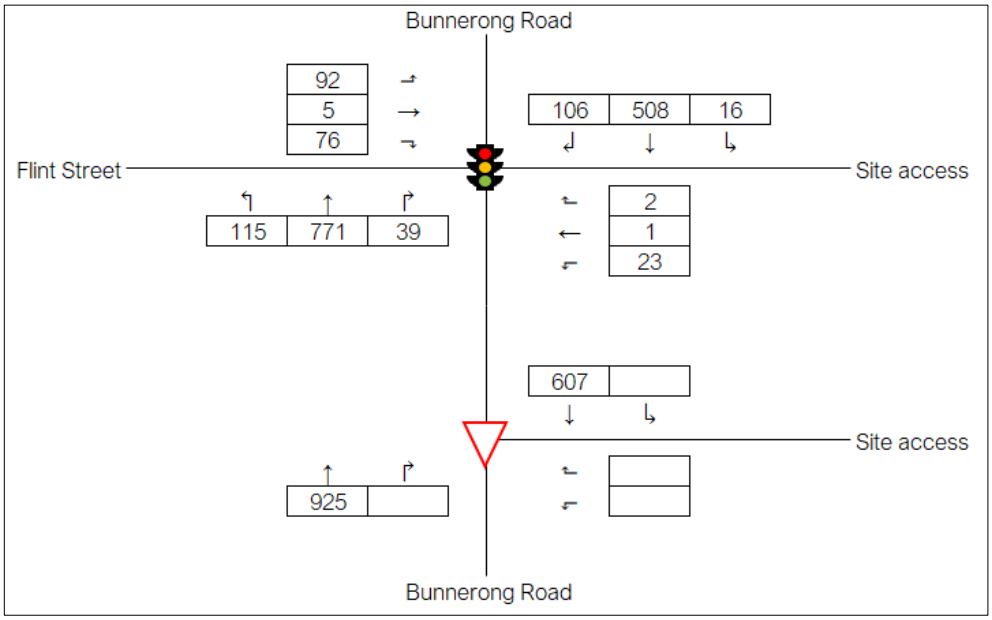
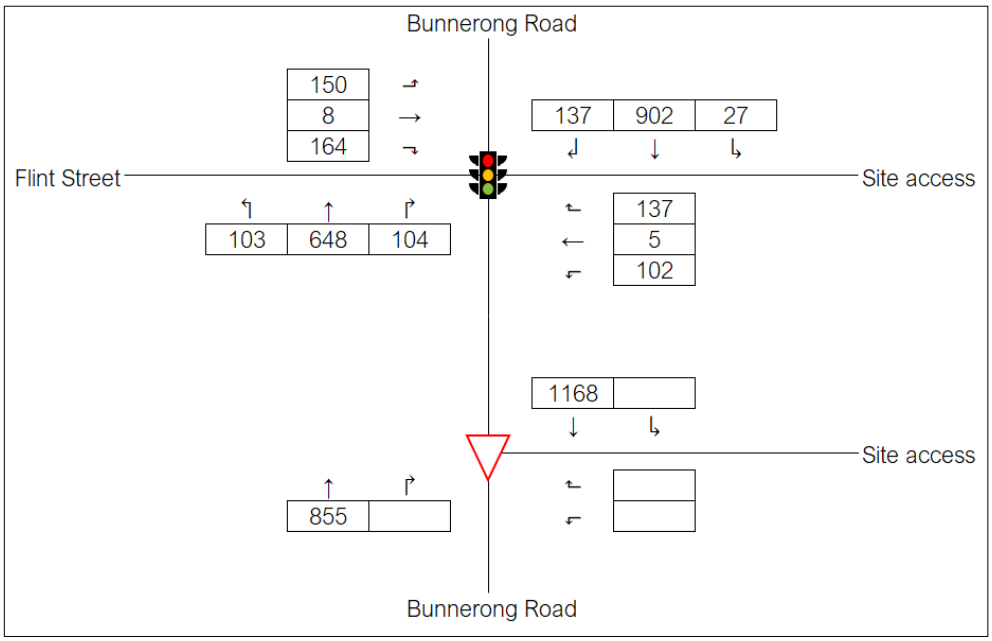


Figure 2.7: Existing PM peak hour traffic volumes



2.4. Intersection Operation

The operation of the key intersections within the study area have been assessed using SIDRA INTERSECTION[1] (SIDRA), a computer-based modelling package which calculates intersection performance.

The commonly used measure of intersection performance, as defined by the TfNSW, is vehicle delay. SIDRA determines the average delay that vehicles encounter and provides a measure of the level of service.

Table 2.1 shows the criteria that SIDRA adopts in assessing the level of service.

Table 2.1: SIDRA level of service criteria

Level of service (LOS)	Average delay per vehicle (secs/veh)	Traffic signals, roundabout	Give way & stop sign
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Near capacity	Near capacity, accident study required
E	57 to 70	At capacity, at signals incidents will cause excessive delays	At capacity, requires other control mode
F	Greater than 70	Extra capacity required	Extreme delay, major treatment required

[1] Program used under license from Akcelik & Associates Pty Ltd.

Table 2.2 presents a summary of the existing operation of the Bunnerong Road/ Flint Street intersection. SIDRA models have been calibrated base on signal phasing and timing and general queue lengths observed on-site.

Table 2.2: Existing intersection operating conditions

Intersection	Peak	Leg	Degree of saturation (DOS)	Average delay (sec)	Average queue (m)	Level of service (LOS)
Bunnerong Road/ Flint Street	AM	South	0.33	8	31	A
		East	0.07	29	4	C
		North	0.33	9	20	A
		West	0.30	35	15	D
		Overall	**0.33**	**11**	**32**	**B**
	PM	South	0.45	14	33	B
		East	0.48	26	21	C
		North	0.47	14	52	B
		West	0.49	30	25	C
		Overall	**0.49**	**17**	**52**	**B**

Table 2.2 indicates that the Bunnerong Road/ Flint Street currently operates well with minimal queues and delays on all approaches. The intersection operates at an overall level of service B in both peak periods.

2.5. Car Parking

As part of the broader upgrade of Heffron Park, a new car park was recently constructed to the north of the site adjacent to the new synthetic field and tennis courts. The car park includes 198 car parking spaces including two accessible spaces and has two access driveways on Bunnerong Road.

The newly constructed car park to the north of the Heffron Centre site is shown in Figure 2.8.

Figure 2.8: Off-street car park adjacent to the Heffron Centre site

Base image source: Nearmap

The subject site is also afforded an informal sealed parking area on the western side of the existing gymnastics centre, north of the indoor sports centre. Unrestricted on-street parking is also permitted along the Bunnerong Road frontage of the site, while other off-street car parks are provided for other areas of the broader Heffron Park precinct.

2.6. Public Transport

The site is supported by a range of frequent bus services that operate along Bunnerong Road. Bus stops are located directly adjacent to the site on Bunnerong Road with services operating approximately every 15-minutes during peak periods. Buses provide services to the north towards Bondi Junction and south towards Little Bay.

A review of the public transport available near the site is shown indicatively in Figure 2.9.

Figure 2.9: Surrounding public transport network

Base image source: Transport for NSW, accessed 13 February 2020

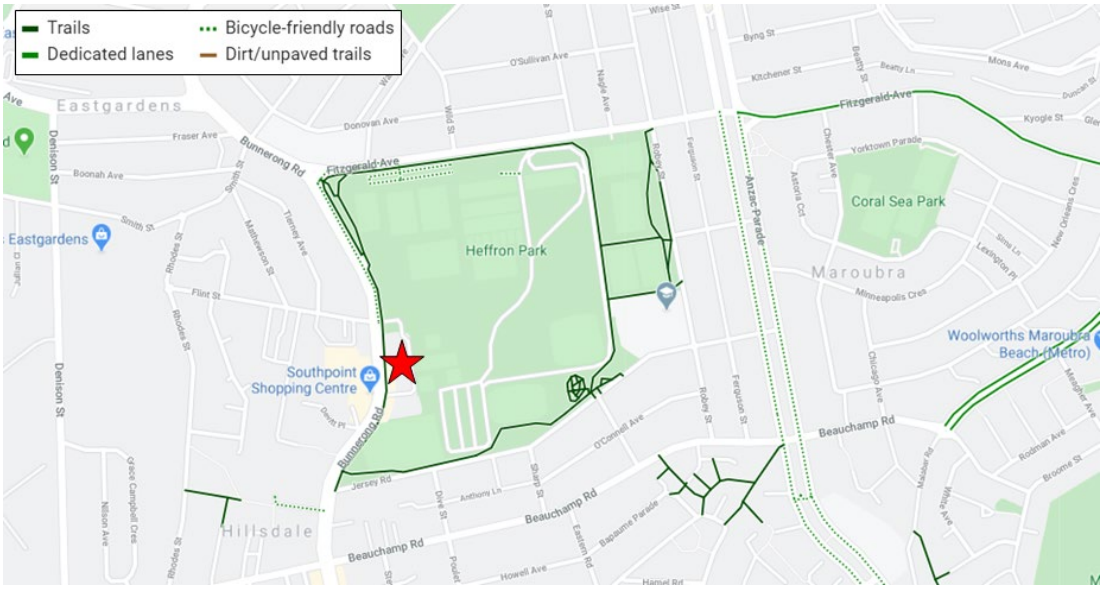
2.7. Walking and Cycling Infrastructure

Well established footpaths are provided on both sides of most surrounding roads. The site is conveniently located adjacent to Southport Shopping Centre, with signalised pedestrian crossings provided on all approaches at the Bunnerong Road/ Flint Street intersection.

The site is well serviced by surrounding cycling infrastructure, with separated cycleways provided adjacent to Heffron Park on Fitzgerald Avenue. There are also shared paths provided through the broader Heffron Park.

The surrounding cycling infrastructure is shown in Figure 2.10.

Figure 2.10: Surrounding cycling network

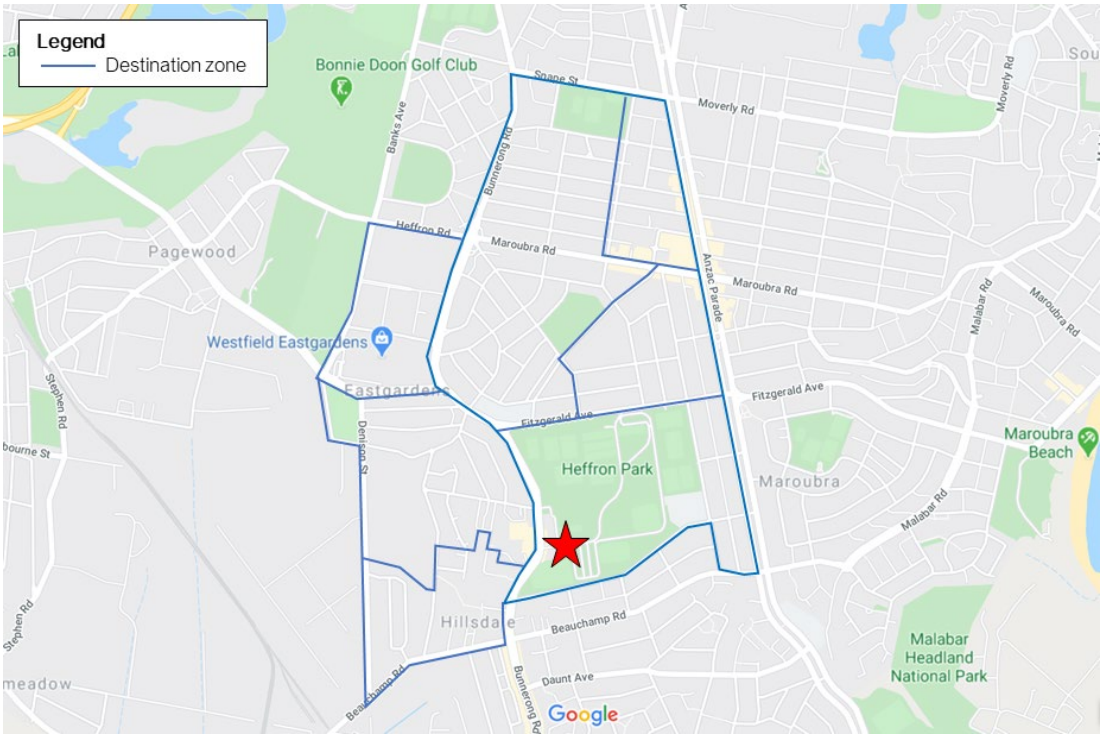


Base image source: Google Maps, accessed 6 April 2020

2.8. Existing Travel Behaviour

Journey to Work data has been sourced from the Australian Bureau of Statistics 2016 census and provides an indication of existing travel patterns from the local area. Figure 2.11 details the catchment of the census data analysed which corresponds to the Australian Bureau of Statistics 2016 Destination Zones (DZN).

Figure 2.11: 2016 Destination Zones



Base image source: Google Maps

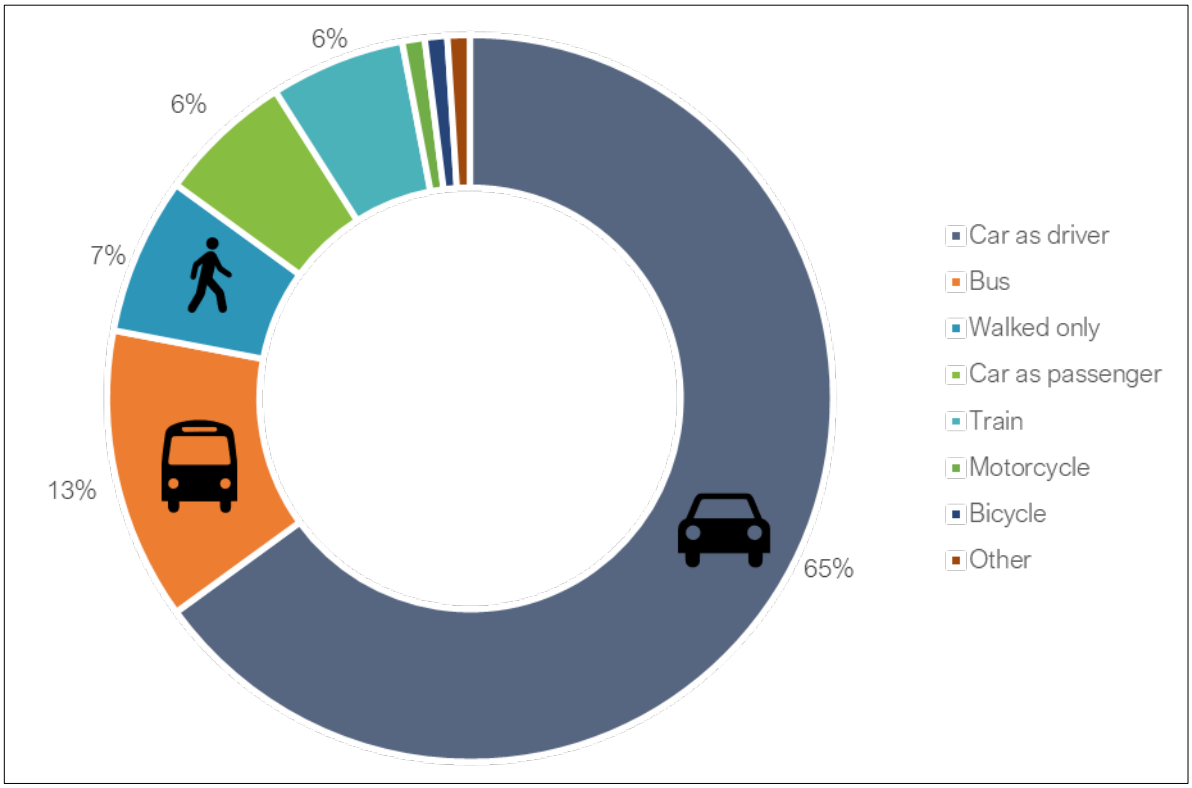
Table 2.3 and Figure 2.11 provide a summary of the existing modes of travel to work for the surrounding area. The results indicate that driving is the most common mode of transport to the area, followed by bus and walking.

Table 2.3: Existing primary mode of travel

Mode of Travel	Mode Share [1]
Car as driver	65%
Bus	13%
Walked only	7%
Car as passenger	6%
Train	6%
Motorcycle	1%
Bicycle	1%
Other	1%
Total	**100%**

[1] Does not include residents who worked at home or did not go to work.

Figure 2.12: Existing travel mode share



2.9. Crash History

An analysis the most recent five-year period of available crash data between 2014 and 2018 has been completed based on crash data supplied by TfNSW Centre for Road Safety for Bunnerong Road near the site. The locations and severity of the crash data for the five-year period is shown in Figure 2.13.

Figure 2.13: TfNSW Centre for Road Safety historical crash data

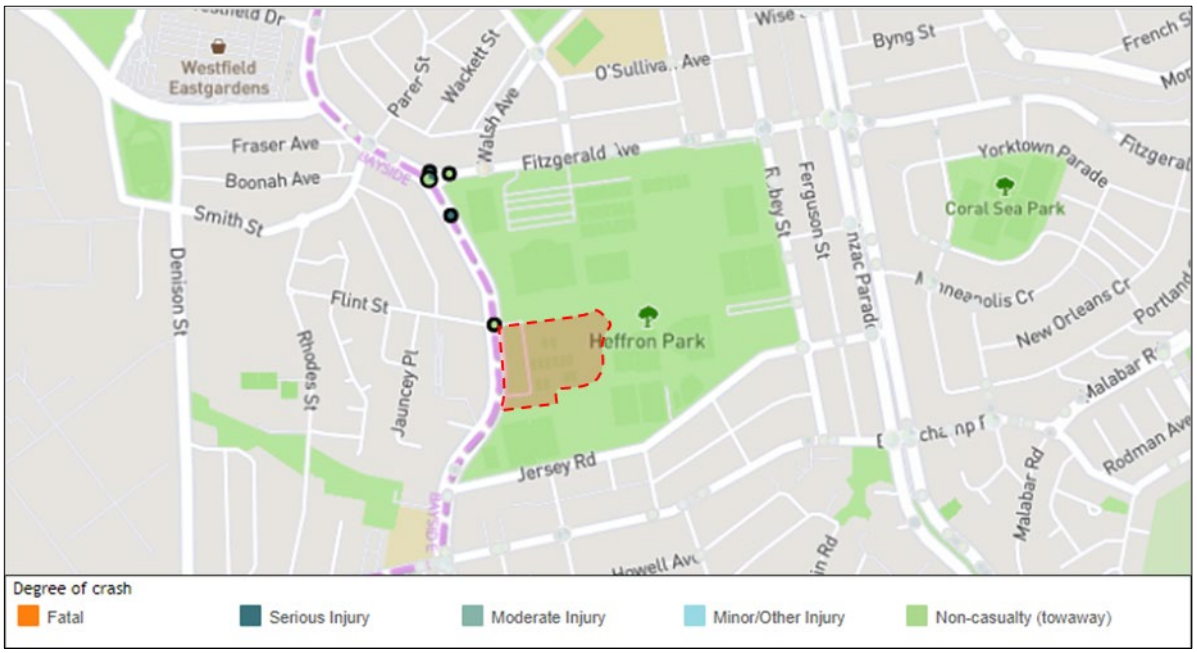


Figure 2.13 indicates that seven crashes have occurred along Bunnerong Road near the site. A closer review of these crashes indicates that the most common of these are rear-end crashes (43 per cent).

The Bunnerong Road/ Fitzgerald Avenue intersection has recorded three non-casualty (tow-away) and two serious injury crashes. These crashes were mostly typical intersection crashes whereby turning vehicles have collided with through vehicles. One of the serious injury crashes involved a pedestrian.

The crash data indicates that only one non-casualty crash occurred in the five-year period at the Bunnerong Road/ Flint Street intersection which was classified as a rear end crash.

Based on the above, the available crash data at this location does not indicate that the proposed development will compromise the safety of the surrounding road environment.

3. DEVELOPMENT PROPOSAL

03

3.1. Overview

The Heffron Centre is subject to two separate Development Applications as follows:

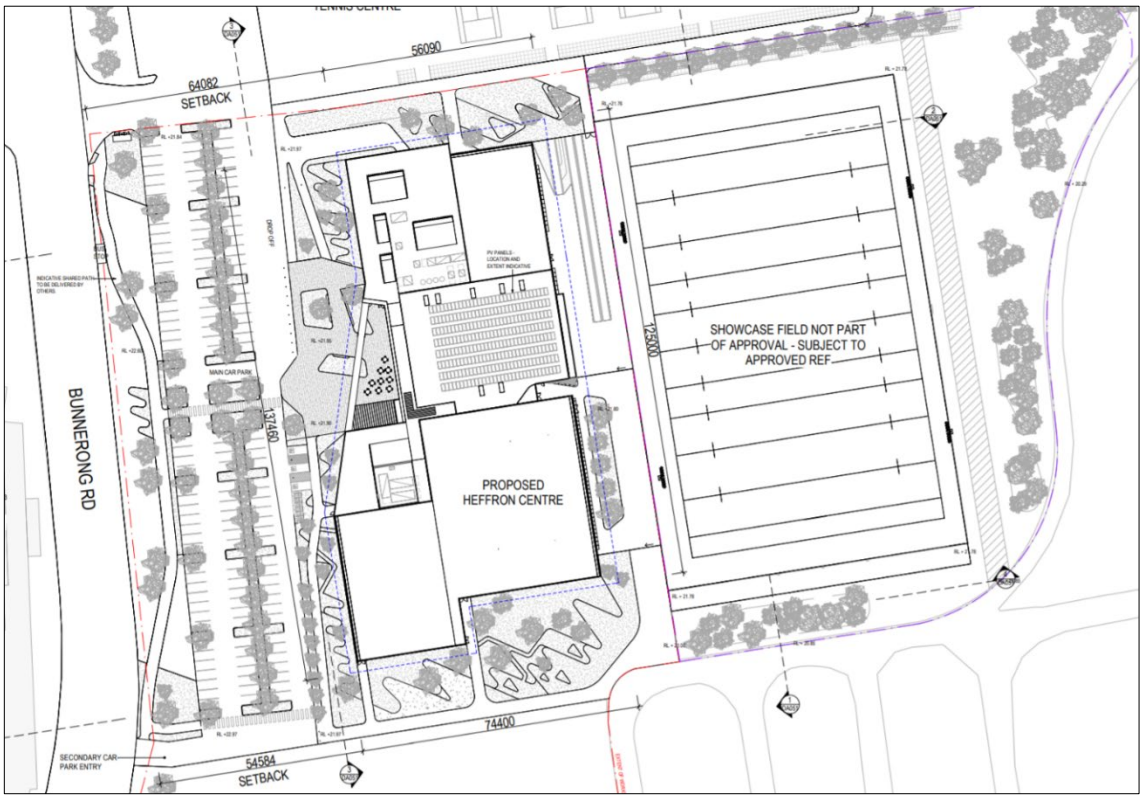
- Concept Development Application which addresses matters set out in Clause 6.12 of Randwick Local Environmental Plan 2012, including seeking consent for land uses, indicative building envelopes and site access arrangements.
- Detailed Development Application which seeks consent for construction and use of the Heffron Centre, including:
    - Demolition of existing buildings and structures within the site.
    - Site preparation works, including termination or relocation of site services and infrastructure, tree removal and the erection of site protection fencing.
    - Construction of the new Heffron Centre, including:
        - A Community and High-Performance Facility (CHPC).
        - An indoor multi-purpose sporting facility.
        - A local indoor gymnastics centre.
        - Installation of floodlighting to the Showcase Field.
    - Car parking for 143 vehicles, including a combination of staff and visitor spaces, accessed via the existing signalised intersection of Bunnerong Road and Flint Street.
    - Building identification signage.
    - Public domain works within the site, including new landscaping and tree planting.

Full details of the proposed development are included in the Architectural Drawings prepared by CO-OP Studio which accompany the Development Applications.

The construction of the Showcase Field is subject of an existing approval under Part 5 of the Environmental Planning and Assessment Act 1979, and accordingly is not within the scope of this Development Application.

The site plan for the Heffron Centre is shown in Figure 3.1.

Figure 3.1: Proposed site layout



Source: CO-OP Studio, Drawing Number DA112, Revision D, dated 31 August 2020

3.2. Parking and Pick-Up and Drop-Off

A new at-grade car park is proposed immediately west of the proposed Heffron Centre. The car park would have capacity for around 143 cars and connected to the existing car park adjacent to the synthetic field and tennis courts to the north. A drop-off/ pick-up area along the north-western side of the Heffron Centre would be appropriate for use by a range of users, including cars and buses/ coaches.

Access to the car park and drop-off/ pick-up area is proposed via the existing access at the Bunnerong Road/ Flint Street intersection and left-in/ left-out driveway towards the southern end of the site.

3.3. Walking and Cycling Infrastructure

An expansive public domain space adjacent to the Heffron Centre main entrance would ensure appropriate space to allow for peak events and the gathering of people. Connecting paths to/ from the south and around the northern and southern sides of the building would also link with key areas, including the showcase field to the south and east respectively.

Pedestrian paths through the car park will connect with pedestrian paths along the eastern side of Bunnerong Road which are subject to be upgraded to shared paths as part of a separate project to be delivered by Council.

Secure bicycle parking will be provided in the community and high performance centre for staff, while visitor bicycle parking will also be provided in the public domain. This is consistent with the requirements set out in DCP 2013, and to take advantage of the established cycling routes in the vicinity.

4. PARKING ASSESSMENT

04

4.1. Car Parking

4.1.1. Car Parking Requirements

The car parking requirements for different development types are set out in DCP 2013. DCP 2013 specifies a rate of one space per 25 square metres GFA for indoor recreation facilities and notes that a transport assessment study should be completed. Office space and cafés should be provided with parking at a rate of one space per 40 square metres GFA.

Given the scale of the proposal together with the mix of land uses and anticipated varying demands across a typical day and week, an empirical assessment has been completed to better understand the anticipated parking demands associated with the proposed development. This is in accordance with Sections 3.2 and 3.3 of DCP 2013.

4.1.2. Anticipated Car Parking Demand

Indoor Multi-Purpose Facility

It is expected that the indoor multi-purpose facility will be used by both teenagers and adults (under 12's and older), primarily on weekday afternoons and on weekends throughout the day. To understand peak parking demand for the indoor multi-purpose facility, an assessment has been completed based both indoor courts being used for netball, as this is likely to experience the most players on the court at one time.

The assumptions used to understand the anticipated peak parking demand are outlined in Table 4.1.

Table 4.1: Indoor multi-purpose facility parking demand

User Group	Description	Number of people
Players	Maximum seven netball players per team	2 x 7 players =14 players per court
Officials	Assume one official per court	1 official per court
Coaching staff/ reserves	Assume five reserve players and two coaches per team	2 x 7 reserves/ coaches =14 per court
Spectators	Assume average of one per player	24 spectators per court
Total		**Average 53 people per court or 106 in total across the two netball courts**
Car occupancy	Surveys for sports fields/ courts in other areas of Sydney have shown an average occupancy of 1.8 people per car	106 people and 1.8 people per car =**~60 cars**

Based on the above, the empirical assessment indicates that with two netball games running concurrently could generate a parking demand of around 60 cars. This demand would likely occur on Saturday game days, while a lower demand could be expected for training (and games) on weeknights given more players, in particularly younger players, are dropped off or catch public transport to training after school.

Weeknight surveys have been completed at other netball courts around Sydney, with the recorded parking demand as follows:

- Mosman Drill Hall Precinct: 10 vehicles per court (GTA, 2018).
- Richard Murden Reserve: 10 vehicles per court (GTA, 2017).

- Willoughby Leisure Centre: 19 vehicles per court (GTA, 2012).
- Throsby Playing Fields, Canberra: 11 vehicles per court (AECOM, July 2011).
- Bungarribee Parklands, Blacktown: 9 vehicles per court (Maunsell AECOM, August 2007).
- Meadowbank Park Netball Courts, Ryde: 10 vehicles per court parking demand (Ryde Council, December 2009).
- Woodward Park Complex, Liverpool: 10 vehicles per court parking demand.
- John Fisher Park, Warringah: up to 20 vehicles per court.

A review of the above sites and their proximity to public transport, surrounding residential areas and metropolitan Sydney generally indicates a parking rate of approximately 10 spaces per court per game could be expected for the Heffron Centre for training on weeknights, or 20 spaces total across the two courts.

Gymnastics Facility

On a typical day it is expected that the gymnastics facility will be used by around 100 people at one time. On a weekend, demand is likely to be slightly higher (to account for parents/ carers and spectators) at around 140 people. Based on an average vehicle occupancy of 1.8 people per car, this results in an anticipated parking demand of around 75 spaces.

Parking demand associated with the indoor multi-purpose facility indicates a typical weeknight parking demand around a third of that on Saturdays. This confirms more drop-off/ pick-up activity, carpooling and use of active and public transport. Based on this, weeknight parking demand for the gymnastics facility is anticipated to be around 25 vehicles.

It is understood that the gymnastics facility will also occasionally (less than four times per year) be used for district/ local level gymnastics events. It is however recognised that larger events are likely to include more carpooling and some travel by bus/ coach. Given the infrequent nature of these large events, it is expected that some form of event planning would be required (at least initially) with other car parks within Heffron Park (and on Bunnerong Road adjacent to the site) also able to accommodate any overflow of parking. Such events would benefit from occurring in isolation or at least planned with regard for other sporting activity in Heffron Park.

Community and High Performance Centre

The proposed community and high performance centre is expected to accommodate 107 staff. With 66 per cent of workers in the surrounding area travelling to work by car or motorcycle (as discussed in Section 2.8) and adopting the broadly accepted Sydney wide average commuter vehicle occupancy of 1.1 to 1.2 people per car, parking demand would be around 60 to 65 vehicles on a typical weekday.

It is also understood that an additional eight dedicated parking spaces are required for use by Rabbitohs players and club staff in addition to the above. The dedicated use of these spaces may be subject to specific days/ hours.

Based on this initial assessment, the anticipated parking demand associated with the community and high performance centre is up to 73 spaces.

4.1.3. Adequacy of Car Parking Supply

Based on the above analysis, the anticipated typical parking demand for the proposed uses is set out in Table 4.2.

Table 4.2: Summary of typical peak parking requirements

User	Weekday afternoon parking demand	Saturday parking demand
Indoor Multi-purpose Facility	20	60
Gymnastics Facility	25	75
Community and High Performance Centre	73	8
Total	**118 spaces**	**143 spaces**

Table 4.2 indicates the peak parking demand for the Heffron Centre is anticipated to be 118 spaces on a weeknight and 143 spaces on a Saturday. The proposed car park includes 143 parking spaces and therefore is expected to meet the anticipated peak parking demand.

Accessible parking should be provided at a rate of one space per 50 standard car parking spaces or part thereof. This is met with the provision of three spaces on the eastern side of the car park close to the main entrance.

As discussed, some use of on-street parking along Bunnerong Road in the immediate vicinity is also anticipated, mostly through perceived convenience (or preference) rather than need. This would further balance the distribution of parking across the precinct.

4.1.4. Car Parking Layout Review

The indicative car park layout has been reviewed against the general requirements of the Australian Standard for Off Street Car Parking (AS/NZS2890.1:2004 and AS/NZS2890.6:2009).

The car park has been designed as a User Class 3 facility. Parking bays meet the minimum dimensional requirements of 2.6 metres wide and 5.4 metres long with 5.8 metre wide aisles. The indented drop-off/ pick-up area also exceeds the recommended minimum width of three metres and is intended for use by both cars and buses/ coaches.

The car park is laid out in a simple and clear manner and ensures appropriate internal circulation, as shown in the swept path assessment included in Appendix C. Vehicles are able to enter and exit the site via the main access through the Bunnerong Road/ Flint Street signalised intersection and the left-in/ left-out access in the south-west corner. The eastern circulation aisle (adjacent to the building) is designed as one-way southbound with the northern half of the western aisle allowing for one-way northbound traffic. This will allow for efficient internal circulation, particularly facilitating those being dropped-off and picked-up. The setback from the traffic signals for entering vehicles also ensures that any such minor delays and/ or queuing will not impact the operation of the signals or through traffic on Bunnerong Road. All vehicles can also circulate through the car park from the southern end should the car park be nearing capacity during peak periods.

4.2. Bicycle Parking

DCP 2013 sets out the minimum bicycle parking rates for different development types. The DCP bicycle parking rate for recreational uses is one space per 10 car parking spaces. Based on the proposed parking provision of 143 spaces, this equates to 14 bicycle parking spaces. It is recommended that six of these be secure spaces for use by staff associated with the community and high performance facility. This is based on the anticipated 107 staff and Journey to Work data indicating a six per cent cycling mode share. This is met with six secure spaces provided in the community and high performance centre and eight visitor spaces as part of the public domain.

The development is also required to provide a minimum four showers based on 107 full-time staff and is to be split between two change rooms (one male and one female). This is met with such provision within the community and high performance centre while additional facilities are also provided for the indoor multi-purpose facility and gymnastics facility.

4.3. Motorcycle Parking

DCP 2013 sets out minimum motorcycle parking rates for different development types. The DCP motorcycle parking rate for recreational uses is five per cent of the car parking rate (one space per 20 car spaces). Based on the 143 spaces, this equates to seven motorcycle spaces. This requirement is met, with these spaces provided on the eastern side of the car park, adjacent to the accessible spaces and close to the main entrance.

4.4. Bus/ Coach Parking

An indented bus/ coach drop-off/ pick-up area is provided adjacent to the public domain and adjacent to the main entrance. The site layout allows for straightforward entry and exit by buses and coaches with north to south circulation through the site. No designated on-site bus parking is proposed with users expected to include contingencies to understand off-site parking areas in the vicinity. This is common for such facilities throughout Sydney where space limitations prevent appropriate provision on-site.

The drop-off/ pick-up area is more than 65 metres long and able to accommodate three to four buses/ coaches at any one time.

4.5. Loading and Servicing

Considering the proposed uses, it is anticipated that at least one dedicated loading bay would be required to accommodate the servicing demands of the site. This has been accommodated in the community and high performance centre, with the loading dock designed to accommodate an 8.8 metre long medium rigid vehicle. It is understood that most deliveries are expected to be by small delivery vehicles such as vans and utes that typically deliver during non-peak periods and likely to use the set-down/ pick-up area adjacent to the main entrance.

Infrequent loading activity associated with the on-site loading dock is therefore expected and limited to approved vehicles only. Removable bollards would ensure appropriate use with management measures to limit day to day operations and use of the public domain generally.

5. TRAFFIC IMPACT ASSESSMENT

05

5.1. Traffic Generation

Given the various areas, the lack of relevant traffic generation rates in the TfNSW Guide to Traffic Generation Developments 2002 (Guide 2002), traffic generation associated with the proposal has been estimates based on an empirical assessment.

Indoor Multi-Purpose Facility

As discussed in Section 4.1, the indoor multi-purpose facility is expected to generate a parking demand of around 20 vehicles per game on a weeknight, and 60 vehicles on a weekend. Netball games are generally scheduled back to back to maximise the number of games played on a given day/ night. In this regard, it is expected that weeknights would experience up to 40 trips per hour (20 vehicles inbound and 20 vehicles outbound) while up to 120 trips per hour could be expected on a Saturday (60 vehicles inbound and 60 vehicles outbound).

There may also be opportunity to stagger game start times, with a short 15-minute gap between games. This would provide the following benefits:

- Limit 'peak of peak' parking demand so often associated with team sports where the end of one game overlaps with the scheduled start of the next game.
- Mitigate the effects of similar short peak traffic generation on the surrounding road network.

Gymnastics Facility

As discussed, the gymnastics facility is expected to generate a parking demand of around 20 vehicles per game on a weeknight, and 55 vehicles on a weekend. With similar back to back classes, it is expected that weeknights would generate up to 40 trips per hour (20 vehicles inbound and 20 vehicles outbound) and up to 110 trips per hour on a Saturday (55 vehicles inbound and 55 vehicles outbound).

As also discussed, the facility may also be used occasionally for district/ local level gymnastic events. It is likely that special event procedures will be implemented for these events, with carpooling and bus/ coach use likely to limit traffic generation. Such events are also likely to occur outside broader road network peak periods.

Community and High Performance Centre

Based on the projected full-time community and high performance centre staff, it is expected that around 65 staff will drive to work on a daily basis. Based on surveys completed for similar developments, it is estimated that around 70 per cent of staff travel to and from work in the road network peak hour. Assuming a directional split of 80 per cent inbound and 20 per cent outbound in the morning peak hour (reversed in the PM), the community and high performance centre could generate 45 vehicle trips (35 vehicles in the peak direction. Minor traffic generation is expected on the weekend.

It is also assumed that Rabbitohs players will mostly travel outside weekday peak periods with some minor activity associated with other Rabbitohs staff.

Summary

The anticipated traffic generation for each of the proposed uses is summarised in Table 5.1.

Table 5.1: Summary of peak hour traffic generation

Use	Weekday AM (trips per hour)			Weekday PM (trips per hour)			Saturday (trips per hour)		
	In	Out	Total	In	Out	Total	In	Out	Total
Indoor Multi-Purpose Facility	0	0	0	20	20	40	60	60	120
Gymnastics Facility	0	0	0	20	20	40	55	55	110
Community and High Performance Centre	40	10	50	10	40	50	0	0	0
Total	**40**	**10**	**50**	**50**	**80**	**130**	**115**	**115**	**230**

5.2. Distribution and Assignment

The directional distribution and assignment of traffic generated by the proposed development will be influenced by several factors, including the:

- configuration of the arterial road network in the immediate vicinity of the site
- existing operation of intersections providing access between the local and arterial road network
- distribution of households in the vicinity of the site
- likely distribution of employee residences in relation to the site
- configuration of access points to the site.

Having consideration to the above and existing traffic counts at the Bunnerong Road/ Flint Street intersection, the following distribution has been assumed:

- 47.5 per cent to/ from the north
- 47.5 per cent to/ from the south
- 5 per cent to/ from the west.

Based on the above, Figure 5.1 to Figure 5.3 have been prepared to show the estimated marginal increase in turning movements near the subject property following full site development.

Figure 5.1: Weekday AM peak hour site generated traffic volumes

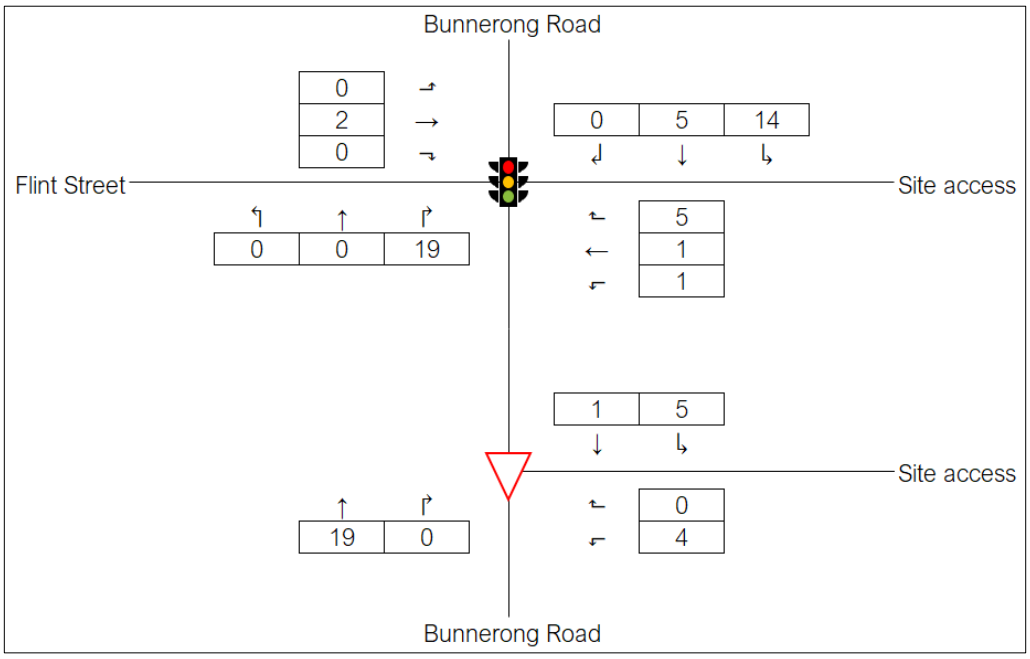


Figure 5.2: Weekday PM peak hour site generated traffic volumes

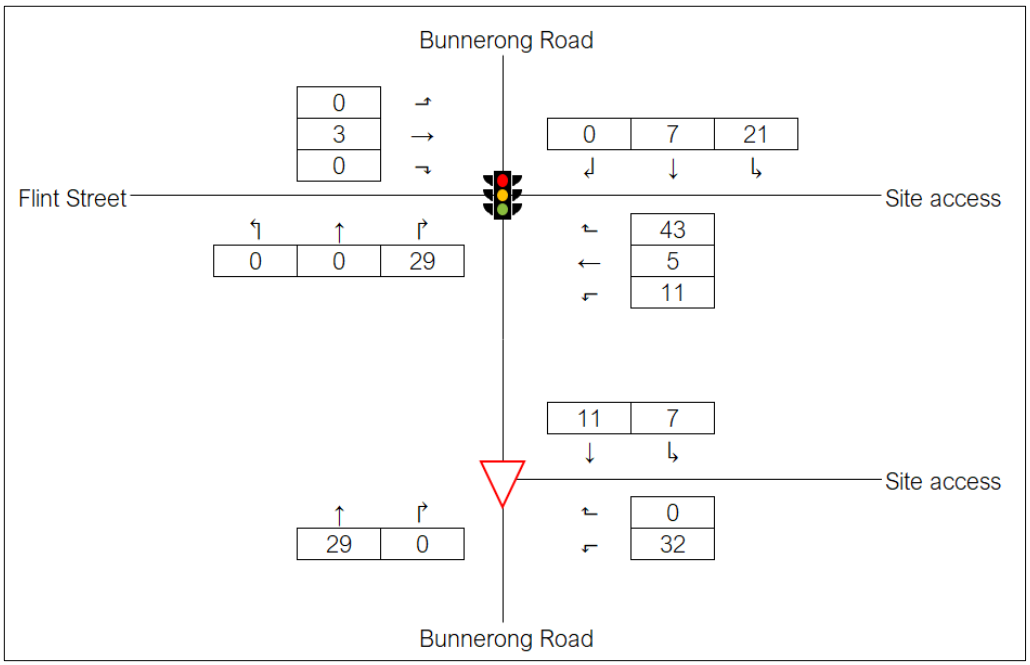
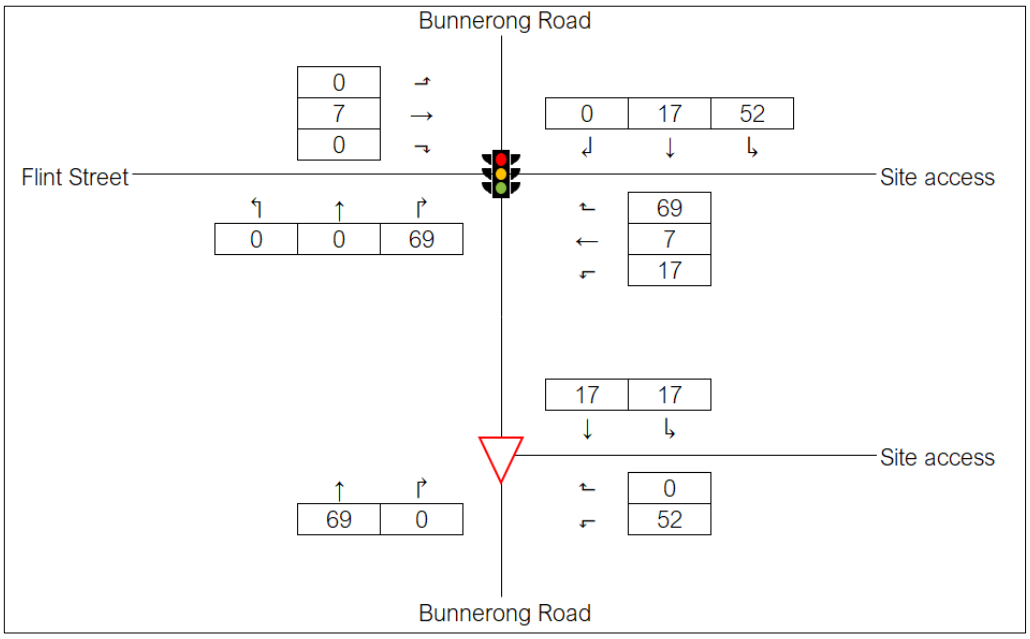


Figure 5.3: Saturday peak hour site generated traffic volumes



5.3. Traffic Impact

The Bunnerong Road/ Flint Street intersection and the left-in/ left-out access onto Bunnerong Road in the south-west corner of the site have been modelled in SIDRA with the anticipated increase in traffic generated by the proposed development. The SIDRA modelling results are summarised in Table 5.2.

Table 5.2: Post development intersection operating conditions

Intersection	Peak	Leg	Degree of saturation (DOS)	Average delay (sec)	Average queue (m)	Level of service (LOS)
Bunnerong Road/ Flint Street	AM	South	0.32	8	30	A
		East	0.8	30	4	C
		North	0.32	8	20	A
		West	0.32	36	16	D
		Overall	**0.32**	**11**	**30**	**B**
	PM	South	0.66	17	37	B
		East	0.59	24	28	C
		North	0.54	17	60	B
		West	0.44	28	24	C
		Overall	**0.66**	**19**	**60**	**B**
Bunnerong Road/ southern site access	AM	East	0.01	1	0	A
		North	0.17	9	0	A
	PM	East	0.04	3	1	A
		North	0.32	9	0	A

Table 5.2 indicates that the Bunnerong Road/ Flint Street intersection is expected to continue to operate well in both weekday peak periods. The intersection would operate at a level of service B in the weekday AM and PM peak hours. It is expected that the overall average delay is expected to increase by up to two seconds in any peak hour with average queues also expected to increase by up to eight metres (one to two cars). It is noted that the results indicate a reduction in average queues over the intersection post development in the weekday AM peak hour, however this is as a result of signal optimisation relating to the slight reallocation of green time away from the minor approaches and the addition of this green time to Bunnerong Road.

The left-in/ left out access is expected to operate well and at a level of service A in both weekday peak periods, with minimal delay and queuing for all approaches.

Considering the anticipated operation during the weekday peak periods, it is also expected that the key intersections would continue to operate at satisfactory levels of service during the Saturday peak periods. This will be further investigated as part of the Development Application stage and following consultation with and feedback from TfNSW regarding the methodology used for assessing the traffic impact of the proposal (as discussed in Section 2.3).

Based on the above, the additional traffic generated by the proposed development is expected to have a minor impact on surrounding road network, with the surrounding key intersections expected to continue operating well at satisfactory levels of service.

6. PRELIMINARY CONSTRUCTION TRAFFIC MANAGEMENT PLAN

06

6.1. Overview

This section seeks to provide an overview of the Construction Traffic Management Plan (CTMP) initiatives to be implemented as part of the construction works associated with the proposed development.

Specifically, this overview CTMP considers the following:

- construction site access arrangements
- anticipated truck volumes during construction stages
- truck routes to/ from the site
- requirements for works zones
- pedestrian and cyclist access
- site personnel parking
- traffic control measures
- overview of CTMP requirements.

6.2. Principles of Traffic Management

The general principles of traffic management during construction activities are as follows:

- minimise the impact on pedestrian and cyclist movements
- maintain appropriate public transport access
- minimise the loss of on-street parking
- minimise the impact on adjacent and surrounding buildings
- maintain access to/ from adjacent buildings
- restrict construction vehicle movements to designated routes to/ from the site
- manage and control construction vehicle activity near the site
- carry out construction activity in accordance with approved hours of works.

6.3. Work Hours

The works will be carried out during the approved work hours. Indicative work hours are as follows, in accordance with information on Council's website:

- Monday to Sunday (inclusive), including public holidays: 7:00am – 5:00pm.

The consent conditions are expected to include further detail on the permitted work hours and other restrictions in relation to use of excavators, jack hammers and pile drivers.

Workers would be advised of the approved work hours during induction. Any works outside of the approved work hours would be subject to specific prior approval from the appropriate authorities. Such works may include delivery of cranes, large plant or equipment required on the site that require oversize vehicle access.

6.4. Site Access and Loading

It is anticipated that construction vehicle access will be provided via the two existing accesses to the site from Bunnerong Road. It is anticipated that the northern site access will be able to be implemented while maintaining access to/ from the Bunnerong Road/ Flint Street intersection. All loading is expected

to take place within the bounds of the site. Should a works zone be required, an application will be made to the relevant authorities prior to commencement of works.

As part of the detailed CTMP, a traffic control plan (TCP) will be prepared in accordance with the principles of the Traffic Control at Work Sites manual (TfNSW, 2018). The TCPs primarily show where construction signs will be located at specific locations (such as uncontrolled intersections) along the approved truck routes to warn other road users of the increase in construction vehicle movements.

Access to the neighbouring sites by emergency vehicles would not be affected by the works as the road and footpath frontages would be unaffected. Emergency protocols on the site would include a requirement for site personnel to assist with emergency access from the street. All truck movements to the site and/ or incident point would be suspended and cleared.

6.5. Construction Staff Parking

At this stage of the project, the number of construction workers for the project is still unknown.

It is anticipated that a small number of construction worker parking spaces will be able to be provided on-site during the construction works. That said, workers will be encouraged to use public transport to access the site. During site induction, workers will be informed of the existing bus network servicing the site. Appropriate arrangements will be made for any equipment/ tool storage and drop-off requirements. This will be confirmed and detailed further in a future Construction Traffic Management Plan to be prepared by the appointed contractor.

6.6. Heavy Vehicle Traffic Generation

At this stage of the project, the number of construction workers for the project is still unknown. This will be confirmed and detailed further in a future Construction Traffic Management Plan to be prepared by the appointed contractor.

SIDRA modelling completed for the project indicates there is capacity on the surrounding road network to accommodate an increase in traffic associated with the construction of the project. Construction vehicle movements will be minimised/ avoided during peak hours where possible.

6.7. Heavy Vehicle Access Routes

Heavy vehicle movements would be restricted to designated routes and confined to the arterial road network wherever feasible. Truck routes to/ from the site have been identified with the aim of providing the most direct routes to/ from the site as well as minimising the impact of heavy vehicles on local roads.

Figure 6.1 provide a summary of the anticipated construction vehicle routes to/ from the site. Truck drivers will be advised of the designated truck routes to/ from the site.

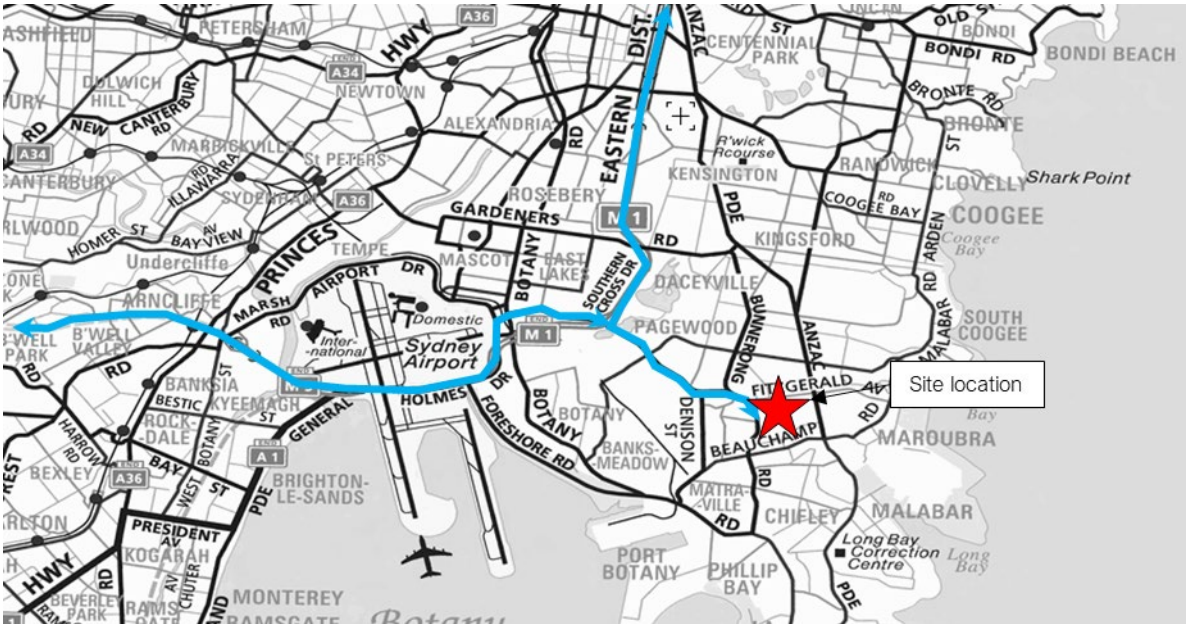
Approach Routes

- North: Eastern Distributor, Southern Cross Drive, Wentworth Avenue, Bunnerong Road
- South: M5 South-West Motorway, General Holmes Drive, Wentworth Avenue, Bunnerong Road.

Departure Routes

- North: Bunnerong Road, Wentworth Avenue, Southern Cross Drive, Eastern Distributor
- South: Bunnerong Road, Wentworth Avenue, General Holmes Drive, M5 South-West Motorway.

Figure 6.1: Construction vehicle routes



Base image source: Sydway

6.8. Pedestrian and Cyclist Access

Where required, B-Class hoardings will be installed along the perimeter of the site where overhead works are occurring to maintain and ensure safe pedestrian and cyclist passage adjacent to the site. Where B-Class hoarding is not required, A-Class hoarding/ fencing will be provided to provide separation between the work site and pedestrians.

Truck movements will be avoided during peak hours where possible to minimise the impact on pedestrians and cyclists.

6.9. Overview of CTMP Requirements

This section provides an overview of the CTMP initiatives that would be implemented for the demolition and construction of the Heffron Centre. A detailed CTMP would cover the following additional information:

- description of construction activities and duration.
- approved construction work hours.
- detailed assessment of construction traffic impacts including any cumulative impacts.
- swept path analysis of heavy vehicle access to the site.
- detailed assessment of on-street parking impacts.
- emergency vehicle access.
- impacts to public transport services.
- traffic control plan(s).
- contact details of key project personnel.

7. CONCLUSION

07

CONCLUSION

Based on the analysis and discussions presented within this report, the following conclusions are made:

1. A new gymnastics facility, indoor multi-purpose sports facility and community and high performance centre is proposed on land on the western side of Heffron Park in Maroubra as part of the Heffron Centre project.
2. Parking demand for the proposed uses is expected to vary throughout the week, with demand for around 118 spaces expected on a weekday afternoon and 143 spaces on a weekend.
3. The proposed provision of 143 spaces is considered acceptable at meeting the anticipated peak parking demand for the site, noting there is also justified use of on-street parking along the Bunnerong Road frontage of the site.
4. A total of 14 bicycle spaces including six secure spaces for staff are proposed, meeting DCP 2013 requirements.
5. The design of the drop-off/ pick-up area adjacent to the main building entrance is considered appropriate and capable of accommodating demands by both cars and buses/ coaches.
6. The provision of one loading bay for vehicles up to 8.8 metre medium rigid vehicles is considered suitable for servicing the site, noting most deliveries are expected to occur in vans/ utes and will likely occur in the drop-off/ pick-up area outside peak periods.
7. The proposed development seeks to provide pedestrian connections which link with the future planned upgraded shared path along the eastern side of Bunnerong Road to be delivered as part of a separate project by Council.
8. The proposed car parking layout is considered consistent with the requirements set out in the Australian Standards for Off Street Parking Facilities (AS/NZS 2890.1:2004 and AS/NZS 2890.6:2009).
9. The proposed development is expected to generate around 50, 130 and 230 trips in the weekday AM, PM and Saturday peak hours respectively.
10. Traffic modelling indicates there is adequate capacity on the surrounding road network to accommodate the increase in traffic generated by the proposed development, with minor increases to delay and queuing.
11. Overall, the proposed development can be supported from a traffic and transport perspective.
12. A detailed Construction Traffic Management Plan will be prepared prior to construction of the project.

A.SIDRA MODELLING RESULTS

A

USER REPORT FOR NETWORK SITE

Project: 200417sid-N186090 417-439R Bunnerong Road, Maroubra (Heffron Centre) **Template: Movement Summary**

Site: [1 Flint Street/ Bunnerong Road/ Site Access AM Ex] **Network: 3 [AM Existing]**

Site Category: -
Signals - Fixed Time Isolated Cycle Time = 80 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, D*, E1*
Output Phase Sequence: A, D*
(* Variable Phase)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Bunnerong Road														
1	L2	121	2.0	121	2.0	0.108	12.4	LOS B	1.2	8.4	0.44	0.68	0.44	40.1
2	T1	812	2.0	812	2.0	0.331	7.1	LOS A	4.4	31.4	0.49	0.43	0.49	48.7
3	R2	41	2.0	41	2.0	0.080	16.6	LOS B	0.4	3.1	0.45	0.79	0.45	18.9
Approach		974	2.0	974	2.0	0.331	8.2	LOS A	4.4	31.4	0.48	0.48	0.48	46.0
East: Site Access														
4	L2	24	2.0	24	2.0	0.073	28.4	LOS C	0.5	3.6	0.84	0.61	0.84	3.7
5	T1	1	2.0	1	2.0	0.073	28.4	LOS C	0.5	3.6	0.84	0.61	0.84	22.9
6	R2	2	2.0	2	2.0	0.008	30.5	LOS C	0.0	0.3	0.86	0.54	0.86	19.9
Approach		27	2.0	27	2.0	0.073	28.6	LOS C	0.5	3.6	0.84	0.61	0.84	6.7
North: Bunnerong Road														
7	L2	17	2.0	17	2.0	0.225	15.4	LOS B	2.8	19.6	0.45	0.43	0.45	35.5
8	T1	535	2.0	535	2.0	0.225	6.5	LOS A	2.8	19.7	0.45	0.40	0.45	45.6
9	R2	112	2.0	112	2.0	0.326	16.7	LOS B	1.5	10.9	0.58	0.73	0.58	41.2
Approach		663	2.0	663	2.0	0.326	8.5	LOS A	2.8	19.7	0.47	0.46	0.47	43.8
West: Flint Street														
10	L2	97	2.0	97	2.0	0.295	34.7	LOS C	2.1	15.2	0.89	0.77	0.89	32.2
11	T1	5	2.0	5	2.0	0.295	40.5	LOS D	2.1	15.2	0.89	0.77	0.89	22.7
12	R2	80	2.0	80	2.0	0.282	35.7	LOS D	1.7	12.1	0.90	0.75	0.90	24.6
Approach		182	2.0	182	2.0	0.295	35.3	LOS D	2.1	15.2	0.89	0.76	0.89	29.1
All Vehicles		1846	2.0	1846	2.0	0.331	11.2	LOS B	4.4	31.4	0.53	0.50	0.53	41.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: [2 Bunnerong Road/ Site Access AM Ex]

Network: 3 [AM Existing]

Site Category: -
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Site Access														
4	L2	1	2.0	1	2.0	0.001	1.0	LOS A	0.0	0.0	0.37	0.15	0.37	36.5
Approach		1	2.0	1	2.0	0.001	1.0	LOS A	0.0	0.0	0.37	0.15	0.37	36.5
North: Bunnerong Road														
7	L2	1	2.0	1	2.0	0.166	8.9	LOS A	0.0	0.0	0.00	0.00	0.00	17.5
8	T1	639	2.0	639	2.0	0.166	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		640	2.0	640	2.0	0.166	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
All Vehicles		641	2.0	641	2.0	0.166	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

USER REPORT FOR NETWORK SITE

Project: 200417sid-N186090 417-439R Bunnerong Road, Maroubra (Heffron Centre) **Template: Movement Summary**

Site: [1 Flint Street/ Bunnerong Road/ Site Access PM Ex] **Network: 2 [PM Existing]**

Site Category: -
Signals - Fixed Time Isolated Cycle Time = 80 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, D*, E1*
Output Phase Sequence: A, D*
(* Variable Phase)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Bunnerong Road														
1	L2	108	2.0	108	2.0	0.116	16.3	LOS B	1.3	9.5	0.55	0.70	0.55	37.5
2	T1	682	2.0	682	2.0	0.331	11.1	LOS B	4.6	32.7	0.60	0.52	0.60	44.0
3	R2	109	2.0	109	2.0	0.446	29.6	LOS C	2.1	14.7	0.78	0.83	0.78	14.0
Approach		900	2.0	900	2.0	0.446	14.0	LOS B	4.6	32.7	0.62	0.58	0.62	38.8
East: Site Access														
4	L2	107	2.0	107	2.0	0.213	22.8	LOS C	2.0	14.5	0.79	0.63	0.79	4.2
5	T1	5	2.0	5	2.0	0.213	22.8	LOS C	2.0	14.5	0.79	0.63	0.79	24.6
6	R2	144	2.0	144	2.0	0.483	28.1	LOS C	3.0	21.4	0.88	0.72	0.88	20.6
Approach		257	2.0	257	2.0	0.483	25.8	LOS C	3.0	21.4	0.84	0.68	0.84	15.9
North: Bunnerong Road														
7	L2	28	2.0	28	2.0	0.474	21.2	LOS C	7.2	51.4	0.67	0.61	0.67	31.0
8	T1	949	2.0	949	2.0	0.474	12.3	LOS B	7.3	51.6	0.67	0.60	0.67	37.9
9	R2	144	2.0	144	2.0	0.434	23.2	LOS C	2.5	17.8	0.74	0.77	0.74	37.8
Approach		1122	2.0	1122	2.0	0.474	13.9	LOS B	7.3	51.6	0.67	0.62	0.67	37.6
West: Flint Street														
10	L2	158	2.0	158	2.0	0.322	28.2	LOS C	3.1	22.2	0.82	0.77	0.82	34.7
11	T1	8	2.0	8	2.0	0.322	33.9	LOS C	3.1	22.2	0.82	0.77	0.82	24.8
12	R2	173	2.0	173	2.0	0.494	31.2	LOS C	3.5	25.1	0.87	0.79	0.87	26.3
Approach		339	2.0	339	2.0	0.494	29.9	LOS C	3.5	25.1	0.85	0.78	0.85	30.7
All Vehicles		2618	2.0	2618	2.0	0.494	17.2	LOS B	7.3	51.6	0.69	0.63	0.69	34.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: [2 Bunnerong Road/ Site Access PM Ex]

Network: 2 [PM Existing]

Site Category: -
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Site Access														
4	L2	1	2.0	1	2.0	0.001	2.4	LOS A	0.0	0.0	0.52	0.28	0.52	35.4
Approach		1	2.0	1	2.0	0.001	2.4	LOS A	0.0	0.0	0.52	0.28	0.52	35.4
North: Bunnerong Road														
7	L2	1	2.0	1	2.0	0.320	8.9	LOS A	0.0	0.0	0.00	0.00	0.00	17.5
8	T1	1229	2.0	1229	2.0	0.320	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		1231	2.0	1231	2.0	0.320	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
All Vehicles		1232	2.0	1232	2.0	0.320	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

USER REPORT FOR NETWORK SITE

Project: 200417sid-N186090 417-439R Bunnerong Road, Maroubra (Heffron Centre) **Template: Movement Summary**

Site: [1 Flint Street/ Bunnerong Road/ Site Access AM Fut] **Network: 4 [AM Future]**

Site Category: -
Signals - Fixed Time Isolated Cycle Time = 80 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, D*, E1*
Output Phase Sequence: A, D*
(* Variable Phase)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Bunnerong Road														
1	L2	121	2.0	121	2.0	0.106	12.0	LOS B	1.1	8.2	0.42	0.68	0.42	40.4
2	T1	812	2.0	812	2.0	0.324	6.6	LOS A	4.3	30.3	0.48	0.42	0.48	49.3
3	R2	61	2.0	61	2.0	0.119	16.4	LOS B	0.6	4.5	0.45	0.80	0.45	19.0
Approach		994	2.0	994	2.0	0.324	7.9	LOS A	4.3	30.3	0.47	0.47	0.47	46.0
East: Site Access														
4	L2	25	2.0	25	2.0	0.084	29.5	LOS C	0.6	3.9	0.86	0.63	0.86	3.6
5	T1	2	2.0	2	2.0	0.084	29.5	LOS C	0.6	3.9	0.86	0.63	0.86	22.6
6	R2	7	2.0	7	2.0	0.031	32.0	LOS C	0.2	1.1	0.88	0.59	0.88	19.5
Approach		35	2.0	35	2.0	0.084	30.0	LOS C	0.6	3.9	0.86	0.62	0.86	9.9
North: Bunnerong Road														
7	L2	32	2.0	32	2.0	0.230	15.0	LOS B	2.8	19.7	0.44	0.45	0.44	35.5
8	T1	540	2.0	540	2.0	0.230	6.1	LOS A	2.8	19.9	0.44	0.41	0.44	45.9
9	R2	112	2.0	112	2.0	0.319	16.0	LOS B	1.5	10.5	0.57	0.72	0.57	41.5
Approach		683	2.0	683	2.0	0.319	8.2	LOS A	2.8	19.9	0.46	0.46	0.46	44.0
West: Flint Street														
10	L2	97	2.0	97	2.0	0.321	35.8	LOS D	2.2	15.9	0.91	0.77	0.91	31.8
11	T1	7	2.0	7	2.0	0.321	41.6	LOS D	2.2	15.9	0.91	0.77	0.91	22.4
12	R2	80	2.0	80	2.0	0.283	36.6	LOS D	1.7	12.3	0.91	0.75	0.91	24.3
Approach		184	2.0	184	2.0	0.321	36.4	LOS D	2.2	15.9	0.91	0.76	0.91	28.6
All Vehicles		1896	2.0	1896	2.0	0.324	11.1	LOS B	4.3	30.3	0.51	0.50	0.51	41.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: [2 Bunnerong Road/ Site Access AM Fut]

Network: 4 [AM Future]

Site Category: -
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Site Access														
4	L2	4	2.0	4	2.0	0.003	1.0	LOS A	0.0	0.0	0.36	0.17	0.36	36.5
Approach		4	2.0	4	2.0	0.003	1.0	LOS A	0.0	0.0	0.36	0.17	0.36	36.5
North: Bunnerong Road														
7	L2	5	2.0	5	2.0	0.168	8.9	LOS A	0.0	0.0	0.00	0.02	0.00	17.5
8	T1	640	2.0	640	2.0	0.168	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.8
Approach		645	2.0	645	2.0	0.168	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.4
All Vehicles		649	2.0	649	2.0	0.168	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

USER REPORT FOR NETWORK SITE

Project: 200417sid-N186090 417-439R Bunnerong Road, Maroubra (Heffron Centre) **Template: Movement Summary**

Site: [1 Flint Street/ Bunnerong Road/ Site Access PM Fut] **Network: 5 [PM Future]**

Site Category: -
Signals - Fixed Time Isolated Cycle Time = 80 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Variable Phasing
Reference Phase: Phase A
Input Phase Sequence: A, D*, E1*
Output Phase Sequence: A, D*
(* Variable Phase)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Bunnerong Road														
1	L2	108	2.0	108	2.0	0.125	18.1	LOS B	1.4	10.2	0.59	0.71	0.59	36.4
2	T1	682	2.0	682	2.0	0.372	13.0	LOS B	5.3	37.4	0.65	0.56	0.65	42.0
3	R2	140	2.0	140	2.0	0.663	38.0	LOS D	3.3	23.2	0.91	0.87	1.03	12.0
Approach		931	2.0	931	2.0	0.663	17.4	LOS B	5.3	37.4	0.68	0.62	0.70	35.6
East: Site Access														
4	L2	118	2.0	118	2.0	0.214	20.5	LOS C	2.2	15.7	0.75	0.61	0.75	4.5
5	T1	11	2.0	11	2.0	0.214	20.5	LOS C	2.2	15.7	0.75	0.61	0.75	25.4
6	R2	189	2.0	189	2.0	0.594	26.3	LOS C	3.9	27.7	0.88	0.73	0.88	21.2
Approach		318	2.0	318	2.0	0.594	24.0	LOS C	3.9	27.7	0.83	0.68	0.83	17.2
North: Bunnerong Road														
7	L2	51	2.0	51	2.0	0.542	23.7	LOS C	8.5	60.3	0.74	0.68	0.74	29.2
8	T1	958	2.0	958	2.0	0.542	14.6	LOS B	8.5	60.3	0.73	0.66	0.73	35.3
9	R2	144	2.0	144	2.0	0.477	26.4	LOS C	2.7	19.4	0.80	0.79	0.80	36.3
Approach		1153	2.0	1153	2.0	0.542	16.5	LOS B	8.5	60.3	0.74	0.67	0.74	35.2
West: Flint Street														
10	L2	158	2.0	158	2.0	0.282	25.7	LOS C	3.0	21.3	0.77	0.77	0.77	35.7
11	T1	12	2.0	12	2.0	0.282	31.4	LOS C	3.0	21.3	0.77	0.77	0.77	25.6
12	R2	173	2.0	173	2.0	0.441	29.3	LOS C	3.4	24.1	0.84	0.78	0.84	27.1
Approach		342	2.0	342	2.0	0.441	27.7	LOS C	3.4	24.1	0.81	0.77	0.81	31.5
All Vehicles		2743	2.0	2743	2.0	0.663	19.0	LOS B	8.5	60.3	0.74	0.67	0.74	32.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: [2 Bunnerong Road/ Site Access PM Fut]

Network: 5 [PM Future]

Site Category: -
Giveway / Yield (Two-Way)

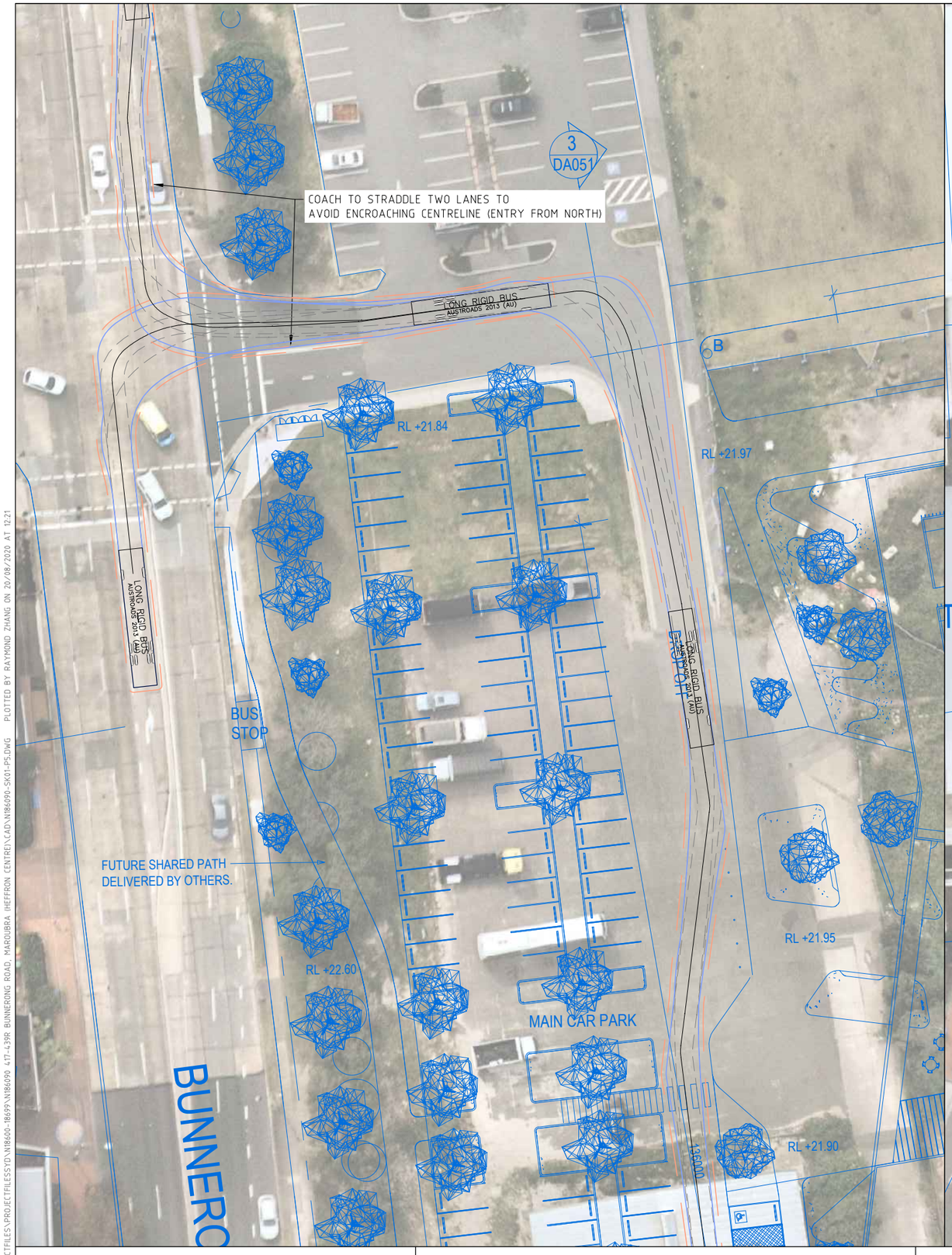
Movement Performance - Vehicles

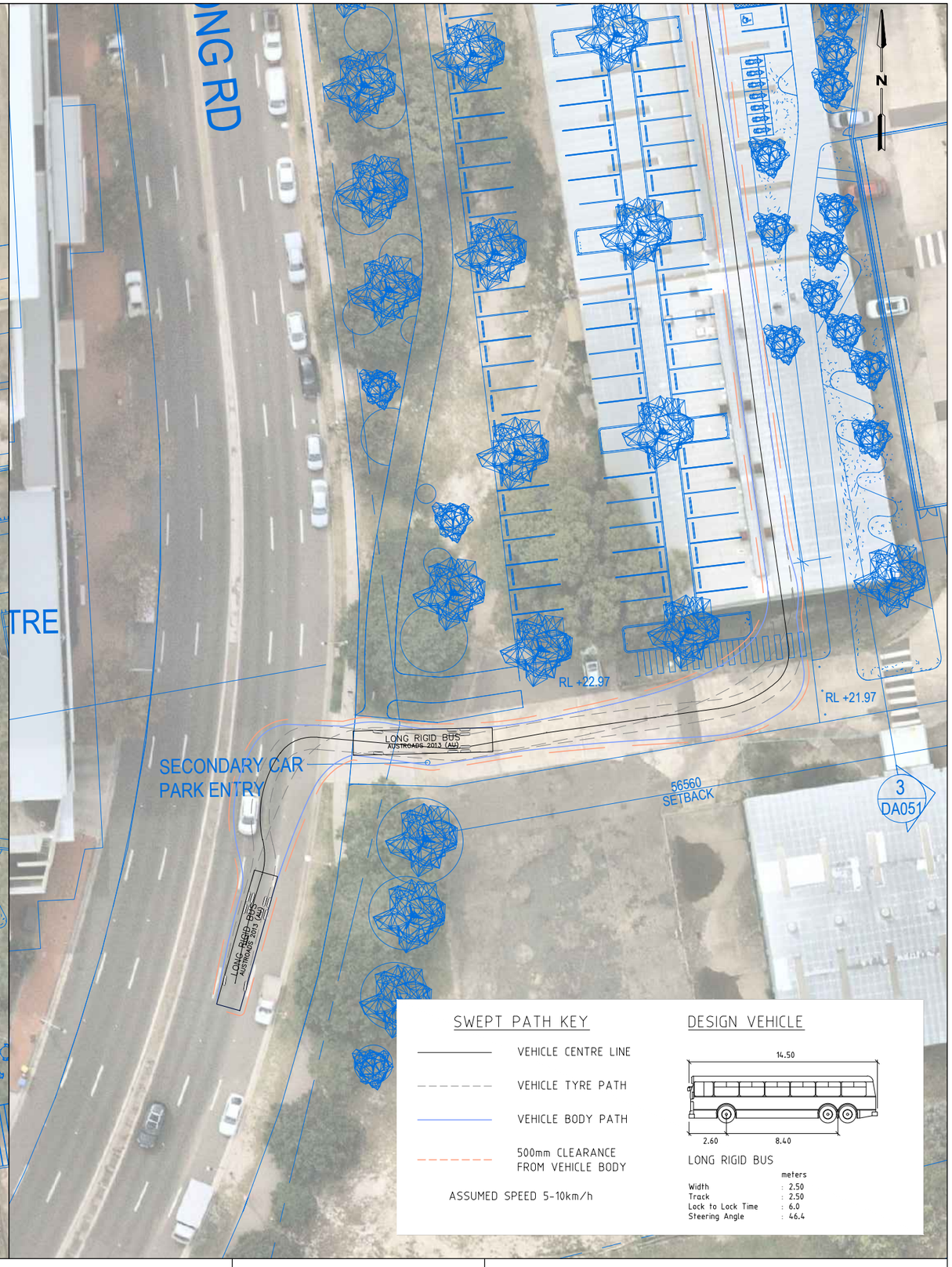
Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Site Access														
4	L2	34	2.0	34	2.0	0.037	2.6	LOS A	0.1	0.5	0.53	0.40	0.53	35.2
Approach		34	2.0	34	2.0	0.037	2.6	LOS A	0.1	0.5	0.53	0.40	0.53	35.2
North: Bunnerong Road														
7	L2	7	2.0	7	2.0	0.324	8.9	LOS A	0.0	0.0	0.00	0.01	0.00	17.5
8	T1	1241	2.0	1241	2.0	0.324	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.8
Approach		1248	2.0	1248	2.0	0.324	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.5
All Vehicles		1282	2.0	1282	2.0	0.324	0.1	NA	0.1	0.5	0.01	0.02	0.01	58.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

B.SWEPT PATH ASSESSMENT

B





SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 500mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5-10km/h

DESIGN VEHICLE

LONG RIGID BUS

	meters
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 46.4

GTA consultants
www.gta.com.au

Melbourne 03 9851 9600
Sydney 02 8448 1800
Brisbane 07 3113 5000
Adelaide 08 8334 3600
Perth 08 6169 1000

nearmap.com

PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY
SUBJECT TO CHANGE WITHOUT NOTIFICATION

WARNING
BEWARE OF UNDERGROUND SERVICES
THE LOCATIONS OF UNDERGROUND SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

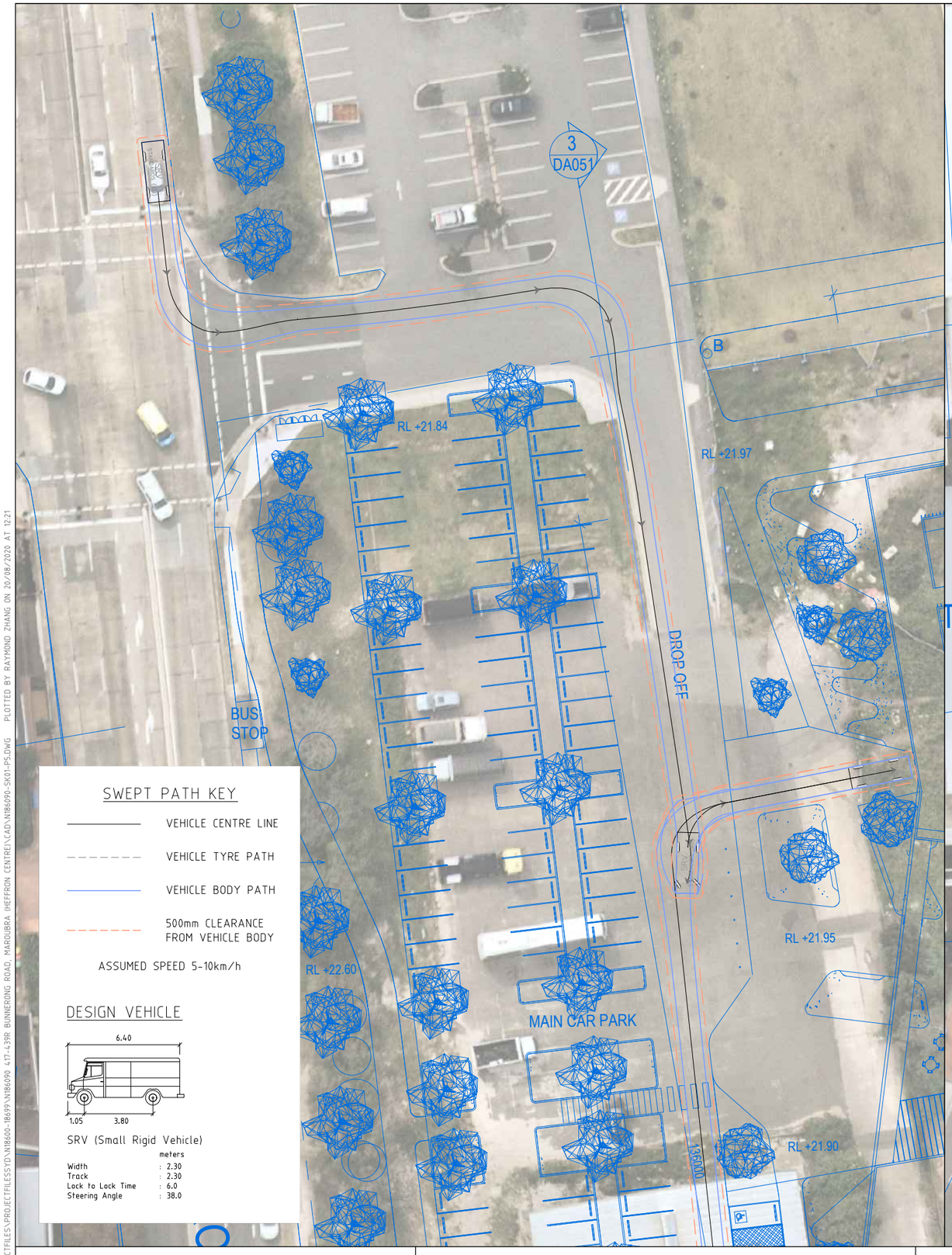
DESIGNED	R.ZHANG
DESIGN CHECK	M.BRINUMS
APPROVED BY	R.HAZELL
DATE ISSUED	20 AUGUST 2020

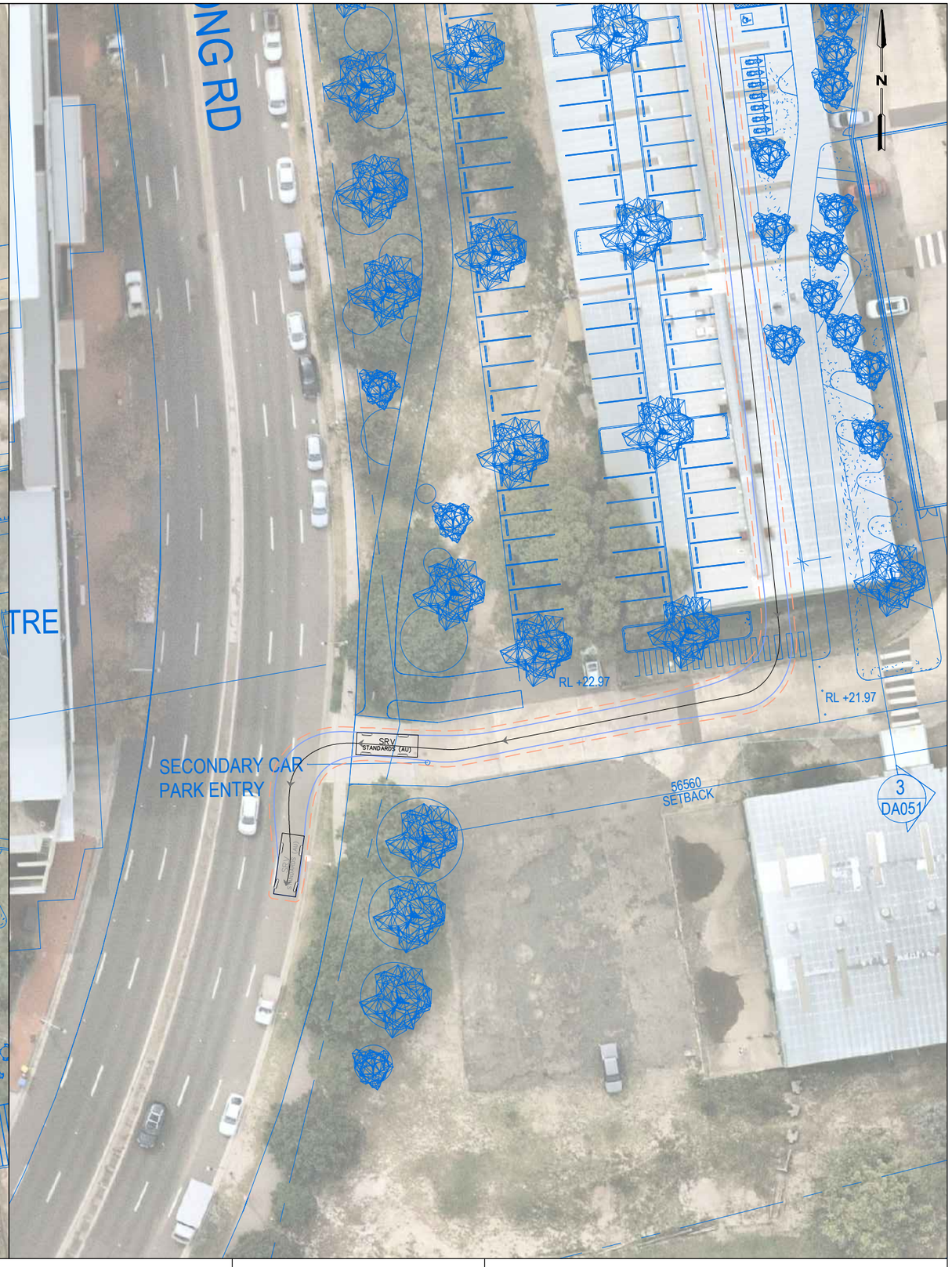
SCALE A3 0 2.5 5 10 1:500

CAD FILE NO. N186090-SK01-P5.DWG

419-439R BUNNERONG ROAD, MAROUBRA
HEFFRON CENTER
SWEPT PATH ASSESSMENT
COACH MANOEUVRING

DRAWING NO. N186090-SK01-01 SHEET 1 OF 4 ISSUE P5





SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 500mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5-10km/h

DESIGN VEHICLE

SRV (Small Rigid Vehicle)

	meters
Width	: 2.30
Track	: 2.30
Lock to Lock Time	: 6.0
Steering Angle	: 38.0

GTA consultants
www.gta.com.au

Melbourne 03 9851 9600
Sydney 02 8448 1800
Brisbane 07 3113 5000
Adelaide 08 8334 3600
Perth 08 6169 1000

nearmap

PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY
SUBJECT TO CHANGE WITHOUT NOTIFICATION

WARNING
BEWARE OF UNDERGROUND SERVICES
THE LOCATIONS OF UNDERGROUND SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

DESIGNED	R.ZHANG
DESIGN CHECK	M.BRINUMS
APPROVED BY	R.HAZELL
DATE ISSUED	20 AUGUST 2020

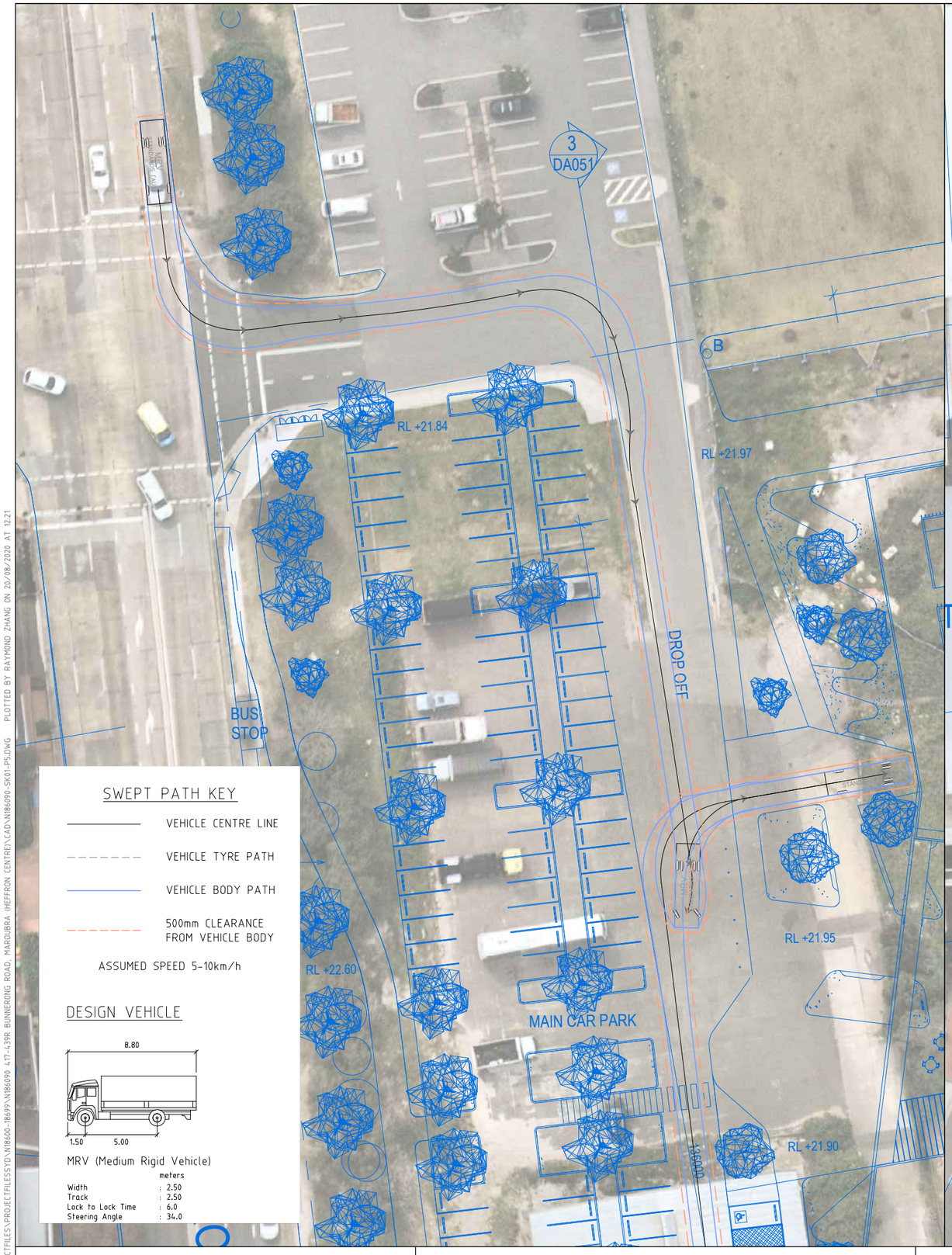
SCALE A3 0 2.5 5 10 1:500

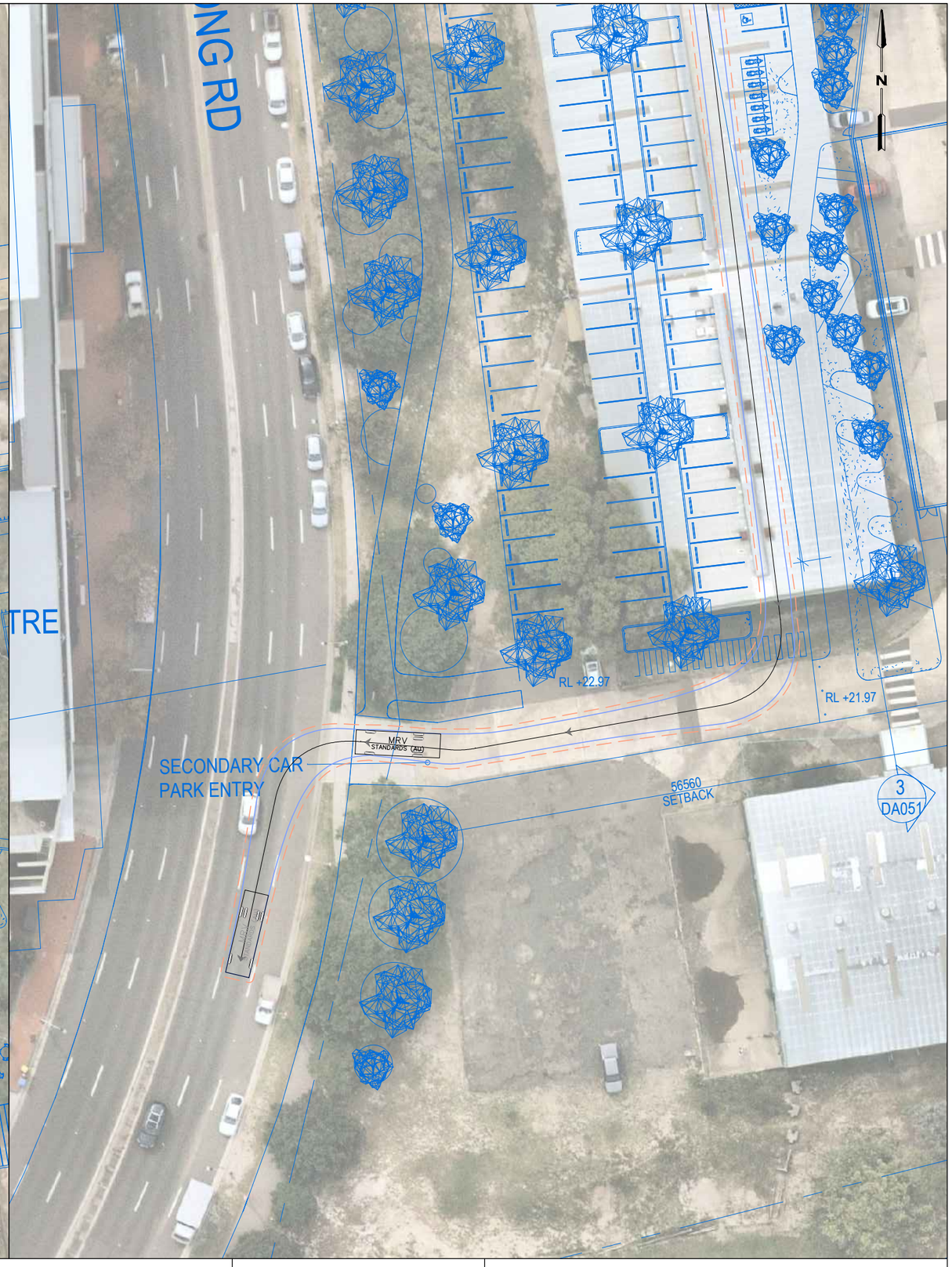
CAD FILE NO. N186090-SK01-P5.DWG

419-439R BUNNERONG ROAD, MAROUBRA
HEFFRON CENTER
SWEPT PATH ASSESSMENT
SERVICE TRUCK MANOEUVRING (SRV)

DRAWING NO. N186090-SK01-02 SHEET 2 OF 4 ISSUE P5

\\GTA.COM.AU\PROJECTFILES\PROJECTFILES\SYD\N18600-18699\N18609 417-439R BUNNERONG ROAD, MAROUBRA (HEFFRON CENTRE)\CAD\N186090-SK01-P5.DWG PLOTTED BY RAYMOND ZHANG ON 20/08/2020 AT 12:21





SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 500mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5-10km/h

DESIGN VEHICLE

MRV (Medium Rigid Vehicle)

	meters
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 34.0

GTA consultants
www.gta.com.au

Melbourne 03 9851 9600
Sydney 02 8448 1800
Brisbane 07 3113 5000
Adelaide 08 8334 3600
Perth 08 6169 1000

nearmap

PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY
SUBJECT TO CHANGE WITHOUT NOTIFICATION

WARNING
BEWARE OF UNDERGROUND SERVICES
THE LOCATIONS OF UNDERGROUND SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

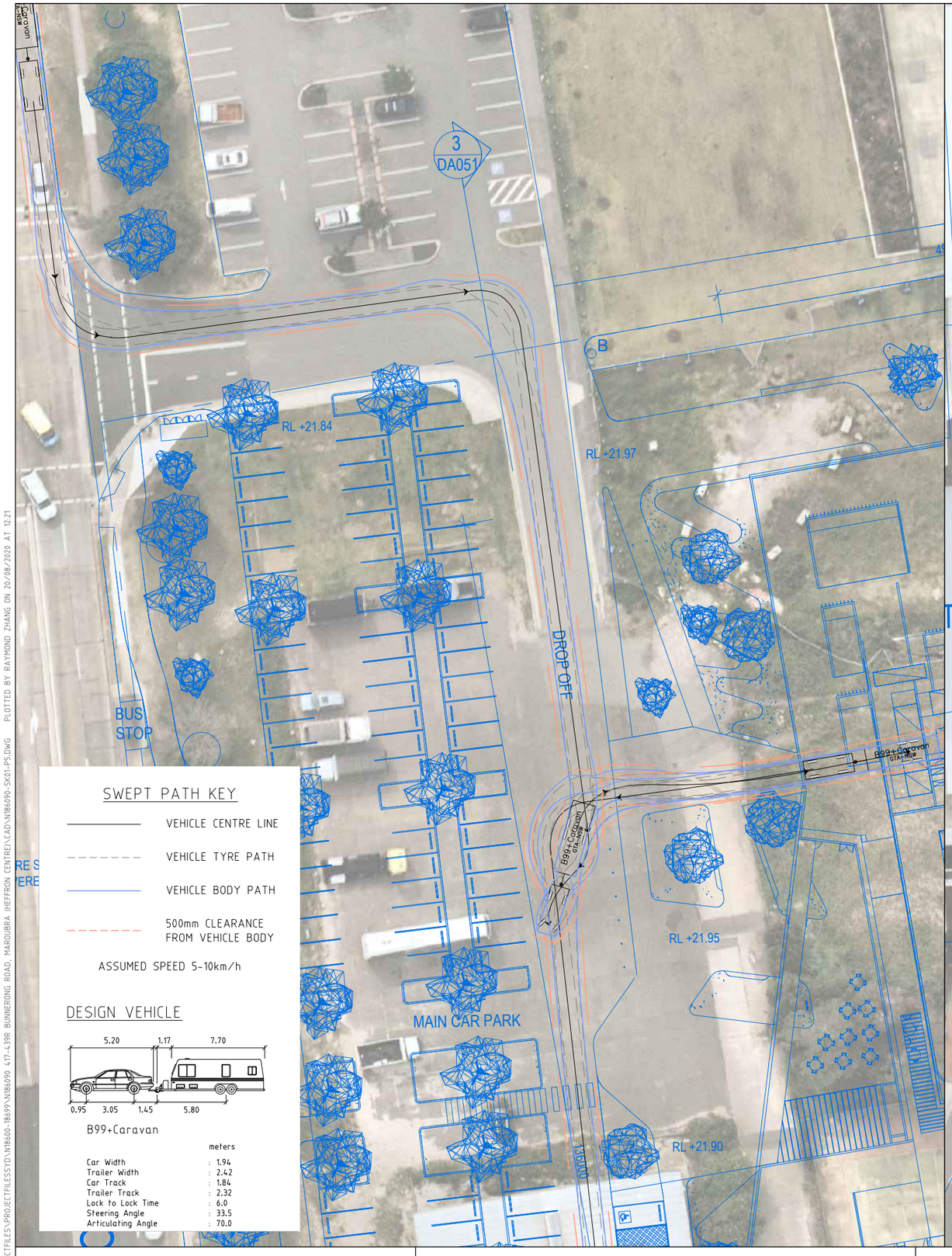
DESIGNED	DESIGN CHECK
R.ZHANG	M.BRINUMS
APPROVED BY	DATE ISSUED
R.HAZELL	20 AUGUST 2020

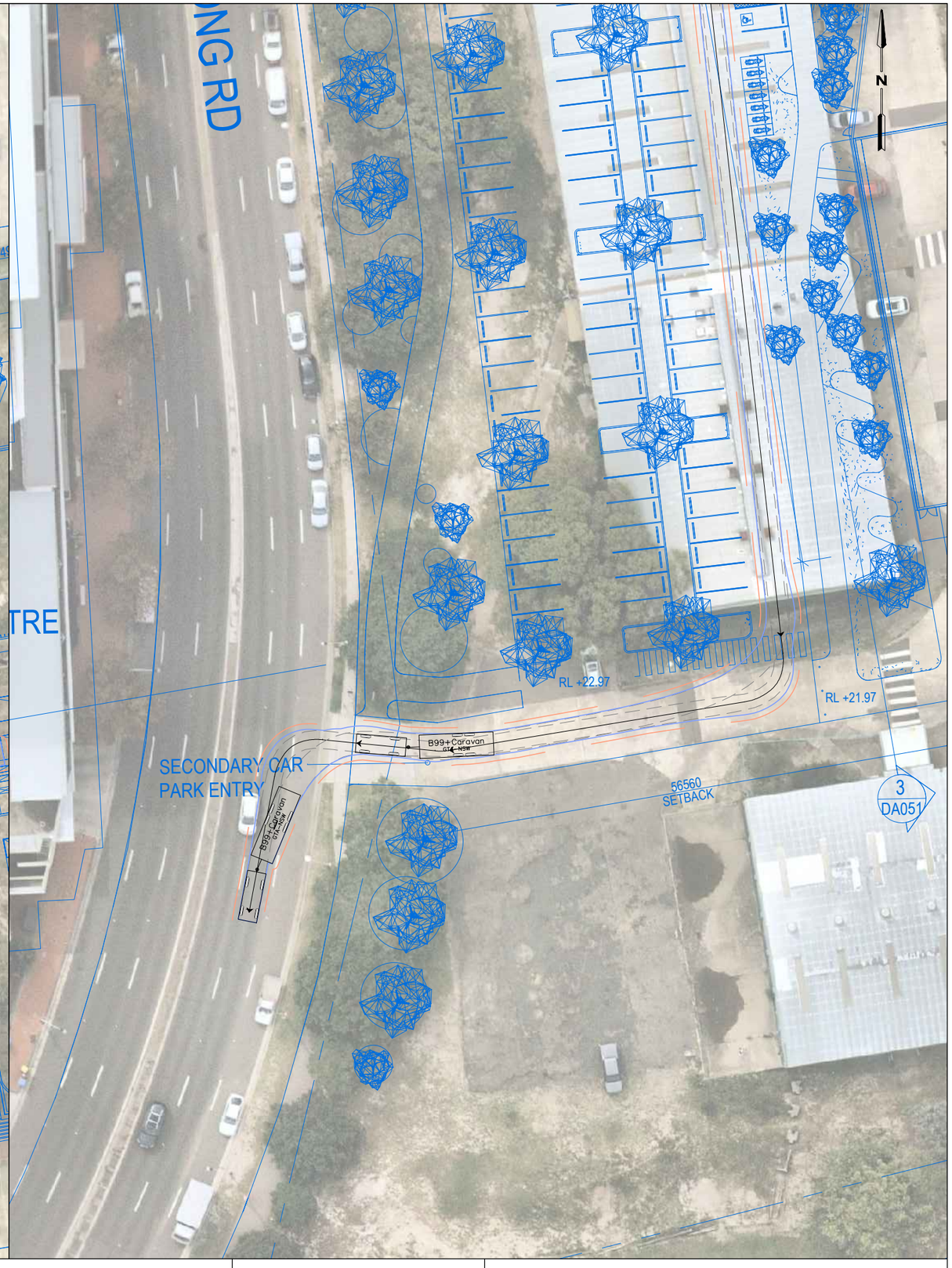
SCALE A3 0 2.5 5 10 1:500

CAD FILE NO. N186090-SK01-P5.DWG

419-439R BUNNERONG ROAD, MAROUBRA
HEFFRON CENTER
SWEPT PATH ASSESSMENT
SERVICE TRUCK MANOEUVRING (MRV)

DRAWING NO. N186090-SK01-03 SHEET 3 OF 4 ISSUE P5





SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 500mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5-10km/h

DESIGN VEHICLE

B99+Caravan

	meters
Car Width	: 1.94
Trailer Width	: 2.42
Car Track	: 1.84
Trailer Track	: 2.32
Lock to Lock Time	: 6.0
Steering Angle	: 33.5
Articulating Angle	: 70.0

GTA consultants
www.gta.com.au

Melbourne 03 9851 9600
Sydney 02 8448 1800
Brisbane 07 3113 5000
Adelaide 08 8334 3600
Perth 08 6169 1000

nearmap.com

PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY
SUBJECT TO CHANGE WITHOUT NOTIFICATION

WARNING
BEWARE OF UNDERGROUND SERVICES
THE LOCATIONS OF UNDERGROUND SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

DESIGNED R.ZHANG
DESIGN CHECK M.BRINUMS
APPROVED BY R.HAZELL
DATE ISSUED 20 AUGUST 2020

SCALE A3 0 2.5 5 10 1:500
CAD FILE NO. N186090-SK01-P5.DWG

419-439R BUNNERONG ROAD, MAROUBRA
HEFFRON CENTER
SWEPT PATH ASSESSMENT
SERVICE VEHICLE MANOEUVRING (B99 + TRAILER)

DRAWING NO. N186090-SK01-04 SHEET 4 OF 4 ISSUE P5

GTAconsultants

www.gta.com.au