

QuantumTraffic

Quantum Traffic Pty Ltd

ABN 54617474370

ACN 617474370

T (03) 9879 4250

E admin@quantumtraffic.com.au

A 5 Murray Place
RINGWOOD VIC 3134

W www.quantumtraffic.com.au

Traffic Impact Assessment Report

Bayside Netball Centre – 11 Holloway
Road, Sandringham

Proposed Netball Courts

20/03/2023



Traffic Impact Assessment Report

Bayside Netball Centre – 11 Holloway Road, Sandringham

Proposed Netball Courts

Document Control

Revision	Date	Reference	Prepared By	Approved By
A (Draft)	30/10/2020	18-0191	BH / DB	DB
B (Revised Draft)	5/11/2020	18-0191	BH / DB	DB
C (Final)	9/11/2020	18-0191	BH / DB	DB
D (Revised)	5/02/2021	18-0191	BH / DB	DB
E (Revised)	10/02/2021	18-0191	BH / DB	DB
F (Revised)	11/11/2022	18-0191	BH / DB	DB
G (Revised)	20/03/2023	18-0191	BH / DB	DB

QuantumTraffic

T

(03) 9879 4250

E

admin@quantumtraffic.com.au

A

5 Murray Place
RINGWOOD VIC 3134

W

www.quantumtraffic.com.au

Quantum Traffic Pty Ltd

ABN: 54617474370

ACN: 617474370

Copyright © 2017- by Quantum Traffic Pty Ltd

All rights reserved. No part of this publication may be reproduced, distributed, or transmitted in any form or by any means, including photocopying, recording, or other electronic or mechanical methods, without the prior written permission of the publisher, Quantum Traffic.



Executive Summary

Having visited the site, undertaken a car parking inventory and undertaken a detailed traffic engineering assessment the following conclusions are reached in relation to the proposed 12 court Bayside Netball Centre development (11 Holloway Road, Sandringham):

Car Parking Provision

1. The proposed netball centre is located on state government secondary school land and therefore the requirements of the Bayside Planning Scheme do not apply. In any event, the proposed use is innominate under Clause 52.06-5 of the Planning Scheme and accordingly, car parking would need to be provided to the satisfaction of the Responsible Authority.
2. On-site parking for the netball centre should be maximised and it is recommended that the on-site carpark is expanded to provide for approximately 114 car parking spaces.
3. The scheduling of netball matches should include a 'stagger' between match commencement times to reduce peak car parking demands as follows (based on 45 minute session times):
 - a. 4 Netball courts to start at commencement of session.
 - b. 4 Netball courts to start 15 mins after commencement of session.
 - c. 4 Netball courts to start 30 mins after commencement of session.
4. The peak parking demands expected with the inclusion of the above stagger times are as follows:
 - a. Saturday/Sunday (Competition):
 - i. 'Likely' Parking Demand - 216 spaces
 - ii. 'Sensitivity Test' Parking Demand – 245-288 Spaces
 - b. Weekday evening (Competition / Training):
 - i. 'Likely' Parking Demand - 162 spaces
 - ii. 'Sensitivity Test' Parking Demand – 184-216 Spaces
5. Based on the provision of 114 spaces on-site, an overflow parking demand of 48-102 spaces on weekday evenings and 102-174 spaces on Saturdays/Sundays is expected in the surrounding public parking resources.
6. To limit the impact to the adjacent residential area, it is recommended that netball centre parking demands are accommodated within 'suitable' non-residential frontages on Wangara Road, George Street and the existing carpark at the former Golf Driving Range.
7. These public parking spaces have a capacity of 151 spaces, with existing availability of 107-144 spaces. On this basis, there is sufficient capacity within the 'suitable' parking spaces to accommodate the 'likely' and weeknight 'sensitivity test' overflow demands associated with the netball centre.
8. However, the weekend 'sensitivity test' scenario would result in parking extending further into Wangara Road, George Street, Brixton Street and potentially Talinga Road. This would result in long walking distances for netball patrons. It is recommended that Council monitor the extent of overflow parking and if parking extends as predicted for the 'sensitivity test' scenario, consider the provision of additional parking on the former golf driving range site (closer proximity to the netball centre).



9. To ensure vehicles associated with the netball centre utilise the 'suitable' parking spaces it is recommended that the following parking restrictions are installed in the local residential areas:
 - a. 'Permit Zone 4pm-9pm Mon-Fri, 8am-6pm Sat-Sun' one side
 - b. '1P 4pm-9pm Mon-Fri, 8am-6pm Sat-Sun' other side
 - c. Existing restrictions outside of these times would be retained
10. Council should monitor on-street parking demands in the area following the opening of the Netball Centre as consider the following amendments if required:
 - a. Potential inclusion of additional Permit Zone parking restrictions if parking availability is an issue within the residential streets.
 - b. Potential modifications of the days/times that the restrictions apply.
11. 'No Stopping' restrictions are recommended along the south side of Holloway Road to maintain two-way traffic flow and allow bus access. Additional 'No Stopping' restrictions are recommended on the south side of Wangara Road opposite the on-site carpark access to facilitate bus egress.

Car Parking Design

12. A concept plan has been prepared for a recommended on-site carparking arrangement catering for 114 spaces as follows:
 - a. One-way configuration (eastbound) with entry via Holloway Road and exit via Wangara Road.
 - b. An access control gate is included on the carpark access points to prevent access outside of the operating hours of the netball centre. It is recommended that Council monitor traffic volumes post development and if 'through' traffic utilising the carpark from Holloway Road to Wangara Road is identified, consider additional traffic management in the carpark and/or on Holloway Road / Wangara Road.
 - c. The entry via Holloway Road designed as left in only to encourage access via Bluff Road and Holloway Road.
 - d. 60 degree parking on both sides of the aisle to reinforce the one-way restriction.
 - e. A shared bus / patron pick-up / drop-off zone in a parallel arrangement adjacent to the site entry.
 - f. Traffic management in the form of road humps at regular intervals.
 - g. A footpath along the northern boundary of the carpark connecting the Holloway Road / Wangara Road footpath with the proposed centre entry.
13. A total of 3 accessible car spaces are provided for the development as required by the NCC (BCA).
14. A signage and linemarking plan should be prepared to formalise the carpark design.

Bicycle Parking

15. Whilst the proposal is not subject to the requirements of the Bayside Planning Scheme, Clause 52.34 has been utilised as a guide for the provision of bicycle parking.
16. The proposed netball centre is expected to generate a total demand for 36 bicycle parking spaces including 28 visitor spaces and 8 staff spaces.
17. It is recommended that visitor spaces are provided via rails in the vicinity of the centre entry and staff spaces are provided internally within a service area for the proposed stadium.



Pedestrian Accessibility

18. A portion of patrons will park within the public parking resources in the surrounding road network and walk to the proposed netball centre.
19. This results in pedestrian demands, particularly towards the east of the centre crossing George Street and Wangara Road.
20. During peak Saturday activity, pedestrian movements between 56-264 pedestrians per hour are estimated on the north, south and west legs of the George Street / Wangara Road intersection.
21. These estimated pedestrian movements in combination with the traffic volumes meet the warrants for the provision of zebra crossings (without flashing lights).
22. On this basis, the following pedestrian upgrades are recommended:
 - a. Raised zebra crossing with kerb extensions on the west Wangara Road leg.
 - b. Raised zebra crossings without kerb extensions on the north and south George Street legs.
 - c. Reduction of the speed zoning along George Street from 60km/h to 50km/h
 - d. Road humps (speed cushions to accommodate truck movements) on the north and south approaches of George Street to further reinforce a slow speed environment in the vicinity of the crossings.

Traffic Impacts

23. The use is assessed as generating peak hour traffic volumes as follows:
 - a. Saturday/Sunday (Competition):
 - i. 'Likely' Peak Hour Traffic Volume – 432 vehicles per hour
 - ii. 'Sensitivity Test' Peak Hour Traffic Volume – 576 vehicles per hour
 - b. Weekday PM Peak (Competition / Training):
 - i. 'Likely' Peak Hour Traffic Volume – 324 vehicles per hour
 - ii. 'Sensitivity Test' Peak Hour Traffic Volume – 432 vehicles per hour
24. The distribution of traffic to/from the proposed netball courts will occur with 80% entry movements via Holloway Road and exit movements via Wangara Road due to the proposed one-way arrangement within the on-site carpark. The remaining 20% of traffic volumes will directly access the on-street parking via George Street and Wangara Road.
25. An assessment of daily traffic volumes has identified the following:
 - a. Whilst Holloway Road is classified as a local road, its land use and traffic flow arrangements are best classified between a local road (up to 3,000vpd) and a collector road (up to 7,000vpd).
 - b. Analysis of the of likely daily volumes associated with the proposed weekday operating hour (4pm-8:30pm/9:30pm) and weekend operating hours (8am-6pm/8pm) indicate the following daily traffic volumes:

Holloway Road:

 - i. Saturday – 2,505-3,615vpd
 - ii. Weekday – 1,682-2,407vpd

Wangara Road:

 - i. Saturday – 2,089-2,668vpd
 - ii. Weekday – 1,017-1,206vpd
 - c. These daily volumes generally fall within the adopted environmental capacities for the surrounding road network.



26. The level of traffic generated based on the distribution assessment can be accommodated by the surrounding road network. However it is recommended that Council could consider the installation of additional road humps on Holloway Road. This would reduce traffic speeds and improve the overall safety of Holloway Road.
27. The SIDRA intersection analysis confirms that the anticipated traffic generated by the Netball facility can be accommodated by the surrounding road network, without significant changes from current delays incurred and vehicle queue lengths that occur.
28. The intersection of Bay Road / Reserve Road operates over capacity in the existing conditions, with existing deficiencies. The traffic volumes generated by the netball centre through this intersection are relatively minor. It is recommended that Council liaise with VicRoads (DOT) to:
 - a. Review cycle and phase times based on most recent traffic volume data.
 - b. Potential physical changes to the intersection including dedicated right-turn lanes, left turn slip lanes etc.
 - c. Turn bans or two right-turn lanes from Reserve Road into Bay Road.

Service Vehicle Access

29. The layout of the carpark has been designed to accommodate busses up to 14.5m long.
30. Emergency service vehicles can manoeuvre through the site, as required, given that they are smaller than the bus design vehicle.
31. Waste collection can occur on-site for vehicles up to 12.5m (HRV) in length which is satisfactory from a traffic engineering perspective. A WMP should be prepared to formalise waste collection arrangements.
32. All loading activities will be accommodated on-site.

Summary

Having undertaken all tasks necessary to adequately assess the traffic engineering impacts of the 12 Proposed Netball Courts at Bayside Netball Centre, we are satisfied that the proposed development is satisfactory.

There are no reasons why the proposed development should not proceed, subject to the recommendations in this report.

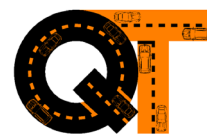
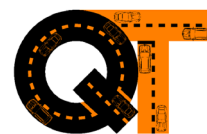


Table of Contents

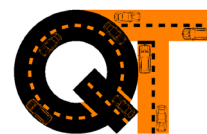
Executive Summary	iii
1 Introduction	5
2 Proposal	5
3 Existing Conditions	6
3.1 Subject Site	6
3.2 Road Network	8
3.3 Existing Traffic Volumes	9
3.3.1 Holloway Road	9
3.3.2 Bluff Road / Holloway Road	10
3.3.3 Intersection Turning Movement Counts – Eastern Precinct	11
3.4 Existing Car Parking Conditions	12
3.4.1 Capacity and Restrictions	12
3.4.2 Spot Car Parking Occupancy Surveys	15
3.5 Road Safety Review	16
3.6 Sustainable Transport Infrastructure	17
4 Car Parking Assessment	17
4.1 Statutory Car Parking Requirements	17
4.2 Peak Operation Days / Times	18
4.3 Peak Car Parking Demand Assessment	18
4.3.1 Saturday/Sunday Competition	18
4.3.2 Weeknight Evening / Night Activity	20
4.3.3 Comparison to Other Netball Facilities	21
4.4 On-Site Car Parking Provision	21
4.5 Suitability of Public Parking in Surrounding Area	23
4.6 Recommended Parking Management Scheme	26
4.6.1 Restrictions for Residential Frontages	26
4.6.2 Restrictions to Maintain Traffic Flow / Facilitate Access	27
4.6.3 Summary of Recommendations	27
4.7 Car Park Design	28
4.7.1 Vehicle Access	28
4.7.2 Vehicle Access Management	28
4.7.3 Parking Spaces	28



4.7.4 Disabled Parking	29
4.7.5 Pedestrian Movements	29
4.7.6 Traffic Management	29
4.8 Car Parking Assessment Summary	30
5 Bicycle Parking Assessment	31
6 Broader Pedestrian Accessibility	32
7 Traffic Impacts	35
7.1 Vehicle Access Arrangements	35
7.2 Traffic Generation	36
7.3 Traffic Distribution	38
8 Daily Traffic Volumes	40
9 Intersection Analysis	42
9.1 SIDRA Modelling	42
9.2 Capacity Analysis - 'Likley' Volumes	43
9.3 Capacity Analysis - 'Sensitivity Test' Volumes	45
10 Service Vehicles	46
10.1 Busses	46
10.2 Waste Collection	46
10.3 Emergency Service Vehicles	46
10.4 Loading	47
11 Conclusions	48

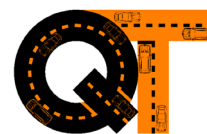
Appendices

- Appendix A: Automatic Traffic Counts
- Appendix B: Turning Movement Counts
- Appendix C: Parking Survey Data
- Appendix D: Recommended On-site Carpark – Concept Plan
- Appendix E: Recommended Parking Restrictions
- Appendix F: Post Development Traffic Volume Diagrams
- Appendix G: SIDRA Results



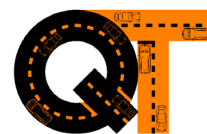
Figures

Figure 1: Aerial Photograph (source: www.nearmap.com)	7
Figure 2: Location Map (Source: www.melway.com.au)	7
Figure 3: Holloway Road at Cooke Street (view east)	8
Figure 4: Holloway Road at Cooke Street (view west)	8
Figure 5: Holloway Road at End (view west)	9
Figure 6: Shared Path Btw Holloway Road and Wangara Road (view east).....	9
Figure 7: Shared Path Btw Holloway Road and Wangara Road (view east).....	9
Figure 8: Wangara Road at End (view east)	9
Figure 9: Bluff Road / Holloway Road – Indicative Turning Movements.....	11
Figure 10: Turning Movement Counts – Wednesday 28/11/18 – 5pm-6pm	12
Figure 11: Turning Movement Counts – Saturday 1/12/18 – 11am-12noon.....	12
Figure 12: On-Street Car Parking Review Area (Source: www.melway.com.au)	13
Figure 13: Parking Occupancy Surveys – Overall Summary.....	15
Figure 14: Road Safety Review Area.....	16
Figure 15: Public Transport Local Area Map (Source: www.ptv.com.au).....	17
Figure 16: Recommended On-Site Car Parking Modifications (114 Spaces)	22
Figure 17: On-Street Parking – Likely Locations Without Restrictions (Source: Nearmap)	23
Figure 18: On-Street Parking – Suitable Spaces on Non-Residential Frontages	24
Figure 19: Suitable Public Parking Spaces – Capacity & Available Spaces	25
Figure 20: Extent of Overflow Parking – ‘Likely’ vs. ‘Sensitivity Test’ Scenarios (Saturday/Sunday)	25
Figure 21: Pedestrian Desire Lines – Off-Site Parking	33
Figure 22: Existing Conditions – George Street / Wangara Road (Aerial: Nearmap)	33
Figure 23: Recommended Pedestrian Treatments – George Street / Wangara Road (Aerial: Nearmap).....	35
Figure 24: Traffic Distribution Diagram (percentages)	38
Figure 25: Development Traffic Generation Diagram – Saturday Peak	39
Figure 26: Development Traffic Generation Diagram – Weekday Evenings Peak	39



Tables

Table 1: Proposed Development Numbers.....	5
Table 2: Existing Features of Subject Site	6
Table 3: Adjacent Road Attributes	8
Table 4: Holloway Road – Traffic Volumes (March 2017).....	9
Table 5: On-Street Car Parking – Capacity & Restrictions	13
Table 6: Car Parking Demands – Per Court	19
Table 7: Saturday / Sunday Peak Carparking Demands – At Critical ‘Change Over’ Period	20
Table 8: On-Site Car Parking Provision - Summary.....	22
Table 9: ‘Suitable’ Public Car Parking - Summary	24
Table 10: Clause 52.34 Bicycle Parking Assessment.....	32
Table 11: George Street / Wangara Road – Post Development Volumes	34
Table 12: Traffic Generation – Saturday / Sunday.....	37
Table 13: Traffic Generation – Weekday Evening.....	37
Table 14: Daily Traffic Volume Assessment – ‘Likley’ Traffic Volume.....	41
Table 15: Daily Traffic Volume Assessment – ‘Sensitivity Test’ Traffic Volume	41
Table 16: Degree of Saturation/Level of Service Measures.....	42
Table 17: Saturday Peak including Existing & Netball Centre Attributed Demands.....	43
Table 18: Weekday PM including Existing & Netball Centre Attributed Demands.....	44
Table 19: SIDRA Capacity Summary Saturday Peak – ‘Sensitivity Test’ Analysis.....	45
Table 20: SIDRA Capacity Summary Weekday PM Peak – ‘Sensitivity Test’ Analysis.....	45



1 Introduction

The following Traffic Impact Assessment Report, reviews the critical matters pertaining to traffic engineering associated with the proposed Bayside Netball Centre at 11 Holloway Road, Sandringham.

The proposed Netball Centre is proposed to be located on the Sandringham Secondary College site, towards the eastern end.

This assessment, where appropriate has had regard to the previous assessments undertaken for the proposed site in Wangara Road (Driving Range site).

2 Proposal

The proposal is for the development of new netball courts, co-located on the existing Sandringham Secondary College site at 11 Holloway Road, Sandringham.

The netball courts are proposed on the eastern portion of the site, in the position of the existing western sporting oval. The existing on-site staff carpark at the school is proposed to be removed as part of the development, with school staff to utilise the proposed netball centre carpark during school hours.

Table 1 outlines the key attributes of the development from a traffic engineering perspective, based on the preliminary concept plans.

Table 1: Proposed Development Numbers

Attribute		Proposed
Land Use		
Netball Courts		3 indoor & 9 outdoor netball courts (12 courts)
Car Parking Provision		
Netball		98 car parking spaces, inclusive of 3 disabled spaces
Vehicle & Pedestrian Access		
Vehicle Access		<ul style="list-style-type: none"> 'Entry' crossover located on Holloway Road opposite Cooke Street 'Exit' crossover located at the existing court bowl termination of Holloway Road
Pedestrian Access		No specific pedestrian facilities are identified on the preliminary layout plans, however, all pedestrian access would be via Holloway Road.
Proposed Operational Characteristics		
Netball		7 players per team on the court (i.e. 14 players per court) 2 umpires per court Game times typically 40mins-1 hour depending on age/level.
Outdoor Courts - Usage	Monday – Friday	4pm-8:30pm
	School Holidays (Mon-Fri)	9am-8:30pm
	Saturday	8am-6pm
	Sunday	9am-4pm
	Additional Use Days (Sundays – 5 days per year)	8am-6pm



Attribute	Proposed	
Indoor Courts - Usage	Monday – Friday	4pm-9:30pm
	School Holidays (Mon-Fri)	9am-9:30pm
	Saturday	8am-8pm
	Sunday	9am-8pm
Car Parking Restrictions	3 x disabled spaces Parallel drop-off/pick-up spaces adjacent to the proposed stadium entry.	

It is noted that the courts will also be utilised by Sandringham Secondary College or other school groups during the school day.

3 Existing Conditions

3.1 Subject Site

The proposed development site is located on the Sandringham Secondary College site at 11 Holloway Road, Sandringham.

Table 2 outlines the key existing features of the development site.

Table 2: Existing Features of Subject Site

Site Feature	Detail
Municipality	
Municipality	Bayside City Council
Existing Use	
Subject Site	Sandringham Secondary College – Sporting Ovals
Zoning & Overlays	
Zoning	Public Use Zone - Education (PUZ2)
Overlays	Design & Development Overlay (DDO2) Development Contributions Plan Overlay (DCPO1) Special Building Overlay (SBO) Environmental Audit Overlay (EAO) Heritage Overlay (HO519)
PPTN Area	Yes
On-Street Car Parking	
Site Frontage	Holloway Road – approximately 47 spaces
Nearby Area	Typically unrestricted with sections/areas of No Stopping to facilitate vehicle flow at school pick up / drop off times.
Nearby Land Use	
Within 500m	Sandringham East Primary School – immediately west Mixed Use – to the north and east Residential – to the south

The site is currently utilised for sporting ovals associated with Sandringham Secondary College.

An aerial photograph and location map are provided at Figure 1 to Figure 2, respectively.



Figure 1: Aerial Photograph (source: www.nearmap.com)

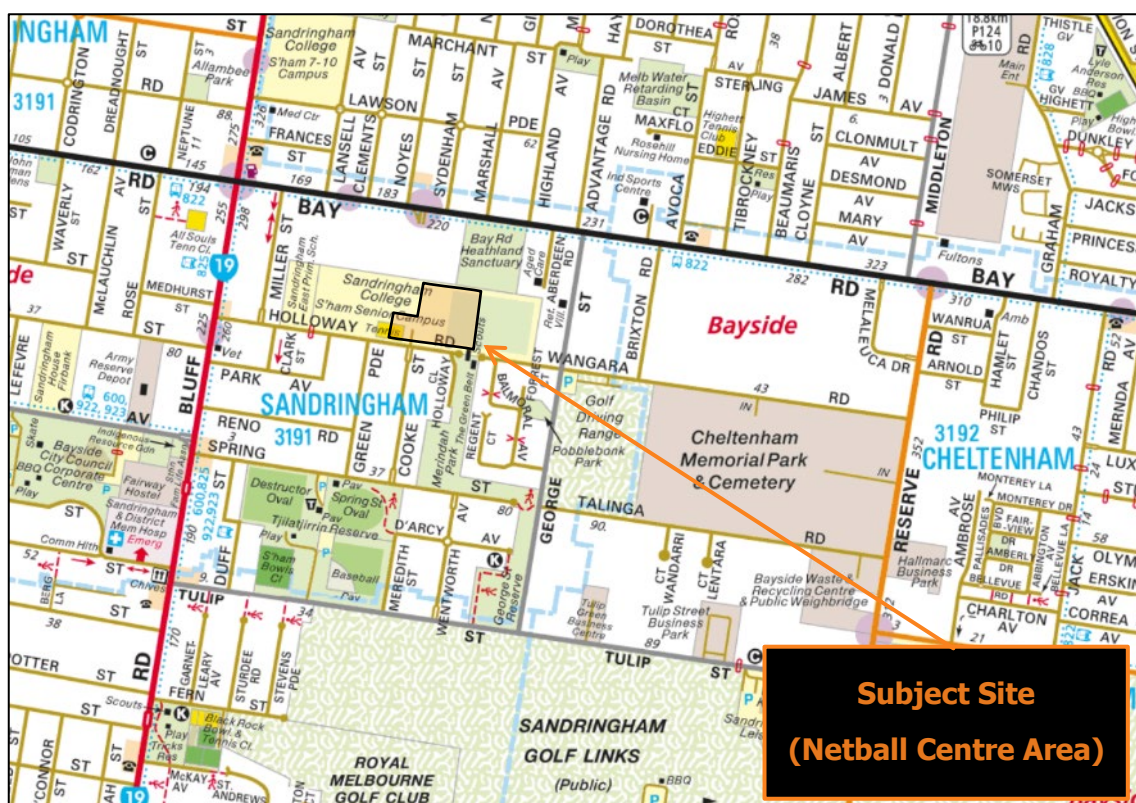


Figure 2: Location Map (Source: www.melway.com.au)

3.2 Road Network

The following table outlines the key characteristics of the surrounding road network adjacent to the site.

Table 3: Adjacent Road Attributes

Attribute	Holloway Road	Wangara Road
Alignment	East-West	East-West
Extends Between	Bluff Road & East of Holloway Close	Reserve Road & West of Balmoral Avenue
Road Authority	Bayside City Council	
Carriageway Width	7.1m – allows for parking both sides and a single lane of traffic or parking 1 side and two-way unobstructed traffic flow	10m – allows for kerbside parking on both sides and two-way unobstructed traffic flow
Classification ⁽¹⁾	Local Road	Local Road
Clause 56.06-8 Classification	Access Street – Level 2	Connector Street – Level 2
Environmental Capacity	2,000-3,000 vpd	3,000-7,000 vpd
Footpaths	Both Sides	Both Sides
Speed Limit	40km/h adjacent to school	Default 50km/h
Parking Restrictions	Short term & No Stopping - School Times only	Unrestricted & No Stopping

Note 1: As per the Bayside Road Register (Version 1.4 dated December, 2009)

Photographs of the surrounding road network are provided from Figure 7 to Figure 8 respectively.



Figure 3: Holloway Road at Cooke Street (view east)



Figure 4: Holloway Road at Cooke Street (view west)



Figure 5: Holloway Road at End (view west)



Figure 6: Shared Path Btw Holloway Road and Wangara Road (view east)



Figure 7: Shared Path Btw Holloway Road and Wangara Road (view east)



Figure 8: Wangara Road at End (view east)

3.3 Existing Traffic Volumes

3.3.1 Holloway Road

Council has previously collected traffic count information for Holloway Road in March 2017, at the following locations:

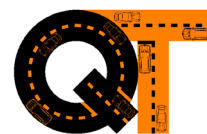
- Between Bluff Road and Miller Street
- Between Park Avenue and Green Parade

The surveys were undertaken utilising automatic tube counts, which record volume and speed data for 24 hours / day across a 7 day period.

A summary of the key traffic volume information is presented in Table 4 below.

Table 4: Holloway Road – Traffic Volumes (March 2017)

Measure		Eastbound	Westbound	Combined
Between Bluff Road and Miller Street				
Daily Volume	Weekday Average	660	991	1,651
	Saturday	515	782	1,297
	Sunday	Tube Count Fault		



Measure		Eastbound	Westbound	Combined
Peak Hour	Weekday Average AM	133 (8-9am)	159 (8-9am)	292 (8-9am)
	Weekday Average PM	74 (3-4pm)	121 (3-4pm)	195 (3-4pm)
	Saturday AM	76 (9-10am)	91 (9-10am)	167 (9-10am)
	Saturday PM	62 (2-3pm)	87 (2-3pm)	149 (2-3pm)
	Sunday AM	Tube Count Fault		
	Sunday PM			
Between Park Avenue and Miller Street				
Daily Volume	Weekday Average	598	517	1,115
	Saturday	403	363	766
	Sunday	293	284	577
Peak Hour	Weekday AM	123 (8-9am)	74 (8-9am)	196 (8-9am)
	Weekday PM	81 (3-4pm)	60 (3-4pm)	141 (3-4pm)
	Saturday AM	42 (9-10am)	40 (11-12noon)	77 (9-10am)
	Saturday PM	37 (2-3pm)	33 (2-3pm)	70 (2-3pm)
	Sunday AM	28 (9-10am)	31 (11-12noon)	48 (11-12noon)
	Sunday PM	29 (5-6pm)	27 (5-6pm)	56 (5-6pm)

A full copy of the traffic count information is provided in **Appendix A**.

It is noted that these surveys include the contribution associated with any existing uses in the study area including Sandringham Secondary College and the Japanese School held on weekends.

3.3.2 Bluff Road / Holloway Road

Turning movements counts have been conducted at the intersection of Bluff Road / Holloway Road as follows:

- Saturday 22nd October 2022 – 10am to 2pm
- Tuesday 25th October 2022 – 3pm-6pm

Volumes have been assessed for the Saturday peak and the weekday PM commuter peak, which coincide with the peak operation of the proposed netball centre. Whilst it is noted that traffic volumes on Holloway Road typically peak between 3pm-4pm (school peak), the proposed netball centre will not be operating at a high level during these times (school activity only).

The Saturday peak hour occurred between 12noon-1pm and the Tuesday peak hour occurred between 4:45pm-5:45pm.

A summary of the turning movements for the weekday PM peak and the Saturday Peak are shown in figure 11 below.



Figure 9: Bluff Road / Holloway Road – Indicative Turning Movements

3.3.3 Intersection Turning Movement Counts – Eastern Precinct

A series of intersection turning movement counts were conducted in the local area to the east of the subject site on Wednesday 28th November and Saturday 1st December, 2018. The intersections counted include:

- Bay Street / George Street (unsignalised)
- Wangara Road / George Street (unsignalised)
- Wangara Road / Reserve Road (unsignalised)
- Bay Road / Reserve Road (traffic signals)

The overall peak hour for the weekday surveys occurred between 5pm-6pm, whilst the overall peak hour for the Saturday surveys occurred between 11am-12noon. As summary of the peak hour volumes at each intersection is provided in Figure 10 and Figure 11 below.

A full copy of the intersection turning movement count information is provided in Appendix B.

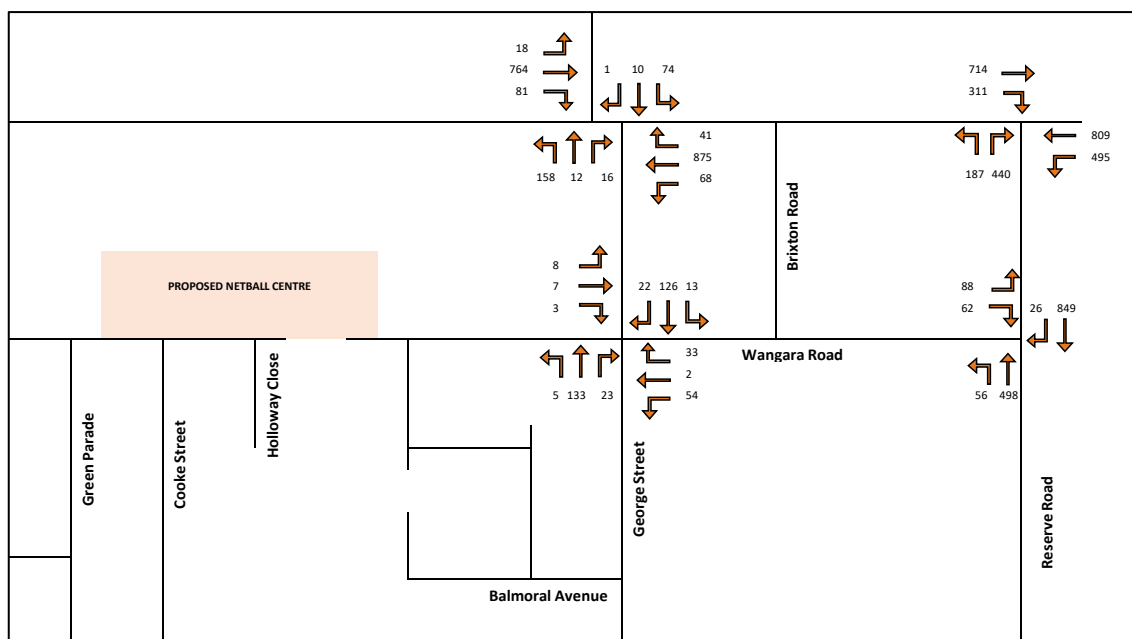
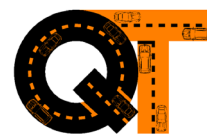


Figure 10: Turning Movement Counts – Wednesday 28/11/18 – 5pm-6pm

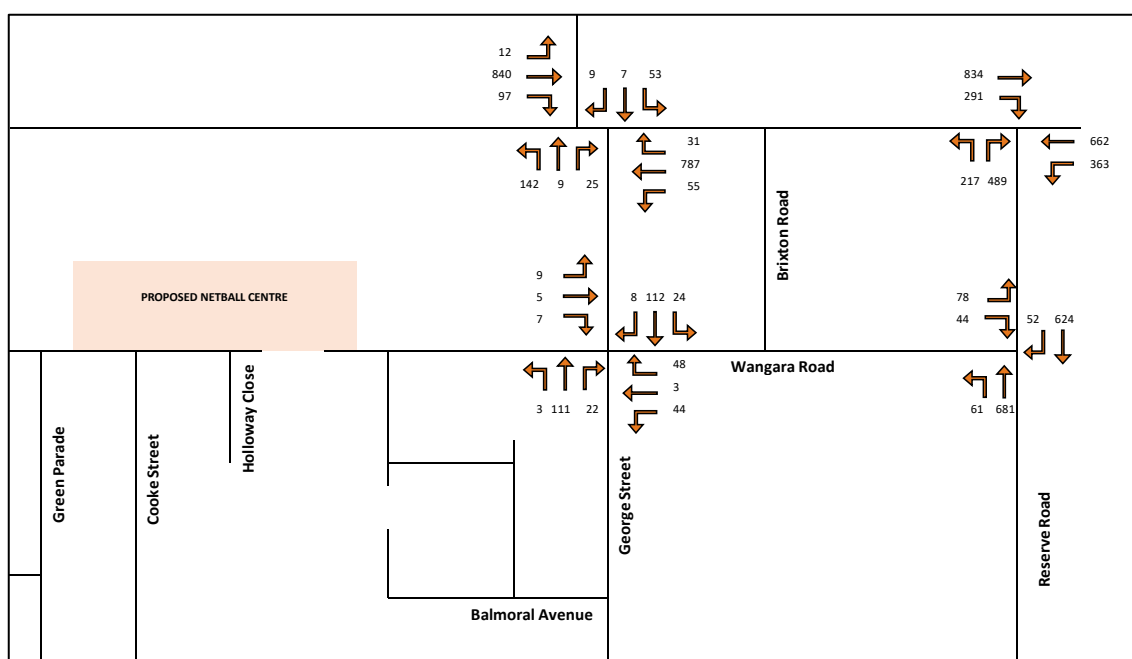


Figure 11: Turning Movement Counts – Saturday 1/12/18 – 11am-12noon

3.4 Existing Car Parking Conditions

3.4.1 Capacity and Restrictions

The existing on-street car parking in the vicinity of the subject site has been documented, including the capacity and restrictions.

A summary of the area reviewed for this study is shown in Figure 12 below.

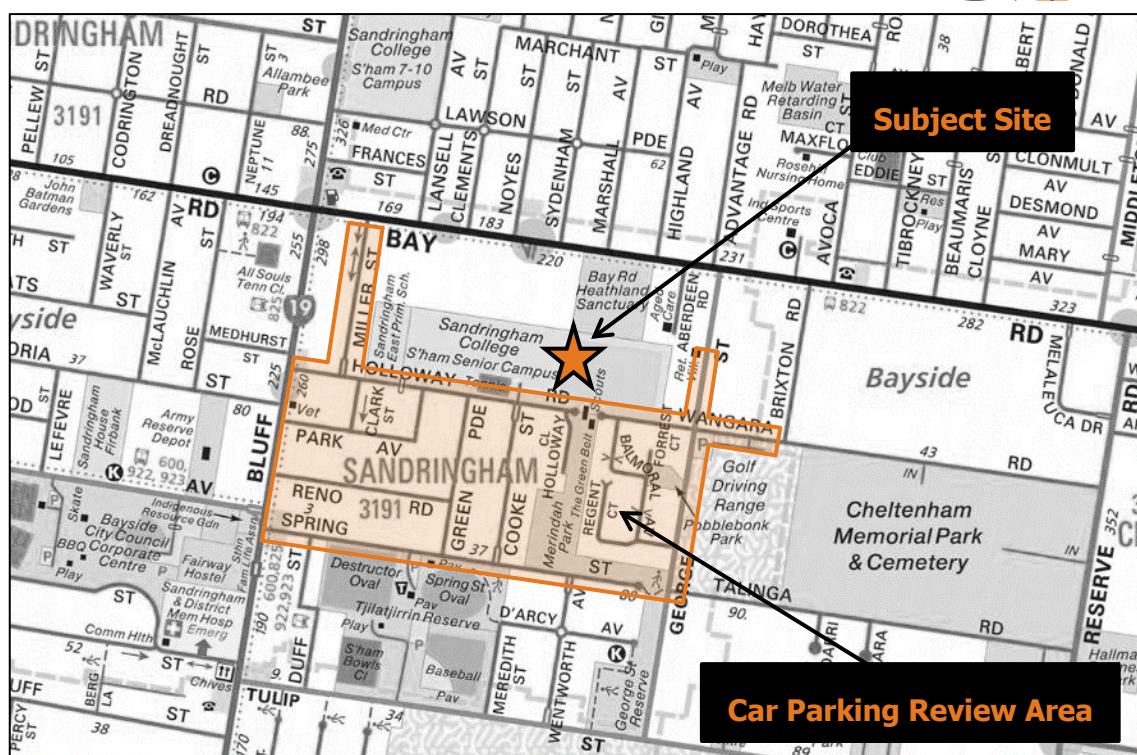
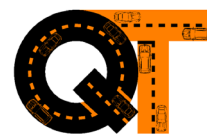


Figure 12: On-Street Car Parking Review Area (Source: www.melway.com.au)

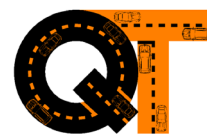
A summary of the capacity and restrictions in the review area is provided in Table 5 below.

Table 5: On-Street Car Parking – Capacity & Restrictions

Street	U/R	No Stopping (School Times)	No Stopping (Weekend)	2P	P15 min / P2min (School Times)	Other (Disabled)	Total
Holloway Road (7.1m wide)							
North Side	-	14	-	-	41	2	57
South Side	-	19	-	-	-	-	19
Combined	-	33	-	-	41	2	76
Miller Street (7.1m wide)							
East Side	11	-	-	20	-	-	31
West Side	-	26	-	-	-	-	26
Combined	11	26	-	20	-	-	57
Clarke Street (3-8m wide – unsealed)							
East Side	-	11	-	-	-	-	11
West Side	-	8	-	-	-	-	8
Combined	-	19	-	-	-	-	19
Park Avenue (7-7.1m wide)							
N/W Side	21	8	-	-	-	-	29
S/E Side	37	-	-	-	-	-	37
Combined	58	8	-	-	-	-	66



Street	U/R	No Stopping (School Times)	No Stopping (Weekend)	2P	P15 min / P2min (School Times)	Other (Disabled)	Total
Reno Road (6.8m wide)							
North Side	32	-	-	-	-	-	32
South Side	32	-	-	-	-	-	32
Combined	64	-	-	-	-	-	64
Spring Street (7.9m wide)							
North Side	49	-	-	28	-	-	77
South Side	94	-	-	-	-	-	94
Combined	143	-	-	28	-	-	171
Green Parade (7.1m wide)							
East Side	29	-	-	-	-	-	29
West Side	24	-	-	-	-	-	24
Combined	53	-	-	-	-	-	53
Cooke Street (7.1m wide)							
East Side	30	-	-	-	-	-	30
West Side	-	-	32	-	-	-	32
Combined	30	-	32	-	-	-	62
Holloway Close (5m wide)							
East Side	2	-	-	-	-	-	2
West Side	1	-	-	-	-	-	1
Combined	3	-	-	-	-	-	3
Balmoral Avenue (6.9m wide)							
W/S Side	22	-	-	-	-	-	22
North Ext.	3	-	-	-	-	-	3
E/N Side	19	-	-	-	-	-	19
Combined	44	-	-	-	-	-	44
Regent Court (5m wide)							
W/S Side	1	-	-	-	-	-	1
E/N side	4	-	-	-	-	-	4
Combined	5	-	-	-	-	-	5
Wangara Road (10m wide)							
North Side	41	-	-	-	-	-	41
South Side	29	-	-	-	-	-	29
Combined	70	-	-	-	-	-	70
George Street (10m wide)							
East Side	47	-	-	-	-	-	47
West Side	35	-	-	15	-	-	50
Combined	82	-	-	15	-	-	97
OVERALL	563	86	32	63	41	2	787



The majority of the parking in the local area is unrestricted (72% of spaces), with a number of 'No Stopping' restrictions applying at school times in the vicinity of Sandringham Secondary College. Outside of school times, these spaces are unrestricted.

3.4.2 Spot Car Parking Occupancy Surveys

A spot parking occupancy surveys was undertaken between 11am-12:30pm on Tuesday, 20th October 2020. We note that Stage 4 COVID-19 restrictions were still in force at the time of the survey, which may result in some non-regular parking patterns as follows:

- Sandringham Secondary College was only partially operating and therefore the staff demands may be lower than 'typical' conditions.
- Residents were subject to 'work from home' restrictions apart from 'permitted workers' which is likely to lead to higher parking demands for residents.

To establish typical Saturday parking demands, we have reviewed parking occupancies based on historical aerial photographs utilising Nearmap.

The most recent Saturday aerial photograph was recorded on 25th November 2017 at 9:45am. At the time of this aerial photograph cricket matches were occurring on both school ovals and 'market' was occurring at the Primary School.

A summary of the observed parking occupancies for the overall survey as detailed previously in Figure 12, is shown in Figure 13 below.

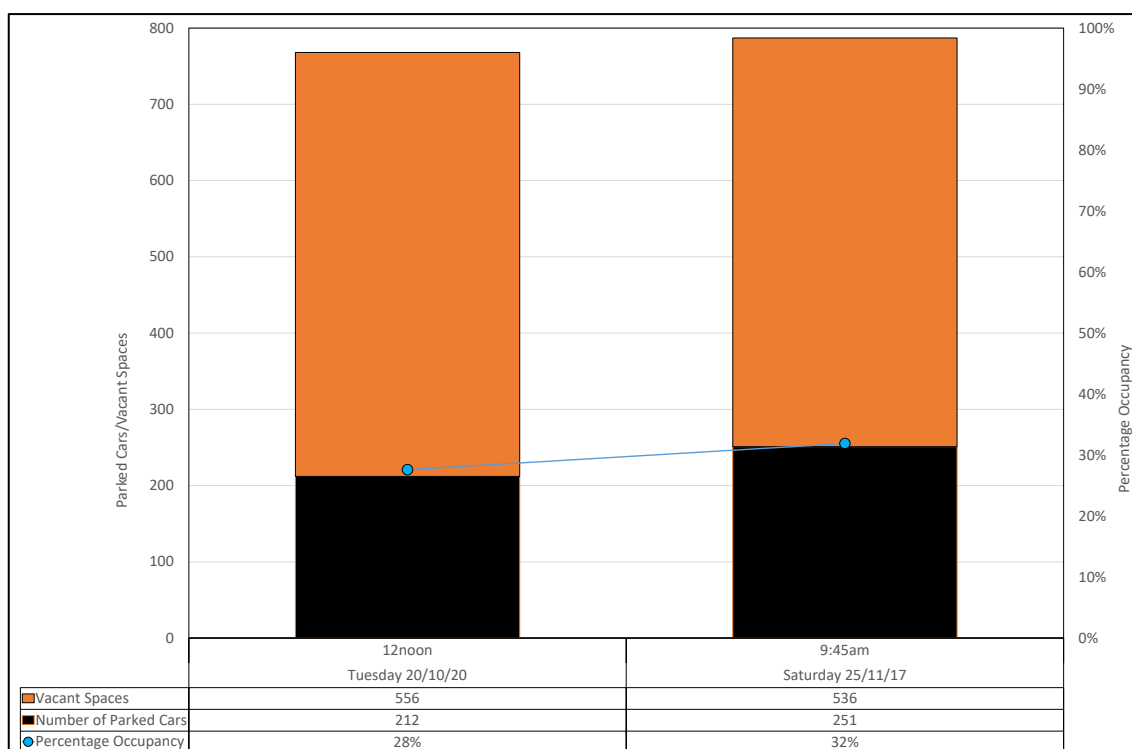


Figure 13: Parking Occupancy Surveys – Overall Summary

A copy of the parking occupancy survey data information is provided at Appendix C.

3.5 Road Safety Review

A road safety review has been undertaken for the key vehicle routes in/out of the local area, using the VicRoads crash stats database. The area is shown in the figure below.

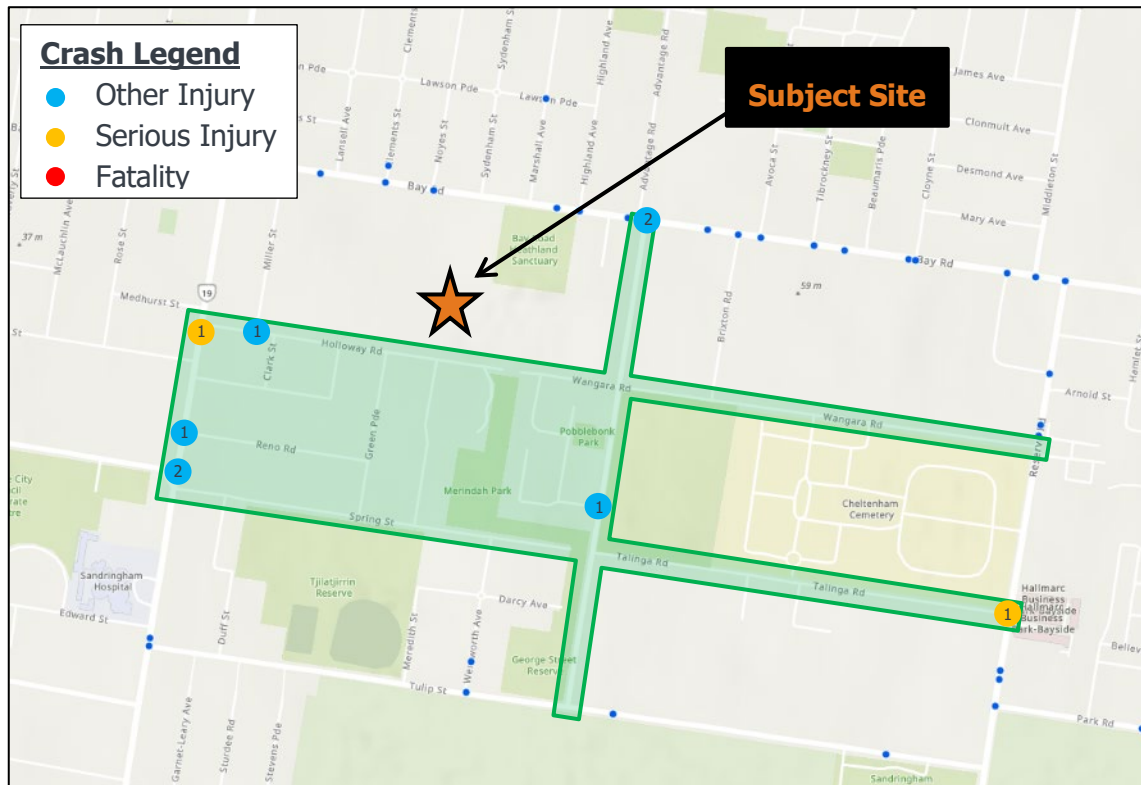


Figure 14: Road Safety Review Area

The period of recorded casualty crashes that has been reviewed is between 2014-2018, which represents the latest 5 years of available data.

A total of 9 casualty crashes have been recorded, with a maximum of 2 casualty crashes in any one location. The remaining locations had 1 casualty crash only.

The Department of Infrastructure outlines the following with respect to 'Black Spots':

For individual sites such as intersections, mid-block or short road sections, there should be a history of at least three casualty crashes over a five-year period. For lengths of road, there should be an average of 0.2 casualty crashes per kilometre per annum over the length in question over five years.

Accordingly, none of the roads or intersections in this area would meet this requirement and therefore there is not considered an inherent safety concern in the review area as a whole or at any one location.

The majority of casualty crashes occur on Reserve Road and Bay Road outside of the review area. The higher traffic volumes on these arterial roads result in higher exposure and therefore higher likelihood of casualty crashes.

3.6 Sustainable Transport Infrastructure

The site has access to public transport infrastructure, including bus services operating along Bay Road and Bluff Road, within 550m of the site.

These services provide a connection to Sandringham Railway Station/Bus Terminus and Southland Shopping Centre/Bus Terminus, which provide a connection to a number of areas in the south-eastern suburbs as well as the CBD.

Figure 15 outline the nearby public transport services.

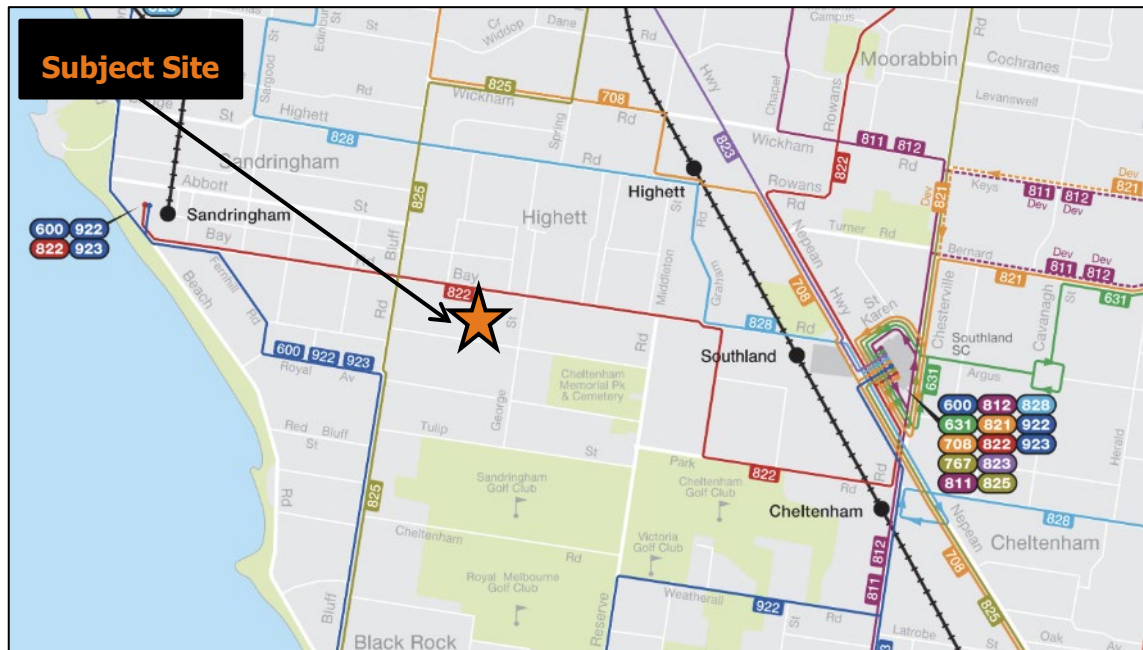


Figure 15: Public Transport Local Area Map (Source: www.ptv.com.au)

These services would not be unreasonably impacted on by the proposed development.

Additionally, the proposed development would not trigger the need for additional public transport services in the area.

4 Car Parking Assessment

4.1 Statutory Car Parking Requirements

The proposed development will occur on a state government public school site. On this basis, the proposal is not subject to the planning requirement of the Bayside Planning Scheme, including Clause 52.06 (Car Parking).

For the purposes of this assessment, we have reviewed the requirements of Clause 52.06 of the Bayside Planning Scheme for context of the of the likely car parking demands.

The proposed netball courts fall under the 'Open Sports Ground' land use category which includes 'Land used for sport, but which is available for informal outdoor leisure or recreation when not being used or prepared for an organised game. It may include lights, changerooms, pavilions, and shelters'.



'Open Sports Ground' is not listed under Clause 52.06-5 of the Planning Scheme and hence, car parking is to be provided to the satisfaction of the Responsible Authority. Therefore, no specific car parking rate is required under Clause 52.06, with the provision of car parking subject to a Car Parking Demand Assessment.

4.2 Peak Operation Days / Times

The proposed facility will operate with the following typical arrangements:

- **Weekday (day period – school hours)** – Utilised by Sandringham Secondary College or other schools for sports activity.
- **Weekday (evening / night period)** – Limited competition and training for local sports clubs (approximately 75% of weekend activity).
- **Saturdays/Sundays (day period)** – Formal competition / matches for local sporting clubs.

During the weekday day period, when the courts are utilised by Sandringham Secondary College or other schools, parking demands are expected to be negligible. The staff and students associated with Sandringham Secondary College are already on-site and therefore do not generate any additional parking demands when utilising the courts. If activity associated with other schools was to occur, students from other schools would be likely to arrive by bus resulting in negligible parking demands.

For the local sporting club activity, peak operation will occur on Saturdays/Sundays when formal competition / matches occur. Parking demands for weeknight activity are expected to be 75% of the Saturday activity. This is due to the training component typically attracting less people, given that only a single team will operate in each court and no umpires or parent spectators are likely to be present.

The courts are proposed to be utilised throughout the day during school holidays. Whilst this activity associated with the netball centre is likely to be higher than the typical weeknight activity, again the activity is expected to be less car intensive given that a portion of parents are still required to work during school holiday periods and therefore are not able to drop off / pick up children. We would expect high levels of car pooling, walking, cycling and bus activity.

In view of the above, the car parking demands for the proposed centre have been assessed for the peak Saturday/Sunday competition and the weeknight evening/night operation.

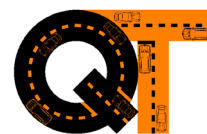
4.3 Peak Car Parking Demand Assessment

4.3.1 Saturday/Sunday Competition

The following outlines a first principles assessment of the likely peak car parking demand to be generated by the 12-netball court facility during competition / matches.

The following numbers form the basis of the assessment:

- 7 players per side resulting in 14 players per court
- 1 substitute per team resulting in 2 substitute players per court
- 2 umpires per court



- 15-30 spectators per court, typically 1 or 2 parents per child for junior matches. Spectators for seniors matches are negligible.
- **TOTAL people per court – 33-47 people**

With this type of use a number of players and umpires are likely to arrive by modes of transport other than individual cars, including:

- Walking and cycling from the nearby area
- Players & umpires under 18 years of age or unlicensed and therefore dropped-off/picked-up by parent/sibling/friend/guardian etc.
- Public transport from bus stops along Bay Road connecting to Southland Shopping Centre/Bus Terminus and Sandringham Railway Station.
- Multiple team members arriving together (car-pooling)

Based on the above, and considering the type of use, an upper limit of 75% of players/umpires/staff etc. are expected to drive to the site individually.

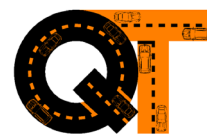
For the purposes of this assessment, we have also considered a series of 'sensitivity test' scenarios as follows:

- 'Sensitivity Test - 85%' – 85% of players/umpires arrive in individual vehicles.
- 'Sensitivity Test - 90%' – 90% of players/umpires arrive in individual vehicles.
- 'Sensitivity Test - 100%' – 100% of players/umpires arrive in individual vehicles.

On this basis, the parking demands per court is summarised in Table 6 below.

Table 6: Car Parking Demands – Per Court

Component	Size	Car Parking Rate	Car Parking Demand
Likley Parking Demand Per Court			
Players	16	0.75 spaces/player	12 spaces
Umpires	2	0.75 spaces/player	1.5 spaces
Spectators	15-30	Arrive in vehicle with players	-
TOTAL	33-47 per court	-	13.5 spaces/court
'Sensitivity Test – 85%' Demand Per Court			
Players	16	0.85 spaces/player	13.6 spaces
Umpires	2	0.85 spaces/player	1.7 spaces
Spectators	15-30	Arrive in vehicle with players	-
TOTAL	33-47 per court	-	15.3 spaces/court
'Sensitivity Test – 90%' Demand Per Court			
Players	16	0.90 spaces/player	14.4 spaces
Umpires	2	0.90 spaces/player	1.8 spaces
Spectators	15-30	Arrive in vehicle with players	-
TOTAL	33-47 per court	-	16.2 spaces/court
'Sensitivity Test – 100%' Demand Per Court			
Players	16	1 spaces/player	16 spaces
Umpires	2	1 spaces/player	2 spaces
Spectators	15-30	Arrive in vehicle with players	-
TOTAL	33-47 per court	-	18 spaces/court



Accordingly, when all 12 courts are being utilised an a likley parking demand of 162 cars would be expected and an upper 'sensitivity test' demand of 184-216 spaces could be expected.

The critical period for this type of use is the changeover period, when players from the next time slot are arriving while the players from the current time slot are still playing/finishing their games.

To manage the parking demands associated with the proposed facility, it is recommended that the session times for the games on the netball courts are staggered as follows (for 45 minute session times):

- 4 Netball courts to start at commencement of session.
- 4 Netball courts to start 15 mins after commencement of session.
- 4 Netball courts to start 30 mins after commencement of session.
- Not required for school sports where students/players generally arrive by bus.

Based on the above, the 'change over' demands will occur to 4 courts at any one time given the staggering of game session times.

Accordingly, the changeover demand would be the parking demand for the 12 courts identified above, plus an additional 1/3 of this demand to account for the change over period of 4 courts at a time. A summary of the peak 'change over' parking demands are presented in Table 7 below.

Table 7: Saturday / Sunday Peak Carparking Demands – At Critical 'Change Over' Period

Scenario	Base Court Usage Demand (12 Courts)	'Change Over' Demand (4 courts)	TOTAL Peak Demand – Change Over Period
Likley Demand	162 spaces	54 spaces	216 spaces
'Sensitivity Test – 85%'	184 spaces	61 spaces	245 spaces
'Sensitivity Test – 90%'	194 spaces	65 spaces	259 spaces
'Sensitivity Test – 100%'	216 spaces	72 spaces	288 spaces

4.3.2 Weeknight Evening / Night Activity

The activity during weeknight evenings / nights will be a mixture of competition and training for the local sporting clubs.

The competition component (matches) is likely to have similar car parking demands as the weekend competition outlined in Section 4.3.1.

The training component typically results in much lower parking demands on the following basis:

- Each court typically occupies a single team training, rather than two teams during competition.
- Parents / spectators are less likely to watch training compared to match competition. Therefore, there is typically more 'drop-off' activity leading to lower parking demands during matches.
- There is typically no significant overlap between consecutive training sessions, resulting in less peak 'changeover'.



- No umpires are required for training activity.

Whilst the exact mixture of competition / training is not known, for the purposes of this assessment we have conservatively assumed that weeknight parking demand is up to 75% of peak weekend competition parking demands.

On this basis, the peak weekday evening parking demand is expected to be as follows:

- Weekday Evening: 'Likely' Peak Parking demand – **162 car spaces**
- Weekday Evening: 'Sensitivity Test – 85%' Parking Demand – **184 car spaces**
- Weekday Evening: 'Sensitivity Test – 90%' Parking Demand – **194 car spaces**
- Weekday Evening: 'Sensitivity Test – 100%' Parking Demand – **216 car spaces**

4.3.3 Comparison to Other Netball Facilities

It is difficult to utilise parking patterns associated with other netball facilities to determine the likely peak parking demand for the subject site. This is principally due to the key recommendation regarding the staggering of match session times.

Empirical data is typically collected by observing the peak carparking demands and dividing by the number of operational courts. As discussed above, the change over time between matches is critical for the peak carparking demands and therefore locations with little staggering will have much higher parking demands than locations with higher levels of staggering.

In view of the above, it is difficult to identify a representative site (similar suburban location, similar netball competition status, similar travel patterns) that also incorporates match start time staggering to the same degree that is recommended in this situation.

Therefore, as discussed above an approach assessing the 'likely' and 'sensitivity test' scenarios has been adopted to review the implications of a range of possible parking demand outcomes.

4.4 On-Site Car Parking Provision

The current indicative site plan includes a total of 98 car parking spaces. Therefore, under the current arrangement a peak overflow of 118-190 spaces would occur in the surrounding on-street car parking resources during the peak Saturday/Sunday competition.

It is desirable to maximise the on-site car parking to reduce the level of car parking catered for in the surrounding public parking resources. We have reviewed the on-site car parking arrangements and have identified a number of recommended modifications to achieve additional on-site parking including:

- Relocate the site entry to the western boundary of the proposed car park and provide car parking spaces on the north side of the aisle.
- Provide additional spaces on the south side of the aisle in the location of the existing site entry.
- Extend the carpark with the exit to Wangara Road.
- Angle the parking spaces on both sides of the access aisle to 60 degrees to reinforce the one-way nature of the carpark.

This reconfiguration of the on-site carpark results in approximately 114 on-site parking spaces which includes 109 60 degree angle spaces and 5 pick-up / drop-off spaces. We note that the bus parking and pick-up / drop-off spaces are proposed to be shared given that the peaks for these two components are not expected to coincide.



Figure 16: Recommended On-Site Car Parking Modifications (114 Spaces)

A summary of the on-site car parking supply following the above recommendations and the resultant overflow parking is provided in Table 8 below.

Table 8: On-Site Car Parking Provision - Summary

Measure	On-Site Parking Provision (Maximised)	Peak Car Parking Demand	Overflow Carparking Demand
Saturday / Sunday			
Likley Demand	114 spaces	216 spaces	102 spaces
'Sensitivity Test – 85%'		245 spaces	131 spaces
'Sensitivity Test – 90%'		259 spaces	145 spaces
'Sensitivity Test – 100%'		288 spaces	174 spaces
Weekday Evenings			
Likley Demand	114 spaces	162 spaces	48 spaces
'Sensitivity Test – 85%'		184 spaces	70 spaces
'Sensitivity Test – 90%'		194 spaces	80 spaces
'Sensitivity Test – 100%'		216 spaces	102 spaces

In view of the above, the recommend on-site carpark layout changes would result in a likely overflow demand of 48-102 spaces during weeknight evenings and 102-174 spaces on weekends in the surrounding public parking resources.

4.5 Suitability of Public Parking in Surrounding Area

As discussed above, at peak times the proposed netball centre is expected to generate a car parking demand of 102-174 spaces in the public parking resources surrounding the subject site.

If no formal parking restrictions are introduced, these parking demands will typically locate in the most proximate parking resources to the centre.

For the purposes of this assessment, a 250m radius from the proposed netball centre entry is shown on the aerial photograph below to indicate the most likely locations where on-street demands would occur.

We anticipate that parking would first occur on Holloway Road and Wangara Road given they are the most proximate spaces to the centre. Parking would then be likely to utilise the surrounding residential streets including Holloway Close, Cooke Street and Green Parade.

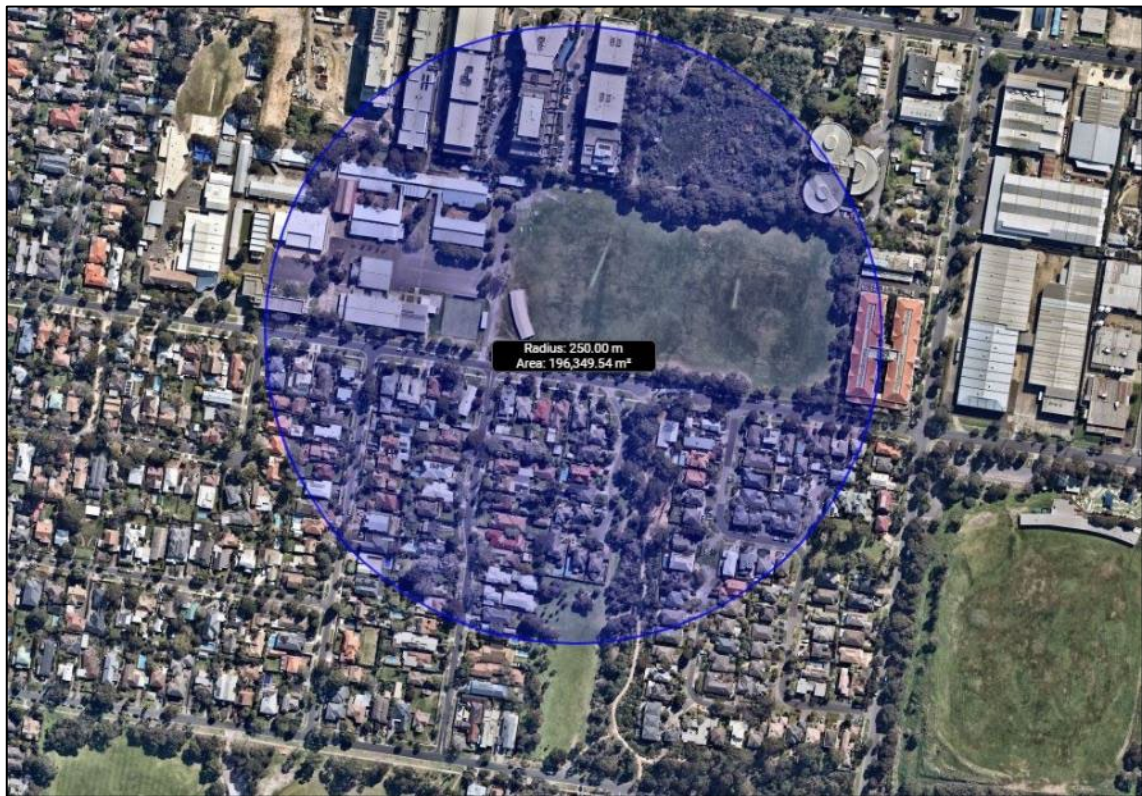


Figure 17: On-Street Parking – Likely Locations Without Restrictions (Source: Nearmap)

These existing conditions would result in concentrated parking demands in the most proximate streets, with limited car parking opportunities for adjacent residents.

In order to avoid the above issues, it is recommended that parking demands associated with the proposed sporting activity occurs on non-residential frontages.

This approach limits the impacts on existing residential properties, whilst allowing for a level of utilisation of the on-street parking resources.

We have reviewed the public parking in the vicinity of the subject site and have identified the following 'suitable' resources along non-residential frontages in close vicinity of the subject site (within approximately 300-500m).



Figure 18: On-Street Parking – Suitable Spaces on Non-Residential Frontages

A summary of the capacity and available spaces in these 'suitable' areas based on the parking occupancy surveys detailed in Section 3.4.2, is provided in Table 9 below. For the purposes of this assessment that parking demand during the weekday 'day' have been adopted for the weekday 'evening' analysis.

Table 9: 'Suitable' Public Car Parking - Summary

Road	Section	Side	Capacity	Spaces Available	
				Weekday (Day)	Weekend (Day)
Wangara Road	School Frontage	North Side	17	14	10
	George St to Brixton Rd	North Side	15	13	11
		South Side	14	14	9
George Street	NB #13 Wangara Rd to Wangara Rd	East Side	9	8	3
	Wangara Rd to Talinga Rd	East Side	38	37	38
Driving Range Carpark	Cnr Wangara Rd & George St	-	58	58	36
TOTAL			151	144	107
Likely Peak Overflow Parking Demand				48	102
Likley Post Development – Spaces Available				96	5
'Sensitivity Test' Peak Overflow Parking Demand				70-102	131-174
'Sensitivity Test' Likley Post Development – Spaces Available				42-74	-24 to -67

A summary diagram showing the capacity and available spaces for each section of 'suitable' public parking is shown in Figure 19 below.



Figure 19: Suitable Public Parking Spaces – Capacity & Available Spaces

In view of the above, the 'suitable' public parking spaces have sufficient capacity and available spaces to accommodate the likely overflow parking demands associated with the proposed netball centre and the weeknight evening 'sensitivity test' scenarios.

However, under the weekend 'sensitivity test' scenario the public parking documented is 24-67 spaces short of accommodating the demand. Therefore, in this scenario parking would be likely to extend further along Wangara Road, George Street (north of Wangara Road), Brixton Street and potentially Talinga Road based on proximity to the netball centre. A summary of the extent of on-street parking is identified in Figure 20 below.



Figure 20: Extent of Overflow Parking – 'Likely' vs. 'Sensitivity Test' Scenarios (Saturday/Sunday)

In terms of suitability, the majority of these roads accommodate commercial properties and therefore there are no specific residential amenity impacts associated with overflow parking from the netball centre. Although, the key issue with the spread of carparking in the weekend 'sensitivity test' scenario is the walking distance to the netball centre



(greater than 500-600m in the worst case scenario). The netball centre patrons required to utilise the furthest away spaces could be required to walk over 1km for the round trip.

In view of the above, it is recommended that Council monitor the extent of on-street parking associated with the netball centre post development. If parking demands do approach the extents predicted for the 'sensitivity test' scenarios, it is recommended that additional off-street carparking is considered within the former golf driving range site at the corner of Wangara Road / George Street (Council owned). The existing carpark could be extended to provide parking in closer proximity to the netball centre.

4.6 Recommended Parking Management Scheme

4.6.1 Restrictions for Residential Frontages

Type of Restrictions

In order to ensure that vehicles associated with the netball centre utilise the suitable public parking spaces identified above, parking management is required along the residential frontages in the local area.

Under the existing conditions, the majority of the streets in the local area are unrestricted or have 'No Stopping' restrictions that apply during school drop-off and pick-up times.

Netball centre patrons and local residents can be separated through the usage of parking restrictions, with residents exempt from restrictions through a permit system administered by Council. This can be achieved through time based parking restrictions or permit zone restrictions.

Time based restrictions are generally applied as 1 hour, 2 hour or 4 hour restrictions. Given the generally short nature of netball games/matches (approximately 40-60 minutes depending on age groups and competition) parking demands for netball patrons could be approximately 45-70 minutes.

Therefore, even with the usage of the shortest typical 1P parking restrictions, it is possible that some netball patrons may still utilise residential frontages.

On this basis, it is recommended that a combination of Permit Zone restrictions on one side of the street and 1P restrictions on the other side of the street are initially installed and reviewed following completion and operation of the netball centre. If netball centre parking is deemed to be an issue along residential frontages, additional Permit Zone restrictions could be considered for implementation as required.

It is noted that any existing restrictions that apply (such as school No Stopping restrictions) will be retained.

Periods of Restrictions

The other key aspect to the introduction of parking restrictions is the time / days that the restrictions apply. The peak overflow parking demands are expected to occur on the weekend, with lower overflow parking demands on weekday evenings.

Whilst the demands on weekday evening are expected to be lower, it is conservatively recommended to apply the restrictions across the general weekday and weekend peak times that netball centre is operating.



The proposal seeks to operate to 6pm (outdoor courts) and 8pm (indoor courts) on Saturday/Sunday. For the weekday night periods, it is recommended that the restriction operate until 9pm, to match the potential use of all 12 courts. Between 8:30pm and 9:30pm, only the indoor courts (3 courts) are permitted to operate and parking demands would be accommodated on-site.

On this basis, the following times are recommended for the parking restrictions:

- 8am-6pm, Sat-Sun
- 4pm-9pm, Mon-Fri

However again, parking demands should be monitored post development, with possible restriction modifications if required (i.e. modified times, reduced periods, etc).

Extent of Parking Restrictions

The proposed parking arrangements aim to direct netball centre users to the 'suitable' parking spaces along residential frontages. On this basis, it is recommended that the parking restrictions are applied to the whole local area bounded by Bluff Road, Spring Street and George Street.

Furthermore, restrictions are recommended on the west side of George Street, between Wangara Road and Bay Road.

A summary of the recommended extent of parking restrictions is shown in Appendix E.

4.6.2 Restrictions to Maintain Traffic Flow / Facilitate Access

The 'suitable' public parking locations identified in Figure 18, were generally located on streets that can accommodate parking on both sides of the road and maintain simultaneous two-way traffic flow. These streets include Wangara Road and George Street.

However, additional traffic volumes including buses are expected on Holloway Road, which has a road width of 7.1m wide. This width allows for parking on one side of the road and simultaneous two-way traffic flow or parking on both sides of the road and a single lane of traffic.

Given the increase in traffic volumes and the increased level of bus movements, we recommend that 'No Stopping' restrictions are applied on the south side of Holloway Road. We note that 'No Stopping' restrictions already apply on the south side of Holloway Road at school drop-off / pick-up times. Residents will be able to utilise the parking on the north side of Holloway Road or within the adjacent side streets as required.

The proposed No Stopping restrictions will also facilitate bus entry movements into the on-site carpark. In addition, a small section of No Stopping to facilitate bus exit movements from the on-site carpark on Wangara Road is also recommended.

4.6.3 Summary of Recommendations

A summary of the proposed parking restriction scheme to be applied to the streets in the vicinity of the subject site is summarised in Appendix E.



4.7 Car Park Design

4.7.1 Vehicle Access

The preliminary Master Plan shows vehicle access at two points to Holloway Road. The western access is for entry only and the eastern access provides for exit movements only. This results in the on-site carpark generally operating in a one-way arrangement (eastbound).

As described in Section 4.4, it is recommended that the carpark is extended to the east with the eastern 'exit' point to Wangara Road. This allows for a larger on-site carpark, but also critically separates the 'In' movements via Holloway Road and the 'Out' movements via Wangara Road. The traffic volumes expected on the surrounding road network are discussed in Section 7 below.

To encourage vehicles to enter via Bluff Road / Holloway Road (rather than via the local road network to the south), it is recommended that the 'In' access points is designed as left in only. All exit movements must occur left out due to the existing road closure between Holloway Road and Wangara Road.

The largest vehicles the carpark will cater for are buses and larger service vehicles (i.e. waste collection). The access points should be designed to accommodate these vehicles.

The proposed vehicle access arrangements are satisfactory in dealing with the level of traffic expected to be generated by the proposed netball centre.

4.7.2 Vehicle Access Management

The proposed one-way configuration of the carpark results in a potential connection between Holloway Road and Wangara Road (eastbound). We note that Holloway Road / Wangara Road was historically closed, most likely due to traffic volumes travelling along the road.

In view of the above, it is important that the carpark is designed to avoid any 'through' traffic volumes utilising the carpark as a shortcut between Holloway Road and Wangara Road.

We recommend that an access control gate is included on the carpark access points to prevent access outside of the operating hours of the netball centre.

When the netball centre is operating, there obviously can't be any control of vehicle access differentiating netball users and through traffic. We note that the proposed carpark layout includes a series of road humps (refer to Section 4.7.6) which make the carpark route unattractive to through traffic. It is recommended that Council monitor traffic volumes post development and if through traffic is deemed an issue consider the provision of additional traffic management in the carpark and/or Holloway Road / Wangara Road.

4.7.3 Parking Spaces

As discussed previously in Section 4.4, we recommend that the parking spaces are modified to a 60 degree configuration. This would reinforce the one-way nature of the carpark with entry via Holloway Road and exit to Wangara Road.



The detailed carpark design should satisfy the requirements of Clause 52.06-9 of the Bayside Planning Scheme and AS2890.1:2004. The concept plan has been prepared with the following general carpark dimensions in accordance with User Class 2 (sports facilities):

- Space width – 2.6m
- Space Length – 6m (perpendicular to the kerb)
- Access Aisle – 4.6m

4.7.4 Disabled Parking

Under the National Construction Code (NCC) formerly the BCA, accessibly designed car spaces are required at a rate of 1 space for every 50 car parking spaces proposed.

Given the recommendation to expand the on-site car parking to 114 spaces, a total of 3 accessible parking spaces are required (as shown on the recommended concept plan).

The disabled spaces should comply with the requirements of AS2890.6:2009.

4.7.5 Pedestrian Movements

Pedestrians movements to the netball centre will be driven by two distinct groups:

- Pedestrians to/from vehicles parked in the on-site carpark
- Pedestrians to/from the external road network including general pedestrian movement and to/from vehicles parked in the off-site public parking resources

On this basis, pedestrian movements can generally be expected from the east, west and south.

The pedestrian entry to the facility is proposed adjacent to the bus drop-off / pick-up point, on the northern side of the proposed carpark.

The most desirable pedestrian arrangement is to avoid pedestrian movements across the carpark access aisle, limiting the interaction between vehicles and pedestrians. This can be achieved for the external pedestrian movements in this layout via the provision of footpaths around the northern side of the carpark, linking to Holloway Road and Wangara Road.

Internal pedestrian movements to the individual car parking spaces are more difficult to manage, given that each parking space will have a differing travel desire lines between vehicles and the facility entrance. On this basis, it is difficult to provide a formal crossing within the car parking that would service these movements. Alternatively, it is recommended that traffic management (speed humps) is incorporated within the carpark to slow vehicle speed and therefore manage the interaction between pedestrians and vehicles.

A summary of the recommended pedestrian arrangements in the on-site car park are shown by the 'red' dashed lines in Figure 16 presented previously or in the concept plan in Appendix D.

4.7.6 Traffic Management

The recommended carpark layout includes a single straight access aisle, with an overall length of approximately 200m. As discussed above, pedestrian movements are expected



across the access aisle between the centre entry and the parking spaces on the south side of the aisle. On this basis, we recommend that traffic management is included within the carpark to manage traffic speeds.

Traffic management within the carpark is best achieved through the provision of road humps at intervals of approximately 50m. Road humps do not impede access to the adjacent parking spaces, whilst providing effective speed control.

A signage and linemarking plan should be prepared to formalise the car parking areas and maximise the efficiency. This should include but not be limited to:

- Clear signage designating the entry of the carpark from Holloway Road
- Appropriate signage / linemarking to highlight the one-way configuration of the carpark..
- Appropriate car parking restriction signage to ensure there are adequate accessible car spaces and drop-off/pick-up facilities

4.8 Car Parking Assessment Summary

A summary of the car parking recommendations for the proposed Bayside Netball Centre is detailed below:

- On-site parking for the netball centre should be maximised and it is recommended that the on-site carpark is expended to provide for approximately 114 car parking spaces.
- The scheduling of netball matches should include a 'stagger' between session times to reduce peak car parking demands as follows:
 - 4 Netball courts to start at commencement of session.
 - 4 Netball courts to start 15 mins after commencement of session.
 - 4 Netball courts to start 30 mins after commencement of session.
- The peak parking demands expected with the inclusion of the above stagger times are as follows:
 - Saturday/Sunday (Competition):
 - 'Likely' Parking Demand – 216 spaces
 - 'Sensitivity Test' Parking Demand – 245-288 Spaces
 - Weekday evening (Competition / Training):
 - 'Likely' Parking Demand – 162 spaces
 - 'Sensitivity Test' Parking Demand – 184-216 Spaces
- Based on the provision of 114 spaces on-site, an overflow parking demand of 48-102 spaces on weekday evenings and 102-174 spaces on Saturdays/Sundays is expected in the surrounding public parking resources.
- To limit the impact to the adjacent residential area, it is recommended that netball centre parking demands are accommodated on 'suitable' non-residential frontages on Wangara Road, George Street and the existing carpark at the Golf Driving Range.
- These public parking spaces have a capacity of 151 spaces, with existing availability of 107-144 spaces. On this basis, there is sufficient capacity within the 'suitable' parking spaces to accommodate the 'likely' and weeknight 'sensitivity test' overflow demands associated with the netball centre.



- However, the weekend 'sensitivity test' scenario would result in parking extending further into Wangara Road, George Street, Brixton Street and potentially Talinga Road. This would result in long walking distances for netball patrons. It is recommended that Council monitor the extent of overflow parking and if parking extends as predicted for the sensitivity test, consider the provision of additional parking on the former golf driving range site (closer proximity to the netball centre).
- To ensure vehicles associated with the netball centre utilise the 'suitable' parking spaces it is recommended that the following parking restrictions are installed in the local residential areas:
 - 'Permit Zone 4pm-9pm Mon-Fri, 8am-6pm Sat-Sun' one side
 - '1P 4pm-9pm Mon-Fri, 8am-6pm Sat-Sun' other side
 - Existing restrictions outside of these times would be retained
- Council should monitor parking demands in the area following the opening of the Netball Centre as consider the following amendments if required:
 - Potential inclusion of additional Permit Zone parking restrictions if parking availability is an issue within the residential streets.
 - Potential modifications of the days/times that the restrictions apply.
- 'No Stopping' restrictions are recommended along the south side of Holloway Road to maintain two-way traffic flow and allow bus access. Additional 'No Stopping' restrictions are recommended on the south side of Wangara Road opposite the on-site carpark access to facilitate bus egress.

5 Bicycle Parking Assessment

As discussed previously, the proposed netball centre is located on a state government high school site and therefore the proposal does not require a planning permit.

In view of the above, the proposal is not subject to Clause 52.34 (Bicycle Parking). However, the requirements of Clause 52.34 have been utilised as a guide to appropriate levels of bicycle parking for the netball centre.

Under Clause 52.34, the use falls under the term 'Minor Sports & Recreation Facility'.

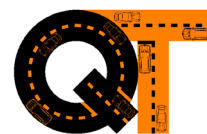


Table 10 outlines an assessment of the bicycle parking provision against the statutory requirement prescribed under Clause 52.34 of the Bayside Planning Scheme adopting the 'Minor Sports & Recreation Facility' rate.

The assessment is made on the assumption of 2 staff per court (umpires) plus 6 management/other staff and each netball court having a Net Floor Area of 465m².

Table 10: Clause 52.34 Bicycle Parking Assessment

Use	Size/ No.	Statutory Bicycle Parking Rate	Requirement (1)
Motel			
Staff	30	1 to each 4 employees	8
Visitor	5,580m ²	1 to each 200m ² of NFA	28
TOTAL			36

Note 1: Non-whole numbers rounded mathematically to the nearest whole number as specified by Clause 52.34

In view of the above, it recommended that bicycle parking in the order of 36 spaces is provided for the netball centre.

The majority of demands are likely to be associated with visitors and therefore, these spaces are best provided via bicycle rails in the vicinity of the entry to the netball centre.

A secure staff bicycle parking enclosure is also recommended, to facilitate longer term staff bicycle parking requirements.

Indicative locations for the recommended visitor bicycle parking spaces are shown on the carpark concept plan in Appendix D.

6 Broader Pedestrian Accessibility

The pedestrian movements within the on-site carpark were discussed in Section 4.7.5, however, a number of netball centre users will park in the surrounding public parking resources and walk to the subject site.

Based on the 'suitable' public parking spaces identified previously, pedestrians will need to cross George Street when parked on the eastern sections of Wangara Road, the east side of George Street or the driving range carpark as shown in Figure 21 below.



Figure 21: Pedestrian Desire Lines – Off-Site Parking

Under the existing conditions, pedestrian facilities at the George Street / Wangara Road intersection are limited to pram ramps on the north, east and west approaches to the intersection. No pram ramps are provided on the south side of the intersection.

We note that the George Street / Wangara Road intersection is unique, whereby it separates the residential area to the west and the commercial area to the east. From a design perspective, this means that the intersection needs to be able to accommodate heavy vehicle movements associated with the existing commercial area on the north, east and south legs. Heavy vehicle movements will be limited on the west leg to waste collection, smaller delivery trucks and buses from the proposed Netball Centre

An aerial photograph of the existing conditions is provided in Figure 22 below, which show a large semi-trailer turning from north to east.



Figure 22: Existing Conditions – George Street / Wangara Road (Aerial: Nearmap)



George Street is classified as a collector roads and Wangara Road is classified as local road. The existing speed zone on George Street is 60km/h, whilst Wangara Road is subject to the default urban speed limit of 50km/h.

Pedestrian movements are only expected in this area during peak Saturday competition (when overflow parking occurs). The pedestrian volumes have been estimated based on the following key assumptions:

- The parking demand assessment presented previously, with vehicle assumed to utilise spaces based on their proximity to the netball centre the closest spaces.
- An average occupancy of 2 people per vehicle.
- Given the short duration of netball matches (40-60 minutes), it is conservatively assumed that during each hour throughout the competition day there will be pedestrians arriving at the site and pedestrians departing the site.
- Pedestrians crossing on the south side of the intersection are assumed to have 80% of movements cross Wangara Road at the George Street intersection.

A summary of the post development traffic volumes and likely pedestrian volumes at the intersection are summarised in Table 11 below.

Table 11: George Street / Wangara Road – Post Development Volumes

Measure	George Street - North	George Street - South	Wangara Road - West
Peak Hour Traffic Volume (Saturday 11am-12noon)	384 veh/hr	371 veh/hr	251 veh/hr
Hourly Pedestrian Volume	56 ped/hr	264 ped/hr	211 ped/hr

The Department of Transport (VicRoads) identifies thresholds for the provision of zebra crossings, however, no formal guidance is currently provided for signalised crossings. On this basis, we have reviewed the thresholds provided by RMS NSW and a general guide. A summary of the general thresholds for the installation of formal pedestrian crossing facilities is as follows:

- **Zebra Crossing (Static)**
 - 20 pedestrians / hour
 - 200 vehicles / hour
- **Zebra Crossing (Flashing Lights)**
 - 60 pedestrians / hour
 - 500 vehicles / hour
- **Pedestrian Operated Signals**
 - 175 pedestrians / hour
 - 600 vehicles / hour in each direction

In view of the above indicative pedestrian volumes, all legs at the intersection fall within the warrants for static zebra crossings.

As described previously, the design of pedestrian facilities are constrained by the need to continue access for larger vehicles on the north, south and east legs of the intersection. Therefore, kerb extensions or median islands are not possible on the north

and south legs of the intersection. However, given the residential nature of the western leg, it is appropriate for the pedestrian crossing to include kerb extensions.

To improve general pedestrian safety the following general pedestrian treatments are recommended:

- Raised Zebra Crossing (without flashing lights) on the north and south George Street legs.
- Raised Zebra Crossing (without flashing lights) including kerb extensions on the west Wangara Road leg.
- Reduce speed zoning along George Street from 60km/h to 50km/h.
- Provide advanced road humps (speed cushions to accommodate truck movements) on the north and south approaches of George Street to further reinforce a slow speed environment.

Given the potential amenity impacts associated with the proposed road humps, we recommend that Council consult with the adjacent property owners/occupiers.

A summary of the recommended pedestrian treatments are summarised in Figure 23 below.



Figure 23: Recommended Pedestrian Treatments – George Street / Wangara Road (Aerial: Nearmap)

7 Traffic Impacts

7.1 Vehicle Access Arrangements

The proposal seeks to distribute traffic volumes in the local road network evenly between Holloway Road and Wangara Road.



This is achieved by the one-way designation of the on-site carpark, with entry movements via Holloway Road and exit movements via Wangara Road. This approach has a range of advantages including:

- Reducing the overall traffic volumes on any one road in the area, particularly Holloway Road.
- Results in all of the netball centre volumes travelling in the same direction, reducing conflict associated with vehicles travelling in opposing directions.
- Allows for multiple departure routes through George Street and Wangara Road, reducing the traffic capacity impacts at any one intersection.

The entry of vehicles via Holloway Road is considered important given the Holloway Road address for the site, as drivers using GPS directions (unfamiliar users) will be guided through the correct road network via Holloway Road.

7.2 Traffic Generation

The following outlines the expected traffic generation based on the full 12 courts being utilised as per the numbers and operational characteristics outlined previously (i.e. Saturday/Sunday competition).

The following assessment is based on 45-minute time slots for games, which is conservative. If game slots are 50mins-1hour, the traffic generation will be less across the entire 'competition' period.

The traffic generation is based on the Parking Demand Assessment outlined at Section 4.3, with each full cycle of the courts generating 216 movement for the 'likley' scenario and up to 288 movements for the 'sensitivity test' scenario.

Based on this, the following traffic generation is anticipated, which represents the upper-limit of demands, assuming full utilisation of the 12 courts and 45-minute allowance for each game and the staggering of matches as discussed previously:

- The first 1-hour period of competition will include the arrival for all courts and the departure movements for the first 4 courts.
- After the first 1-hour period, traffic volumes will include the full arrival for 12 courts and the full departure for 12 courts.
- In the last hour of operation will include the arrival of last game time for 4 courts and departure movements for all courts.
- Council's current proposal sees operation of the courts between 8am-6pm (outdoor courts) and 8am-8pm (indoor courts) during Saturday competition. Sunday competition occurs for a shorter time period.
- On weeknights the courts will operate between 4pm-8:30pm (outdoor courts) and 4pm-9:30pm (indoor courts).

Activity on weekday evenings is expected to be approximately 75% of the peak Saturday activity identified above.

A summary of the peak hour and daily traffic generation for the 'likley' and 'sensitivity test' scenarios is outlined in Table 12 and below.

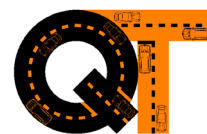


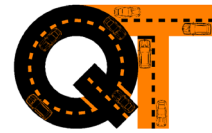
Table 12: Traffic Generation – Saturday / Sunday

'Likley' Traffic Generation				'Sensitivity Test' Traffic Generation		
Hour	Arrival	Departure	Total Movements	Arrival	Departure	Total Movements
7-8am	54	0	54	72	0	72
8-9am	216	54	270	288	72	360
9-10am	216	216	432	288	288	576
10-11am	216	216	432	288	288	576
11-12pm	216	216	432	288	288	576
12-1pm	216	216	432	288	288	576
1-2pm	216	216	432	288	288	576
2-3pm	216	216	432	288	288	576
3-4pm	216	216	432	288	288	576
4-5pm	216	216	432	288	288	576
5-6pm	95	216	311	126	288	414
6-7pm	41	95	135	54	126	180
7-8pm	41	41	81	54	54	108
8-9pm	0	41	41	0	54	54
Daily	2,174	2,174	4,347	2,898	2,898	5,796

Table 13: Traffic Generation – Weekday Evening

'Likley' Traffic Generation				'Sensitivity Test' Traffic Generation		
Hour	Arrival	Departure	Total Movements	Arrival	Departure	Total Movements
3-4pm	41	0	41	54	0	54
4-5pm	162	41	203	216	54	270
5-6pm	162	162	324	216	216	432
6-7pm	162	162	324	216	216	432
7-8pm	152	162	314	203	216	419
8-9pm	30	152	182	41	203	243
9-10pm	0	30	30	0	41	41
Daily	709	709	1,418	945	945	1,890

It is noted that traffic generation associated with any weekday school activity during business hours is expected to be negligible.



7.3 Traffic Distribution

Based on the configuration of the proposed on-site carpark, the majority of vehicle movements (80%) are expected to arrive via Holloway Road (from Bluff Road) and exit to Wangara Road (to George Street, Bay Road, Reserve Road, Tulip Street).

The remaining 20% of traffic generation is expected to directly access the on-street parking via George Street to/from Bay Road and Wangara Road (to/from Reserve Road). Given the regional nature of the netball facility, we have assumed a generally even distribution of traffic movements in the surrounding road network.

In particular the following outlines the rationale of the distribution model:

Arrival Movements

- 40 % from the north (Bluff Road & Miller Street)
- 40 % from the south (Bluff Road)
- 10% from the south-east (Wangara Road)
- 10% from the north-east and north-west (George Street)

Departure Movements (Wangara Road)

- 37% to the east (Wangara Road to Reserve Road)
- 37% to the north (George Street to Bay Road)
- 27% to the south (George Street to Talinga Road / Tulip Street)

This is shown diagrammatically in the figure below with the arrival percentages shown in 'blue' and the departure percentages shown in 'orange'.

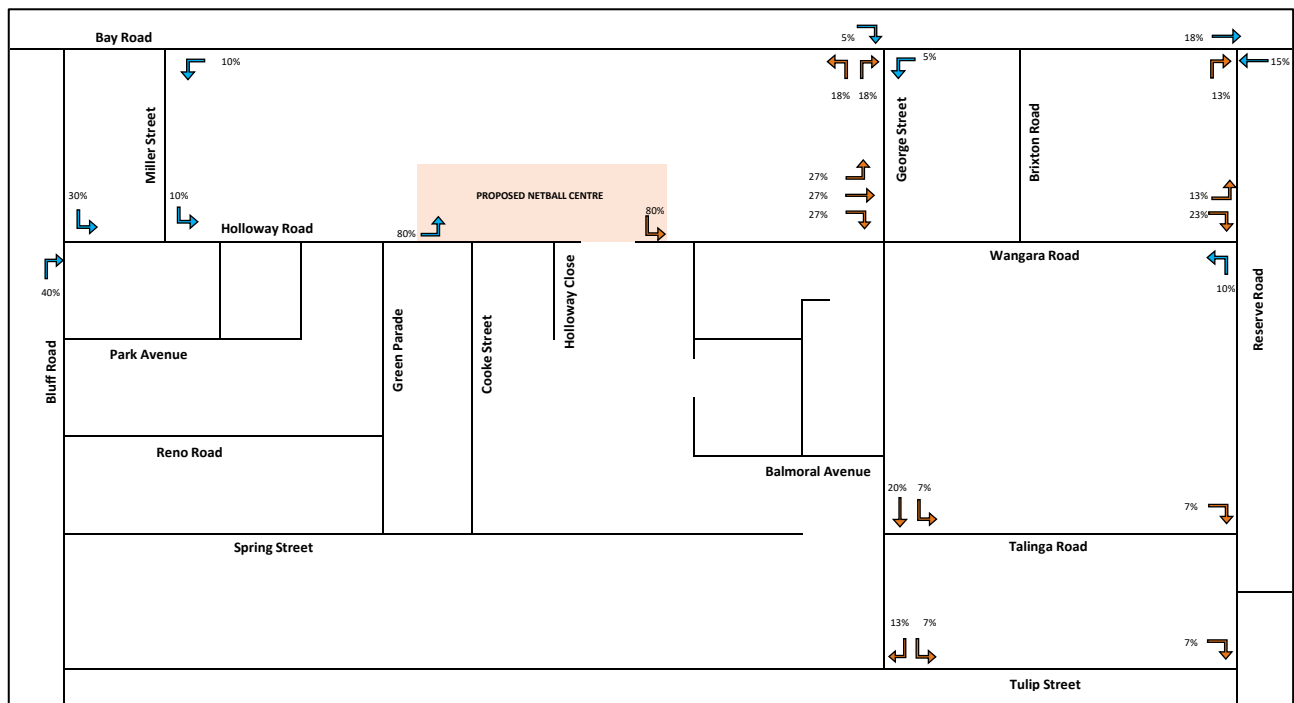


Figure 24: Traffic Distribution Diagram (percentages)

Based on the traffic distribution outlined at Figure 24 and the upper-limit hourly traffic generation of 432-576 movements for Saturday peak and 324-432 for weekday evenings, the following development traffic volumes are provided which form the basis of the peak hour capacity impact analysis.

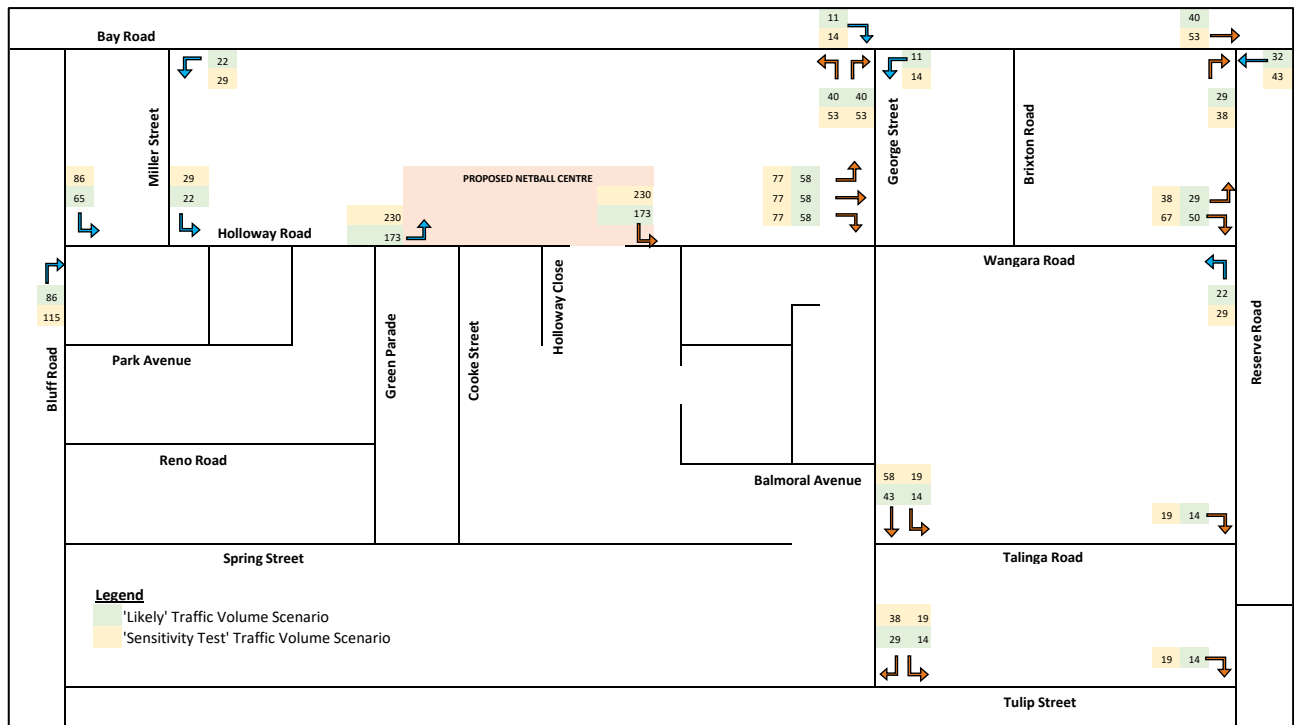


Figure 25: Development Traffic Generation Diagram – Saturday Peak

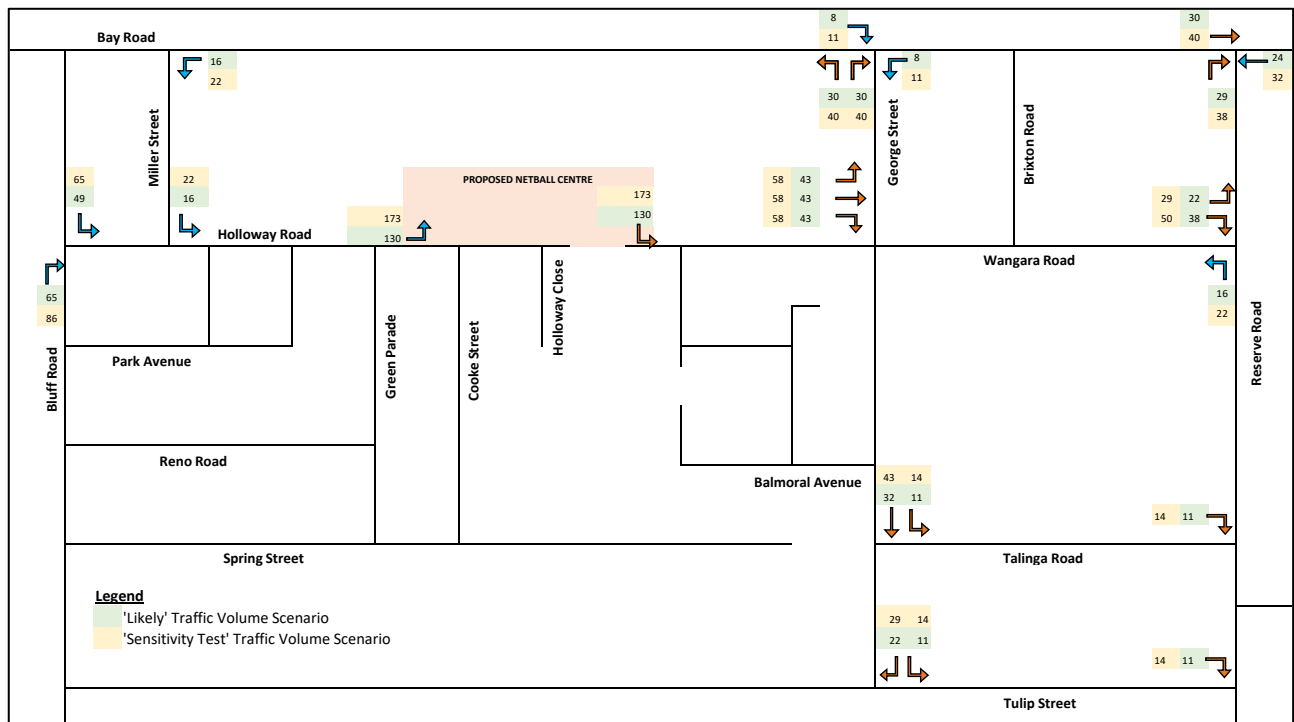


Figure 26: Development Traffic Generation Diagram – Weekday Evenings Peak

These development traffic volumes have superimposed onto the existing traffic volumes in the local area. This 'post development' traffic volume diagrams are provided at Appendix F.



8 Daily Traffic Volumes

The daily traffic volume is used as a measure of amenity for adjacent residents, with the 'environmental capacity' established to set acceptable daily traffic volumes for various road classifications.

The 'environmental capacity' represents a reduced volume compared to the pure traffic capacity and considers factors such as amenity and accessibility for adjacent properties. In the local area, the following environmental capacities apply for the key roads based on Council's road register:

- Holloway Road – 2,000-3,000 vehicles per day
- Wangara Road – 3,000-7,000 vehicle per day

It is noted that whilst Holloway Road is classified as a local road under Council's road register, it has a number of features consistent with a higher environmental capacity including:

- **Land Use:** The majority of the north side of Holloway Road is adjacent to the Secondary School, with residential uses in the remaining sections. The amenity impacts associated with higher traffic volumes are less applicable to non-residential land uses.
- **Traffic Flow:** A typical 'local street' provides for on-street parking on one side of the road, resulting in single lane flow when parking occurs. This situation is one of the key reasons for the application of 3,000 vehicles per day environmental capacity to manage the interaction of vehicles approaching in opposing directions. Whilst Holloway Road has a similar cross-section to typical local streets, the current proposal seeks to introduce 'No Stopping' restrictions on the south side of the road. This allows for simultaneous two-way traffic flow and therefore the ability to cater for additional traffic volumes.

In view of the above, it is appropriate to treat Holloway Road as falling between a local road (up to 3,000vpd) and a collector road (up to 7,000vpd).

In this case, Holloway Road and Wangara Road will experience the highest traffic volumes associated with the proposed netball centre given the location of the vehicle access points to the on-site carpark. All of the remaining roads that serve as vehicle access for the proposed netball centre are fully or partially adjacent to commercial properties and the 'environmental capacity' does not specifically apply.

A summary of the existing daily volume, the daily volume generated by the proposed netball centre and the post development volumes are presented in Table 14 below. The daily volume for Wangara Road has been estimated from the turning movement count data, with the peak hour assumed to represent 10% of the daily volume which is typical for local street environments.

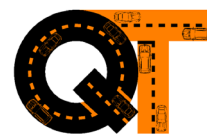


Table 14: Daily Traffic Volume Assessment – 'Likley' Traffic Volume

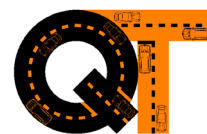
Road	Section	Existing Volume	Development Volume	Post Development Volume
Saturday (Peak Activity) – 8am-6pm/8pm				
Holloway Road	Bluff Road to Miller Street	1297 vpd	1739 vpd	3,036 vpd
	Park Avenue to Green Parade	766 vpd	1739 vpd	2,505 vpd
Wangara Road	Balmoral Avenue to Green Parade	350 vpd	1739 vpd	2,089 vpd
Weekday (Evening Netball Activity) – 4pm-8:30/9:30pm				
Holloway Road	Bluff Road to Miller Street	1,651 vpd	567 vpd	2,218 vpd
	Park Avenue to Green Parade	1,115 vpd	567 vpd	1,682 vpd
Wangara Road	Balmoral Avenue to Green Parade	450 vpd	567 vpd	1,017 vpd

Table 15: Daily Traffic Volume Assessment – 'Sensitivity Test' Traffic Volume

Road	Section	Existing Volume	Development Volume	Post Development Volume
Saturday (Peak Activity) – 8am-6pm/8pm				
Holloway Road	Bluff Road to Miller Street	1297	2318	3,615
	Park Avenue to Green Parade	766	2318	3,084
Wangara Road	Balmoral Avenue to Green Parade	350	2318	2,668
Weekday (Evening Netball Activity) – 4pm-8:30/9:30pm				
Holloway Road	Bluff Road to Miller Street	1651	756	2,407
	Park Avenue to Green Parade	1115	756	1,871
Wangara Road	Balmoral Avenue to Green Parade	450	756	1,206

In view of the above, the expected post development volumes (including the contribution from the Netball Centre) are generally within the nominal 'environmental capacity' thresholds for Holloway Road and Wangara Road.

The volume at the eastern end of Holloway Road is above the 3,000vpd local street capacity. However, as discussed previously, Holloway Road has a number of features that result in the environmental capacity falling between a local road (3,000vpd) and a collector road (7,000vpd).



To manage the additional traffic volumes on Holloway Road, Council could consider the installation of additional road humps. This would reduce traffic speeds and improve the overall safety of Holloway Road.

9 Intersection Analysis

The following sections assess the capacity impacts at the key intersections in the vicinity of the subject site. The assessment reviews the existing traffic volumes and operational characteristics compared to what is anticipated to be generated by the proposed Netball Centre.

It needs to be considered what impacts the proposed development(s) have on key intersections compared to existing conditions and if there are any mitigating measures that would be required as a direct result of the proposed development.

9.1 SIDRA Modelling

Sidra Intersection traffic modelling software has been used to model the performance of the following intersections:

- Bluff Road / Holloway Road (unsignalised)
- Wangara Road / George Street (unsignalised)
- Bay Road / George Street (unsignalised)
- Wangara Road / Reserve Road (unsignalised)
- Bay Road / Reserve Road (traffic signals)

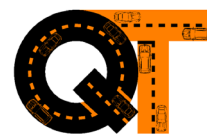
The capacity analysis software allows estimations of key operating parameters including (but are not limited to) the following:

- **Average Delay** – in seconds for vehicles on a particular movement
- **Queue length (95th percentile)** – where 1 vehicle equates to 7m
- **Level of Service (LOS)** – Rating of intersection operation based on delay
- **Degree of Saturation** – A ratio of demand/capacity

The following table outlines the generally accepted Degree of Saturation and Level of Service thresholds for intersection analysis.

Table 16: Degree of Saturation/Level of Service Measures

Level of Service		Intersection Degree of Saturation	
		Unsignalised	Signalised
A	Excellent	≤ 0.6	≤ 0.6
B	Very Good	0.6-0.7	0.6-0.7
C	Good	0.7-0.8	0.7-0.9
D	Acceptable	0.8-0.9	0.9-0.95
E	Poor	0.9-1.0	0.95-1.0
F	Very Poor	≥ 1.0	≥ 1.0



9.2 Capacity Analysis - 'Likely' Volumes

The following provides a summary of the SIDRA results comparing the existing conditions and the ultimate conditions with the Bayside Netball Centre operating ('likely' traffic generation).

We have assessed the following key time periods:

- **Saturday Peak** – when the proposed netball centre is expected to generate peak volumes, but traffic volumes on the surrounding road network are lower than the peak.
- **Weekday PM Peak** – when the proposed netball centre is expected to generate lower volumes, but the surrounding road network is experiencing peak volumes.

A summary of the SIDRA results for the two peak periods are presented in Table 17 and Table 18 below.

Table 17: Saturday Peak including Existing & Netball Centre Attributed Demands

Intersection	Leg	Delay		Queue Length		DoS	
		Existing	Netball	Existing	Netball	Existing	Netball
Bay Road/ George Street	Bay Rd (E)	0 sec	1 sec	0 veh	0 veh	0.26	0.26
	Bay Rd (W)	3 sec	3 sec	1 veh	3 veh	0.37	0.38
	George St (S)	15 sec	23 sec	3 veh	2 veh	0.23	0.58
George Street/ Wangara Road	George St (S)	1 sec	1 sec	0 veh	0 veh	0.08	0.08
	Wangara Rd (E)	7 sec	7 sec	0 veh	0 veh	0.10	0.11
	George St (N)	1 sec	1 sec	0 veh	0 veh	0.08	0.08
	Wangara Rd (W)	6 sec	7 sec	0 veh	1 veh	0.02	0.21
Wangara Road/ Reserve Road	Reserve Rd (S)	1 sec	1 sec	0 veh	0 veh	0.42	0.43
	Reserve Rd (N)	3 sec	3 sec	2 veh	2 veh	0.43	0.44
	Wangara Rd (W)	15 sec	19 sec	1 veh	2 veh	0.23	0.50
Bay Road/ Reserve Road	Reserve Rd (S)	49 sec	50 sec	31 veh	33 veh	0.95	0.95
	Bay Rd (E)	69 sec	55 sec	37 veh	34 veh	0.97	0.94
	Bay Rd (W)	30 sec	50 sec	33 veh	51 veh	0.83	0.94
Bluff Road / Holloway Road	Bluff Rd (S)	1 sec	3 sec	0 veh	1 veh	0.20	0.29
	Holloway Rd (E)	20 sec	25 sec	0 veh	1 veh	0.26	0.33
	Bluff Rd (N)	0 sec	1 sec	4 veh	4 veh	0.14	0.16

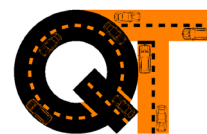


Table 18: Weekday PM including Existing & Netball Centre Attributed Demands

Intersection	Leg	Delay		Queue Length		DoS	
		Existing	Netball	Existing	Netball	Existing	Netball
Bay Road/ George Street	Bay Rd (E)	0 sec	1 sec	0 veh	0 veh	0.30	0.30
	Bay Rd (W)	3 sec	3 sec	3 veh	3 veh	0.36	0.37
	George St (S)	15 sec	20 sec	1 veh	2 veh	0.29	0.42
George Street/ Wangara Road	George St (S)	1 sec	1 sec	0 veh	0 veh	0.09	0.09
	Wangara Rd (E)	7 sec	7 sec	0 veh	0 veh	0.09	0.09
	George St (N)	1 sec	1 sec	0 veh	0 veh	0.09	0.09
	Wangara Rd (W)	6 sec	7 sec	0 veh	1 veh	0.02	0.16
Wangara Road/ Reserve Road	Reserve Rd (S)	1 sec	1 sec	0 veh	0 veh	0.31	0.32
	Reserve Rd (N)	1 sec	1 sec	1 veh	1 veh	0.50	0.51
	Wangara Rd (W)	16 sec	21 sec	1 veh	2 veh	0.36	0.59
Bay Road/ Reserve Road	Reserve Rd (S)	42 sec	74 sec	24 veh	37 veh	0.89	1.01
	Bay Rd (E)	45 sec	92 sec	39 veh	56 veh	0.91	1.02
	Bay Rd (W)	41 sec	26 sec	25 veh	25 veh	1.06	0.85
Bluff Road / Holloway Road	Bluff Rd (S)	1 sec	3 sec	0 veh	1 veh	0.25	0.33
	Holloway Rd (E)	31 sec	40 sec	1 veh	1 veh	0.45	0.55
	Bluff Rd (N)	0 sec	1 sec	4 veh	4 veh	0.16	0.17

Based on the above, the changes are minimal associated with the inclusion of the Bayside Netball Centre into this local area.

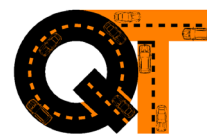
It is noted that the existing intersections, particularly the Bay Road/Reserve Road intersection services a large vehicle volume during peak periods.

The signalised intersection in particular, is already operating at 'poor' to 'very poor' conditions and will continue to do so regardless of the Netball Centre being approved/refused. It is noted that the additional volumes associated with the netball centre only account for a small number of all the movements through the intersection.

This intersection should be reviewed by VicRoads to determine any changes that may be necessary to this intersection. This includes but is not limited to the following:

- Revised cycle and phase times based on most recent traffic volume data.
- Potential physical changes to the intersection including dedicated right-turn lanes, left turn slip lanes etc.
- Turn bans or two right-turn lanes from Reserve Road into Bay Road.

The other critical intersection is Bluff Road / Holloway Road, which is expected to cater for the majority of the 'entry' movements towards the proposed netball centre. The SIDRA modelling for this intersection has been undertaken as a 'network' with the existing pedestrian operated signals on Bluff Road, to accurately model the interaction with the Holloway Road intersection. The results indicated that the critical right turn movement into Holloway Road from the south will generally be clear of the pedestrian signals.



Overall, the netball centre is located in an inner suburban location where people accessing the site can choose a range of travel paths for both arrival and departures.

9.3 Capacity Analysis - 'Sensitivity Test' Volumes

We have undertaken additional SIDRA analysis utilising the 'sensitivity test' traffic volumes, to understand the potential implications in the 'worst case' traffic volume scenario.

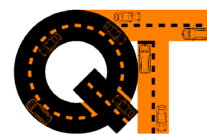
A summary of the SIDRA results utilising the 'sensitivity test' traffic volumes is presented in Table 19 and Table 20 below.

Table 19: SIDRA Capacity Summary Saturday Peak – 'Sensitivity Test' Analysis

Intersection	Leg	Delay	Queue Length	DoS
Bay Road/ George Street	Bay Rd (E)	1 sec	0 veh	0.26
	Bay Rd (W)	3 sec	3 veh	0.39
	George St (S)	27 sec	3 veh	0.71
George Street/ Wangara Road	George St (S)	1 sec	0 veh	0.08
	Wangara Rd (E)	7 sec	0 veh	0.11
	George St (S)	1 sec	0 veh	0.08
	Wangara Rd (W)	7 sec	1 veh	0.27
Wangara Road/ Reserve Road	Reserve Rd (S)	1 sec	0 veh	0.43
	Reserve Rd (N)	3 sec	2 veh	0.44
	Wangara Rd (W)	21 sec	2 veh	0.59
Bay Road/ Reserve Road	Reserve Rd (S)	55 sec	35 veh	0.97
	Bay Rd (E)	59 sec	35 veh	0.95
	Bay Rd (W)	53 sec	53 veh	0.95
Bluff Road / Holloway Road	Bluff Rd (S)	3 sec	1 veh	0.33
	Holloway Rd (E)	27 sec	1 veh	0.36
	Bluff Rd (N)	1 sec	4 veh	0.16

Table 20: SIDRA Capacity Summary Weekday PM Peak – 'Sensitivity Test' Analysis

Intersection	Leg	Delay	Queue Length	DoS
Bay Road/ George Street	Bay Rd (E)	1 sec	0 veh	0.31
	Bay Rd (W)	4 sec	3 veh	0.38
	George St (S)	22 sec	2 veh	0.52
George Street/ Wangara Road	George St (S)	1 sec	0 veh	0.09
	Wangara Rd (E)	7 sec	0 veh	0.10
	George St (S)	1 sec	0 veh	0.09
	Wangara Rd (W)	7 sec	1 veh	0.21
Wangara Road/ Reserve Road	Reserve Rd (S)	1 sec	0 veh	0.32
	Reserve Rd (N)	1 sec	1 veh	0.51
	Wangara Rd (W)	23 sec	3 veh	0.66



Intersection	Leg	Delay	Queue Length	DoS
Bay Road/ Reserve Road	Reserve Rd (S)	82 sec	40 veh	1.03
	Bay Rd (E)	96 sec	58 veh	1.03
	Bay Rd (W)	26 sec	25 veh	0.85
Bluff Road / Holloway Road	Bluff Rd (S)	3 sec	1 veh	0.36
	Holloway Rd (E)	43 sec	1 veh	0.58
	Bluff Rd (N)	1 sec	4 veh	0.18

In view of the above, the 'sensitivity test' SIDRA results are generally similar to the 'likley' traffic volume results. There are no differences in the recommendations regarding intersection capacity discussed previously in Section 9.2 above.

10 Service Vehicles

10.1 Busses

It is anticipated that busses will be utilised by groups in accessing the site for certain organised competitions.

This will primarily be for school groups/interschool sports competitions.

The recommended on-site carpark includes a pick-up / drop-off area that can service bus movements.

Bus storage will occur off-site. The best location for this is along the west side of George Street adjacent to the driving range site given the wide nature of the road.

No stopping restrictions are proposed opposite the site access and egress and generally along the south side of Holloway Road to ensure exiting busses can exit to the east, as desired.

Accordingly, we are satisfied that this size bus can be accommodated on-site.

10.2 Waste Collection

The current concept plan does not show a specific waste storage area or proposed waste collection area.

We expect waste collection will occur on-site utilising standard waste collection vehicles, outside of the typical operating times for the netball centre.

On this basis, the waste vehicle will be able to utilise the empty parking spaces to facilitate waste loading.

A Waste Management Plan (WMP) should be prepared to formalise this arrangement and nominate specific waste storage and loading areas.

10.3 Emergency Service Vehicles

The proposed car parking layout can accommodate MFB, ambulance and police vehicles as required (given they are all smaller than the bus design vehicle).



Overall, we are satisfied that the carpark can accommodate emergency service vehicles, when required.

10.4 Loading

Given the carpark will be designed to cater for buses (14.5m), we are satisfied that loading vehicles will be able to enter/exit the site in a forwards direction.

Overall, we are satisfied that any loading activities associated with the proposed development will be met on-site and all delivery vehicles will be able to enter and exit the site in a forward direction.



11 Conclusions

Having visited the site, undertaken a car parking inventory and undertaken a detailed traffic engineering assessment the following conclusions are reached in relation to the proposed 12 court Bayside Netball Centre development (11 Holloway Road, Sandringham):

Car Parking Provision

1. The proposed netball centre is located on state government secondary school land and therefore the requirements of the Bayside Planning Scheme do not apply. In any event, the proposed use is innominate under Clause 52.06-5 of the Planning Scheme and accordingly, car parking would need to be provided to the satisfaction of the Responsible Authority.
2. On-site parking for the netball centre should be maximised and it is recommended that the on-site carpark is expanded to provide for approximately 114 car parking spaces.
3. The scheduling of netball matches should include a 'stagger' between match commencement times to reduce peak car parking demands as follows (based on 45 minute session times):
 - a. 4 Netball courts to start at commencement of session.
 - b. 4 Netball courts to start 15 mins after commencement of session.
 - c. 4 Netball courts to start 30 mins after commencement of session.
4. The peak parking demands expected with the inclusion of the above stagger times are as follows:
 - a. Saturday/Sunday (Competition):
 - i. 'Likely' Parking Demand - 216 spaces
 - ii. 'Sensitivity Test' Parking Demand – 245-288 Spaces
 - b. Weekday evening (Competition / Training):
 - i. 'Likely' Parking Demand - 162 spaces
 - ii. 'Sensitivity Test' Parking Demand – 184-216 Spaces
5. Based on the provision of 114 spaces on-site, an overflow parking demand of 48-102 spaces on weekday evenings and 102-174 spaces on Saturdays/Sundays is expected in the surrounding public parking resources.
6. To limit the impact to the adjacent residential area, it is recommended that netball centre parking demands are accommodated on 'suitable' non-residential frontages on Wangara Road, George Street and the existing carpark at the Golf Driving Range.
7. These public parking spaces have a capacity of 151 spaces, with existing availability of 107-144 spaces. On this basis, there is sufficient capacity within the 'suitable' parking spaces to accommodate the 'likely' and weeknight 'sensitivity test' overflow demands associated with the netball centre.
8. However, the weekend 'sensitivity test' scenario would result in parking extending further into Wangara Road, George Street, Brixton Street and potentially Talinga Road. This would result in long walking distances for netball patrons. It is recommended that Council monitor the extent of overflow parking and if parking extends as predicted for the 'sensitivity test' scenario, consider the provision of additional parking on the former golf driving range site (closer proximity to the netball centre).



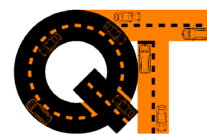
9. To ensure vehicles associated with the netball centre utilise the 'suitable' parking spaces it is recommended that the following parking restrictions are installed in the local residential areas:
 - a. 'Permit Zone 4pm-9pm Mon-Fri, 8am-6pm Sat-Sun' one side
 - b. '1P 4pm-9pm Mon-Fri, 8am-6pm Sat-Sun' other side
 - c. Existing restrictions outside of these times would be retained
10. Council should monitor on-street parking demands in the area following the opening of the Netball Centre as consider the following amendments if required:
 - a. Potential inclusion of additional Permit Zone parking restrictions if parking availability is an issue within the residential streets.
 - b. Potential modifications of the days/times that the restrictions apply.
11. 'No Stopping' restrictions are recommended along the south side of Holloway Road to maintain two-way traffic flow and allow bus access. Additional 'No Stopping' restrictions are recommended on the south side of Wangara Road opposite the on-site carpark access to facilitate bus egress.

Car Parking Design

12. A concept plan has been prepared for a recommended on-site carparking arrangement catering for 114 spaces as follows:
 - a. One-way configuration (eastbound) with entry via Holloway Road and exit via Wangara Road.
 - b. An access control gate is included on the carpark access points to prevent access outside of the operating hours of the netball centre. It is recommended that Council monitor traffic volumes post development and if 'through' traffic utilising the carpark from Holloway Road to Wangara Road is identified, consider additional traffic management in the carpark and/or on Holloway Road / Wangara Road.
 - c. The entry via Holloway Road designed as left in only to encourage access via Bluff Road and Holloway Road.
 - d. 60 degree parking on both sides of the aisle to reinforce the one-way restriction.
 - e. A shared bus / patron pick-up / drop-off zone in a parallel arrangement adjacent to the site entry.
 - f. Traffic management in the form of road humps at regular intervals.
 - g. A footpath along the northern boundary of the carpark connecting the Holloway Road / Wangara Road footpath with the proposed centre entry.
13. A total of 3 accessible car spaces are provided for the development as required by the NCC (BCA).
14. A signage and linemarking plan should be prepared to formalise the carpark design.

Bicycle Parking

15. Whilst the proposal is not subject to the requirements of the Bayside Planning Scheme, Clause 52.34 has been utilised as a guide for the provision of bicycle parking.
16. The proposed netball centre is expected to generate a total demand for 36 bicycle parking spaces including 28 visitor spaces and 8 staff spaces.
17. It is recommended that visitor spaces are provided via rails in the vicinity of the centre entry and staff spaces are provided internally within a service area for the proposed stadium.



Pedestrian Accessibility

18. A portion of patrons will park within the public parking resources in the surrounding road network and walk to the proposed netball centre.
19. This results in pedestrian demands, particularly towards the east of the centre crossing George Street and Wangara Road.
20. During peak Saturday activity, pedestrian movements between 56-264 pedestrians per hour are estimated on the north, south and west legs of the George Street / Wangara Road intersection.
21. These estimated pedestrian movements in combination with the traffic volumes meet the warrants for the provision of zebra crossings (without flashing lights).
22. On this basis, the following pedestrian upgrades are recommended:
 - a. Raised zebra crossing with kerb extensions on the west Wangara Road leg.
 - b. Raised zebra crossings without kerb extensions on the north and south George Street legs.
 - c. Reduction of the speed zoning along George Street from 60km/h to 50km/h
 - d. Road humps (speed cushions to accommodate truck movements) on the north and south approaches of George Street to further reinforce a slow speed environment in the vicinity of the crossings.

Traffic Impacts

23. The use is assessed as generating peak hour traffic volumes as follows:
 - a. Saturday/Sunday (Competition):
 - i. 'Likely' Peak Hour Traffic Volume – 432 vehicles per hour
 - ii. 'Sensitivity Test' Peak Hour Traffic Volume – 576 vehicles per hour
 - b. Weekday PM Peak (Competition / Training):
 - i. 'Likely' Peak Hour Traffic Volume – 324 vehicles per hour
 - ii. 'Sensitivity Test' Peak Hour Traffic Volume – 432 vehicles per hour
24. The distribution of traffic to/from the proposed netball courts will occur with 80% entry movements via Holloway Road and exit movements via Wangara Road due to the proposed one-way arrangement within the on-site carpark. The remaining 20% of traffic volumes will directly access the on-street parking via George Street and Wangara Road.
25. An assessment of daily traffic volumes has identified the following:
 - a. Whilst Holloway Road is classified as a local road, its land use and traffic flow arrangements are best classified between a local road (up to 3,000vpd) and a collector road (up to 7,000vpd).
 - b. Analysis of the of likely daily volumes associated with the proposed weekday operating hour (4pm-8:30/9:30pm) and weekend operating hours (8am-6pm/8pm) indicate the following daily traffic volumes:

Holloway Road:

 - i. Saturday – 2,505-3,615vpd
 - ii. Weekday – 1,682-2,407vpd

Wangara Road:

 - i. Saturday – 2,089-2,668vpd
 - ii. Weekday – 1,017-1,206vpd
 - c. These daily volumes generally fall within the adopted environmental capacities for the surrounding road network.



26. The level of traffic generated based on the distribution assessment can be accommodated by the surrounding road network. However it is recommended that Council could consider the installation of additional road humps on Holloway Road. This would reduce traffic speeds and improve the overall safety of Holloway Road.
27. The SIDRA intersection analysis confirms that the anticipated traffic generated by this Netball facility can be accommodated by the surrounding road network, without significant changes from current delays incurred and vehicle queue lengths that occur.
28. The intersection of Bay Road / Reserve Road operates over capacity in the existing conditions, with existing deficiencies. The traffic volumes generated by the netball centre through this intersection are relatively minor. It is recommended that Council liaise with VicRoads (DOT) to:
 - a. Review cycle and phase times based on most recent traffic volume data.
 - b. Potential physical changes to the intersection including dedicated right-turn lanes, left turn slip lanes etc.
 - c. Turn bans or two right-turn lanes from Reserve Road into Bay Road.

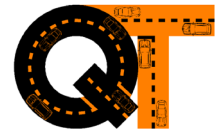
Service Vehicle Access

29. The layout of the carpark has been designed to accommodate busses up to 14.5m long.
30. Emergency service vehicles can manoeuvre through the site, as required, given that they are smaller than the bus design vehicle.
31. Waste collection can occur on-site for vehicles up to 12.5m (HRV) in length which is satisfactory from a traffic engineering perspective. A WMP should be prepared to formalise waste collection arrangements.
32. All loading activities will be accommodated on-site.

Summary

Having undertaken all tasks necessary to adequately assess the traffic engineering impacts of the 12 Proposed Netball Courts at Bayside Netball Centre, we are satisfied that the proposed development is satisfactory.

There are no reasons why the proposed development should not proceed, subject to the recommendations in this report.



Appendix A

Automatic Traffic Counts

TRAFFIC COUNT SUMMARY



Holloway Road, Sandringham

At: #2

Between

Bluff Road & Miller Street

CUSTOMER: Bayside City Council
TYPE COUNT: 7 days, Speed Vol Class
DATE START: 15/03/17
TIME START: 0000
DIRECTION-1: Eastbound
COUNTER NO:
CLASSES: 1 - 12

MAP REF: 77 A11
ACTUAL DURATION: 15 days
DATE FINISH: 21/03/17
TIME FINISH: 2300
DIRECTION-2: Westbound
SPEED LIMIT: 50
SPEEDS: All

ALL VEHICLES	Eastbound	Westbound	COMBINED
24 Hour Week Day Average	660	991	1651
24 Hour 7 Day Average	611	915	1526
A.M. Peak Hour Volume	164	176	340
A.M. Peak Hour	0800-0859	0800-0859	0800-0859
P.M. Peak Hour Volume	87	143	228
P.M. Hour	1800-1859	1500-1559	1500-1559

COMMERCIAL VEHICLE	Eastbound	Westbound	COMBINED
Total Volume	110	133	243
%	2.9%	2.4%	2.6%

SPEEDS	Eastbound	Westbound	COMBINED
	% Vol.	% Vol.	% Vol.
>119km/h	0.0	0.0	0.0
>109km/h	0.0	0.0	0.0
>99km/h	0.0	0.0	0.0
>89km/h	0.0	0.0	0.0
>79km/h	0.0	0.0	0.0
>69km/h	0.0	0.0	0.0
>59km/h	0.2	0.0	0.1
>49km/h	3.1	1.7	2.3
>39km/h	38.8	32.8	35.2
>29km/h	85.9	85.1	85.4
>19km/h	97.1	97.7	97.5
85%ile	43.9	42.7	43.2
Mean	37.0	36.2	36.6

Notes

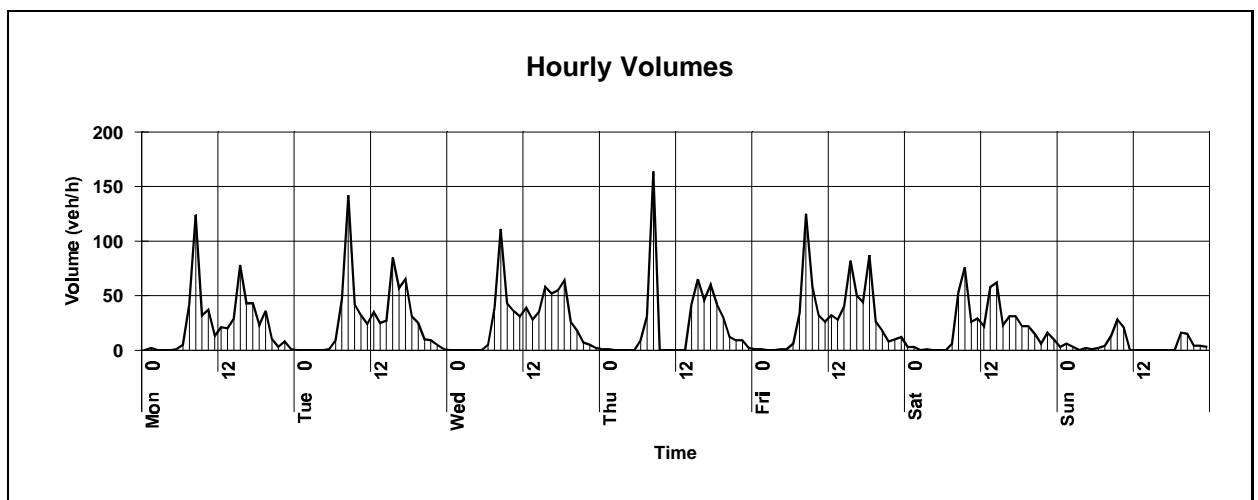
Traffix Survey Traffic Count Traffic Volume Analysis



Site No: 3861037
Site location: Holloway Road, Sandringham
Between : Bluff Road & Miller Street
Direction : Eastbound
Time range: 0000 15/03/17 to 2300 21/03/17
Filters: Class: 1-12, Speeds: All

Date	20/03/17	21/03/17	15/03/17	16/03/17*	17/03/17	18/03/17	19/03/17*	AVERAGES	
	Mon	Tue	Wed	Thu	Fri	Sat	Sun	WEEKDAY	ALL DAYS
Period									
0000-0059	0	0	0	1	1	3	3	0	1
0100-0159	2	0	0	1	1	3	6	1	2
0200-0259	0	0	0	0	0	0	3	0	0
0300-0359	0	0	0	0	0	1	0	0	0
0400-0459	0	0	0	0	1	0	2	0	0
0500-0559	1	1	0	0	1	0	1	1	1
0600-0659	5	9	5	9	6	0	2	7	5
0700-0759	42	47	39	31	34	6	4	39	29
0800-0859	124	142	111	164	125	53	13	133	105
0900-0959	32	42	43	.	58	76	28	44	47
1000-1059	37	32	36	.	32	26	21	34	31
1100-1159	13	24	31	.	26	29	.	24	25
1200-1259	21	35	39	.	32	22	.	32	30
1300-1359	20	25	28	.	28	58	.	25	32
1400-1459	29	27	35	42	40	62	.	35	39
1500-1559	78	85	58	65	82	23	.	74	65
1600-1659	43	57	52	46	50	31	.	50	47
1700-1759	43	65	55	60	44	31	.	53	50
1800-1859	23	31	64	42	87	22	.	49	45
1900-1959	36	25	26	30	26	22	16	29	26
2000-2059	10	10	18	12	18	15	15	14	14
2100-2159	3	9	7	9	8	6	4	7	7
2200-2259	8	5	5	9	10	16	4	7	8
2300-2359	1	1	2	2	12	10	3	4	4
TOTALS									
12Hr 7-19	505	612	591	450	638	439	66	591	542
24Hr 0-24	571	672	654	523	722	515	125	660	611
24/12 Fact	1.13	1.10	1.11	1.16	1.13	1.17	1.89	1.12	1.13
AM HR	0800-0859	0800-0859	0800-0859	0800-0859	0800-0859	0900-0959	0900-0959		
PEAK	124	142	111	164	125	76	28		
PM HR	1500-1559	1500-1559	1800-1859	1500-1559	1800-1859	1400-1459	1900-1959		
PEAK	78	85	64	65	87	62	16		

. Data not included in Summary Averages



Traffix Survey Traffic Count

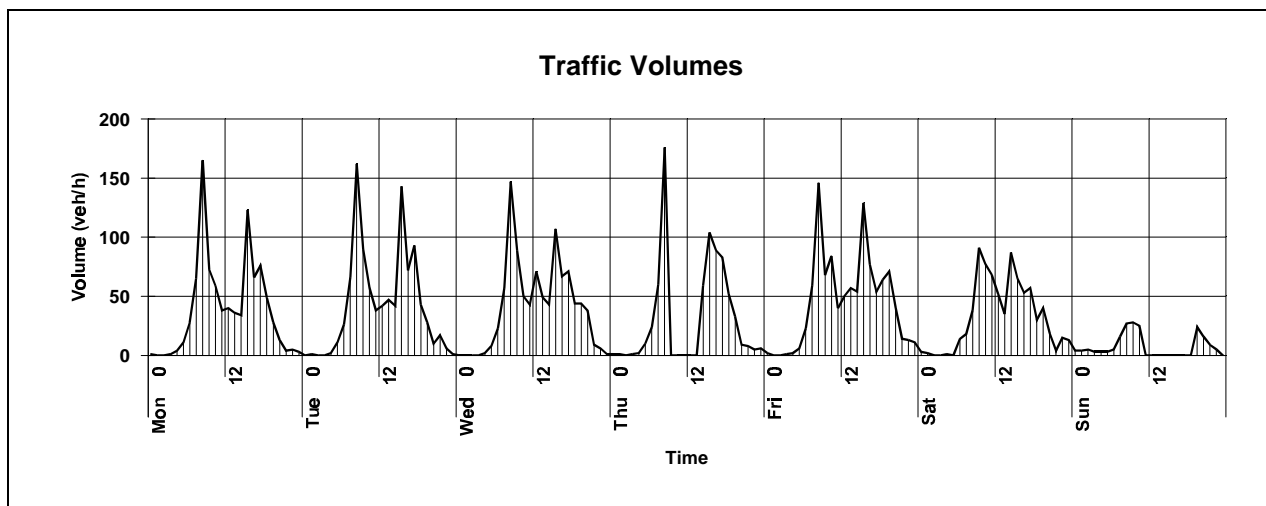
Traffic Volume Analysis



Site No: 3861037
Site location: Holloway Road, Sandringham
Between : Bluff Road & Miller Street
Direction : Westbound
Time range: 0000 15/03/17 to 2300 21/03/17
Filters: Class: 1-12, Speeds: All

Date	20/03/17	21/03/17	15/03/17	16/03/17*	17/03/17	18/03/17	19/03/17*	AVERAGES	
	Mon	Tue	Wed	Thu	Fri	Sat	Sun	WEEKDAY	ALL DAYS
Period									
0000-0059	1	0	0	1	2	3	4	1	2
0100-0159	0	1	0	1	0	2	4	0	1
0200-0259	0	0	0	0	0	0	5	0	1
0300-0359	1	0	0	1	1	0	3	1	1
0400-0459	4	2	2	2	2	1	3	2	2
0500-0559	11	11	8	10	6	0	3	9	7
0600-0659	28	26	23	24	23	14	5	25	20
0700-0759	65	66	57	60	59	18	16	61	49
0800-0859	165	162	147	176	146	38	27	159	123
0900-0959	73	90	89	.	68	91	28	80	73
1000-1059	59	57	50	.	84	77	25	63	59
1100-1159	38	38	43	.	40	68	.	40	45
1200-1259	40	42	71	.	50	52	.	51	51
1300-1359	36	47	49	.	57	35	.	47	45
1400-1459	34	42	43	59	54	87	.	46	53
1500-1559	123	143	107	104	129	65	.	121	112
1600-1659	66	72	67	89	77	53	.	74	71
1700-1759	76	93	71	83	54	57	.	75	72
1800-1859	49	43	44	52	64	30	.	50	47
1900-1959	28	28	44	33	71	40	24	41	38
2000-2059	13	10	38	9	40	19	16	22	21
2100-2159	4	17	9	8	14	4	9	10	9
2200-2259	5	6	6	5	13	15	5	7	8
2300-2359	3	1	1	6	11	13	0	4	5
TOTALS									
12Hr 7-19	824	895	838	623	882	671	96	868	800
24Hr 0-24	922	997	969	723	1065	782	177	991	915
24/12 Fact	1.12	1.11	1.16	1.16	1.21	1.17	1.84	1.14	1.14
AM HR	0800-0859	0800-0859	0800-0859	0800-0859	0800-0859	0900-0959	0900-0959		
PEAK	165	162	147	176	146	91	28		
PM HR	1500-1559	1500-1559	1500-1559	1500-1559	1500-1559	1400-1459	1900-1959		
PEAK	123	143	107	104	129	87	24		

. Data not included in Summary Averages



Traffix Survey Traffic Count

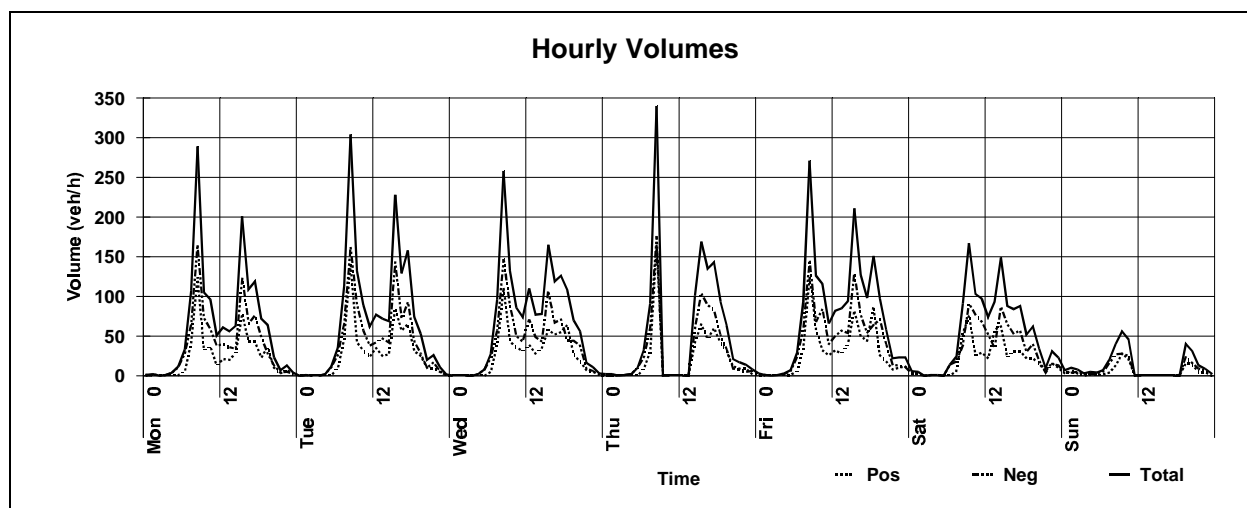
Traffic Volume Analysis



Site No: 3861037
Site location: Holloway Road, Sandringham
Between : Bluff Road & Miller Street
Direction : Eastbound & Westbound
Time range: 0000 15/03/17 to 2300 21/03/17
Filters: Class: 1-12, Speeds: All

Date	20/03/17	21/03/17	15/03/17	16/03/17*	17/03/17	18/03/17	19/03/17*	AVERAGES	
	Mon	Tue	Wed	Thu	Fri	Sat	Sun	WEEKDAY	ALL DAYS
Period									
0000-0059	1	0	0	2	3	6	7	1	3
0100-0159	2	1	0	2	1	5	10	1	3
0200-0259	0	0	0	0	0	0	8	0	1
0300-0359	1	0	0	1	1	1	3	1	1
0400-0459	4	2	2	2	3	1	5	3	3
0500-0559	12	12	8	10	7	0	4	10	8
0600-0659	33	35	28	33	29	14	7	32	26
0700-0759	107	113	96	91	93	24	20	100	78
0800-0859	289	304	258	340	271	91	40	292	228
0900-0959	105	132	132	.	126	167	56	124	120
1000-1059	96	89	86	.	116	103	46	97	89
1100-1159	51	62	74	.	66	97	.	63	70
1200-1259	61	77	110	.	82	74	.	83	81
1300-1359	56	72	77	.	85	93	.	73	77
1400-1459	63	69	78	101	94	149	.	81	92
1500-1559	201	228	165	169	211	88	.	195	177
1600-1659	109	129	119	135	127	84	.	124	117
1700-1759	119	158	126	143	98	88	.	129	122
1800-1859	72	74	108	94	151	52	.	100	92
1900-1959	64	53	70	63	97	62	40	69	64
2000-2059	23	20	56	21	58	34	31	36	35
2100-2159	7	26	16	17	22	10	13	18	16
2200-2259	13	11	11	14	23	31	9	14	16
2300-2359	4	2	3	8	23	23	3	8	9
TOTALS									
12Hr 7-19	1329	1507	1429	1073	1520	1110	162	1459	1342
24Hr 0-24	1493	1669	1623	1246	1787	1297	302	1651	1526
24/12 Fact	1.12	1.11	1.14	1.16	1.18	1.17	1.86	1.13	1.14
AM HR	0800-0859	0800-0859	0800-0859	0800-0859	0800-0859	0900-0959	0900-0959		
PEAK	289	304	258	340	271	167	56		
PM HR	1500-1559	1500-1559	1500-1559	1500-1559	1500-1559	1400-1459	1900-1959		
PEAK	201	228	165	169	211	149	40		

. Data not included in Summary Averages



TRAFFIC COUNT SUMMARY



Holloway Road, Sandringham

At: #26

Between

Park Avenue & Green Parade

CUSTOMER: Bayside City Council
TYPE COUNT: 7 days, Speed Vol Class
DATE START: 15/03/17
TIME START: 0000
DIRECTION-1: Eastbound
COUNTER NO:
CLASSES: 1 - 12

MAP REF: 77 A11
ACTUAL DURATION: 15 days
DATE FINISH: 21/03/17
TIME FINISH: 2300
DIRECTION-2: Westbound
SPEED LIMIT: 50
SPEEDS: All

ALL VEHICLES	Eastbound	Westbound	COMBINED
24 Hour Week Day Average	598	517	1115
24 Hour 7 Day Average	527	462	988
A.M. Peak Hour Volume	141	80	216
A.M. Peak Hour	0800-0859	0800-0859	0800-0859
P.M. Peak Hour Volume	102	77	179
P.M. Hour	1500-1559	1500-1559	1500-1559

COMMERCIAL VEHICLE	Eastbound	Westbound	COMBINED
Total Volume	97	71	168
%	2.6%	2.2%	2.4%

SPEEDS	Eastbound	Westbound	COMBINED
	% Vol.	% Vol.	% Vol.
>119km/h	0.0	0.0	0.0
>109km/h	0.0	0.0	0.0
>99km/h	0.0	0.0	0.0
>89km/h	0.0	0.0	0.0
>79km/h	0.0	0.0	0.0
>69km/h	0.1	0.0	0.0
>59km/h	0.2	0.1	0.1
>49km/h	3.3	2.3	2.8
>39km/h	30.0	24.3	27.3
>29km/h	71.3	68.0	69.7
>19km/h	91.3	95.2	93.1
85%ile	43.2	41.7	42.5
Mean	34.1	33.4	33.8

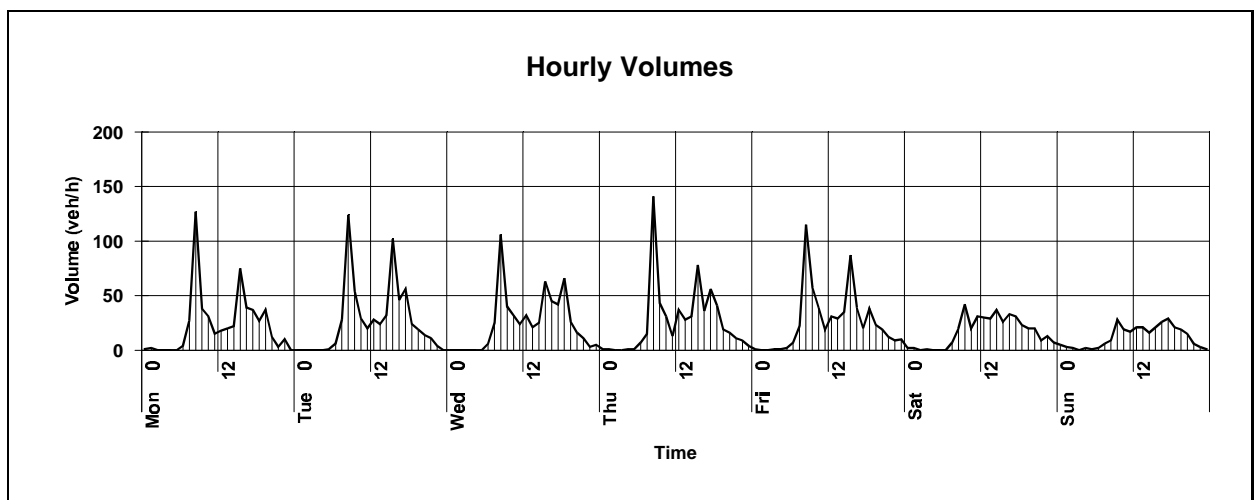
Notes

Traffix Survey Traffic Count Traffic Volume Analysis



Site No: 3861038
Site location: Holloway Road, Sandringham
Between : Park Avenue & Green Parade
Direction : Eastbound
Time range: 0000 15/03/17 to 2300 21/03/17
Filters: Class: 1-12, Speeds: All

Date	20/03/17	21/03/17	15/03/17	16/03/17	17/03/17	18/03/17	19/03/17	AVERAGES	
	Mon	Tue	Wed	Thu	Fri	Sat	Sun	WEEKDAY	ALL DAYS
Period									
0000-0059	1	0	0	1	1	2	5	1	1
0100-0159	2	0	0	1	0	2	3	1	1
0200-0259	0	0	0	0	0	0	2	0	0
0300-0359	0	0	0	0	1	1	0	0	0
0400-0459	0	0	0	1	1	0	2	0	1
0500-0559	0	1	0	1	2	0	1	1	1
0600-0659	4	6	6	7	7	0	2	6	5
0700-0759	27	28	25	15	22	7	6	23	19
0800-0859	127	124	106	141	115	20	9	123	92
0900-0959	38	54	40	43	58	42	28	47	43
1000-1059	31	29	32	31	39	20	19	32	29
1100-1159	15	20	24	13	19	31	17	18	20
1200-1259	18	28	32	37	31	30	21	29	28
1300-1359	20	24	21	28	29	29	21	24	25
1400-1459	22	32	25	31	35	37	16	29	28
1500-1559	75	102	63	78	87	26	21	81	65
1600-1659	39	46	45	36	39	33	26	41	38
1700-1759	37	56	42	56	20	31	29	42	39
1800-1859	27	24	66	41	38	23	21	39	34
1900-1959	37	19	26	19	23	20	19	25	23
2000-2059	12	14	16	16	19	20	15	15	16
2100-2159	3	11	11	11	12	9	6	10	9
2200-2259	10	4	3	9	9	13	3	7	7
2300-2359	0	0	5	4	10	7	1	4	4
TOTALS									
12Hr 7-19	476	567	521	550	532	329	234	529	458
24Hr 0-24	545	622	588	620	617	403	293	598	527
24/12 Fact	1.14	1.10	1.13	1.13	1.16	1.22	1.25	1.13	1.15
AM HR	0800-0859	0800-0859	0800-0859	0800-0859	0800-0859	0900-0959	0900-0959		
PEAK	127	124	106	141	115	42	28		
PM HR	1500-1559	1500-1559	1800-1859	1500-1559	1500-1559	1400-1459	1700-1759		
PEAK	75	102	66	78	87	37	29		



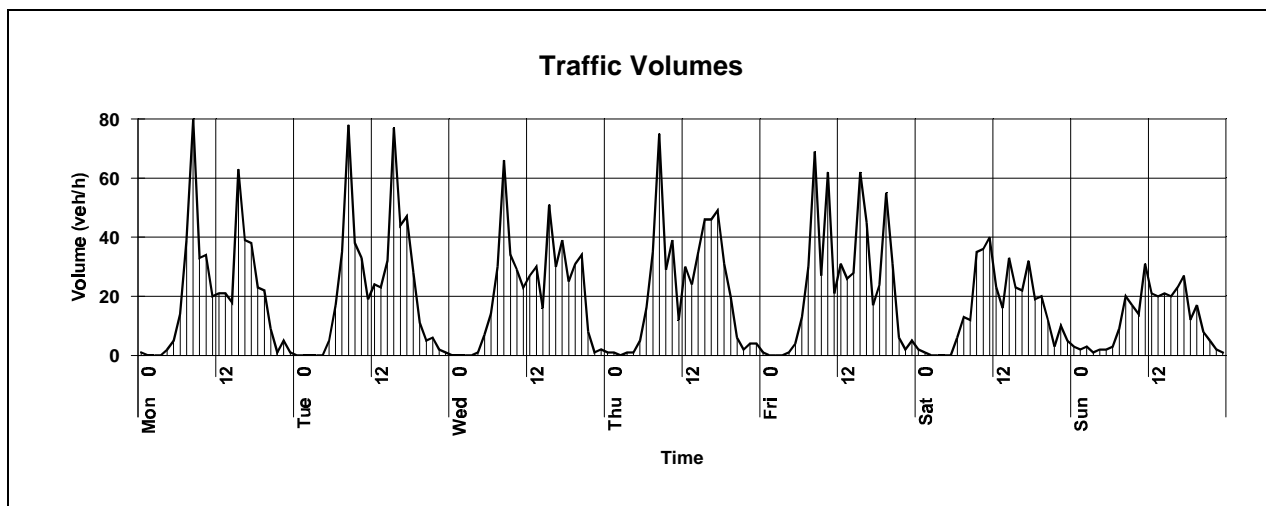
Traffix Survey Traffic Count

Traffic Volume Analysis



Site No: 3861038
Site location: Holloway Road, Sandringham
Between : Park Avenue & Green Parade
Direction : Westbound
Time range: 0000 15/03/17 to 2300 21/03/17
Filters: Class: 1-12, Speeds: All

Date	20/03/17	21/03/17	15/03/17	16/03/17	17/03/17	18/03/17	19/03/17	AVERAGES	
	Mon	Tue	Wed	Thu	Fri	Sat	Sun	WEEKDAY	ALL DAYS
Period									
0000-0059	1	0	0	1	1	2	3	1	1
0100-0159	0	0	0	1	0	1	2	0	1
0200-0259	0	0	0	0	0	0	3	0	0
0300-0359	0	0	0	1	0	0	1	0	0
0400-0459	2	0	1	1	1	0	2	1	1
0500-0559	5	5	7	5	4	0	2	5	4
0600-0659	14	17	14	16	13	6	3	15	12
0700-0759	39	35	30	35	30	13	9	34	27
0800-0859	80	78	66	75	69	12	20	74	57
0900-0959	33	38	34	29	27	35	17	32	30
1000-1059	34	33	29	39	62	36	14	39	35
1100-1159	20	19	23	12	21	40	31	19	24
1200-1259	21	24	27	30	31	23	21	27	25
1300-1359	21	23	30	24	26	16	20	25	23
1400-1459	18	32	16	35	28	33	21	26	26
1500-1559	63	77	51	46	62	23	20	60	49
1600-1659	39	44	30	46	45	22	23	41	36
1700-1759	38	47	39	49	17	32	27	38	36
1800-1859	23	28	25	31	24	19	12	26	23
1900-1959	22	11	31	20	55	20	17	28	25
2000-2059	9	5	34	6	31	12	8	17	15
2100-2159	1	6	8	2	6	3	5	5	4
2200-2259	5	2	1	4	2	10	2	3	4
2300-2359	1	1	2	4	5	5	1	3	3
TOTALS									
12Hr 7-19	429	478	400	451	442	304	235	440	391
24Hr 0-24	489	525	498	512	560	363	284	517	462
24/12 Fact	1.14	1.10	1.25	1.14	1.27	1.19	1.21	1.17	1.18
AM HR	0800-0859	0800-0859	0800-0859	0800-0859	0800-0859	1100-1159	1100-1159		
PEAK	80	78	66	75	69	40	31		
PM HR	1500-1559	1500-1559	1500-1559	1700-1759	1500-1559	1400-1459	1700-1759		
PEAK	63	77	51	49	62	33	27		



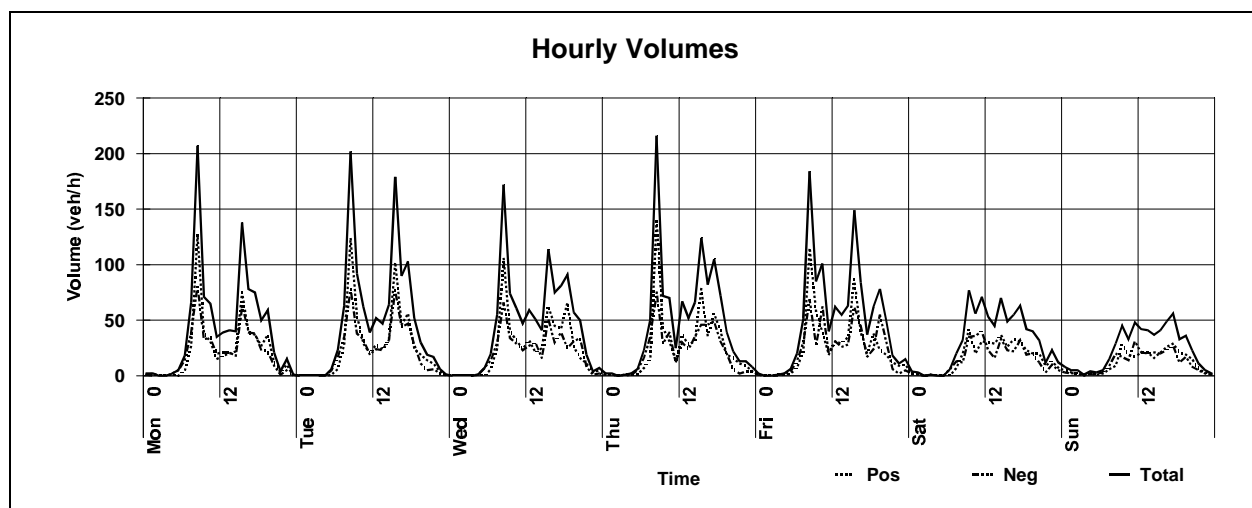
Traffic Survey Traffic Count

Traffic Volume Analysis



Site No: 3861038
Site location: Holloway Road, Sandringham
Between : Park Avenue & Green Parade
Direction : Eastbound & Westbound
Time range: 0000 15/03/17 to 2300 21/03/17
Filters: Class: 1-12, Speeds: All

Date	20/03/17	21/03/17	15/03/17	16/03/17	17/03/17	18/03/17	19/03/17	AVERAGES	
	Mon	Tue	Wed	Thu	Fri	Sat	Sun	WEEKDAY	ALL DAYS
Period									
0000-0059	2	0	0	2	2	4	8	1	3
0100-0159	2	0	0	2	0	3	5	1	2
0200-0259	0	0	0	0	0	0	5	0	1
0300-0359	0	0	0	1	1	1	1	0	1
0400-0459	2	0	1	2	2	0	4	1	2
0500-0559	5	6	7	6	6	0	3	6	5
0600-0659	18	23	20	23	20	6	5	21	16
0700-0759	66	63	55	50	52	20	15	57	46
0800-0859	207	202	172	216	184	32	29	196	149
0900-0959	71	92	74	72	85	77	45	79	74
1000-1059	65	62	61	70	101	56	33	72	64
1100-1159	35	39	47	25	40	71	48	37	44
1200-1259	39	52	59	67	62	53	42	56	53
1300-1359	41	47	51	52	55	45	41	49	47
1400-1459	40	64	41	66	63	70	37	55	54
1500-1559	138	179	114	124	149	49	41	141	113
1600-1659	78	90	75	82	84	55	49	82	73
1700-1759	75	103	81	105	37	63	56	80	74
1800-1859	50	52	91	72	62	42	33	65	57
1900-1959	59	30	57	39	78	40	36	53	48
2000-2059	21	19	50	22	50	32	23	32	31
2100-2159	4	17	19	13	18	12	11	14	13
2200-2259	15	6	4	13	11	23	5	10	11
2300-2359	1	1	7	8	15	12	2	6	7
TOTALS									
12Hr 7-19	905	1045	921	1001	974	633	469	969	850
24Hr 0-24	1034	1147	1086	1132	1177	766	577	1115	988
24/12 Fact	1.14	1.10	1.18	1.13	1.21	1.21	1.23	1.15	1.16
AM HR	0800-0859	0800-0859	0800-0859	0800-0859	0800-0859	0900-0959	1100-1159		
PEAK	207	202	172	216	184	77	48		
PM HR	1500-1559	1500-1559	1500-1559	1500-1559	1500-1559	1400-1459	1700-1759		
PEAK	138	179	114	124	149	70	56		





Appendix B

Turning Movement Counts

Intersection of Bay Rd and Advantage Rd, Cheltenham

GPS -37.954837, 145.029784

Date:	Wed 28/11/18
Weather:	Fine
Suburban:	Cheltenham
Customer:	Quantum Traffic

North:	Advantage Rd
East:	Bay Rd
South:	George St
West:	Bay Rd

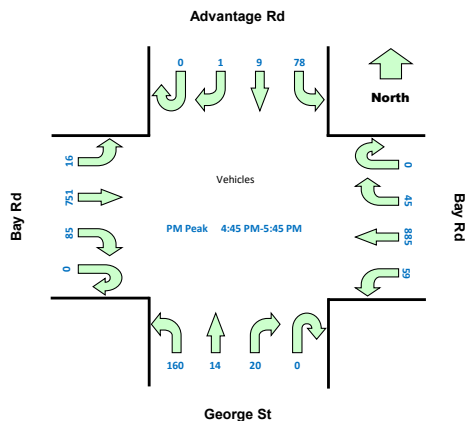
Survey Start	AM:	15:00	PM:	15:00
Vehicular Peakhour				Pedestrians Peakhour
AM:	N/A		AM:	N/A
PM:	4:45 PM-5:45 PM		PM:	N/A

All Vehicles

Time		North Approach Advantage Rd				East Approach Bay Rd				South Approach George St				West Approach Bay Rd				Hourly Total	
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	Hour	Peak
15:00	15:15	0	1	1	19	0	7	194	12	0	10	1	30	0	21	210	1	1895	
15:15	15:30	0	0	3	11	0	4	208	6	0	3	0	22	0	20	175	3	1870	
15:30	15:45	0	2	2	14	0	8	155	13	0	2	2	37	0	21	190	3	1868	
15:45	16:00	0	0	2	14	0	16	161	7	0	8	2	33	0	20	216	5	1859	
16:00	16:15	0	1	1	10	0	11	186	17	0	6	0	40	0	25	182	3	1870	
16:15	16:30	0	0	2	15	0	5	165	8	0	4	2	41	0	33	177	1	1932	
16:30	16:45	0	0	1	10	0	8	166	14	0	3	4	27	0	11	193	3	2027	
16:45	17:00	0	0	2	18	0	10	215	12	0	11	3	26	0	18	179	1	2123	Peak
17:00	17:15	0	1	2	22	0	8	207	18	0	5	6	49	0	26	198	2	2118	
17:15	17:30	0	0	1	22	0	17	219	12	0	3	2	46	0	19	199	8	2024	
17:30	17:45	0	0	4	16	0	10	244	17	0	1	3	39	0	22	175	5	1883	
17:45	18:00	0	0	3	14	0	6	205	21	0	7	1	24	0	14	192	3	1694	
18:00	18:15	0	2	3	11	0	4	204	8		3	4	28	0	16	166	1	1501	
18:15	18:30	0	0	2	15	0	10	147	9	0	6	0	25	0	21	167	5		
18:30	18:45	0	1	4	6	0	4	146	9	0	2	4	30	0	12	129	0		
18:45	19:00	0	1	1	4	0	8	108	12	0	4	2	11	0	11	133	2		

Peak Time		North Approach Advantage Rd				East Approach Bay Rd				South Approach George St				West Approach Bay Rd				Peak total	
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L		
16:45	17:45	0	1	9	78	0	45	885	59	0	20	14	160	0	85	751	16	2123	
17:00	18:00	0	1	10	74	0	41	875	68	0	16	12	158	0	81	764	18	2118	

Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration.



TRANS TRAFFIC SURVEY

TURNING MOVEMENT SURVEY

trafficsurvey.com.au



Intersection of Bay Rd and Advantage Rd, Cheltenham

GPS -37.954837, 145.029784

Date:	Sat 01/12/18
Weather:	Fine
Suburban:	Cheltenham
Customer:	Quantum Traffic

North:	Advantage Rd
East:	Bay Rd
South:	George St
West:	Bay Rd

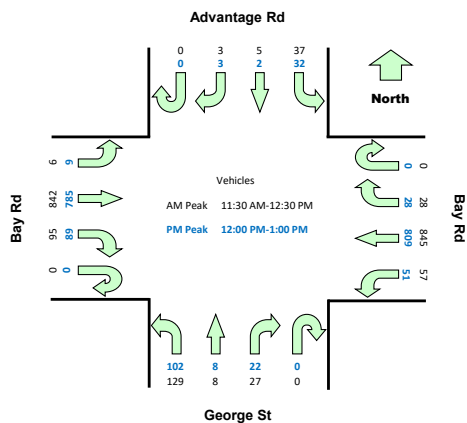
Survey Start	AM: 9:00	PM: 12:00
Vehicular Peakhour	AM: 11:30 AM-12:30 PM	PM: 12:00 PM-1:00 PM
Pedestrians Peakhour	AM: N/A	PM: N/A

All Vehicles

Time		North Approach Advantage Rd				East Approach Bay Rd				South Approach George St				West Approach Bay Rd				Hourly Total	
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	Hour	Peak
11:00	11:15	0	5	3	21	0	5	179	11	0	6	3	37	0	28	223	5	2067	Peak
11:15	11:30	0	2	0	14	0	7	184	19	0	3	1	32	0	20	202	5	2066	
11:30	11:45	0	1	1	6	0	6	196	13	0	8	1	45	0	25	228	0	2082	
11:45	12:00	0	1	3	12	0	13	228	12	0	8	4	28	0	24	187	2	2010	
12:00	12:15	0	0	0	11	0	5	204	20	0	4	1	26	0	25	226	3	1940	Peak
12:15	12:30	0	1	1	8	0	4	217	12	0	7	2	30	0	21	201	1	1415	
12:30	12:45	0	2	1	6	0	2	201	7	0	5	1	24	0	23	184	2	910	
12:45	13:00	0	0	0	7	0	17	187	12		6	4	22	0	20	174	3	452	

Peak Time		North Approach Advantage Rd				East Approach Bay Rd				South Approach George St				West Approach Bay Rd				Peak total	
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L		
11:30	12:30	0	3	5	37	0	28	845	57	0	27	8	129	0	95	842	6	2082	
12:00	13:00	0	3	2	32	0	28	809	51	0	22	8	102	0	89	785	9	1940	
11:00	12:00	0	9	7	53	0	31	787	55	0	25	9	142	0	97	840	12	2067	

Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration.



Intersection of Wangara Rd and George St, Cheltenham

GPS -37.957692, 145.029198

Date:	Wed 28/11/18
Weather:	Fine
Suburban:	Cheltenham
Customer:	Quantum Traffic

North:	George St
East:	Wangara Rd
South:	George St
West:	Wangara Rd

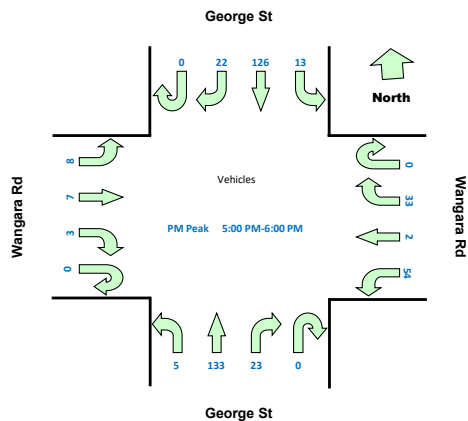
Survey Start	AM: 15:00	PM: 15:00
Vehicular Peakhour		Pedestrians Peakhour
AM:	N/A	AM: N/A
PM:	5:00 PM-6:00 PM	PM: N/A

All Vehicles

Time		North Approach George St				East Approach Wangara Rd				South Approach George St				West Approach Wangara Rd				Hourly Total	
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	Hour	Peak
15:00	15:15	0	4	30	5	0	6	0	15	0	6	26	1	0	2	1	5	362	
15:15	15:30	0	2	26	1	0	8	3	10	0	8	16	0	0	0	1	3	364	
15:30	15:45	0	1	26	5	0	9	2	9	0	9	26	1	0	2	1	2	390	
15:45	16:00	0	1	21	9	0	12	0	9	0	4	31	0	0	0	2	1	380	
16:00	16:15	0	2	32	5	0	20	0	11	0	5	27	0	0	0	1	0	376	
16:15	16:30	0	2	36	7	0	10	3	5	0	8	31	0	0	1	1	0	405	
16:30	16:45	0	0	26	4	0	7	0	11	0	8	26	0	0	0	0	1	410	
16:45	17:00	0	4	25	1	0	10	1	7	0	10	24	0	0	0	1	3	427	
17:00	17:15	0	7	36	3	0	6	0	15	0	11	50	1	0	1	0	2	429	Peak
17:15	17:30	0	2	28	4	0	9	0	17	0	7	40	0	0	0	1	1	379	
17:30	17:45	0	5	35	3	0	10	1	13	0	0	24	2	0	1	3	3	343	
17:45	18:00	0	8	27	3	0	8	1	9	0	5	19	2	0	1	3	2	313	
18:00	18:15	0	5	21	1	0	9	0	11	0	6	26	1	0	0	1	1	270	
18:15	18:30	0	6	23	4	0	7	3	5	0	5	18	0	0	0	0	2		
18:30	18:45	0	3	20	2	0	8	0	3	0	3	27	1	0	1	0	2		
18:45	19:00	0	4	16	3	0	1	1	2	0	2	15	0	0	0	0	1		

Peak Time		North Approach George St				East Approach Wangara Rd				South Approach George St				West Approach Wangara Rd				Peak total
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	
17:00	18:00	0	22	126	13	0	33	2	54	0	23	133	5	0	3	7	8	429

Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration.



Intersection of Wangara Rd and George St, Cheltenham

GPS -37.957692, 145.029198

Date:	Sat 01/12/18
Weather:	Fine
Suburban:	Cheltenham
Customer:	Quantum Traffic

North:	George St
East:	Wangara Rd
South:	George St
West:	Wangara Rd

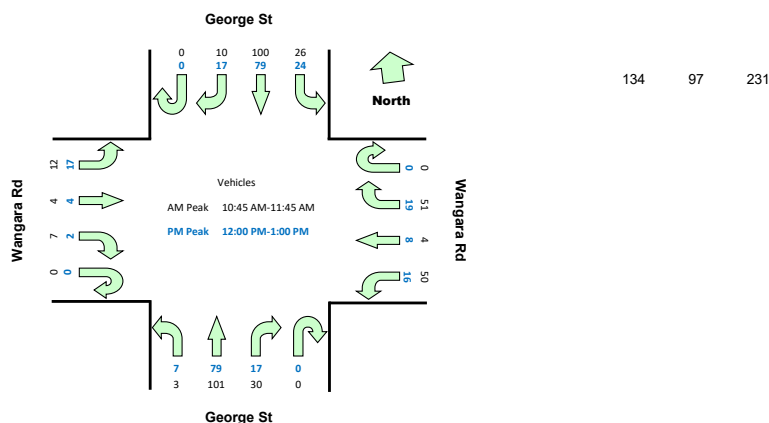
Survey Start	AM: 9:00	PM: 12:00
Vehicular Peakhour	AM: 10:45 AM-11:45 AM	PM: 12:00 PM-1:00 PM
Pedestrians Peakhour	AM: N/A	PM: N/A

All Vehicles

Time		North Approach George St				East Approach Wangara Rd				South Approach George St				West Approach Wangara Rd				Hourly Total	
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	Hour	Peak
11:00	11:15	0	2	23	8	0	16	1	9	0	5	27	1	0	3	3	2	396	
11:15	11:30	0	1	31	4	0	10	1	9	0	8	23	1	0	0	0	2	379	
11:30	11:45	0	4	27	6	0	12	0	15	0	5	36	1	0	3	0	4	356	
11:45	12:00	0	1	31	6	0	10	1	11	0	4	25	0	0	1	2	1	311	
12:00	12:15	0	3	30	7	0	5	0	5	0	4	24	1	0	0	1	3	289	Peak
12:15	12:30	0	3	15	9	0	5	4	2	0	4	16	2	0	1	0	6	206	
12:30	12:45	0	6	15	4	0	3	2	7	0	5	17	2	0	0	2	5	139	
12:45	13:00	0	5	19	4	0	6	2	2	0	4	22	2	0	1	1	3	71	

Peak Time		North Approach George St				East Approach Wangara Rd				South Approach George St				West Approach Wangara Rd				Peak total	
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L		
10:45	11:45	0	10	100	26	0	51	4	50	0	30	101	3	0	7	4	12	398	
12:00	13:00	0	17	79	24	0	19	8	16	0	17	79	7	0	2	4	17	289	
11:00	12:00	0	8	112	24	0	48	3	44	0	22	111	3	0	7	5	9	396	

Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration.



TRANS TRAFFIC SURVEY

TURNING MOVEMENT SURVEY

trafficsurvey.com.au



Intersection of Wangard Rd and Reserve Rd, Cheltenham

GPS -37.958732, 145.038294

Date:	Wed 28/11/18
Weather:	Fine
Suburban:	Cheltenham
Customer:	Quantum Traffic

North:	Reserve Rd
East:	N/A
South:	Reserve Rd
West:	Wangard Rd

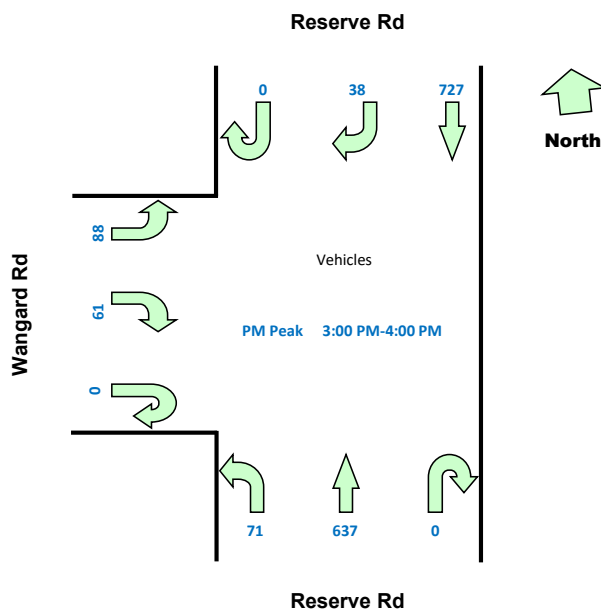
Survey Start			
AM:	15:00	PM:	15:00
Peak hours			
Vehicles	AM:	N/A	
	PM:	3:00 PM-4:00 PM	
Ped	AM:	N/A	
	PM:	N/A	

All Vehicles

Time		North Approach Reserve Rd			South Approach Reserve Rd			West Approach Wangard Rd			Hourly Total	
Period Start	Period End	U	R	SB	U	NB	L	U	R	L	Hour	Peak
15:00	15:15	0	7	182	0	147	14	0	22	24	1622	Peak
15:15	15:30	0	17	209	0	138	21	0	14	21	1608	
15:30	15:45	0	8	176	0	173	14	0	9	15	1510	
15:45	16:00	0	6	160	0	179	22	0	16	28	1512	
16:00	16:15	0	8	161	0	139	30	0	12	32	1471	
16:15	16:30	0	10	150	0	118	11	0	13	20	1516	
16:30	16:45	0	13	192	0	130	12	0	20	30	1597	
16:45	17:00	0	9	174	0	145	12	0	9	21	1594	
17:00	17:15	0	5	213	0	135	14	0	25	35	1579	
17:15	17:30	0	8	241	0	118	6	0	13	17	1508	
17:30	17:45	0	9	210	0	121	25	0	12	17	1425	
17:45	18:00	0	4	185	0	124	11	0	12	19	1285	
18:00	18:15	0	3	190	0	123	12	0	14	14	1161	
18:15	18:30	0	4	157	0	130	8	0	5	16		
18:30	18:45	0	4	115	0	115	4	0	4	12		
18:45	19:00	0	2	119	0	94	3	0	7	6		

Peak Time		North Approach Reserve Rd			South Approach Reserve Rd			West Approach Wangard Rd			Peak total
Period Start	Period End	U	R	SB	U	NB	L	U	R	L	
15:00	16:00	0	38	727	0	637	71	0	61	88	1622
17:00	18:00	0	26	849	0	498	56	0	62	88	1579

Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration.



TRANS TRAFFIC SURVEY

TURNING MOVEMENT SURVEY

trafficsurvey.com.au



Intersection of Wangard Rd and Reserve Rd, Cheltenham

GPS -37.958732, 145.038294

Date:	Sat 01/12/18
Weather:	Fine
Suburban:	Cheltenham
Customer:	Quantum Traffic

North:	Reserve Rd
East:	N/A
South:	Reserve Rd
West:	Wangard Rd

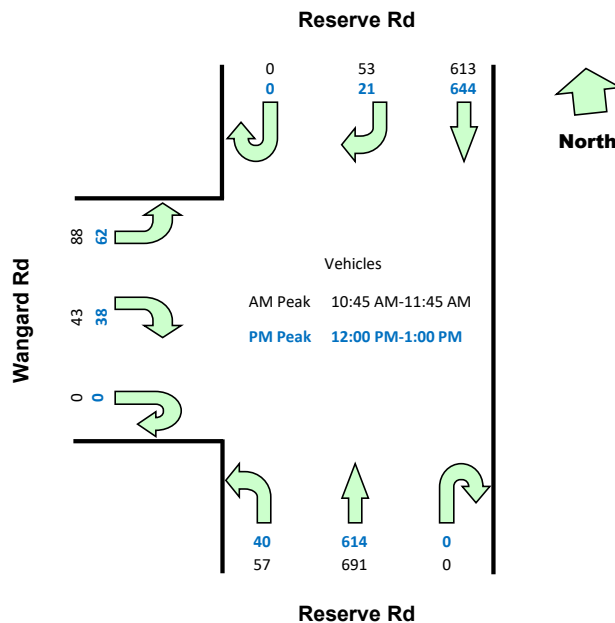
Survey Start			
AM:	9:00	PM:	12:00
Peak hours			
Vehicles	AM:	10:45 AM-11:45 AM	
	PM:	12:00 PM-1:00 PM	
Ped	AM:	N/A	
	PM:	N/A	

All Vehicles

Time		North Approach Reserve Rd			South Approach Reserve Rd			West Approach Wangard Rd			Hourly Total	
Period Start	Period End	U	R	SB	U	NB	L	U	R	L	Hour	Peak
11:00	11:15	0	10	171	0	161	11	0	9	27	1540	
11:15	11:30	0	17	150	0	173	11	0	10	24	1512	
11:30	11:45	0	11	157	0	169	19	0	12	16	1478	
11:45	12:00	0	14	146	0	178	20	0	13	11	1454	
12:00	12:15	0	5	162	0	161	8	0	10	15	1419	Peak
12:15	12:30	0	4	172	0	135	13	0	9	18		
12:30	12:45	0	5	157	0	173	8	0	6	11		
12:45	13:00	0	7	153	0	145	11	0	13	18		

Peak Time		North Approach Reserve Rd			South Approach Reserve Rd			West Approach Wangard Rd			Peak total
Period Start	Period End	U	R	SB	U	NB	L	U	R	L	
10:45	11:45	0	53	613	0	691	57	0	43	88	1545
12:00	13:00	0	21	644	0	614	40	0	38	62	1419
11:00	12:00	0	52	624	0	681	61	0	44	78	1540

Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration



TRANS TRAFFIC SURVEY

TURNING MOVEMENT SURVEY

trafficsurvey.com.au



Intersection of Bay Rd and Reserve Rd, Cheltenham

GPS -37.955879, 145.038898

Date:	Wed 28/11/18
Weather:	Fine
Suburban:	Cheltenham
Customer:	Quantum Traffic

North:	N/A
East:	Bay Rd
South:	Reserve Rd
West:	Bay Rd

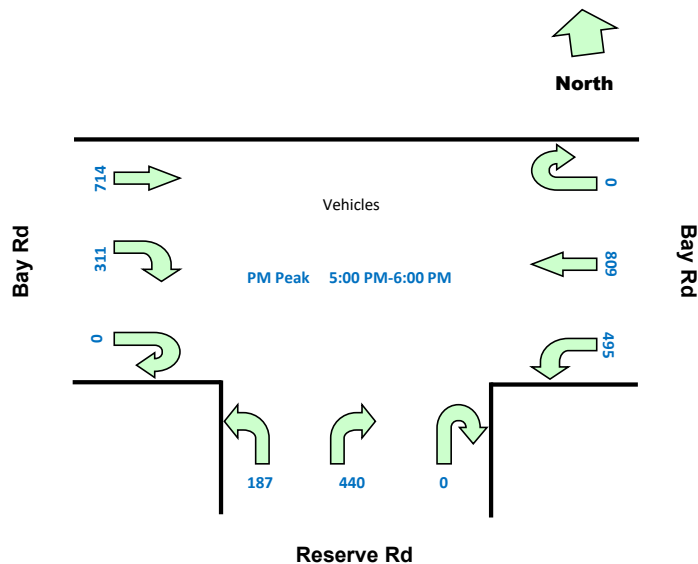
Survey Start			
AM:	15:00	PM:	15:00
Peak hours			
Vehicles	AM:	N/A	
	PM:	5:00 PM-6:00 PM	
Ped	AM:	N/A	
	PM:	N/A	

All Vehicles

Time		East Approach Bay Rd			South Approach Reserve Rd			West Approach Bay Rd			Hourly Total	
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	Hour	Peak
15:00	15:15	0	154	104	0	110	47	0	57	176	2664	
15:15	15:30	0	160	123	0	79	46	0	57	200	2685	
15:30	15:45	0	140	125	0	102	68	0	84	159	2655	
15:45	16:00	0	140	101	0	132	54	0	60	186	2605	
16:00	16:15	0	155	88	0	134	46	0	66	180	2607	
16:15	16:30	0	140	94	0	110	48	0	73	170	2671	
16:30	16:45	0	155	113	0	101	39	0	62	158	2754	
16:45	17:00	0	194	109	0	101	55	0	68	148	2895	
17:00	17:15	0	176	123	0	135	50	0	77	172	2956	Peak
17:15	17:30	0	188	127	0	111	51	0	75	166	2906	
17:30	17:45	0	230	124	0	90	42	0	83	200	2820	
17:45	18:00	0	215	121	0	104	44	0	76	176	2683	
18:00	18:15	0	180	98	0	93	48	0	83	181	2387	
18:15	18:30	0	152	90	0	87	61	0	80	162		
18:30	18:45	0	144	81	0	95	46	0	82	184		
18:45	19:00	0	114	59	0	63	37	0	40	127		

Peak Time		East Approach Bay Rd			South Approach Reserve Rd			West Approach Bay Rd			Peak total
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	
17:00	18:00	0	809	495	0	440	187	0	311	714	2956

Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration



TRANS TRAFFIC SURVEY

TURNING MOVEMENT SURVEY

trafficsurvey.com.au



Intersection of Bay Rd and Reserve Rd, Cheltenham

GPS -37.955879, 145.038898

Date:	Sat 01/12/18
Weather:	Fine
Suburban:	Cheltenham
Customer:	Quantum Traffic

North:	N/A
East:	Bay Rd
South:	Reserve Rd
West:	Bay Rd

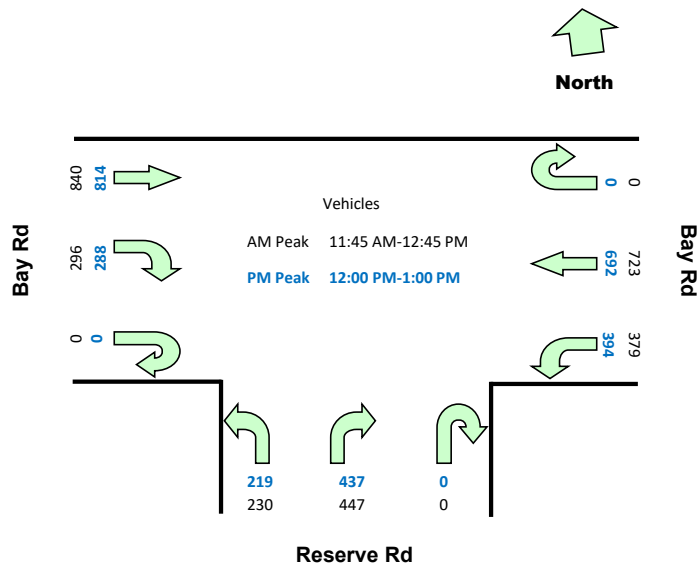
Survey Start			
AM:	9:00	PM:	12:00
Peak hours			
Vehicles	AM:	11:45 AM-12:45 PM	
	PM:	12:00 PM-1:00 PM	
Ped	AM:	N/A	
	PM:	N/A	

All Vehicles

Time		East Approach Bay Rd			South Approach Reserve Rd			West Approach Bay Rd			Hourly Total	
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	Hour	Peak
11:00	11:15	0	160	82	0	117	59	0	81	218	2856	Peak
11:15	11:30	0	154	104	0	123	62	0	84	221	2867	
11:30	11:45	0	156	101	0	124	25	0	52	197	2849	
11:45	12:00	0	192	76	0	125	71	0	74	198	2915	
12:00	12:15	0	196	91	0	100	51	0	80	210	2844	Peak
12:15	12:30	0	182	106	0	114	48	0	69	211		
12:30	12:45	0	153	106	0	108	60	0	73	221		
12:45	13:00	0	161	91	0	115	60	0	66	172		

Peak Time		East Approach Bay Rd			South Approach Reserve Rd			West Approach Bay Rd			Peak total
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	
11:45	12:45	0	723	379	0	447	230	0	296	840	2915
12:00	13:00	0	692	394	0	437	219	0	288	814	2844
11:00	12:00	0	662	363	0	489	217	0	291	834	2856

Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration



TRANS TRAFFIC SURVEY

TURNING MOVEMENT SURVEY

trafficsurvey.com.au



Intersection of Bluff Rd and Holloway Rd, Sandringham

GPS -37.956599, 145.020104

Date:	Sat 22/10/22
Weather:	Fine
Suburban:	Sandringham
Customer:	QT

North:	Bluff Rd
East:	Holloway Rd
South:	Bluff Rd
West:	N/A

Survey	AM:	10:00 AM-12:00 PM
Period	PM:	12:00 PM-2:00 PM
Traffic	AM:	11:00 AM-12:00 PM
Peak	PM:	12:00 PM-1:00 PM

All Vehicles

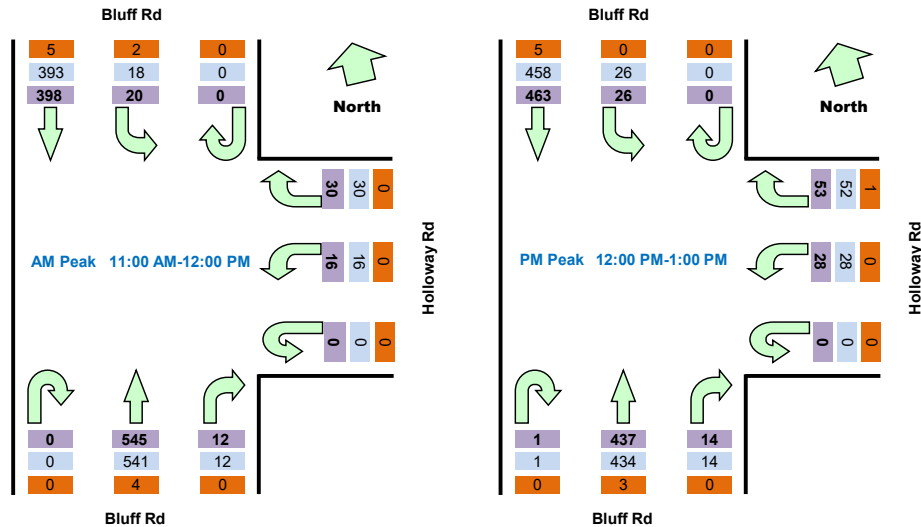
Time		North Approach Bluff Rd			East Approach Holloway Rd			South Approach Bluff Rd			Hourly Total	
Period Start	Period End	U	SB	L	U	R	L	U	R	NB	Hour	Peak
10:00	10:15	0	97	4	0	8	1	0	3	107	896	
10:15	10:30	0	99	2	0	6	6	0	1	97	933	
10:30	10:45	0	93	3	0	17	7	0	9	102	1007	
10:45	11:00	0	101	4	0	15	6	0	2	106	1011	
11:00	11:15	0	101	2	0	5	3	0	3	143	1021	Peak
11:15	11:30	0	103	9	0	6	5	0	4	158		
11:30	11:45	0	94	4	0	11	4	0	3	119		
11:45	12:00	0	100	5	0	8	4	0	2	125		
12:00	12:15	0	107	8	0	16	4	0	4	95	1022	Peak
12:15	12:30	0	115	6	0	14	8	0	1	110	999	
12:30	12:45	0	125	7	0	12	11	0	6	105	963	
12:45	13:00	0	116	5	0	11	5	1	3	127	896	
13:00	13:15	0	101	5	0	6	4	0	3	92	879	
13:15	13:30	0	107	5	0	5	5	0	3	93		
13:30	13:45	0	100	7	0	5	2	0	2	83		
13:45	14:00	0	109	18	0	7	4	0	5	108		

Peak Time		North Approach Bluff Rd			East Approach Holloway Rd			South Approach Bluff Rd			Peak
Period Start	Period End	U	SB	L	U	R	L	U	R	NB	total
11:00	12:00	0	398	20	0	30	16	0	12	545	1021
12:00	13:00	0	463	26	0	53	28	1	14	437	1022

Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration.

Graphic

Total
Light
Heavy



TRANS TRAFFIC SURVEY

TURNING MOVEMENT SURVEY

trafficsurvey.com.au



Intersection of Bluff Rd and Holloway Rd, Sandringham

GPS -37.956599, 145.020104

Date:	Tue 25/10/22
Weather:	Fine
Suburban:	Sandringham
Customer:	QT

North:	Bluff Rd
East:	Holloway Rd
South:	Bluff Rd
West:	N/A

Survey Period	AM:	3:00 PM-3:00 PM
	PM:	3:00 PM-6:00 PM
Traffic Peak	AM:	N/A
	PM:	4:45 PM-5:45 PM

All Vehicles

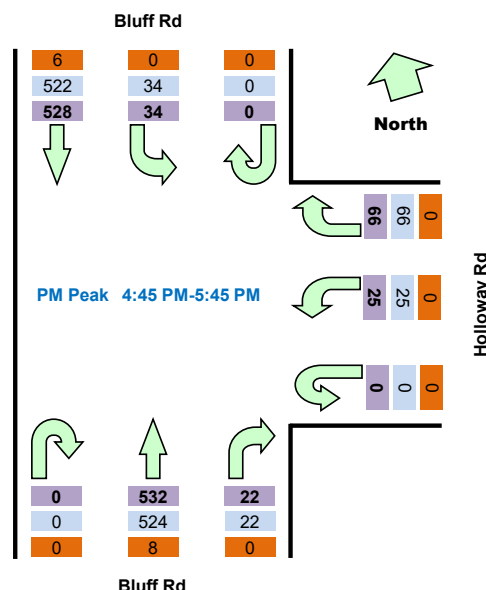
Time		North Approach Bluff Rd			East Approach Holloway Rd			South Approach Bluff Rd			Hourly Total	
Period Start	Period End	U	SB	L	U	R	L	U	R	NB	Hour	Peak
15:00	15:15	0	113	18	0	26	6	0	13	123	1166	
15:15	15:30	0	117	8	0	13	1	0	11	114	1134	
15:30	15:45	0	111	8	0	41	10	0	4	128	1116	
15:45	16:00	0	132	6	0	15	4	0	6	138	1093	
16:00	16:15	0	109	10	0	18	12	0	1	117	1091	
16:15	16:30	0	131	3	0	14	4	0	2	92	1144	
16:30	16:45	0	132	7	0	12	5	0	7	116	1202	
16:45	17:00	0	120	5	0	27	8	0	4	135	1207	Peak
17:00	17:15	0	137	8	0	11	5	0	7	152		
17:15	17:30	0	126	7	0	14	6	0	7	144		
17:30	17:45	0	145	14	0	14	6	0	4	101		
17:45	18:00	0	125	6	0	19	4	0	6	96		

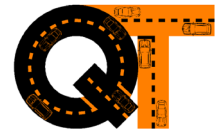
Peak Time		North Approach Bluff Rd			East Approach Holloway Rd			South Approach Bluff Rd			Peak total
Period Start	Period End	U	SB	L	U	R	L	U	R	NB	
16:45	17:45	0	528	34	0	66	25	0	22	532	1207

Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration.

Graphic

Total
Light
Heavy

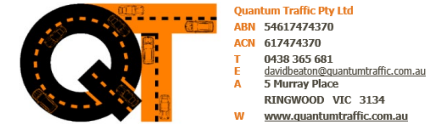




Appendix C

Parking Surveys

Address: Holloway Road, Sandringham
Quantum Reference: 18-0191
Proposal: Bayside Netball Centre
Surveys: Detailed Car Parking Survey Results



Location	Restriction	Period	Capacity	Tuesday 20/10/20	Saturday 25/11/17
				12noon	9:45am
ON-STREET CAR PARKING					
Holloway Road					
North Side					
Bluff Road to Miller Street	No Stopping	8am-9:15am, 3pm-4pm School Days	3	0	2
Miller Street to Western School Loop Road Entry	No Stopping	8am-4pm School Days	7	0	7
	No Stopping	All Times	-	0	1
Western School Loop Road Entry to Eastern School Loop Road Entry	P Disabled	8:30am-9am, 3:30pm-4pm School Days	2	0	2
	P 2 Minutes	8:15am-9:15am, 3pm-4pm School Days	3	0	3
Eastern School Loop Road Entry to 20m west of Green Parade	P 2 Minutes	8:15am-9:15am, 3pm-4pm School Days	12	1	12
20m west of Green Parade to 20 east of Green Parade	No Stopping	8:15am-4pm School Days	4	0	3
20m east of Green Parade to School Driveway opposite Cooke Street	P 15 Minute	8:15am-9:15am, 3pm-4pm School Days	12	2	6
Opposite Cooke Street to opposite Holloway Close	P 15 Minute	8:15am-9:15am, 3pm-4pm School Days	14	4	9
Opposite Holloway Close to End	No Stopping	All Times	-	0	0
South Side					
Bluff Road to Miller Street	No Stopping	8am-9:15am, 3pm-4pm School Days	4	0	5
Miller Street to Clarke Street	No Stopping	All Times	-	0	0
Clarke Street to Park Avenue	No Stopping	8am-9:15am, 3pm-4pm School Days	3	1	0
	No Stopping	8:30am-9am, 3:30pm-4pm School Days	6	0	5
Park Avenue to Green Parade	No Stopping	8:30am-9am, 3:30pm-4pm School Days	6	0	0
Green Parade to Cooke Street	No Stopping	All Times	-	0	0
Cooke Street to Holloway Close	No Stopping	All Times	-	0	0
Holloway Close to End	No Stopping	All Times	-	0	0
Capacity			76	65	76
Number of Parked Cars				8	55
Number of Vacant Spaces				57	21
Percentage Occupancy				12%	72%

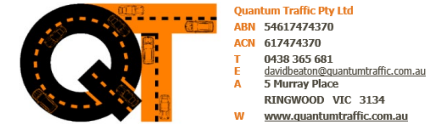
Address: Holloway Road, Sandringham
Quantum Reference: 18-0191
Proposal: Bayside Netball Centre
Surveys: Detailed Car Parking Survey Results



Quantum Traffic Pty Ltd
ABN 54617474370
ACN 617474370
T 0438 365 681
E david@quantumtraffic.com.au
A 5 Murray Place
RINGWOOD VIC 3134
W www.quantumtraffic.com.au

Location	Restriction	Period	Capacity	Tuesday 20/10/20	Saturday 25/11/17
				12noon	9:45am
Wangara Road					
North Side					
End to George Street	Unrestricted	All Times	17	3	7
	Unrestricted	All Times	9	3	2
George Street to Brixton Street	Unrestricted	All Times	15	2	4
South Side					
End to Balmoral Avenue	Unrestricted	All Times	3	1	1
Balmoral Avenue to George Street	Unrestricted	All Times	12	4	6
George Street to Opposite Brixton Street	Unrestricted	All Times	14	0	5
Wangara Road		Capacity	70	70	70
		Number of Parked Cars		13	25
		Number of Vacant Spaces		57	45
		Percentage Occupancy		19%	36%
George Street					
West Side					
NB #11 George Street to Wangara Road	2P	8am-6pm Mon-Fri	15	3	1
Wangara Road to Park	Unrestricted	All Times	7	2	1
Park Frontage	Unrestricted	All Times	4	0	0
Park to Balmoral Avenue	Unrestricted	All Times	11	0	0
Balmoral Avenue to opposite Talinga Street	Unrestricted	All Times	13	0	0
East Side					
NB #13 Wangara Road to Wangara Road	Unrestricted	All Times	9	1	6
Wangara Road to Talinga Road	Unrestricted	All Times	38	1	0
George Street		Capacity	97	97	97
		Number of Parked Cars		7	8
		Number of Vacant Spaces		90	89
		Percentage Occupancy		7%	8%

Address: Holloway Road, Sandringham
Quantum Reference: 18-0191
Proposal: Bayside Netball Centre
Surveys: Detailed Car Parking Survey Results



Location	Restriction	Period	Capacity	Tuesday 20/10/20	Saturday 25/11/17
				12noon	9:45am
Miller Street					
East Side					
Bay Road to Holloway Road	2P	8am-6pm Mon-Fri	20	10	13
	Unrestricted	All Times	11	11	10
West Side					
Bay Road to Holloway Road	No Stopping	8:15am-9:15am, 3pm-4pm School Days	26	2	7
Miller Street			Capacity 57	57	57
			Number of Parked Cars	23	30
			Number of Vacant Spaces	34	27
			Percentage Occupancy	40%	53%
Clarke Street					
East Side					
Holloway Road to Park Avenue	No Stopping	8:15am-9:15am, 3pm-4pm School Days	11	0	9
West Side					
Bay Road to Holloway Road	No Stopping	8:15am-9:15am, 3pm-4pm School Days	8	0	4
Clarke Street			Capacity 19	19	19
			Number of Parked Cars	0	13
			Number of Vacant Spaces	19	6
			Percentage Occupancy	0%	68%
Park Avenue					
North/West Side					
Bluff Road to Clarke Street	Unrestricted	All Times	11	8	2
Clarke Street to Bend	Unrestricted	All Times	10	10	6
Bend to Holloway Road	No Stopping	8:15am-4pm School Days	8	0	5
South/East Side					
Bluff Road to opposite Clarke Street	Unrestricted	All Times	14	14	3
Opposite Clarke Street to Bend	Unrestricted	All Times	10	8	1
On outside of Bend	Unrestricted	All Times	4	3	2
Bend to Holloway Road	Unrestricted	All Times	9	7	9
Park Avenue			Capacity 66	58	66
			Number of Parked Cars	50	28
			Number of Vacant Spaces	8	38
			Percentage Occupancy	86%	42%

Address: Holloway Road, Sandringham
Quantum Reference: 18-0191
Proposal: Bayside Netball Centre
Surveys: Detailed Car Parking Survey Results



Quantum Traffic Pty Ltd
ABN 54617474370
ACN 617474370
T 0438 365 681
E david@quantumtraffic.com.au
A 5 Murray Place
RINGWOOD VIC 3134
W www.quantumtraffic.com.au

Location	Restriction	Period	Capacity	Tuesday 20/10/20	Saturday 25/11/17
				12noon	9:45am
Reno Road					
North Side					
Bluff Road to Green Parade	Unrestricted	All Times	32	13	7
South Side					
Bluff Road to Green Parade	Unrestricted	All Times	32	9	4
Reno Road			Capacity Number of Parked Cars Number of Vacant Spaces Percentage Occupancy	64 22 42 34%	64 11 53 17%
Spring Street					
North Side					
Bluff Road to Green Parade	2P	8am-6pm Mon-Fri	28	11	2
Green Parade to Cooke Street	Unrestricted	All Times	8	0	0
Cooke Street to Park	Unrestricted	All Times	4	0	0
Park to Opposite Wentworth Avenue	Unrestricted	All Times	12	1	1
Opposite Wentworth Avenue to End	Unrestricted	All Times	25	1	3
South Side					
Bluff Road to Duff Street	Unrestricted	All Times	4	4	4
Duff Street to opposite Green Parade	Unrestricted	All Times	38	14	19
opposite Green Parade to opposite Cooke Street	Unrestricted	All Times	23	1	1
opposite Cooke Street to Wentworth Avenue	Unrestricted	All Times	15	1	1
Wentworth Avenue to End	Unrestricted	All Times	14	4	4
Spring Street			Capacity Number of Parked Cars Number of Vacant Spaces Percentage Occupancy	171 37 134 22%	171 35 136 20%

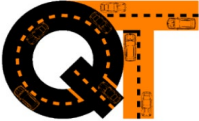
Address: Holloway Road, Sandringham
 Quantum Reference: 18-0191
 Proposal: Bayside Netball Centre
 Surveys: Detailed Car Parking Survey Results



Quantum Traffic Pty Ltd
 ABN 54617474370
 ACN 617474370
 T 0438 365 681
 E david@quantumtraffic.com.au
 A 5 Murray Place
 RINGWOOD VIC 3134
 W www.quantumtraffic.com.au

Location	Restriction	Period	Capacity	Tuesday 20/10/20	Saturday 25/11/17
				12noon	9:45am
Green Parade					
East Side					
Holloway Road to Spring Street	Unrestricted	All Times	29	11	7
West Side					
Holloway Road to Reno Road	Unrestricted	All Times	16	3	4
Reno Road to Spring Street	Unrestricted	All Times	8	2	1
Green Parade			Capacity	53	53
			Number of Parked Cars	16	12
			Number of Vacant Spaces	37	41
			Percentage Occupancy	30%	23%
Cooke Street					
East Side					
Holloway Road to Spring Street	Unrestricted	All Times	30	9	9
West Side					
Holloway Road to Spring Street	No Stopping	9am-4pm Sat & Sun Apr-Sep	32	3	5
Cooke Street			Capacity	62	62
			Number of Parked Cars	12	14
			Number of Vacant Spaces	50	48
			Percentage Occupancy	19%	23%
Holloway Close					
East Side					
Holloway Road to End	Unrestricted	All Times	2	0	0
West Side					
Holloway Road to End	Unrestricted	All Times	1	1	1
Holloway Close			Capacity	3	3
			Number of Parked Cars	1	1
			Number of Vacant Spaces	2	2
			Percentage Occupancy	33%	33%

Address: Holloway Road, Sandringham
 Quantum Reference: 18-0191
 Proposal: Bayside Netball Centre
 Surveys: Detailed Car Parking Survey Results



Quantum Traffic Pty Ltd
 ABN 54617474370
 ACN 617474370
 T 0438 365 681
 E david@quantumtraffic.com.au
 A 5 Murray Place
 RINGWOOD VIC 3134
 W www.quantumtraffic.com.au

Location	Restriction	Period	Capacity	Tuesday 20/10/20	Saturday 25/11/17
				12noon	9:45am
Balmoral Avenue					
West/South Side					
Holloway Road to bend	Unrestricted	All Times	7	3	1
bend to bend (E-W section)	Unrestricted	All Times	5	0	3
bend to bend (N-S section)	Unrestricted	All Times	6	3	0
bend to George Street	Unrestricted	All Times	4	2	3
Northern Extension (No Through Area)					
2nd bend extending north	Unrestricted	All Times	3	1	2
East/North Side					
Holloway Road to bend	Unrestricted	All Times	3	1	1
bend to bend (E-W section)	Unrestricted	All Times	4	2	0
bend to bend (N-S section)	Unrestricted	All Times	6	4	2
bend to George Street	Unrestricted	All Times	6	2	2
		Capacity	44	44	44
Balmoral Avenue		Number of Parked Cars		18	14
		Number of Vacant Spaces		26	30
		Percentage Occupancy		41%	32%
Regent Court					
West/South Side					
Balmoral Avenue to End	Unrestricted	All Times	1	1	3
East/North Side					
Balmoral Avenue to End	Unrestricted	All Times	4	4	2
		Capacity	5	5	5
Regent Court		Number of Parked Cars		5	5
		Number of Vacant Spaces		0	0
		Percentage Occupancy		100%	100%
		Capacity	787	768	787
OVERALL AREA SUMMARY		Number of Parked Cars		212	251
		Number of Vacant Spaces		556	536
		Percentage Occupancy		28%	32%



Appendix D

Recommended On-site Carpark – Concept Plan

Bayside Netball Centre

Internal Carpark - Concept Layout

Project: 11 Holloway Road, Sandringham
Proposal: Netball Centre
Assessment: Concept Carpark Design



e: admin@quantumtraffic.com.au
p: (03) 9879 4250
w: www.quantumtraffic.com.au
a: 5 Murray Place
RINGWOOD VIC 3134

Melway Ref: 77 B11

Drawn By: BH

Approved By: DB

Rev: B

Date: 5/11/2020

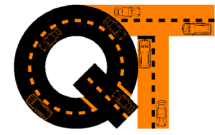
Drawing No: 18-0191-01

SCALE IN M - 1:500 & A3
0 10 20 30

Sheet 1 of 1

Aerial Source: Nearmap





Appendix E

Recommended Parking Restrictions

Bayside Netball Centre Recommended Parking Restrictions

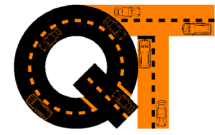
Project: 11 Holloway Road, Sandringham
Proposal: Netball Centre
Assessment: Parking Restrictions



e: admin@quantumtraffic.com.au
p: (03) 9879 4250
w: www.quantumtraffic.com.au
a: 5 Murray Place
RINGWOOD VIC 3134

Melway Ref: 77 B11	Drawn By: BH	Approved By: DB	Rev: E	Date: 20/03/2023	Drawing No: 18-0191-02	Not to Scale	Sheet 1 of 1	Aerial Source: Nearmap
--------------------	--------------	-----------------	--------	------------------	------------------------	--------------	--------------	------------------------

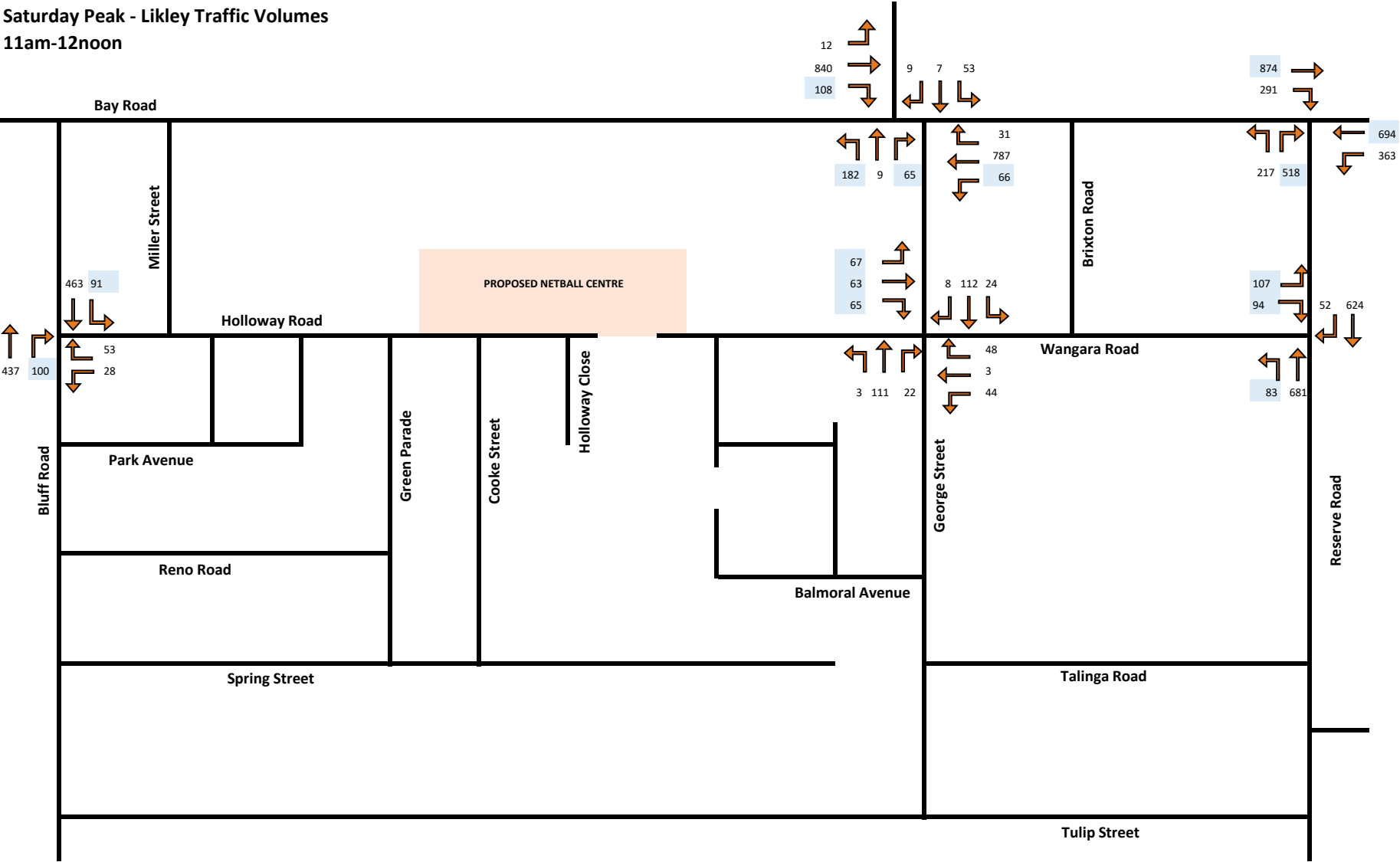




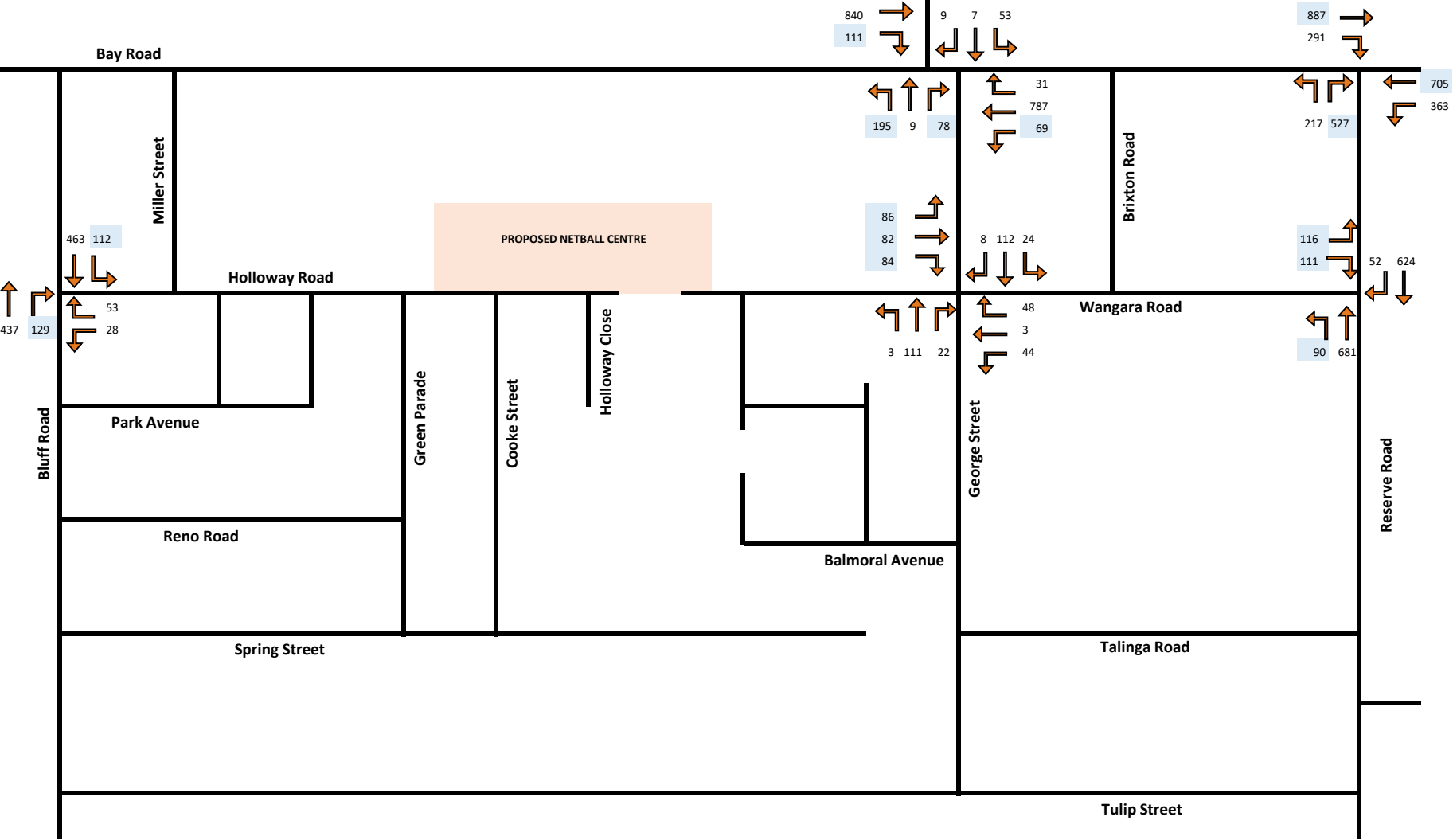
Appendix F

Post Development – Traffic Volume Diagrams

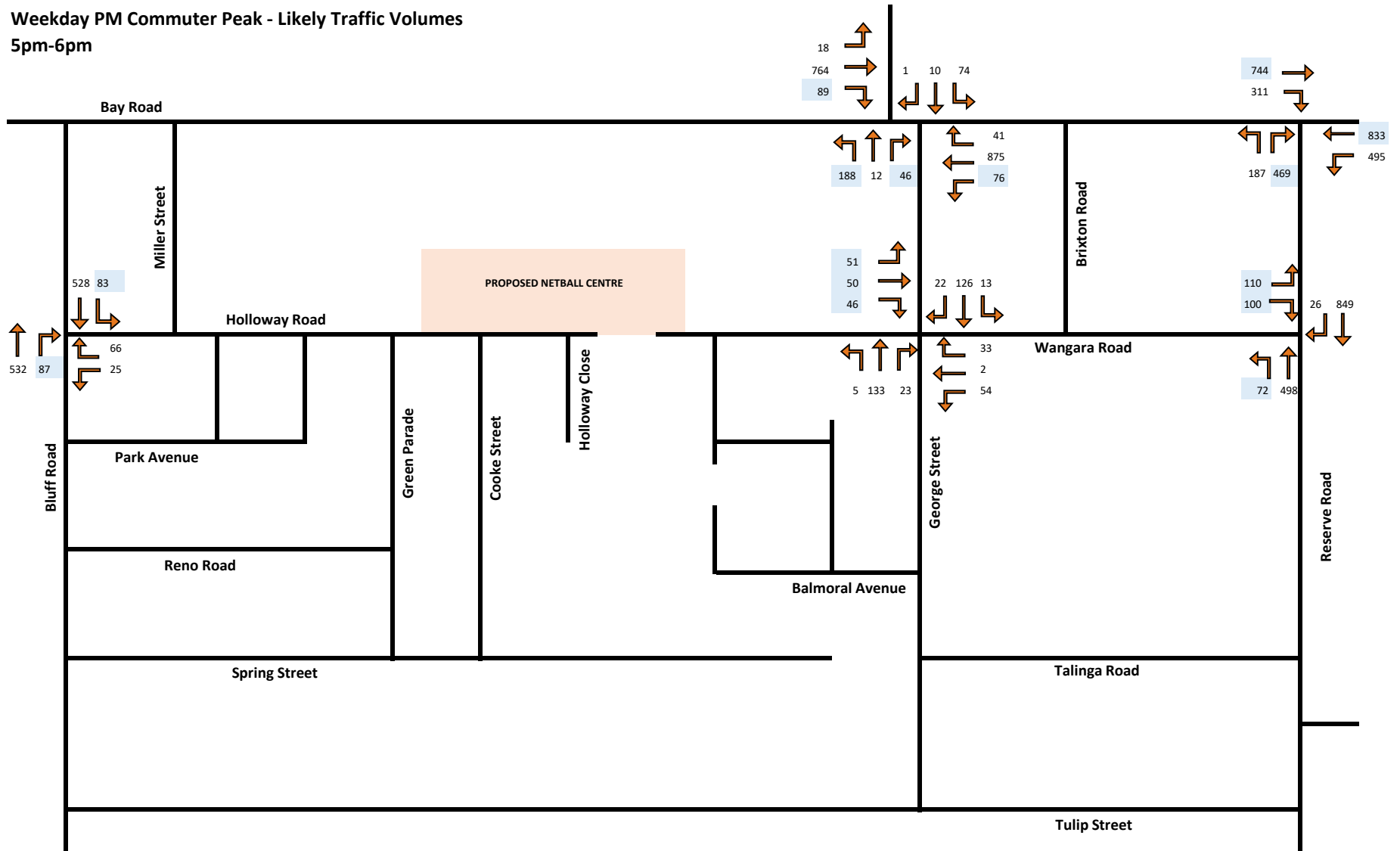
Saturday Peak - Likley Traffic Volumes
11am-12noon



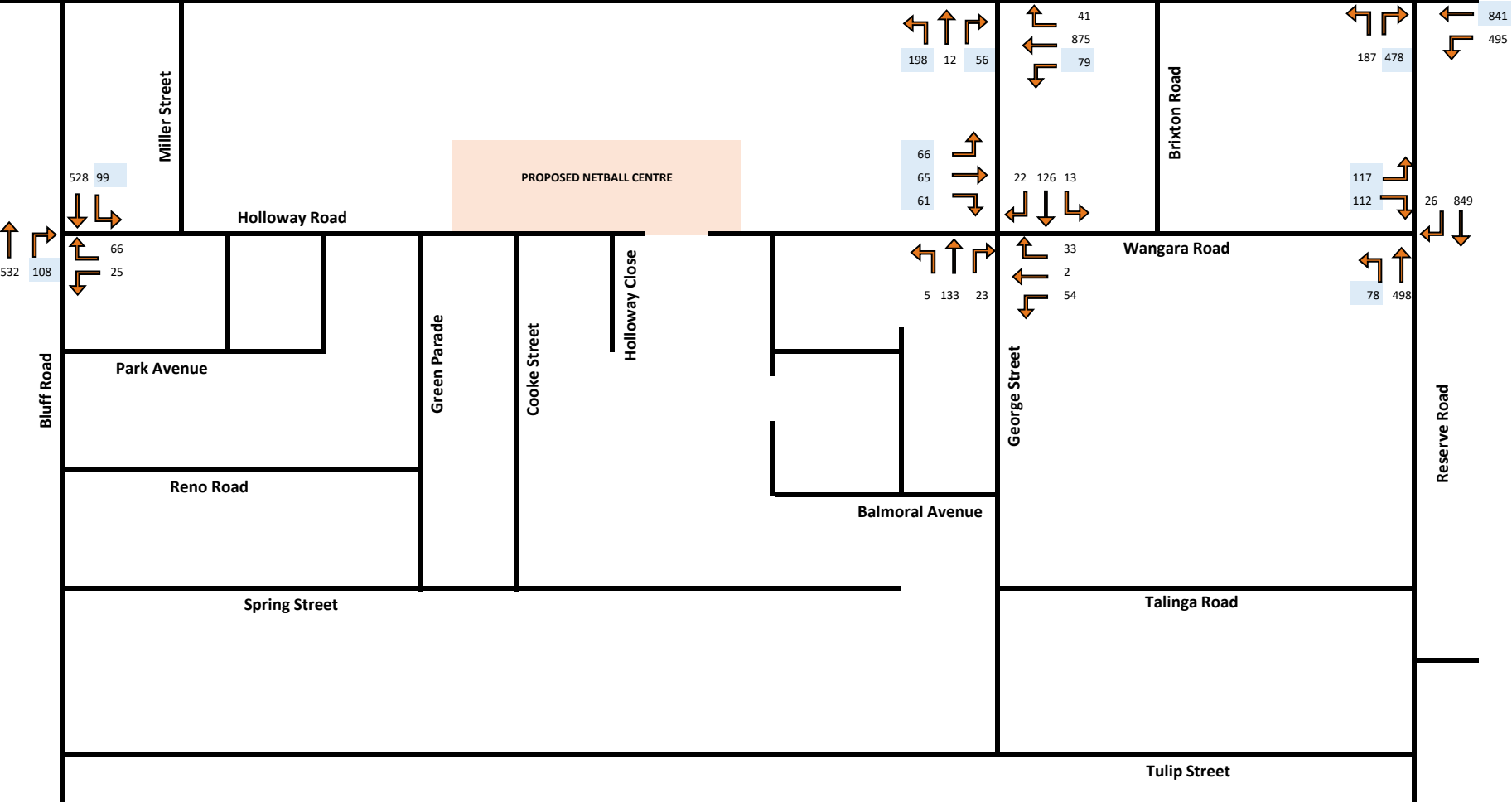
Saturday Peak - Sensitivity Test
11am-12noon

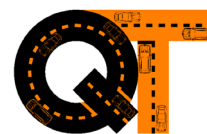


Weekday PM Commuter Peak - Likely Traffic Volumes
5pm-6pm



Weekday PM Commuter Peak - Sensitivity Test
5pm-6pm





Appendix G

SIDRA Results

MOVEMENT SUMMARY

▽ Site: 101 [Netball Sat - Wangara Road / George Street]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: George Street												
1	L2	3	5.0	0.079	6.1	LOS A	0.2	1.2	0.10	0.11	0.10	56.8
2	T1	117	5.0	0.079	0.1	LOS A	0.2	1.2	0.10	0.11	0.10	58.6
3	R2	23	5.0	0.079	6.0	LOS A	0.2	1.2	0.10	0.11	0.10	56.2
Approach		143	5.0	0.079	1.2	NA	0.2	1.2	0.10	0.11	0.10	58.2
East: Wangara Road												
4	L2	46	5.0	0.108	6.0	LOS A	0.4	2.9	0.28	0.61	0.28	52.3
5	T1	3	5.0	0.108	5.5	LOS A	0.4	2.9	0.28	0.61	0.28	52.5
6	R2	51	5.0	0.108	8.1	LOS A	0.4	2.9	0.28	0.61	0.28	51.8
Approach		100	5.0	0.108	7.0	LOS A	0.4	2.9	0.28	0.61	0.28	52.0
North: George Street												
7	L2	25	5.0	0.082	5.7	LOS A	0.1	0.6	0.04	0.13	0.04	56.8
8	T1	118	5.0	0.082	0.0	LOS A	0.1	0.6	0.04	0.13	0.04	58.6
9	R2	8	5.0	0.082	5.9	LOS A	0.1	0.6	0.04	0.13	0.04	56.2
Approach		152	5.0	0.082	1.3	NA	0.1	0.6	0.04	0.13	0.04	58.2
West: Wangara Road												
10	L2	71	5.0	0.205	6.0	LOS A	0.8	6.0	0.31	0.61	0.31	52.7
11	T1	66	5.0	0.205	5.7	LOS A	0.8	6.0	0.31	0.61	0.31	52.9
12	R2	68	5.0	0.205	7.6	LOS A	0.8	6.0	0.31	0.61	0.31	52.2
Approach		205	5.0	0.205	6.5	LOS A	0.8	6.0	0.31	0.61	0.31	52.6
All Vehicles		600	5.0	0.205	4.0	NA	0.8	6.0	0.19	0.37	0.19	55.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: QUANTUM TRAFFIC PTY LTD | Processed: Wednesday, 10 February 2021 2:47:39 PM

Project: C:\Users\brent\Desktop\New Work - Migrate To Harddrive\Active\Bayside Netball Centre (18-0191)\SIDRA\18-0191(Likely Volume).sip8

MOVEMENT SUMMARY

▽ Site: 101v [Netball Sat - Wangara Road/Reserve Road]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Reserve Road												
1	L2	87	5.0	0.428	5.7	LOS A	0.0	0.0	0.00	0.06	0.00	57.5
2	T1	717	5.0	0.428	0.1	LOS A	0.0	0.0	0.00	0.06	0.00	59.3
Approach		804	5.0	0.428	0.7	NA	0.0	0.0	0.00	0.06	0.00	59.1
North: Reserve Road												
8	T1	657	5.0	0.435	1.7	LOS A	1.7	12.1	0.25	0.06	0.34	57.5
9	R2	55	5.0	0.435	14.1	LOS B	1.7	12.1	0.25	0.06	0.34	55.5
Approach		712	5.0	0.435	2.6	NA	1.7	12.1	0.25	0.06	0.34	57.4
West: Wangara Road												
10	L2	113	5.0	0.164	9.7	LOS A	0.6	4.4	0.61	0.84	0.61	50.4
12	R2	99	5.0	0.499	29.2	LOS D	1.8	13.0	0.91	1.05	1.25	39.4
Approach		212	5.0	0.499	18.8	LOS C	1.8	13.0	0.75	0.93	0.91	44.6
All Vehicles		1727	5.0	0.499	3.7	NA	1.8	13.0	0.19	0.17	0.25	56.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: QUANTUM TRAFFIC PTY LTD | Processed: Wednesday, 10 February 2021 2:47:41 PM

Project: C:\Users\brent\Desktop\New Work - Migrate To Harddrive\Active\Bayside Netball Centre (18-0191)\SIDRA\18-0191(Likely Volume).sip8

MOVEMENT SUMMARY

 **Site: 101v [Netball Sat - Bay Road/Reserve Road]**

New Site

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Reserve Road												
1	L2	228	5.0	0.225	15.9	LOS B	4.9	36.0	0.53	0.72	0.53	46.4
3	R2	545	5.0	0.954	64.5	LOS E	32.6	237.8	0.99	1.08	1.50	28.6
Approach		774	5.0	0.954	50.2	LOS D	32.6	237.8	0.86	0.97	1.21	32.3
East: Bay Road (east)												
4	L2	382	5.0	0.935	58.4	LOS E	33.5	244.6	1.00	1.11	1.40	30.6
5	T1	731	5.0	0.935	53.8	LOS D	33.5	244.6	1.00	1.16	1.42	31.5
Approach		1113	5.0	0.935	55.4	LOS E	33.5	244.6	1.00	1.14	1.41	31.2
West: Bay Road (west)												
11	T1	920	5.0	0.935	43.9	LOS D	50.6	369.1	1.00	1.15	1.31	34.8
12	R2	306	5.0	0.935	66.4	LOS E	16.8	122.8	1.00	1.22	2.06	28.4
Approach		1226	5.0	0.935	49.5	LOS D	50.6	369.1	1.00	1.17	1.50	32.9
All Vehicles		3113	5.0	0.954	51.8	LOS D	50.6	369.1	0.96	1.11	1.40	32.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: QUANTUM TRAFFIC PTY LTD | Processed: Wednesday, 10 February 2021 2:47:40 PM

Project: C:\Users\brent\Desktop\New Work - Migrate To Harddrive\Active\Bayside Netball Centre (18-0191)\SIDRA\18-0191(Likely Volume).sip8

MOVEMENT SUMMARY

 **Site: 101 [Bluff-Holloway - Post Dev Sat - Likely (Site Folder: General)]**

 **Network: N101 [Post Dev Sat - Likely (Network Folder: General)]**

New Site
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %	v/c	sec		[Veh. veh	Dist m				km/h
South: Bluff Road														
2	T1	460	5.0	460	5.0	0.294	1.7	LOS A	0.7	4.7	0.26	0.13	0.29	56.2
3	R2	105	0.0	105	0.0	0.294	6.2	LOS A	0.7	4.7	0.39	0.19	0.44	51.8
Approach		565	4.1	565	4.1	0.294	2.5	NA	0.7	4.7	0.28	0.14	0.32	55.3
East: Holloway Road														
4	L2	29	0.0	29	0.0	0.061	9.0	LOS A	0.0	0.3	0.30	0.88	0.30	47.3
6	R2	56	0.0	56	0.0	0.334	33.8	LOS D	0.5	3.4	0.88	1.04	1.06	38.6
Approach		85	0.0	85	0.0	0.334	25.2	LOS D	0.5	3.4	0.68	0.99	0.79	40.2
North: Bluff Road														
7	L2	96	0.0	96	0.0	0.155	5.6	LOS A	0.1	1.0	0.00	0.20	0.00	56.6
8	T1	487	5.0	487	5.0	0.155	0.0	LOS A	3.6	26.0	0.00	0.08	0.00	58.5
Approach		583	4.2	583	4.2	0.155	0.9	NA	3.6	26.0	0.00	0.10	0.00	58.0
All Vehicles		1234	3.8	1234	3.8	0.334	3.3	NA	3.6	26.0	0.18	0.18	0.20	54.5

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.

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.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 9.0 | Copyright © 2000-2020 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: QUANTUM TRAFFIC PTY LTD | Licence: PLUS / 1PC | Processed: Monday, 7 November 2022 1:32:47 PM

Project: Z:\QUANTUM TRAFFIC\PROJECTS\ACTIVE\2018\Bayside Netball Centre (18-0191)\2022 Update\SIDRA\18-0191 SIDRA 2022.sip9

MOVEMENT SUMMARY

 **Site: 101 [Bluff-Holloway - Post Dev Weekday PM - Likely (Site Folder: General)]**

 **Network: N101 [Post Dev Weekday PM - Likely (Network Folder: General)]**

New Site
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %	v/c	sec		[Veh. veh	Dist m				km/h
South: Bluff Road														
2	T1	560	5.0	560	5.0	0.329	1.8	LOS A	0.7	5.0	0.24	0.10	0.29	56.2
3	R2	92	0.0	92	0.0	0.329	7.2	LOS A	0.7	5.0	0.35	0.14	0.43	52.0
Approach		652	4.3	652	4.3	0.329	2.5	NA	0.7	5.0	0.26	0.10	0.31	55.5
East: Holloway Road														
4	L2	26	0.0	26	0.0	0.057	9.2	LOS A	0.0	0.3	0.33	0.88	0.33	47.1
6	R2	69	0.0	69	0.0	0.547	51.0	LOS F	0.9	6.0	0.94	1.10	1.33	32.7
Approach		96	0.0	96	0.0	0.547	39.5	LOS E	0.9	6.0	0.77	1.04	1.06	34.4
North: Bluff Road														
7	L2	87	0.0	87	0.0	0.171	5.6	LOS A	0.3	1.9	0.00	0.16	0.00	56.9
8	T1	556	5.0	556	5.0	0.171	0.0	LOS A	4.4	31.8	0.00	0.07	0.00	58.7
Approach		643	4.3	643	4.3	0.171	0.8	NA	4.4	31.8	0.00	0.08	0.00	58.2
All Vehicles		1391	4.0	1391	4.0	0.547	4.3	NA	4.4	31.8	0.17	0.16	0.22	53.3

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.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 9.0 | Copyright © 2000-2020 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: QUANTUM TRAFFIC PTY LTD | Licence: PLUS / 1PC | Processed: Monday, 7 November 2022 1:32:54 PM

Project: Z:\QUANTUM TRAFFIC\PROJECTS\ACTIVE\2018\Bayside Netball Centre (18-0191)\2022 Update\SIDRA\18-0191 SIDRA 2022.sip9

MOVEMENT SUMMARY

▽ Site: 101v [Netball PM - Wangara Road/Reserve Road]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Reserve Road												
1	L2	76	5.0	0.320	5.6	LOS A	0.0	0.0	0.00	0.08	0.00	57.4
2	T1	524	5.0	0.320	0.0	LOS A	0.0	0.0	0.00	0.08	0.00	59.2
Approach		600	5.0	0.320	0.7	NA	0.0	0.0	0.00	0.08	0.00	59.0
North: Reserve Road												
8	T1	894	5.0	0.505	0.4	LOS A	0.7	5.3	0.08	0.02	0.11	59.3
9	R2	27	5.0	0.505	11.5	LOS B	0.7	5.3	0.08	0.02	0.11	57.2
Approach		921	5.0	0.505	0.7	NA	0.7	5.3	0.08	0.02	0.11	59.2
West: Wangara Road												
10	L2	116	5.0	0.126	8.0	LOS A	0.5	3.6	0.52	0.74	0.52	51.6
12	R2	105	5.0	0.589	34.7	LOS D	2.2	15.9	0.94	1.08	1.39	37.1
Approach		221	5.0	0.589	20.7	LOS C	2.2	15.9	0.72	0.90	0.93	43.5
All Vehicles		1742	5.0	0.589	3.3	NA	2.2	15.9	0.13	0.15	0.18	56.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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.

MOVEMENT SUMMARY

 **Site: 101v [Netball PM - Bay Road/Reserve Road]**

New Site

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Reserve Road												
1	L2	197	5.0	0.210	17.9	LOS B	4.6	33.5	0.57	0.73	0.57	45.3
3	R2	494	5.0	1.013	95.9	LOS F	36.7	267.6	1.00	1.20	1.84	22.9
Approach		691	5.0	1.013	73.7	LOS E	36.7	267.6	0.88	1.06	1.47	26.7
East: Bay Road (east)												
4	L2	521	5.0	1.017	94.6	LOS F	56.4	411.7	1.00	1.31	1.77	23.4
5	T1	877	5.0	1.017	89.6	LOS F	56.4	411.7	1.00	1.45	1.79	24.0
Approach		1398	5.0	1.017	91.5	LOS F	56.4	411.7	1.00	1.40	1.78	23.8
West: Bay Road (west)												
11	T1	783	5.0	0.718	14.7	LOS B	24.7	180.1	0.78	0.71	0.78	48.3
12	R2	327	5.0	0.850	51.3	LOS D	14.1	103.0	1.00	1.10	1.76	32.0
Approach		1111	5.0	0.850	25.5	LOS C	24.7	180.1	0.85	0.83	1.07	42.0
All Vehicles		3199	5.0	1.017	64.7	LOS E	56.4	411.7	0.92	1.13	1.47	28.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: QUANTUM TRAFFIC PTY LTD | Processed: Wednesday, 10 February 2021 2:47:41 PM

Project: C:\Users\brent\Desktop\New Work - Migrate To Harddrive\Active\Bayside Netball Centre (18-0191)\SIDRA\18-0191(Likely Volume).sip8

MOVEMENT SUMMARY

▽ Site: 101 [Netball PM - Wangara Road / George Street]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: George Street												
1	L2	5	5.0	0.093	6.1	LOS A	0.2	1.3	0.09	0.10	0.09	56.9
2	T1	140	5.0	0.093	0.1	LOS A	0.2	1.3	0.09	0.10	0.09	58.7
3	R2	24	5.0	0.093	6.0	LOS A	0.2	1.3	0.09	0.10	0.09	56.3
Approach		169	5.0	0.093	1.1	NA	0.2	1.3	0.09	0.10	0.09	58.3
East: Wangara Road												
4	L2	57	5.0	0.093	6.0	LOS A	0.3	2.5	0.27	0.60	0.27	52.4
5	T1	2	5.0	0.093	5.8	LOS A	0.3	2.5	0.27	0.60	0.27	52.6
6	R2	35	5.0	0.093	8.2	LOS A	0.3	2.5	0.27	0.60	0.27	51.9
Approach		94	5.0	0.093	6.9	LOS A	0.3	2.5	0.27	0.60	0.27	52.3
North: George Street												
7	L2	14	5.0	0.093	6.0	LOS A	0.2	1.4	0.10	0.13	0.10	56.7
8	T1	133	5.0	0.093	0.1	LOS A	0.2	1.4	0.10	0.13	0.10	58.4
9	R2	23	5.0	0.093	6.0	LOS A	0.2	1.4	0.10	0.13	0.10	56.0
Approach		169	5.0	0.093	1.4	NA	0.2	1.4	0.10	0.13	0.10	58.0
West: Wangara Road												
10	L2	54	5.0	0.162	6.1	LOS A	0.6	4.5	0.34	0.62	0.34	52.6
11	T1	53	5.0	0.162	5.9	LOS A	0.6	4.5	0.34	0.62	0.34	52.8
12	R2	48	5.0	0.162	8.0	LOS A	0.6	4.5	0.34	0.62	0.34	52.1
Approach		155	5.0	0.162	6.6	LOS A	0.6	4.5	0.34	0.62	0.34	52.5
All Vehicles		587	5.0	0.162	3.6	NA	0.6	4.5	0.19	0.32	0.19	55.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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.

MOVEMENT SUMMARY

 Site: 101 [Netball Sat - Bay Road/George St]

 Network: N101 [Netball Sat - Bay/George/Advantage]

New Site
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed	
		veh/h	%	veh/h	%	v/c	sec		veh	m			km/h	
South: George Street														
1	L2	201	5.0	201	5.0	0.289	11.8	LOS B	1.2	9.1	0.54	1.00	0.59	44.8
3	R2	68	5.0	68	5.0	0.581	55.1	LOS F	2.0	14.9	0.96	1.09	1.33	31.4
Approach		269	5.0	269	5.0	0.581	22.8	LOS C	2.0	14.9	0.65	1.02	0.78	38.3
East: Bay Road (east)														
4	L2	69	5.0	69	5.0	0.263	5.6	LOS A	0.0	0.0	0.00	0.08	0.00	57.4
5	T1	861	5.0	861	5.0	0.263	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	59.2
Approach		931	5.0	931	5.0	0.263	0.5	NA	0.0	0.0	0.00	0.04	0.00	58.9
West: Bay Road (west)														
11	T1	940	5.0	940	5.0	0.382	1.9	LOS A	2.8	20.6	0.17	0.08	0.22	56.0
12	R2	121	5.0	121	5.0	0.382	12.3	LOS B	2.8	20.6	0.73	0.33	0.95	43.9
Approach		1061	5.0	1061	5.0	0.382	3.0	NA	2.8	20.6	0.23	0.11	0.31	54.3
All Vehicles		2261	5.0	2261	5.0	0.581	4.3	NA	2.8	20.6	0.19	0.19	0.24	52.9

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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: QUANTUM TRAFFIC PTY LTD | Processed: Wednesday, 10 February 2021 1:25:37 PM

Project: C:\Users\brent\Desktop\New Work - Migrate To Harddrive\Active\Bayside Netball Centre (18-0191)\SIDRA\18-0191(Likely Volume).sip8

MOVEMENT SUMMARY

 Site: 101 [Netball PM - Bay Road/George St]

 Network: N101 [Netball PM - Bay/George/Advantage]

New Site
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	Arrival Flows HV	Flows Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: George Street														
1	L2	211	5.0	211	5.0	0.334	13.0	LOS B	1.5	11.2	0.59	1.04	0.71	43.7
3	R2	48	5.0	48	5.0	0.423	48.5	LOS E	1.4	9.9	0.95	1.05	1.15	33.3
Approach		259	5.0	259	5.0	0.423	19.7	LOS C	1.5	11.2	0.66	1.04	0.79	39.8
East: Bay Road (east)														
4	L2	80	5.0	80	5.0	0.303	5.6	LOS A	0.0	0.0	0.00	0.08	0.00	57.3
5	T1	964	5.0	964	5.0	0.303	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	59.2
Approach		1044	5.0	1044	5.0	0.303	0.5	NA	0.0	0.0	0.00	0.05	0.00	58.9
West: Bay Road (west)														
11	T1	882	5.0	882	5.0	0.370	2.1	LOS A	2.8	20.2	0.16	0.07	0.21	55.7
12	R2	104	5.0	104	5.0	0.370	14.6	LOS B	2.8	20.2	0.78	0.35	1.01	41.7
Approach		986	5.0	986	5.0	0.370	3.4	NA	2.8	20.2	0.23	0.10	0.29	53.8
All Vehicles		2289	5.0	2289	5.0	0.423	3.9	NA	2.8	20.2	0.17	0.18	0.22	53.5

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.

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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: QUANTUM TRAFFIC PTY LTD | Processed: Wednesday, 10 February 2021 1:25:41 PM

Project: C:\Users\brent\Desktop\New Work - Migrate To Harddrive\Active\Bayside Netball Centre (18-0191)\SIDRA\18-0191(Likely Volume).sip8

MOVEMENT SUMMARY

▽ Site: 101 [Netball Sat - Wangara Road / George Street]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: George Street												
1	L2	3	5.0	0.079	6.1	LOS A	0.2	1.2	0.10	0.11	0.10	56.8
2	T1	117	5.0	0.079	0.1	LOS A	0.2	1.2	0.10	0.11	0.10	58.6
3	R2	23	5.0	0.079	6.0	LOS A	0.2	1.2	0.10	0.11	0.10	56.2
Approach		143	5.0	0.079	1.2	NA	0.2	1.2	0.10	0.11	0.10	58.2
East: Wangara Road												
4	L2	46	5.0	0.111	6.0	LOS A	0.4	3.0	0.29	0.62	0.29	52.2
5	T1	3	5.0	0.111	5.5	LOS A	0.4	3.0	0.29	0.62	0.29	52.3
6	R2	51	5.0	0.111	8.5	LOS A	0.4	3.0	0.29	0.62	0.29	51.6
Approach		100	5.0	0.111	7.2	LOS A	0.4	3.0	0.29	0.62	0.29	51.9
North: George Street												
7	L2	25	5.0	0.082	5.7	LOS A	0.1	0.6	0.04	0.13	0.04	56.8
8	T1	118	5.0	0.082	0.0	LOS A	0.1	0.6	0.04	0.13	0.04	58.6
9	R2	8	5.0	0.082	5.9	LOS A	0.1	0.6	0.04	0.13	0.04	56.2
Approach		152	5.0	0.082	1.3	NA	0.1	0.6	0.04	0.13	0.04	58.2
West: Wangara Road												
10	L2	91	5.0	0.265	6.1	LOS A	1.1	8.2	0.33	0.62	0.33	52.7
11	T1	86	5.0	0.265	5.8	LOS A	1.1	8.2	0.33	0.62	0.33	52.8
12	R2	88	5.0	0.265	7.8	LOS A	1.1	8.2	0.33	0.62	0.33	52.1
Approach		265	5.0	0.265	6.6	LOS A	1.1	8.2	0.33	0.62	0.33	52.5
All Vehicles		660	5.0	0.265	4.3	NA	1.1	8.2	0.21	0.40	0.21	54.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: QUANTUM TRAFFIC PTY LTD | Processed: Wednesday, 10 February 2021 1:49:22 PM

Project: C:\Users\brent\Desktop\New Work - Migrate To Harddrive\Active\Bayside Netball Centre (18-0191)\SIDRA\18-0191(Sensitivity Test Volume).sip8

MOVEMENT SUMMARY

▽ Site: 101v [Netball Sat - Wangara Road/Reserve Road]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Reserve Road												
1	L2	95	5.0	0.432	5.7	LOS A	0.0	0.0	0.00	0.07	0.00	57.4
2	T1	717	5.0	0.432	0.1	LOS A	0.0	0.0	0.00	0.07	0.00	59.2
Approach		812	5.0	0.432	0.7	NA	0.0	0.0	0.00	0.07	0.00	59.0
North: Reserve Road												
8	T1	657	5.0	0.437	1.7	LOS A	1.7	12.3	0.25	0.06	0.34	57.5
9	R2	55	5.0	0.437	14.2	LOS B	1.7	12.3	0.25	0.06	0.34	55.5
Approach		712	5.0	0.437	2.7	NA	1.7	12.3	0.25	0.06	0.34	57.3
West: Wangara Road												
10	L2	122	5.0	0.177	9.8	LOS A	0.7	4.8	0.62	0.84	0.62	50.3
12	R2	117	5.0	0.594	32.2	LOS D	2.3	16.6	0.93	1.09	1.41	38.1
Approach		239	5.0	0.594	20.8	LOS C	2.3	16.6	0.77	0.96	1.00	43.5
All Vehicles		1762	5.0	0.594	4.2	NA	2.3	16.6	0.21	0.18	0.27	55.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: QUANTUM TRAFFIC PTY LTD | Processed: Wednesday, 10 February 2021 1:49:23 PM

Project: C:\Users\brent\Desktop\New Work - Migrate To Harddrive\Active\Bayside Netball Centre (18-0191)\SIDRA\18-0191(Sensitivity Test Volume).sip8

MOVEMENT SUMMARY

 **Site: 101v [Netball Sat - Bay Road/Reserve Road]**

New Site

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Reserve Road												
1	L2	228	5.0	0.225	15.9	LOS B	4.9	36.0	0.53	0.72	0.53	46.4
3	R2	555	5.0	0.971	71.5	LOS E	35.1	256.3	1.00	1.11	1.58	27.1
Approach		783	5.0	0.971	55.3	LOS E	35.1	256.3	0.86	1.00	1.27	30.9
East: Bay Road (east)												
4	L2	382	5.0	0.946	62.0	LOS E	35.0	255.6	1.00	1.13	1.45	29.7
5	T1	742	5.0	0.946	57.3	LOS E	35.0	255.6	1.00	1.19	1.46	30.6
Approach		1124	5.0	0.946	58.9	LOS E	35.0	255.6	1.00	1.17	1.45	30.3
West: Bay Road (west)												
11	T1	934	5.0	0.946	47.8	LOS D	53.4	390.1	1.00	1.19	1.36	33.5
12	R2	306	5.0	0.946	69.7	LOS E	17.5	127.8	1.00	1.25	2.12	27.6
Approach		1240	5.0	0.946	53.2	LOS D	53.4	390.1	1.00	1.20	1.54	31.9
All Vehicles		3147	5.0	0.971	55.8	LOS E	53.4	390.1	0.97	1.14	1.45	31.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: QUANTUM TRAFFIC PTY LTD | Processed: Wednesday, 10 February 2021 1:49:22 PM

Project: C:\Users\brent\Desktop\New Work - Migrate To Harddrive\Active\Bayside Netball Centre (18-0191)\SIDRA\18-0191(Sensitivity Test Volume).sip8

MOVEMENT SUMMARY

 **Site: 101 [Bluff-Holloway - Post Dev Sat - Sensitivity (Site Folder: General)]**

 **Network: N101 [Post Dev Sat - Sensitivity (Network Folder: General)]**

New Site
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total HV] veh/h	%	v/c	sec		[Veh. veh	Dist] m				km/h
South: Bluff Road														
2	T1	460	5.0	460	5.0	0.329	2.1	LOS A	0.7	5.0	0.29	0.16	0.35	55.4
3	R2	136	0.0	136	0.0	0.329	6.7	LOS A	0.7	5.0	0.47	0.26	0.57	50.5
Approach		596	3.9	596	3.9	0.329	3.1	NA	0.7	5.0	0.33	0.18	0.40	54.2
East: Holloway Road														
4	L2	29	0.0	29	0.0	0.060	8.9	LOS A	0.0	0.3	0.29	0.88	0.29	47.3
6	R2	56	0.0	56	0.0	0.363	37.1	LOS E	0.5	3.7	0.90	1.05	1.09	37.4
Approach		85	0.0	85	0.0	0.363	27.3	LOS D	0.5	3.7	0.69	0.99	0.82	39.1
North: Bluff Road														
7	L2	118	0.0	118	0.0	0.161	5.6	LOS A	0.1	1.0	0.00	0.23	0.00	56.3
8	T1	487	5.0	487	5.0	0.161	0.0	LOS A	3.6	26.0	0.00	0.09	0.00	58.3
Approach		605	4.0	605	4.0	0.161	1.1	NA	3.6	26.0	0.00	0.12	0.00	57.7
All Vehicles		1286	3.7	1286	3.7	0.363	3.8	NA	3.6	26.0	0.20	0.20	0.24	53.8

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.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 9.0 | Copyright © 2000-2020 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: QUANTUM TRAFFIC PTY LTD | Licence: PLUS / 1PC | Processed: Monday, 7 November 2022 1:32:50 PM

Project: Z:\QUANTUM TRAFFIC\PROJECTS\ACTIVE\2018\Bayside Netball Centre (18-0191)\2022 Update\SIDRA\18-0191 SIDRA 2022.sip9

MOVEMENT SUMMARY

 **Site: 101 [Bluff-Holloway - Post Dev Weekday PM - Sensitivity**
(Site Folder: General)]

 **Network: N101 [Post Dev**
Weekday PM - Sensitivity
(Network Folder: General)]

New Site
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %	v/c	sec		[Veh. veh	Dist m				km/h
South: Bluff Road														
2	T1	560	5.0	560	5.0	0.355	2.2	LOS A	0.7	5.0	0.28	0.12	0.36	55.4
3	R2	114	0.0	114	0.0	0.355	7.5	LOS A	0.7	5.0	0.43	0.18	0.54	50.8
Approach		674	4.2	674	4.2	0.355	3.1	NA	0.7	5.0	0.31	0.13	0.39	54.6
East: Holloway Road														
4	L2	26	0.0	26	0.0	0.056	9.1	LOS A	0.0	0.3	0.32	0.88	0.32	47.1
6	R2	69	0.0	69	0.0	0.584	56.1	LOS F	0.9	6.5	0.95	1.11	1.38	31.3
Approach		96	0.0	96	0.0	0.584	43.2	LOS E	0.9	6.5	0.78	1.04	1.09	33.1
North: Bluff Road														
7	L2	104	0.0	104	0.0	0.175	5.6	LOS A	0.3	1.9	0.00	0.19	0.00	56.7
8	T1	556	5.0	556	5.0	0.175	0.0	LOS A	4.4	31.8	0.00	0.08	0.00	58.5
Approach		660	4.2	660	4.2	0.175	0.9	NA	4.4	31.8	0.00	0.09	0.00	58.0
All Vehicles		1429	3.9	1429	3.9	0.584	4.8	NA	4.4	31.8	0.20	0.18	0.26	52.6

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.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 9.0 | Copyright © 2000-2020 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: QUANTUM TRAFFIC PTY LTD | Licence: PLUS / 1PC | Processed: Monday, 7 November 2022 1:32:57 PM

Project: Z:\QUANTUM TRAFFIC\PROJECTS\ACTIVE\2018\Bayside Netball Centre (18-0191)\2022 Update\SIDRA\18-0191 SIDRA 2022.sip9

MOVEMENT SUMMARY

▽ Site: 101v [Netball PM - Wangara Road/Reserve Road]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Reserve Road												
1	L2	82	5.0	0.323	5.6	LOS A	0.0	0.0	0.00	0.08	0.00	57.4
2	T1	524	5.0	0.323	0.0	LOS A	0.0	0.0	0.00	0.08	0.00	59.2
Approach		606	5.0	0.323	0.8	NA	0.0	0.0	0.00	0.08	0.00	58.9
North: Reserve Road												
8	T1	894	5.0	0.505	0.4	LOS A	0.7	5.4	0.08	0.02	0.11	59.3
9	R2	27	5.0	0.505	11.6	LOS B	0.7	5.4	0.08	0.02	0.11	57.2
Approach		921	5.0	0.505	0.7	NA	0.7	5.4	0.08	0.02	0.11	59.2
West: Wangara Road												
10	L2	123	5.0	0.135	8.1	LOS A	0.5	3.8	0.52	0.74	0.52	51.6
12	R2	118	5.0	0.663	38.1	LOS E	2.6	19.1	0.95	1.12	1.55	35.9
Approach		241	5.0	0.663	22.8	LOS C	2.6	19.1	0.73	0.93	1.02	42.5
All Vehicles		1768	5.0	0.663	3.8	NA	2.6	19.1	0.14	0.16	0.20	56.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: QUANTUM TRAFFIC PTY LTD | Processed: Wednesday, 10 February 2021 1:49:23 PM

Project: C:\Users\brent\Desktop\New Work - Migrate To Harddrive\Active\Bayside Netball Centre (18-0191)\SIDRA\18-0191(Sensitivity Test Volume).sip8

MOVEMENT SUMMARY

 **Site: 101v [Netball PM - Bay Road/Reserve Road]**

New Site

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Reserve Road												
1	L2	197	5.0	0.210	17.9	LOS B	4.6	33.5	0.57	0.73	0.57	45.3
3	R2	503	5.0	1.031	106.9	LOS F	39.7	289.7	1.00	1.24	1.94	21.3
Approach		700	5.0	1.031	81.9	LOS F	39.7	289.7	0.88	1.10	1.56	25.1
East: Bay Road (east)												
4	L2	521	5.0	1.025	98.9	LOS F	58.0	423.8	1.00	1.34	1.81	22.7
5	T1	885	5.0	1.025	93.9	LOS F	58.0	423.8	1.00	1.48	1.83	23.3
Approach		1406	5.0	1.025	95.8	LOS F	58.0	423.8	1.00	1.42	1.82	23.1
West: Bay Road (west)												
11	T1	794	5.0	0.727	14.8	LOS B	25.2	184.2	0.79	0.72	0.79	48.2
12	R2	327	5.0	0.850	51.3	LOS D	14.1	103.0	1.00	1.10	1.76	32.0
Approach		1121	5.0	0.850	25.5	LOS C	25.2	184.2	0.85	0.83	1.07	42.0
All Vehicles		3227	5.0	1.031	68.3	LOS E	58.0	423.8	0.92	1.15	1.50	27.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: QUANTUM TRAFFIC PTY LTD | Processed: Wednesday, 10 February 2021 1:49:22 PM

Project: C:\Users\brent\Desktop\New Work - Migrate To Harddrive\Active\Bayside Netball Centre (18-0191)\SIDRA\18-0191(Sensitivity Test Volume).sip8

MOVEMENT SUMMARY

▽ Site: 101 [Netball PM - Wangara Road / George Street]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: George Street												
1	L2	5	5.0	0.093	6.1	LOS A	0.2	1.3	0.09	0.10	0.09	56.9
2	T1	140	5.0	0.093	0.1	LOS A	0.2	1.3	0.09	0.10	0.09	58.7
3	R2	24	5.0	0.093	6.0	LOS A	0.2	1.3	0.09	0.10	0.09	56.3
Approach		169	5.0	0.093	1.1	NA	0.2	1.3	0.09	0.10	0.09	58.3
East: Wangara Road												
4	L2	57	5.0	0.095	6.0	LOS A	0.4	2.6	0.28	0.60	0.28	52.4
5	T1	2	5.0	0.095	5.8	LOS A	0.4	2.6	0.28	0.60	0.28	52.6
6	R2	35	5.0	0.095	8.5	LOS A	0.4	2.6	0.28	0.60	0.28	51.8
Approach		94	5.0	0.095	6.9	LOS A	0.4	2.6	0.28	0.60	0.28	52.2
North: George Street												
7	L2	14	5.0	0.093	6.0	LOS A	0.2	1.4	0.10	0.13	0.10	56.7
8	T1	133	5.0	0.093	0.1	LOS A	0.2	1.4	0.10	0.13	0.10	58.4
9	R2	23	5.0	0.093	6.0	LOS A	0.2	1.4	0.10	0.13	0.10	56.0
Approach		169	5.0	0.093	1.4	NA	0.2	1.4	0.10	0.13	0.10	58.0
West: Wangara Road												
10	L2	69	5.0	0.212	6.1	LOS A	0.8	6.2	0.35	0.63	0.35	52.5
11	T1	68	5.0	0.212	6.0	LOS A	0.8	6.2	0.35	0.63	0.35	52.7
12	R2	64	5.0	0.212	8.2	LOS A	0.8	6.2	0.35	0.63	0.35	52.0
Approach		202	5.0	0.212	6.7	LOS A	0.8	6.2	0.35	0.63	0.35	52.4
All Vehicles		635	5.0	0.212	3.8	NA	0.8	6.2	0.20	0.35	0.20	55.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: QUANTUM TRAFFIC PTY LTD | Processed: Wednesday, 10 February 2021 1:49:22 PM

Project: C:\Users\brent\Desktop\New Work - Migrate To Harddrive\Active\Bayside Netball Centre (18-0191)\SIDRA\18-0191(Sensitivity Test Volume).sip8

MOVEMENT SUMMARY

 Site: 101 [Netball Sat - Bay Road/George St]

 Network: N101 [Netball Sat - Bay/George/Advantage]

New Site
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	Arrival Flows HV	Flows Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: George Street														
1	L2	215	5.0	215	5.0	0.309	12.0	LOS B	1.4	10.1	0.55	1.01	0.62	44.7
3	R2	82	5.0	82	5.0	0.705	65.5	LOS F	2.7	19.8	0.97	1.14	1.56	28.8
Approach		297	5.0	297	5.0	0.705	26.8	LOS D	2.7	19.8	0.67	1.05	0.88	36.1
East: Bay Road (east)														
4	L2	73	5.0	73	5.0	0.265	5.6	LOS A	0.0	0.0	0.00	0.09	0.00	57.3
5	T1	861	5.0	861	5.0	0.265	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	59.2
Approach		934	5.0	934	5.0	0.265	0.5	NA	0.0	0.0	0.00	0.05	0.00	58.9
West: Bay Road (west)														
11	T1	940	5.0	940	5.0	0.386	1.8	LOS A	2.9	20.8	0.17	0.08	0.22	56.1
12	R2	124	5.0	124	5.0	0.386	12.4	LOS B	2.9	20.8	0.74	0.35	0.97	43.7
Approach		1064	5.0	1064	5.0	0.386	3.1	NA	2.9	20.8	0.23	0.11	0.31	54.3
All Vehicles		2295	5.0	2295	5.0	0.705	5.1	NA	2.9	20.8	0.19	0.21	0.26	51.9

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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: QUANTUM TRAFFIC PTY LTD | Processed: Wednesday, 10 February 2021 1:49:28 PM

Project: C:\Users\brent\Desktop\New Work - Migrate To Harddrive\Active\Bayside Netball Centre (18-0191)\SIDRA\18-0191(Sensitivity Test Volume).sip8

MOVEMENT SUMMARY

 Site: 101 [Netball PM - Bay Road/George St]

 Network: N101 [Netball PM - Bay/George/Advantage]

New Site
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Total	Flows HV	Arrival Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed	
		veh/h	%	veh/h	%	v/c	sec		veh	m			km/h	
South: George Street														
1	L2	221	5.0	221	5.0	0.352	13.2	LOS B	1.7	12.1	0.59	1.05	0.74	43.5
3	R2	59	5.0	59	5.0	0.522	53.6	LOS F	1.8	12.8	0.96	1.07	1.25	31.8
Approach		280	5.0	280	5.0	0.522	21.7	LOS C	1.8	12.8	0.67	1.05	0.84	38.6
East: Bay Road (east)														
4	L2	83	5.0	83	5.0	0.306	5.6	LOS A	0.0	0.0	0.00	0.09	0.00	57.3
5	T1	964	5.0	964	5.0	0.306	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	59.1
Approach		1047	5.0	1047	5.0	0.306	0.5	NA	0.0	0.0	0.00	0.05	0.00	58.9
West: Bay Road (west)														
11	T1	882	5.0	882	5.0	0.375	2.1	LOS A	2.8	20.3	0.16	0.07	0.20	55.7
12	R2	107	5.0	107	5.0	0.375	14.7	LOS B	2.8	20.3	0.80	0.37	1.03	41.4
Approach		989	5.0	989	5.0	0.375	3.5	NA	2.8	20.3	0.23	0.11	0.29	53.7
All Vehicles		2317	5.0	2317	5.0	0.522	4.3	NA	2.8	20.3	0.18	0.19	0.23	53.0

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.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: QUANTUM TRAFFIC PTY LTD | Processed: Wednesday, 10 February 2021 1:49:30 PM

Project: C:\Users\brent\Desktop\New Work - Migrate To Harddrive\Active\Bayside Netball Centre (18-0191)\SIDRA\18-0191(Sensitivity Test Volume).sip8