PROPOSED
BUNNINGS DEVELOPMENT

461 – 495 VICTORIA ROAD, GLADESVILLE
COLLEGE STREET ROAD CLOSURE

12 Month Post Implementation Review Report

May 2018
(Rev F)

Reference 16001

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1. INTRODUCTION

Development Consents (DA and S96) have been granted for development of the Bunnings site on a staged basis comprising:

Stage 1	**Stage 2**	**Stage 3**
Bunnings	Bunnings	Bunnings
Child Care Centre	Child Care Centre	Child Care Centre
Retained Building E, F & G	Bulky Good (Part)	Bulky Goods
	Retained Building F & G	

The Bunnings site (Figure 2) has extensive frontages to Victoria Road, Frank Street and College Street. There are industrial and educational uses on the opposite of the Frank Street frontage and industrial uses on the opposite side of the College Street frontage with residential frontages extending along both sides of College Street to the east.

There are extensive existing industrial buildings on the Bunnings site some of which have already been demolished to “make way” for the proposed development.

Due to expressed community concerns in relation to the potential traffic implications of the proposed development as well as other approved and impending developments in the Gladesville area Council engaged Bitzios Consulting to undertake a comprehensive study of the area (Gladesville Traffic and Parking Study). Bitzios held a community forum in August 2014 and one of the identified “treatments” for assessment in the study was the introduction of a road closure in College Street to prevent through traffic movements.

Consent Conditions No. 4, 5 and 6 of the approval for the Bunnings development relate to the requirements for the introduction of a Trial Full Closure of College Street with:

- Preparation and approval of a Traffic Management Plan (for the closure)

- Implementation of the trial closure to Council's satisfaction prior to the commencement of demolition works

- Review of the trial closure 12 months after completion of the modification works at the Victoria Road and Tennyson Road intersection

The process for the trial closure included the undertaking of community consultation and advertising campaigns as well as traffic surveys:

- prior to closure
- immediately after closure
- at 3 monthly intervals following the closure

The purpose of this report is to document a Post Implementation Review of the trial closure of College Street.

The following review has been requested at this time by Ryde City Council officers, notwithstanding the actual wording of Condition 6 which requires this review to occur 12 months after operation of the proposed Tennyson Road intersection.

LEGEND

LOCATION

FIG 1

LEGEND

N

SITE

FIG 2

2. DETAILS OF THE TRIAL CLOSURE

2.1 ACTIONS PRIOR TO TRIAL CLOSURE

- Early 2014 Council commissioned the Bitzios 'Gladesville Traffic and Parking Study'

- August and November 2014 Council convened community forums to discuss the proposed closure and solicited submissions from the community

- Council received 515 submissions and these were considered and summarised with the great majority indicating support for the proposed closure

- 28.4.15 Council resolved to adopt the findings and recommendations of the Bitzios Study including the proposed trial closure of College Street in conjunction with the Bunnings development

- 25.10.15 the Sydney East JRPP having considered the outcome of the community consultation process, the results of the Bitzios Study and Council's resolution of 28.4.15, resolved to approve the Bunnings Development Application.

- February 2016 a Traffic Management Plan for the trial closure (as required by Consent Condition No. 4) was prepared, submitted to and approved by Council and this included the completed RMS TMP PROFORMA which is reproduced in Appendix A.

- A Communications and Consultation Strategy was documented (see Appendix B) and adopted for implementation of the trial closure and subsequently enacted for the trial closure. This included a "letter box drop" to all properties in the affected area and advertisements in the local newspaper advising of the proposed closure and the intended implementation date. Details are provided in Appendix C.

2.2 DETAILS OF TRIAL CLOSURE

Details of the arrangements for the implementation of the trial closure are provided on Figure 3 which included:

- Preformed concrete “Jersey kerb” sections with a section of chain (locked)
- NO STOPPING restrictions
- NO THROUGH ROAD signage
- Temporary advance VMS signs (before and after closure)

The closure was implemented on 6.11.2016 and in the following months at the request of Council officers a number of minor changes and additions were made principally including provision of additional bollards and signage.

2.3 ACTIONS FOLLOWING TRIAL CLOSURE

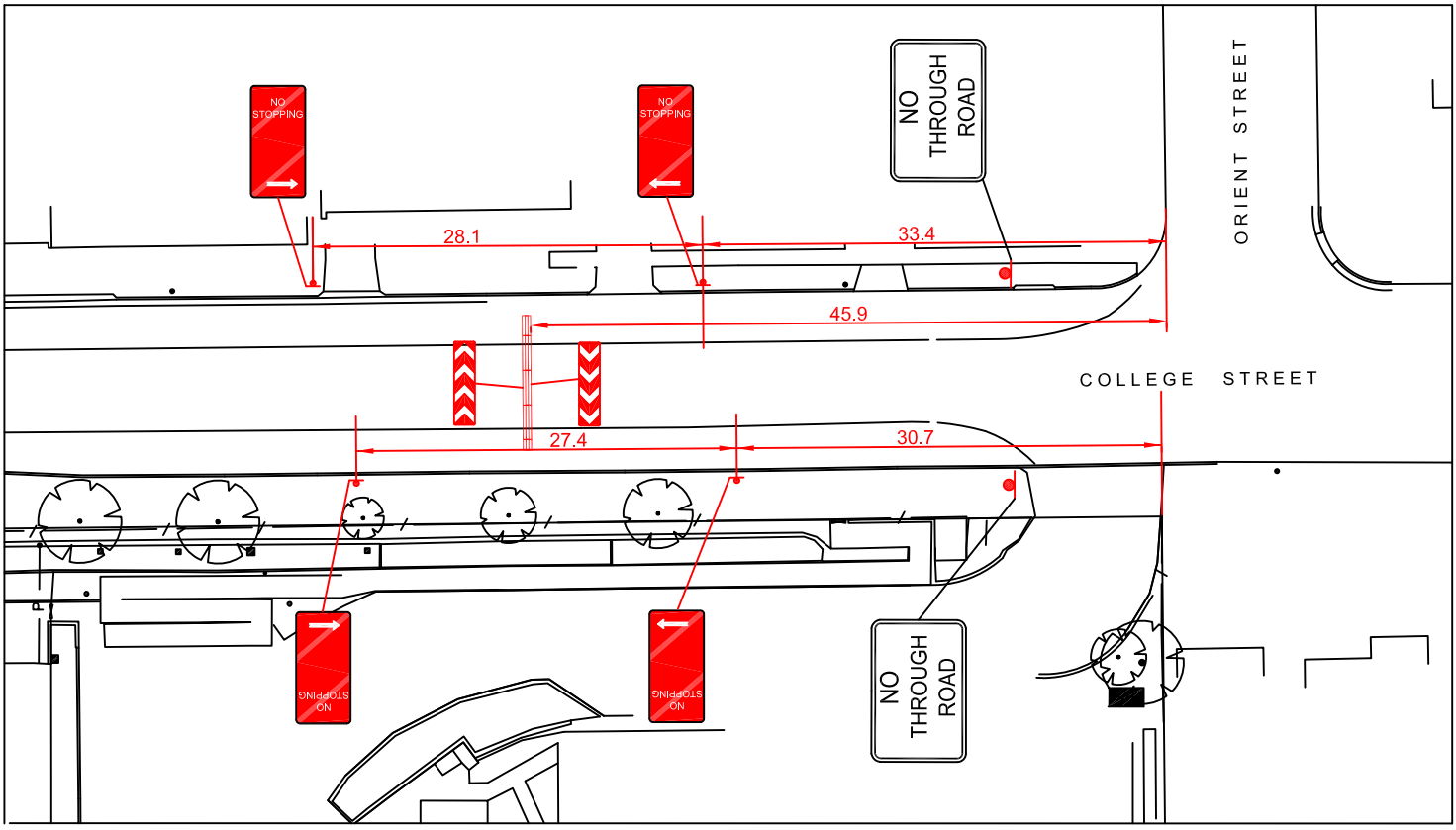
The Communications and Consultation Strategy continued with the 1800 info line for 4 weeks, VMS signs remained for 4 weeks and a Community Consultation Summary was prepared summarising the community “feedback”. An extract from this summary is provided in Appendix D while the "4 Week Review" is reproduced in Appendix E.

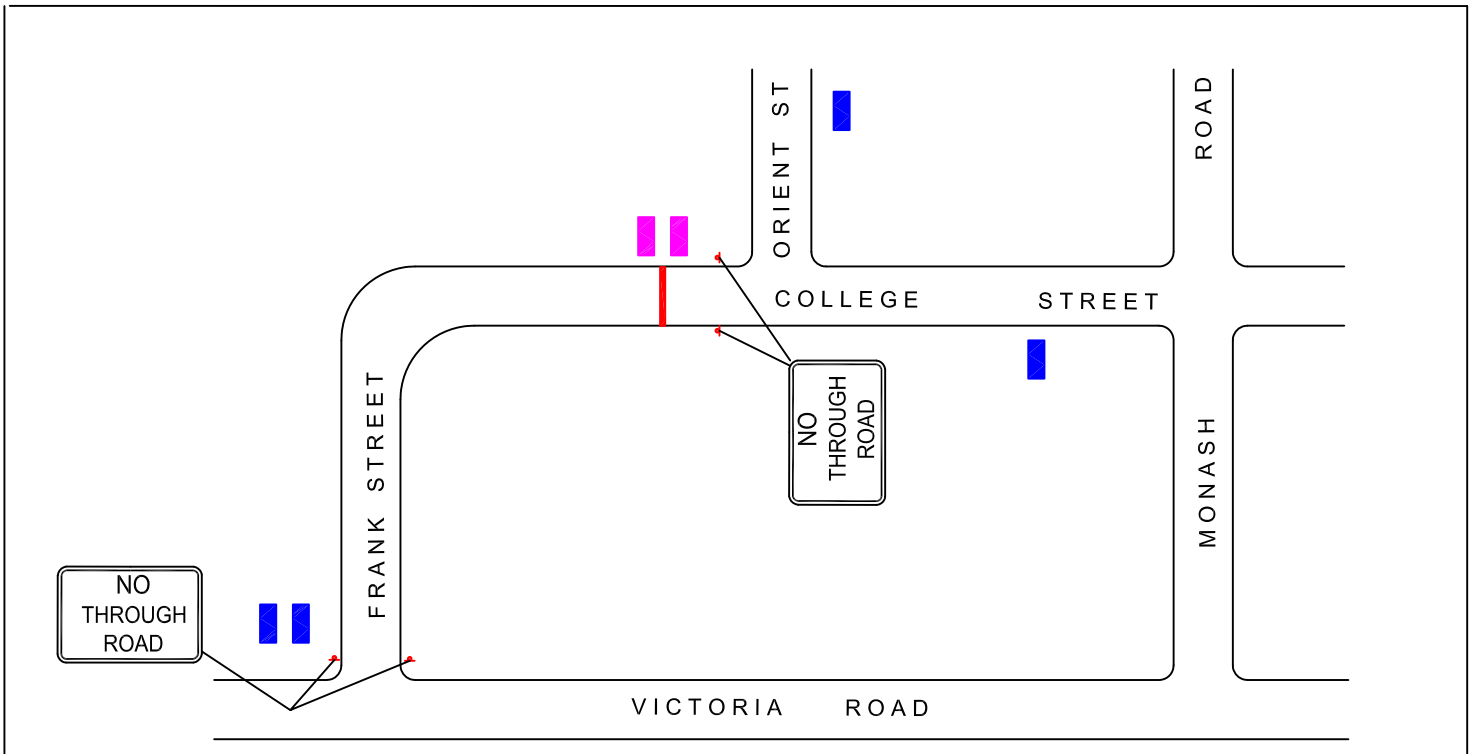
2.4 DATA COLLECTION

It is a requirement of the approved Traffic Management Plan (Rev G) that traffic surveys be taken to document the traffic movement circumstances prior to and immediately after the closure and at 3 monthly intervals after the closure for a 12 month period. The approved TMP (page 5) specified that the surveys be undertaken:

- in Cressy Road north of Victoria Road
- in College Street east of Orient Street
- in Orient Street north of College Street

These surveys were undertaken by the specialist survey company CFE Technology with 7 day/24 hours automatic “tube” recordings.





LEGEND

- CONCRETE BARRIERS
- HAZARD MARKERS
- VMS BEFORE
- VMS AFTER/ONE WEEK PRIOR TO CLOSURE

PROPOSED ROAD CLOSURE DETAILS

FIG 3

3. BITZIOS ASSESSMENT & CONSULTATION STRATEGY

Bitzios Assessment

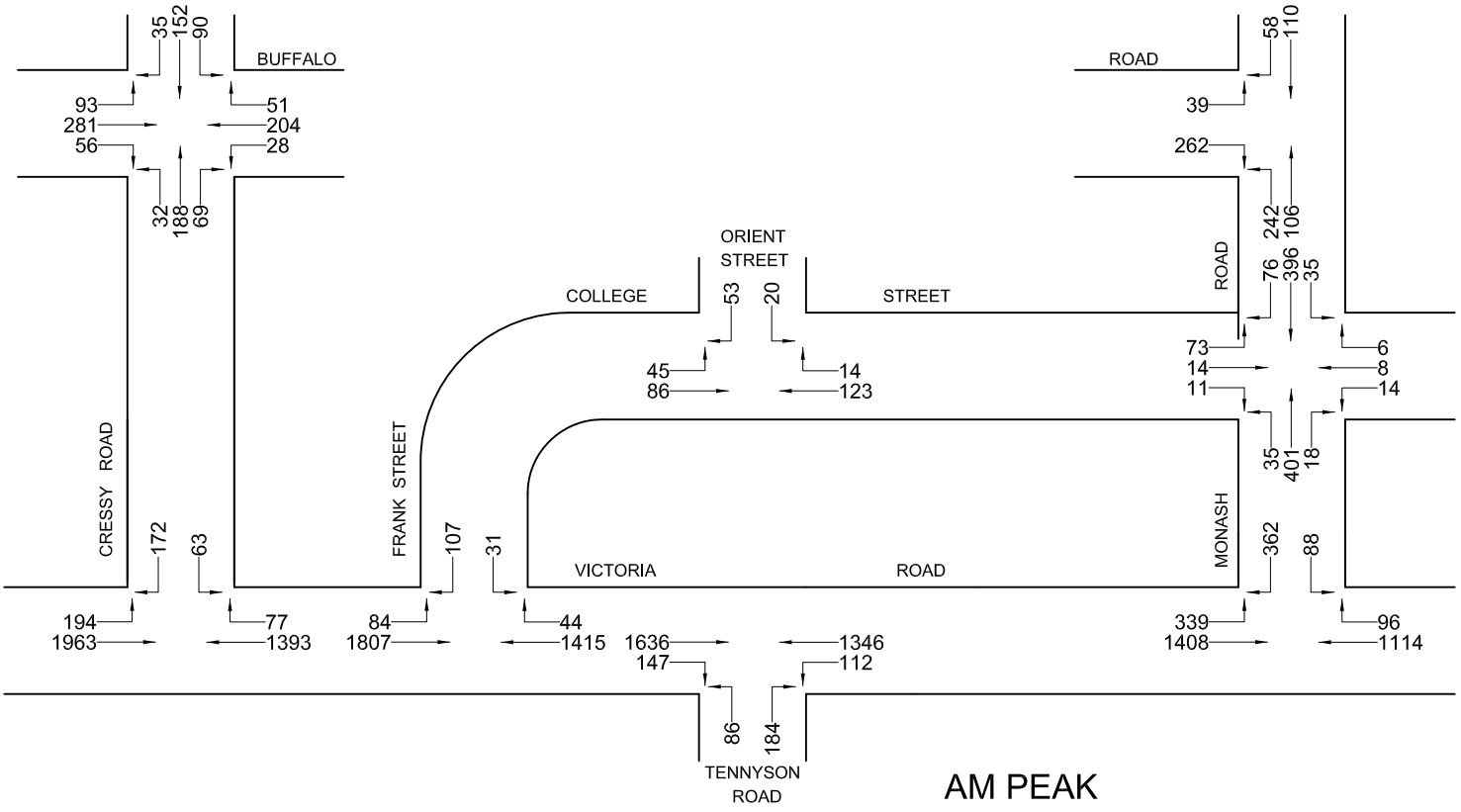
Assessment of the potential traffic implications of the proposed road closure were the subject of the Bitzios Traffic Study. Pertinent details and conclusions of that study are provided in the extracts reproduced in Appendix F while the AM and PM peak movement volumes recorded in 2014 at intersections in the vicinity of the proposed road closure are reproduced from the study in Figure 4.

A principal conclusion of the study was that the proposed road closure could be implemented without any adverse traffic implications.

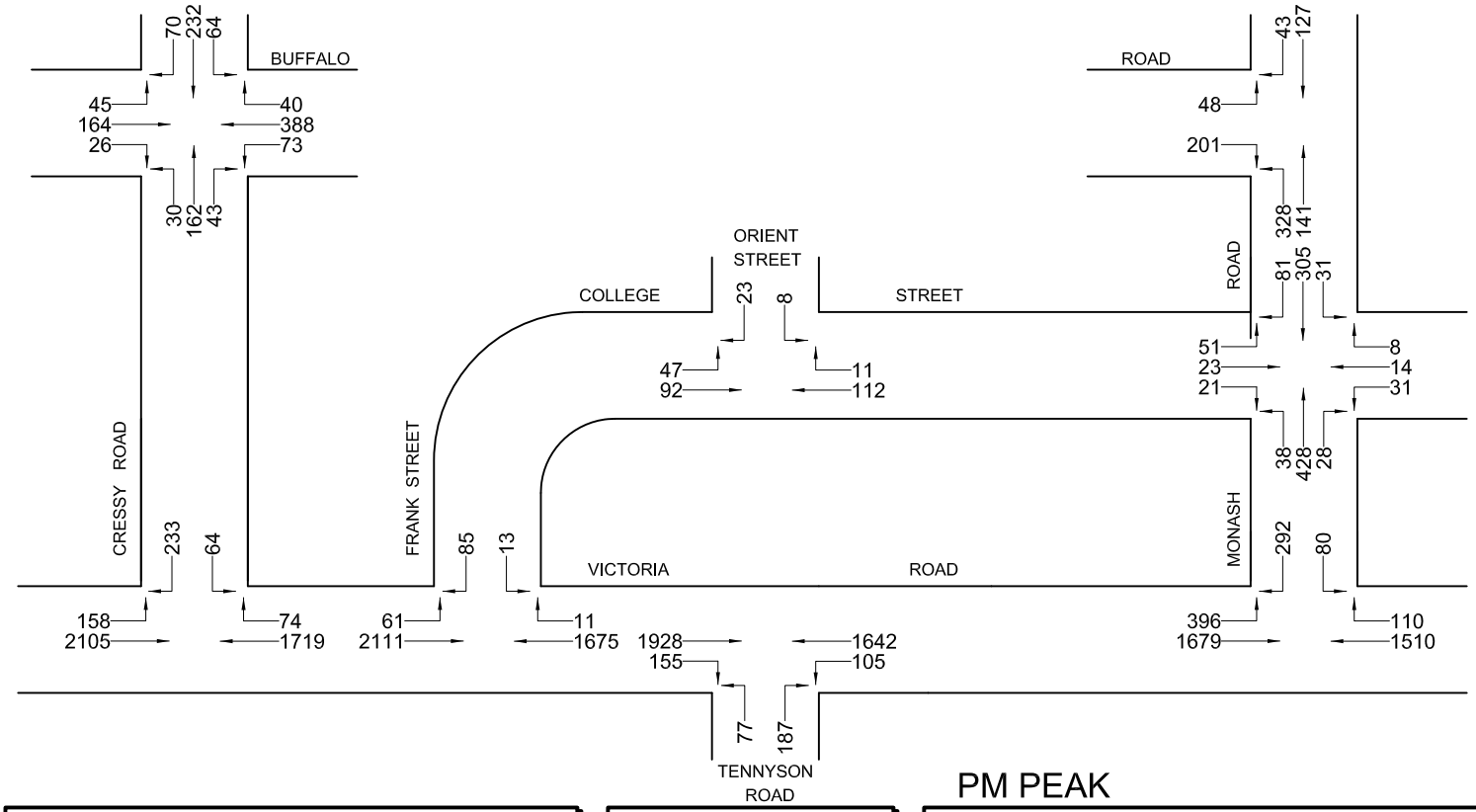
Consultation Strategy

As can be seen in Appendix E, the trial "Full Closure" has been noted as having negative and/or significant impacts on the respondents of the post Consultation review.

It should be noted that the majority of those that contacted Bunnings or Council were complaining of the inconvenience.



AM PEAK



PM PEAK

LEGEND

Source : Bitzios Consulting

EXISTING (2014) PEAK VOLUMES (PRE - CLOSURE)

FIG 4

4. ASSESSMENT OF TRAFFIC IMPACTS

Assessment of the traffic impacts of the trial closure is provided by the results of the 24/7 automatic traffic surveys undertaken on Cressy Road (as specified in the Consent) prior to the closure implementation and 3 monthly intervals after the closure. This comparison is provided in the following for the "before" surveys (October 2016) and the "after" surveys in February, May, July and November 2017.

5 Day Average Recorded Volumes

On Cressy Road

	BEFORE			AFTER											
	October			February			May			July			November		
Cressy	**BD**	**NB**	**SB**	**BD**	**NB**	**SB**	**BD**	**NB**	**SB**	**BD**	**NB**	**SB**	**BD**	**NB**	**SB**
AM	604	268	336	687	382	305	600	350	252	657	367	285	654	369	299
PM	616	342	274	590	263	328	607	293	314	589	274	318	607	300	264
College	**BD**	**NB**	**SB**	**BD**	**NB**	**SB**	**BD**	**NB**	**SB**	**BD**	**NB**	**SB**	**BD**	**NB**	**SB**
AM	229	96	139	76	40	36	85	44	41	82	43	40	78	39	40
PM	226	122	105	86	41	44	79	38	42	76	39	37	77	37	40
Orient	**BD**	**NB**	**SB**	**BD**	**NB**	**SB**	**BD**	**NB**	**SB**	**BD**	**NB**	**SB**	**BD**	**NB**	**SB**
AM	126	74	52	34	18	19	49	27	21	48	26	22	40	22	19
PM	106	45	61	43	21	26	49	20	29	46	20	27	49	21	27

College Street – East of Orient Street

** BD Total Both Directions*

NB Northbound etc.

*** the times of single direction peaks do not always correspond with the times of the bidirectional peak therefore the sum is not equal*

**** full copies of the CFE recordings have been provided to Council on an ongoing basis with each 3 monthly report*

These traffic surveys were undertaken in accordance with the Consent requirements and the trial road closure would have its most direct impact on Cressy Road, however the results indicate:

- overall movements in Cressy Road have only marginally increased since the closure
- the numbers of north and southbound movements have varied with more northbound movements in the AM, but less southbound movements in the AM
- the above is reversed in the PM with a slight increase in southbound and decrease of northbound movements
- movements (total and in any direction) have substantially reduced since closure of College Street

The approval terms for the trial closure did not specify that traffic surveys be undertaken in Frank Street however subsequently Council officer have requested that a survey and assessment process be undertaken in relation to the impact of the trial closure on traffic movements in Frank Street.

In order to undertake this assessment, the following data has been obtained:

- RMS SCATS count data for vehicles in Frank Street approaching Victoria Road for 1 week (Mon – Fri)
- CCTV recording of egress queues in Frank Street for 1 week (Mon – Fri 8.00am – 9.30am and 2.30pm – 6.00pm)
- Traffic counts and observations of vehicle movements ingressing and egressing the school on Frank Street
- Traffic counts at the Victoria Road/Frank Street intersection during the AM and PM peak periods for 1 weekday (to enable SIDRA modelling)

The RMS SCATS count data was obtained for 1 week periods before and after the introduction of the closure and this is reproduced in Appendix G.

The "before" and "after" Frank Street 'approach' volumes for the AM peak (7.00 – 8.00 & 8.00 – 9.00) and PM peak (3.00 – 4.00, 4.00 – 5.00 & 5.00-6.00) have been summarised in the graph form which is provided overleaf. It can be seen that overall there has been a general increase in the volume of vehicles egressing Frank Street in these periods which include the peak school drop off and pick up times.

The CCTV recording of queues on the Frank Street approach movements were recorded for the periods 8.00 – 9.30am and 2.30 – 6.00pm for 1 week in March. The results of those surveys are provided in Appendix H and indicate that queue "spikes" of up to 18 cars occurred for the right turn movement out of Frank Street in the period 3.00pm – 3.30pm. A closer analysis of the Monday and Wednesday results for this period reveal that a significant number of cars were still queued at the end of the green signal to Frank Street. See Appendix H.

The surveys at the school driveway on Frank Street (Appendix I) revealed:

- A peak of 122 vph accessing between 8.0 – 9.0am (54 entering and 68 exiting)
- A peak of 159 vph accessing between 3.45 – 4.45pm (44 entering and 115 exiting)

The results of the peak period traffic counts undertaken at the Victoria Road/Frank Street intersection in March are provided in Appendix J and a SIDRA assessment has been undertaken to analyse the operational performance of this intersection for the "post closure" circumstance. The SIDRA assessments include a vph basis as well as the 15 minute School egress peak.

The results of the SIDRA assessments are provided in Appendix K and summarised for the vph basis in the following:

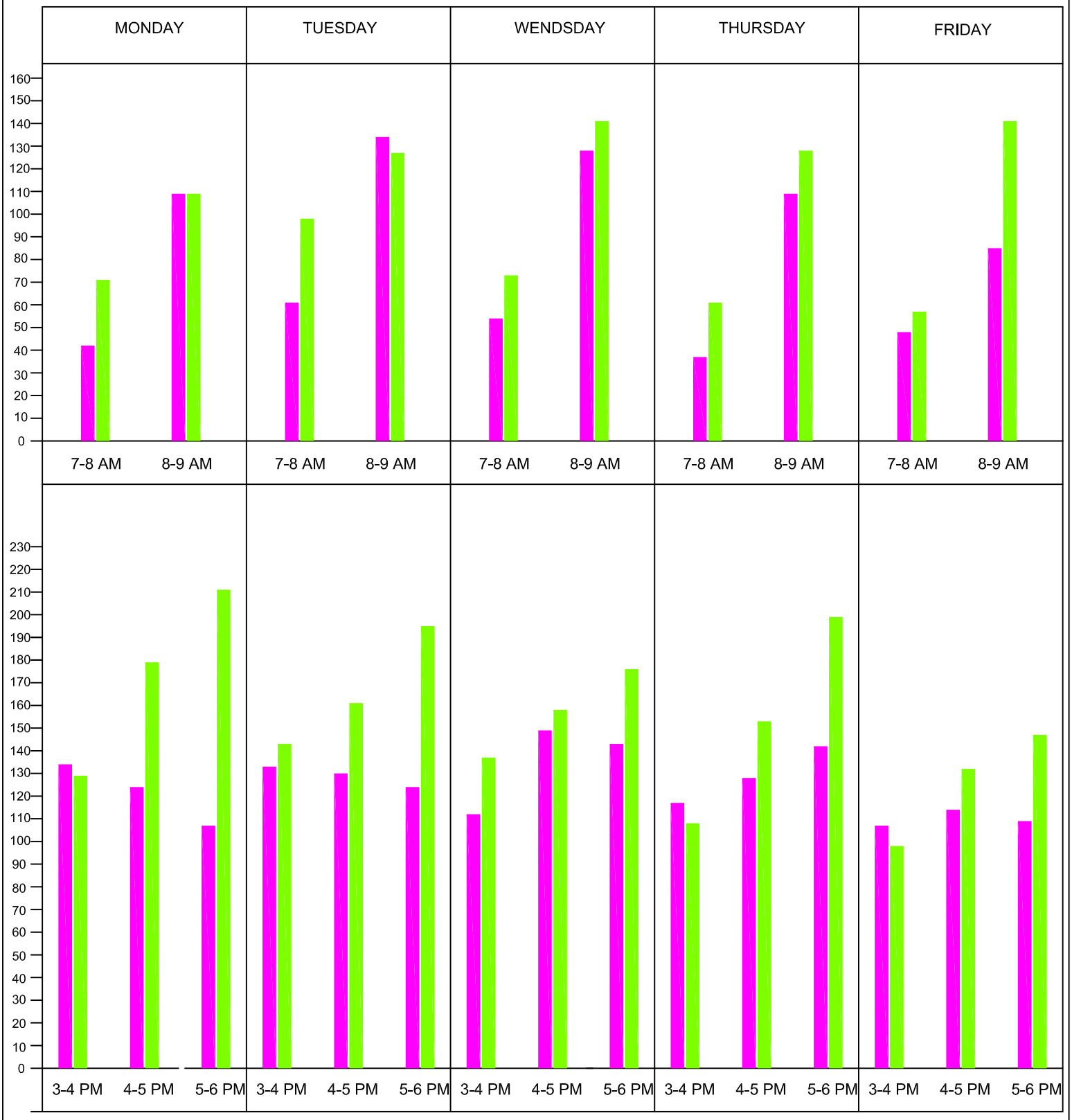
SIDRA Results	**AM**	**PM**	
See Appendix K	**8 – 9**	**3 – 4**	**4.30 – 5.30**
LOS	A	A	A
AVD	4.0s	4.7s	7.1s
Frank Street RT	F	F	F
Frank Street Queue	49m	64m	78m

The results indicate that while the intersection has an overall LOS A, the Frank Street right turn movement has a LOS F and the queuing results largely reflect the results of the queue surveys.

There is no record available of any queuing which may have occurred in Frank Street in the afternoon school departure period prior to the closure. However, the graph comparison of the RMS SCATS count data provided overleaf for before and after closure reveals relatively minor change in the egress volumes during the 3.0 to 4.0 pm period. The results of the intersection survey reveal that the total approach movement in Frank Street is relatively consistent between 2.30pm and 6.00pm with the 1 hour peak occurring in the 4.30 – 5.30 period (worker departure).

However, the survey results reveal an increase in the right turn movement out of Frank Street between 3.15 and 3.30pm (school departure) and this movement conflicts with the movement of school children crossing Victoria Road on the western side of Frank Street. This right turn movement is held on “red” while the pedestrians are crossing. However, this traffic signal operation was changed with the RMS road widening works and the before and after signal designs are reproduced with the related SCATS count data in Appendix G (although the after design shows the Frank Street widening). “Drilling down” into the details reveals that:

- the right turn movement out of Frank Street is now held for the WALK & CLEARANCE periods (24 seconds) which is significantly longer than just the WALK period (6 seconds) as per the previous (pre-widening) operation. This new signal timing reflects the proposed future circumstances when there will be



LEGEND

BEFORE 2015

AFTER 2018

N

VEHICLES EGRESSING FRANK STREET AT VICTORIA ROAD BEFORE AND AFTER ROAD CLOSURE

2 lanes to turn right out of Frank Street (i.e. RMS policy for 2 lane turn conflicting with pedestrians).

The evidence shows that the current queuing circumstance in the 3.0-4.0 pm period is a result of short school generated vehicle peak movements conflicting with school children crossing movements in a circumstance where the traffic signal delay (pedestrian protection) has been increased significantly from what formerly prevailed.

It is apparent that the temporary road closure has acted to increase the volume of vehicles egressing from Frank Street into Victoria Road. The queuing which now occurs in Frank Street during the afternoon school departure time has been exacerbated by the changed RMS signal provisions in relation to the protected conflict between the right turn movement and of Frank Street and pedestrians crossing Victoria Road.

5. MITIGATION STRATEGIES / PROPOSALS

The formal and final requirement to review the operation of the temporary road closure will occur 12 months after the change to the Tennyson Road intersection.

The potential mitigation measures are:

- RMS to be requested to change the “red for pedestrian” protection back to the former walk only period or provide more “green time” to Frank Street until such time as the Frank Street widening is completed
- the closure to be modified to permit a one-way eastbound movement.

APPENDIX A

TMP PROFORMA

C. TMP FORMAT

A. Description or detailed plan of proposed measures.
Is a detailed plan of the proposed measures necessary?

Yes Provided in the TMP
~~No~~ (state reason)

B. Identification and assessment of impact of proposed measures.
Is a detailed assessment required?

Yes Provided in the Bitzios Study.
~~No~~ (state reason)

C. Measures to ameliorate the impact of re-assigned traffic.
Is an assessment required?

Yes Cressy Street to be widened as identified in the Bitzios Study and the Victoria Road/Frank Street and Victoria Road/Tennyson Street intersections are to be upgraded.
~~No~~ (state reason)

D. Assessment of public transport service affected.
Is an assessment required?

~~Yes~~
No (state reason) There are no public transport services affected. Bus priority measures on Victoria Road will be upgraded as a result of the Bunnings development.

E. Details of provision made for emergency vehicles, heavy vehicles, cyclists and pedestrians.
Are these details required?

Yes Pedestrians and cyclists will not be affected. Heavy vehicles and emergency vehicles will divert via Monash Road but will still be able to access College Street via Frank Street.
~~No~~ (state reason)

F. Assessment of effect on existing and future developments with transport implications in the vicinity of the proposed measures.
Is an assessment required?

Yes Assessment is provided in the Bitzios Study.
~~No~~ (state reason)

G. Assessment of effect of proposed measures on traffic movements in adjoining Council areas.
Is an assessment required?

~~Yes~~
No (state reason) There will be no effect in the adjoining Council areas which are at least 2km away.

H. Public consultation process.
Is a public consultation process required?

Yes A comprehensive consultation was undertaken by Council and some 515 representations and letters of support were received and Council resolved to proceed with the trial closure.
~~No~~ (state reason)

APPENDIX B

COMMUNICATION AND CONSULTATION STRATEGY

1 The trial closure of College Street – a communications and consultation strategy

About this strategy

The purpose of this strategy is to ensure that impacted stakeholders – particularly local residents, adjacent business owners and operators and people accessing the nearby school, Holy Cross Ryde, are informed about the trial closure of College Street.

Through a proactive upfront communication approach, the element of surprise will be alleviated and stakeholders will have the opportunity to make alternative arrangements to minimise any frustration or negative impacts upon stakeholders.

Implementation strategy

Key stakeholder meeting – Holy Cross Ryde	Offer a briefing with the project team to Holy Cross Ryde to: » establish a good relationship with the key stakeholder » provide relevant information to the school, to distribute to students and school users. May also offer electronic versions of easy-to-read maps and details about the closure for inclusion in written and/or electronic school communication with students and school families.	Three weeks prior to commencement of works
Key stakeholder meetings – Emergency services	Offer briefings on the changes to emergency services including Police, ambulance and fire services.	Early 2016

Newsletter / letter to stakeholders	A newsletter detailing the trial full closure to be distributed via letterbox drop to local stakeholders, including residents, local business owners/operators and the Holy Cross Ryde school community. The catchment area will be agreed with the project team. The newsletter will include: » an introduction to the project and context » easy-to-read maps showing traffic changes » contact information for the project team (including dedicated project email address and infoline) and the City of Ryde.	Min. 2 weeks prior to commencement of trial full closure of College Street
Email notification to Council database	An electronic form of the above letter to stakeholders will be distributed to stakeholders listed on the Council database, with some tailored language. Council has the email contacts of most of the people who made submissions during previous consultation phases relating to the proposal.	Min. 2 weeks prior to commencement of trial full closure of College Street (same day as the above letterbox distribution)
Project infoline	A project infoline (1800 number) will be set up to field comments, concerns and feedback from stakeholders about the trial full closure of College Street. Elton Consulting would organise set up and management of the infoline. Where necessary, the calls will be escalated to the project team for response or action. All feedback received via the infoline will be captured and reported back to the project team for inclusion in the review of the trial.	Min. 2 weeks prior to commencement until 4 weeks following implementation.

Project email	A dedicated project email will be set up to field comments, concerns and feedback from stakeholders about the trial full closure of College Street. Elton Consulting would organise set up and monitoring of the inbox, including providing agreed responses. Where necessary, the emails will be escalated to the project team for response or action. All feedback received via the project email will be captured and reported back to the project team for inclusion in the review of the trial.	Min. 2 weeks prior of commencement until completion of trial full closure
Newspaper notifications	Notifications / advertisements will be placed in local newspapers to advise the community about the traffic changes to College Street.	Min. 1 and 2 weeks prior to the commencement of the trial full closure Weekly for the first 3 weeks of the trial
Online survey	Provide an online survey to capture thoughts and feedback about the trial full closure. The purpose of the survey would be to: » provide useful, comparable data for analysis in the review of the trial full closure of College Street » demonstrate that the project team is actively seeking feedback on the trial » investigate *what the traffic changes mean to key stakeholders*.	Available online continuously, from the commencement of the trial to completion (12 months)
Variable message signs (VMS)	» Install two VMS units at suitable locations to the trial closure, so as to inform drivers of the closure, who may not be captured via other consultation methods.	From commencement of work until 4 weeks following implementation
Four week review	» Adjacent businesses and residents in College St will be consulted four weeks after the commencement of the pilot to understand potential issues with the new traffic conditions. » Consultation could include a door knock or online survey and a preliminary report would be provided to Council outlining feedback received.	From commencement of work until 4 weeks following implementation

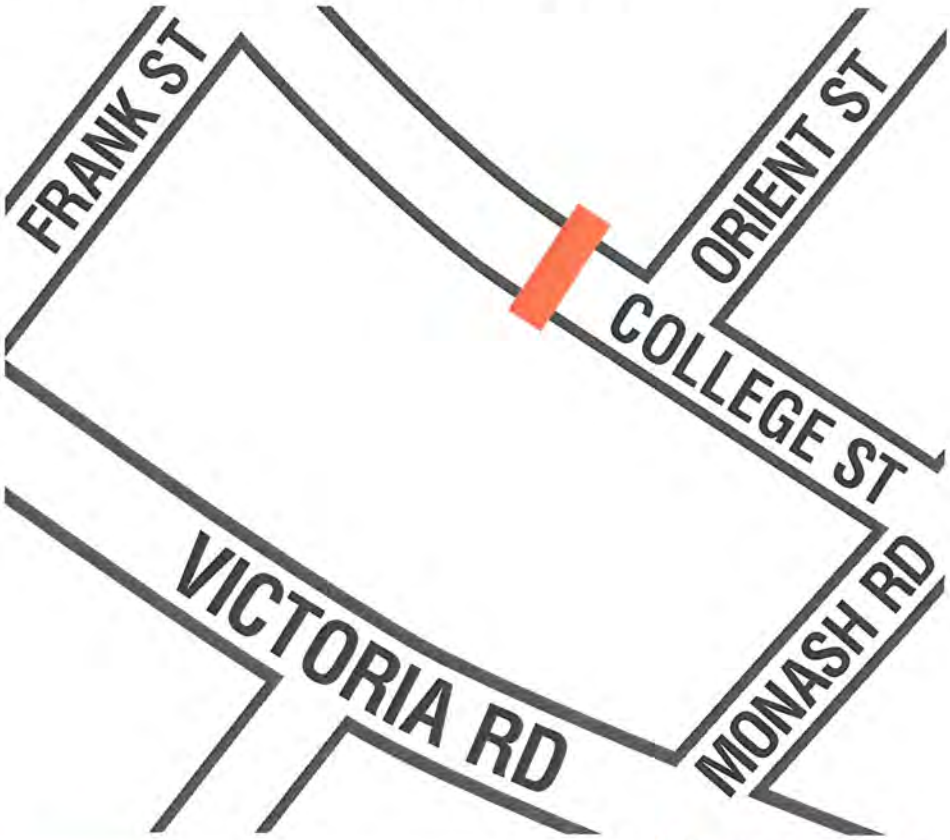
Elton Consulting would draft copy, content and graphic design of written and electronic communications listed above. Where required, the project team will provide technical input and drawings, including maps, as required.

APPENDIX C

DETAILS OF LETTER BOX DROP/ADVERTISING

HAVE YOUR **SAY**

Trial Road Closure - College Street and Frank Street, Gladesville



BUNNINGS warehouse

From midnight Sunday, 6 November 2016 barricades will be located on College Street approximately 45 metres west of the intersection of Orient Street.

During this trial period, there will be no vehicle access between College Street and Frank Street, Gladesville except for emergency service vehicles.

The traffic changes do not affect vehicle access to businesses and residential properties in College Street or Frank Street. The trial closure will assist City of Ryde to evaluate the traffic management for the new Bunnings Warehouse located at 461 – 495 Victoria Road.

Feedback can be made via an online survey at **www.ryde.nsw.gov.au/haveyoursay**

For more information about the trial closure, call 1800 959 965 or email BunningsGladesville@bunnings.com.au

TRIAL ROAD CLOSURE

Traffic changes to College St and Frank Street, Gladesville

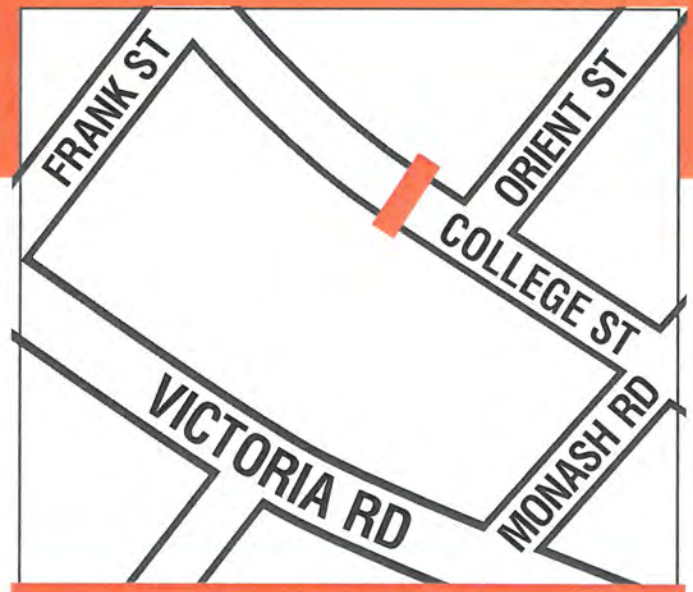
From midnight Sunday, 6 November 2016 there will be no vehicle access between College Street and Frank Street, Gladesville.

Barricades will be located on College Street approximately 45 metres west of the intersection of Orient Street. No vehicles will be allowed to travel between Frank Street and College Street, Gladesville during this trial.

The traffic changes do not affect vehicle access to businesses and residential properties in College Street or Frank Street.

The trial closure will assist Ryde City Council to evaluate the traffic management for the new Bunnings Warehouse located at 461 – 495 Victoria Road.

You can give us feedback on the trial at **research.net/r/bunnings_gladesville**, or via Ryde City Council's website **ryde.nsw.gov.au**



no through vehicular access

For more information about the trial closure please contact 1800 959 965 or email BunningsGladesville@bunnings.com.au

BUNNINGS warehouse

OUR POLICY LOWEST PRICES ARE JUST THE BEGINNING...

APPENDIX D

EXTRACT OF COMMUNITY CONSULTATION SUMMARY

Draft *Bunnings Gladesville Traffic and Parking Study* -- Summary of Submissions to exhibition 17 December 2014 to 30 January 2015

No.	FILE REF	Summary of Submission	Consideration of Issues	Recommendation
1	D14/115470 (Duplicate: D14/122139) And D15/9225	**Full Closure Form Submissions - Resident Orient St** Comments received 1 December 2014 following Information Session held 27 November 2014 • Thanks Council for community consultation • Strongly SUPPORTS traffic study recommendations, in particular full closure of College St • Sensible responses to existing problems and to identified future issues • Closure of College St has greatest impact on most people. Over 8,000 residents live in the traffic study area, risking losing residential amenity with Bunnings and other developments imminent • Residents are not opposing the Bunnings development **Full Closure Form Submission:** Submission dated 29 January 2015 • SUPPORTS recommendations traffic study • Strongly SUPPORTS FULL closure College St, and separation of residential and industrial traffic Reasons for supporting full closure: • The Bunnings and other, future development along College St would unreasonably impact local residential streets if no measures were put in place. • Full closure College St will provide a solution that does not need to be revisited as development grows. • The Bunnings and future development in the industrial area will cause loss of residential amenity on surrounding streets • A closure would provide an effective separation between industrial/commercial traffic and residential traffic • College St is currently a rat run with speeding common and the safety of residents, school students and users of the industrial park compromised. A full closure would eliminate this issue. • Businesses on College St will benefit from better access via Frank St, increased exposure, increased industrial property values increased safety for their employees on a quieter College St. There would be the small inconvenience of reduced access through College St. Over 50% of industrial units in College St are currently unoccupied. One-way option for College St will not work for the following reasons: • The one-way option proposed for College St will not work. As already evidenced in the Eltham St trial • Unenforceable especially as the one-way section is necessarily short. In Eltham St one-way trial drivers are ignoring the one-way requirements • **Full closure would negate the need for complicated traffic arrangements at Bunnings' Frank St** entrance, allow exiting traffic to proceed to other businesses within the industrial area • One-way option does not take into consideration inevitable future development on the northern side of College St West • The one-way option would require all industrial traffic to enter and exit the business park via Victoria Rd • All residents would prefer the minor inconvenience of no access to/from Frank St – i.e. a full closure	**Comments in Response to Full Closure Form Submission** A preference for full closure in College Street is noted <u>Expected growth in the Gladesville Industrial Area</u> It is acknowledged that the Gladesville Industrial Area has and will continue to experience change, both as a result of broader economic and local issues. Change will be experienced both in the type of business operating in the area and also in the type of built form. While many sites in the Gladesville industrial area are developed to their full potential, the Bunnings and some other sites are below the permissible floor space under the existing planning controls and as a result could reasonably be expected to redevelop. Accordingly, the Gladesville industrial area may still experience some growth. <u>Residential Amenity</u> It is acknowledged that residents nearest the Bunnings site will experience the greatest amenity impacts resulting from redevelopment as increased traffic converges on the industrial area and the Bunnings site. The Bunnings peak is expected to occur during Saturday trading hours, when it is currently quiet relatively quiet in College Street with fewer businesses operating. The proposal by the Bunnings (Gladesville) Traffic and Parking Study (traffic study) for one-way/partial or full closure College Street is to specifically address residential amenity and meet the study aims to reduce impacts from redevelopment and Bunnings operations on local residents. <u>Rat running</u> The data collection phase of the traffic study observed through traffic in College and other local streets due to existing congestion at the intersections of Victoria/Monash, Victoria/Cressy and Victoria/ Pittwater. The preferred network responds to these circumstances and reduces rat running in local streets directing traffic to collector roads including Monash and Cressy Roads. <u>Property values</u> No evidence is provided or available regarding the impact of Bunnings on College Street business or industrial property values. However, it is noted that land owners from College Street have advised Council over a period of years that it is increasingly difficult to attract new tenants to the area and that vacancies exist (some long term). There is some evidence therefore that factors, other than the Bunnings proposal, influence tenant decisions to locate in	**Recommendations in response to Full Closure Form Submission** Amend the Bunnings Gladesville Traffic and Parking Study to include the outcomes of the exhibition (add the Council report and the Council resolutions of 14 April 2015 to the study report). Amend the site specific Bunnings DCP to **require implementation of Council's** resolutions with respect to the Bunnings Gladesville Traffic and Parking Study. A report containing traffic data and results of community feedback will be submitted to Ryde Traffic Committee for final decision on whether to retain, remove or modify the current arrangements in Eltham Street. Requests for speed management and a safer pedestrian environment in Orient, Higginbotham and Thompson Streets and Buffalo Road **will be forwarded to Council's** Traffic/Transport and Development Management to prepare a report for consideration of the Ryde Traffic Committee for the development of the speed management scheme in the area that considers • Signage • Pedestrian safety • Traffic calming devices

Draft *Bunnings Gladesville Traffic and Parking Study* -- Summary of Submissions to exhibition 17 December 2014 to 30 January 2015				
No.	**FILE REF**	**Summary of Submission**	**Consideration of Issues**	**Recommendation**
				Amend the site specific Bunnings DCP to **require implementation of Council's** resolutions with respect to the Bunnings Gladesville Traffic and Parking Study.
63	D15/6499	**(Resident, Higginbotham Rd)** • Agrees with most of the traffic study • Does not agree with traffic calming in Higginbotham Rd traffic calming as cause for annoyance for emergency services, buses and local traffic. • Police can monitor those who speed.	Speed Management in Higginbotham Rd/Thompson St Corridor The traffic study recommends treatments for Higginbotham Rd and Thompson Street to slow down traffic in this area. However, the type of speed management measures is not detailed Refer comments on Full Closure Form Submission No 1 In relation to Speed Management	Refer recommendations for Submission No 1 In relation to Speed Management
64	D15/6656	**BUSINESS Form Submission - Employee College St business** Prefers partial closure to full closure College St – however, both result in inconvenience to staff and deliveries and may impact on business Objects to Bunnings if full closure is the outcome of this process.	Preference for a one-way closure over full closure is noted. OBJECTION to full closure in College St is noted. Refer comments on BUSINESS Form Submission No 4	Refer recommendations for Submission No 4
65	D15/6675	**Supports Full Closure Form Submission – Resident Brereton St** • SUPPORTS recommendations traffic study • Strongly SUPPORTS FULL closure College St, and separation of residential and industrial traffic **Additional comments re Tennyson Road/Sth Victoria Road:** • Disappointed study re traffic issues on southern side of Victoria Rd • Tennyson Rd and surrounding streets under pressure from Putney development & RALC traffic • Bunnings will add to current traffic issues • Even more development planned – 2-12&14 Tennyson Road PP, child care centre cnr Victoria Rd/Tennyson Rd, Primrose Hill, expansion of Putney Hill.	Refer comments on Full Closure Submission No 1 **Tennyson Road/South of Victoria Road** The scope of the traffic study included assessment of whether or not traffic volumes will exceed acceptable growth and if so recommend mitigation measures. The traffic model identifies and quantifies traffic growth in Tennyson Rd. It also indicates that the Tennyson/Victoria intersection experiences congestion on the Victoria Rd leg in the PM peak due to the storage capacity i.e. the short distance between Tennyson and Morrison Rd. As a result of the study and traffic modelling, the consultants did not identify a need for mitigation measures in Tennyson Road/south of Victoria Road, as a result of traffic associated with the Bunnings planning proposal.	Refer recommendations for Submission No 1 While no amendments are required to the Planning Proposal or the site specific DCP, it is proposed to require that the proponent of any density increase in Tennyson Road or South of Victoria Road undertakes a detailed traffic study to identify issues and mitigation measures. This approach is supported by the RMS.
66	D15/6676	**(Outside LGA, regular visitor to relatives in College St)** • Concerned about speeding vehicles and additional traffic in College St • Traffic access to College St is an issue	The traffic study puts forward two options – one-way or full closure - to reduce traffic in College St. Both options address through traffic and speeding traffic.	Refer recommendations for Submission No 1
67	D15/6677	**Supports Full Closure Form Submission – Resident Searle St** • SUPPORTS recommendations traffic study • Strongly SUPPORTS FULL closure College St, and separation of residential and industrial traffic **Additional comments re Tennyson Road/Sth Victoria Road:** • Disappointed study re traffic issues on southern side of Victoria Rd • Tennyson Rd and surrounding streets under pressure from Putney development & RALC traffic	Refer comments on Full Closure Submission No 1 Refer comments on Tennyson Road/South of Victoria Road on Submission No 65	Refer recommendations for Submission No 1 Refer recommendations for Submission No 65

Draft *Bunnings Gladesville Traffic and Parking Study* -- Summary of Submissions to exhibition 17 December 2014 to 30 January 2015				
No.	**FILE REF**	**Summary of Submission**	**Consideration of Issues**	**Recommendation**
		• Council needs to consider childcare centres on College and Frank Sts • Does not SUPPORT small one-way option because it will not sufficiently limit traffic on College St, will put residents at risk if motorist disobey the one-way – already evident at Eltham St trial one-way.		
116	D15/7691	**(Resident, Cressy Road)** • Strongly SUPPORTS Bunnings and other developments, but impact on residents is a major factor sharing the burden of traffic and noise • Hidden issues slowly changing the dynamics in the area need addressing – including: • Parking for residences • Increase in traffic flow • Access for school children – Holy Cross College • Reduction in traffic delays – am/pm school pickup/drop off • Reduce damage caused by illegal drop offs. **Suggestions re Cressy Road:** • Wants Cressy Road made one-way southbound towards Buffalo Road – this will widen Cressy Rd to 2 lanes, allow parking in off peak times for at least half of Cressy Rd (currently nearly all taken up during work hours) • Limit drop off same side of road (no u-turns) • Increase flow of traffic out of Cressy onto Victoria • Allow parking in bus bay in non-school times • Eliminate traffic blockage at end of school time for students alighting buses to depart • Permit left turn at end of Cressy Rd • Achievable at minimum cost. • Applauds Council for approach, professional manner.	Victoria Rd is considered a regional road and Cressy Rd a higher order road in the road hierarchy than other local streets such as College St. As a result options such as one way were not considered by the traffic study. The Bunnings traffic impacts will be experienced on Cressy Road as all options - do nothing, partial or full closure College St – result in increased traffic. Both options for partial and full closure College St divert traffic to Cressy Road, but mitigation measures are able to decease wait times at the northern approach to the Victoria/ Cressy Rd intersection and improve the intersection performance. The mitigation measures include widening the street at the intersection. This in particular will benefit locals and reduce wait times at the lights.	Refer recommendations for Submission No 1

117	D15/7698
	
	Duplicate: D15/9954
		(Part owner factory units, College St)
		• Strongly OBJECTS to full closure – cul-de-sac in College St
		• If the Bunnings development is only possible with full closure, then OBJECTS also to Bunnings development
		• One-way option would give Bunnings want they want, and residents a large part of what they want
		• Questions why changes are being considered without informing them or their neighbours
		• Questions why Council exhibited traffic study at a time when schools and factories closed for the holidays
		• Understands there are two options for College St, has Council considered the following:
		  • Full closure with a cul-de-sac would result in trucks turning at where child care centre is proposed
		  • Cul-de-sac would result in very restricted access for emergency vehicles – **shouldn't this require** clearance from the appropriate emergency authorities
		  • Full closure would result in severe disruption to businesses – all deliveries, clients and workers needing to enter/leave via Frank St which is already congested at times without adding Bunnings traffic
		• Adding issues by adding industrial traffic to Frank St used by Holy Cross College, plus two proposed child care
		• Refer Business Form Submission.
			Preference for a one-way closure over full closure is noted. OBJECTION to full closure in College St is noted.
			
			Refer comments on BUSINESS Form Submission No 4
				Refer recommendations for Submission No 4

118	D15/7701	**(Resident, Tennyson Rd, Gladesville)** • Current traffic Tennyson Rd traffic at saturation, difficult to cross or gain access from driveway • Extremely concerned regarding traffic • Wants residents not to be inconvenienced and to be heard over the needs of big business.	Concerns re traffic issues are noted.	No further action recommended

Draft *Bunnings Gladesville Traffic and Parking Study* -- Summary of Submissions to exhibition 17 December 2014 to 30 January 2015				
No.	**FILE REF**	**Summary of Submission**	**Consideration of Issues**	**Recommendation**
310	D15/9229	**(Employee, College St business)** **OBJECTS to full closure** because • Parking would be difficult for business and residents • Would affect my work • Questions the need for another Bunnings.	Refer comments on Business Form Submission No 4	Refer recommendations for Submission No 4
311	D15/9231	**(Resident, Eltham St)** **OBJECTS to a Bunnings development** due to traffic and parking impacts	Objection to Bunnings development/planning proposal is noted.	No further action is recommended
312	D15/9234	**(Employee, College St business)** **SUPPORTS partial closure** because works at College St business and deliveries on a daily basis	Refer comments on Business Form Submission No 4	Refer recommendations for Submission No 4
313	D15/9235	**(Relatives live in Orient St)** **SUPPORTS full closure of College St** as it provides best separation residential and industrial areas, addresses safety and residents amenity.	Refer comments on Full Closure Submission No 1	Refer recommendations for Submission No 1
314	D15/9236	**(Relatives live in Orient St)** **SUPPORTS full closure of College St** as it provides best separation residential and industrial areas, addresses safety and residents amenity. And other recommendations of the Traffic Study	Refer comments on Full Closure Submission No 1	Refer recommendations for Submission No 1
315	D15/9248	**(Resident, College St)** **SUPPORTS full closure of College St** as it provides best separation residential and industrial areas, addresses safety and residents amenity.	Refer comments on Full Closure Submission No 1	Refer recommendations for Submission No 1
316	D15/9250	**(Resident, Orient St)** **SUPPORTS full closure of College St** as it provides best separation residential and industrial areas, addresses safety and residents amenity.	Refer comments on Full Closure Submission No 1	Refer recommendations for Submission No 1
317	D15/9252	**(Past resident of Nelson St)** **SUPPORTS full closure of College St** as it provides best separation residential and industrial areas, addresses safety and residents amenity.	Refer comments on Full Closure Submission No 1	Refer recommendations for Submission No 1
318	D15/9253	**(Resident, Buffalo Rd)** **SUPPORTS full closure of College St** as it provides best separation residential and industrial areas, addresses safety and residents amenity. AND Requests additional measures to address pedestrian safety in Buffalo Rd (safe crossing near Orient St intersection.	Refer comments on Full Closure Submission No 1	Refer recommendations for Submission No 1
319	D15/9256 Duplicate: D15/9316	**BUSINESS form submission - Runs a business in College St** • OBJECTS to full closure College St, and any changes to traffic flow/condition on College St • Half, or worse, full closure will inconvenience staff, deliveries, clients by having limited access to College St • OBJECTS to Bunnings development if full closure is the result	OBJECTION to ANY closure of College St is noted - Do nothing option preferred Refer also comments on BUSINESS Form Submission No. 4 **Refer also comments on "Do Nothing" Submission No. 24**	No further action is recommended in response.

Draft *Bunnings Gladesville Traffic and Parking Study* -- Summary of Submissions to exhibition 17 December 2014 to 30 January 2015				
No.	**FILE REF**	**Summary of Submission**	**Consideration of Issues**	**Recommendation**
		Council should give weight to protection of amenity, social and health issues		
445	D15/11670	**Supports Full Closure Form Submission – Resident Stanbury St Gladesville** • SUPPORTS recommendations traffic study • Strongly SUPPORTS FULL closure College St, and separation of residential and industrial traffic	Refer comments on Full Closure Submission No 1	Refer recommendations for Submission No 1
446	D15/11675	**Supports Full Closure Form Submission – Resident East Ryde** • SUPPORTS recommendations traffic study • Strongly SUPPORTS FULL closure College St, and separation of residential and industrial traffic	Refer comments on Full Closure Submission No 1	Refer recommendations for Submission No 1
447	D15/11679	**Supports Full Closure Form Submission – Resident Albert St Gladesville** • SUPPORTS recommendations traffic study • Strongly SUPPORTS FULL closure College St, and separation of residential and industrial traffic	Refer comments on Full Closure Submission No 1	Refer recommendations for Submission No 1
448	D15/11684 Duplicate: D15/11708	**Supports Full Closure Form Submission (Outside Ryde LGA)** • SUPPORTS recommendations traffic study • Strongly SUPPORTS FULL closure College St, and separation of residential and industrial traffic	Refer comments on Full Closure Submission No 1	Refer recommendations for Submission No 1
449	D15/11687	**Supports Full Closure Form Submission – Resident Buffalo Rd Gladesville** • SUPPORTS recommendations traffic study • Strongly SUPPORTS FULL closure College St, and separation of residential and industrial traffic Additional comment Council should give weight to protection of amenity, social and health issues	Refer comments on Full Closure Submission No 1	Refer recommendations for Submission No 1
450	D15/11690	**Supports Full Closure Form Submission – Resident East Ryde** • SUPPORTS recommendations traffic study • Strongly SUPPORTS FULL closure College St, and separation of residential and industrial traffic	Refer comments on Full Closure Submission No 1	Refer recommendations for Submission No 1
451	D15/11694	**Supports Full Closure Form Submission – Resident Sunnyside St Gladesville** • SUPPORTS recommendations traffic study • Strongly SUPPORTS FULL closure College St, and separation of residential and industrial traffic	Refer comments on Full Closure Submission No 1	Refer recommendations for Submission No 1
452	D15/11697	**Supports Full Closure Form Submission (No address provided)** • SUPPORTS recommendations traffic study • Strongly SUPPORTS FULL closure College St, and separation of residential and industrial traffic	Refer comments on Full Closure Submission No 1	Refer recommendations for Submission No 1
453	D15/11701	**Supports Full Closure Form Submission – Resident Sunnyside St Gladesville** • SUPPORTS recommendations traffic study • Strongly SUPPORTS FULL closure College St, and separation of residential and industrial traffic	Refer comments on Full Closure Submission No 1	Refer recommendations for Submission No 1
454	D15/11707	**Supports Full Closure Form Submission – Resident Parry St Ryde** • SUPPORTS recommendations traffic study • Strongly SUPPORTS FULL closure College St, and separation of residential and industrial traffic	Refer comments on Full Closure Submission No 1	Refer recommendations for Submission No 1

Draft *Bunnings Gladesville Traffic and Parking Study* -- Summary of Submissions to exhibition 17 December 2014 to 30 January 2015				
No.	**FILE REF**	**Summary of Submission**	**Consideration of Issues**	**Recommendation**
510	D15/12717	**Supports Full Closure Form Submission - Resident, Eltham Street** • SUPPORTS recommendations traffic study • Strongly SUPPORTS FULL closure College St, and separation of residential and industrial traffic	Refer comments on Full Closure Submission No 1	Refer recommendations for Submission No 1
511	D15/14083	(Received 4 Feb) **(Residents, College St)** • Concern about increase in traffic volumes - impact on traffic safety • Need for lights to control traffic using College St as a speedway • Don't turn lovely suburb into another Chatswood	Concerns about increased traffic volumes and safety issues are noted. Refer comments on Full Closure Submission No 1	Amend the site specific Bunnings DCP to **require implementation of Council's** resolutions with respect to the Bunnings Gladesville Traffic and Parking Study. Refer recommendations for Submission No 1
512	D15/14084	(Received 4 Feb) **(Residents, Owen St, Gladesville)** • Concerned with proposed traffic changes • Current problems of doing a right turn out of Owen St into Buffalo Road will increase with the proposed development • Cumulative impact when Putney Hill complete – traffic will use Morrison and Buffalo Roads as alternate to Victoria Road • Proposed roundabout and lights at Eltham Street will slow traffic even more causing build up difficulty driving up to Victoria Road.	Refer comments on Full Closure Submission No 1 in relation to speed management A roundabout at the intersection of Buffalo and Monash is recommended to be implemented.	Refer recommendations for Submission No 1
513	D15/13312	**Supports Full Closure Form Submission – Regular visitor College Street** • SUPPORTS recommendations traffic study • Strongly SUPPORTS FULL closure College St, and separation of residential and industrial traffic	Refer comments on Full Closure Submission No 1	Refer recommendations for Submission No 1
515	D15/13314	**Supports Full Closure Form Submission – Regular visitor College Street** • SUPPORTS recommendations traffic study • Strongly SUPPORTS FULL closure College St, and separation of residential and industrial traffic	Refer comments on Full Closure Submission No 1	Refer recommendations for Submission No 1

APPENDIX E

4 WEEK REVIEW SUMMARY REPORT

Trial Road Closure of College Street 4 Week Review of Consultation - Summary Report

Overview

On 6 November 2016 the trial road closure of College Street was implemented.

COR's approval of the Traffic Management Plan in March 2016 required the completion of a 4 week review following implementation. This report provides a compilation of feedback received from all sources.

In November, there were seven calls to the 1800 number, three emails and 37 respondents to the online survey. City of Ryde Council received feedback from ten members of the local community. Feedback from stakeholders were generally negative and non-supportive of the road closure.

The online survey results show that most respondents were made aware of the trial via road signage. The majority of the respondents do not live in Gladesville and either work or visit businesses in Frank or College streets or travel through to another destination.

All respondents have noted the trial having a negative and/or significant impact on them.

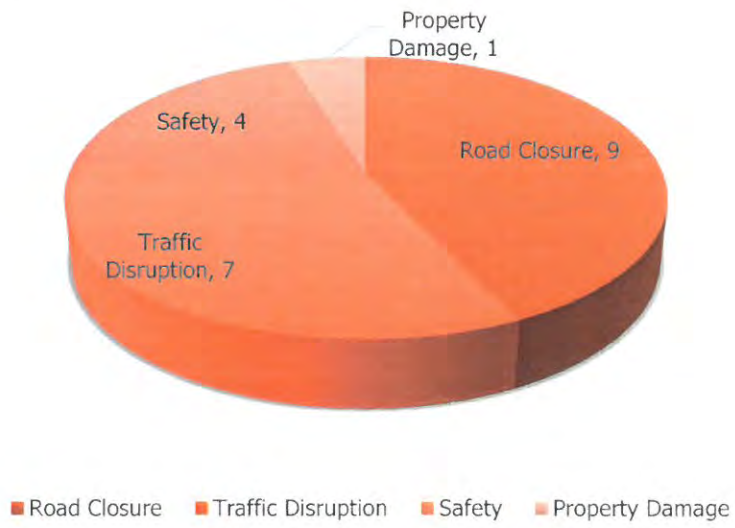
A low number of the respondents use these streets to drop their children to Holy Cross College.

Stakeholder and community contact via Bunnings 1800 number and email, and Gladesville Council

There were 21 contacts made with Bunnings or Council in relation to the trial road closure. A majority of the calls were from local businesses or community members complaining about the inconvenience of the road closure to access properties such as the child care or Holy Cross College.

Area of interest via 1800 number and email

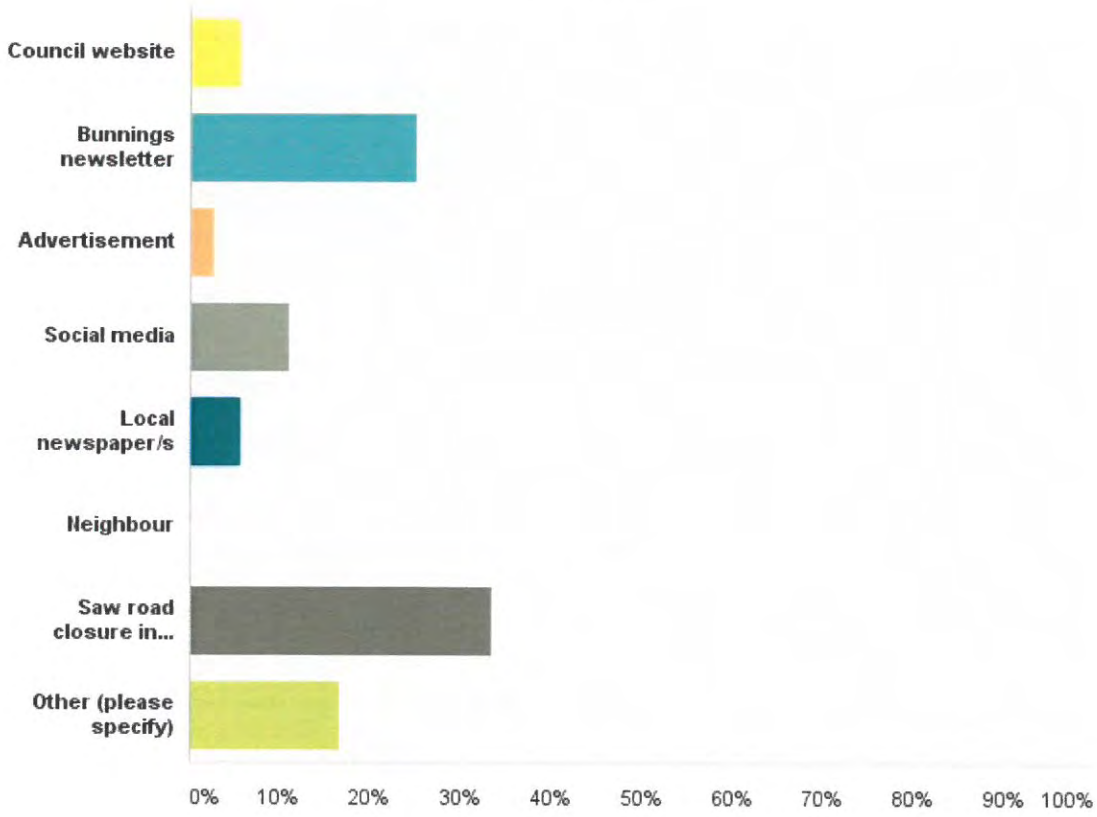
The main feedback was the inconvenience of the road closure and the increased traffic congestion to the local area as a result of the trial. Safety concerns were also raised in relation to the narrow street and the high volume of children frequenting Frank and College streets.



Online Survey

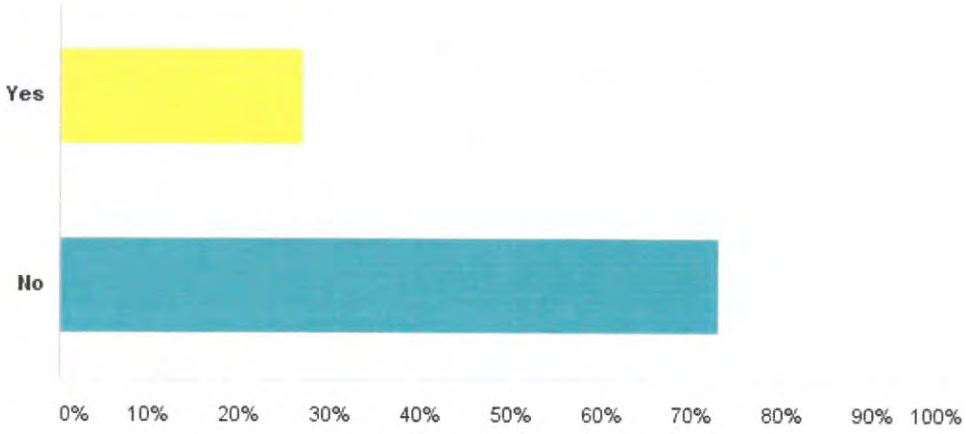
Q1 How did you first become aware of the trial road closure?

Answered: 36 Skipped: 1



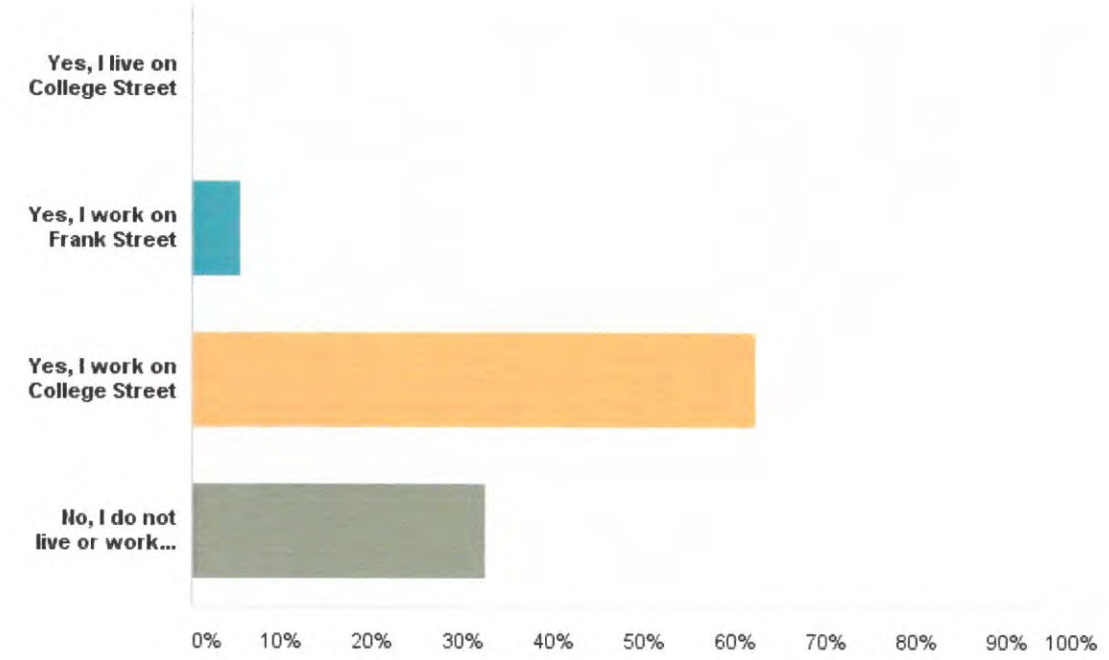
Q2 Do you live in Gladesville?

Answered: 37 Skipped: 0



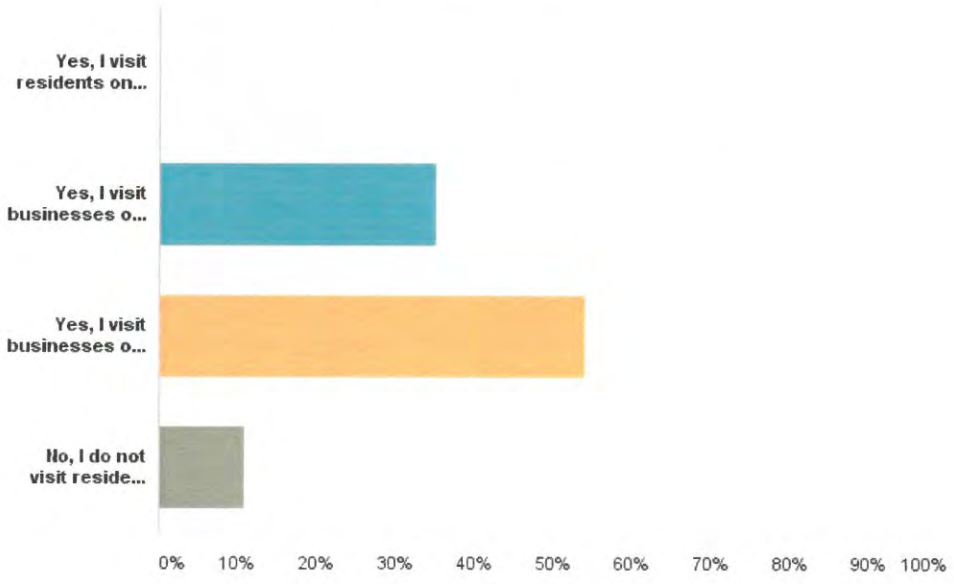
Q3 Do you live or work on Frank Street or College Street, Gladesville?

Answered: 37 Skipped: 0



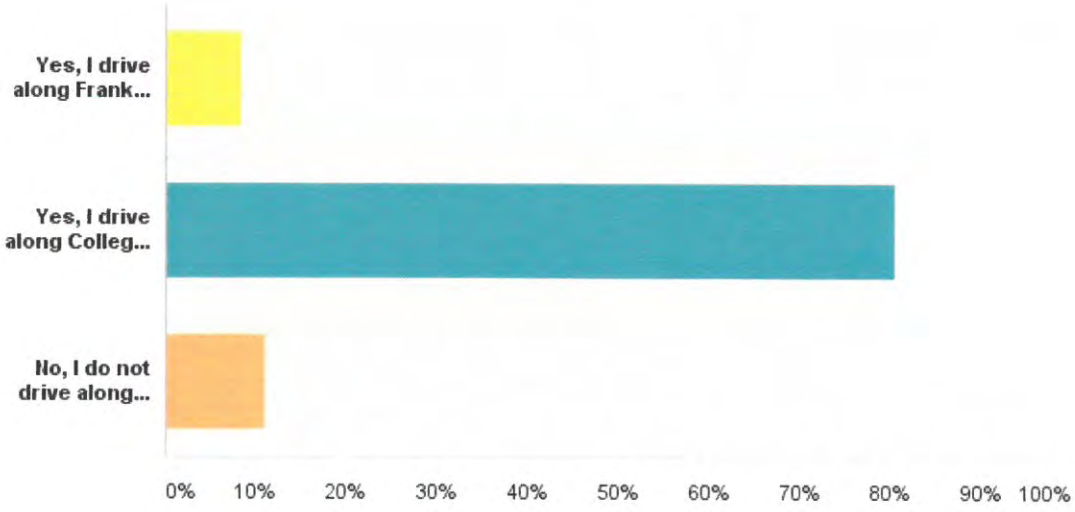
Q4 Do you visit residents or businesses on Frank Street or College Street, Gladesville?

Answered: 37 Skipped: 0



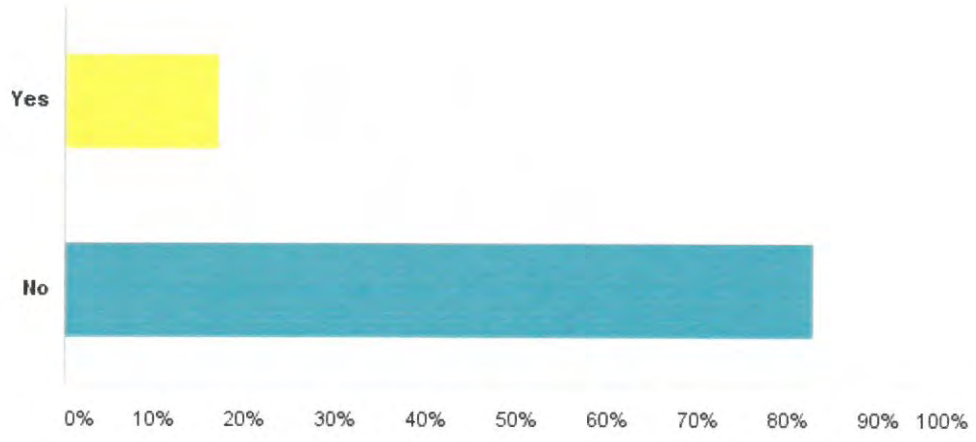
Q5 Do you drive along Frank and/or College streets to get to other destinations?

Answered: 36 Skipped: 1



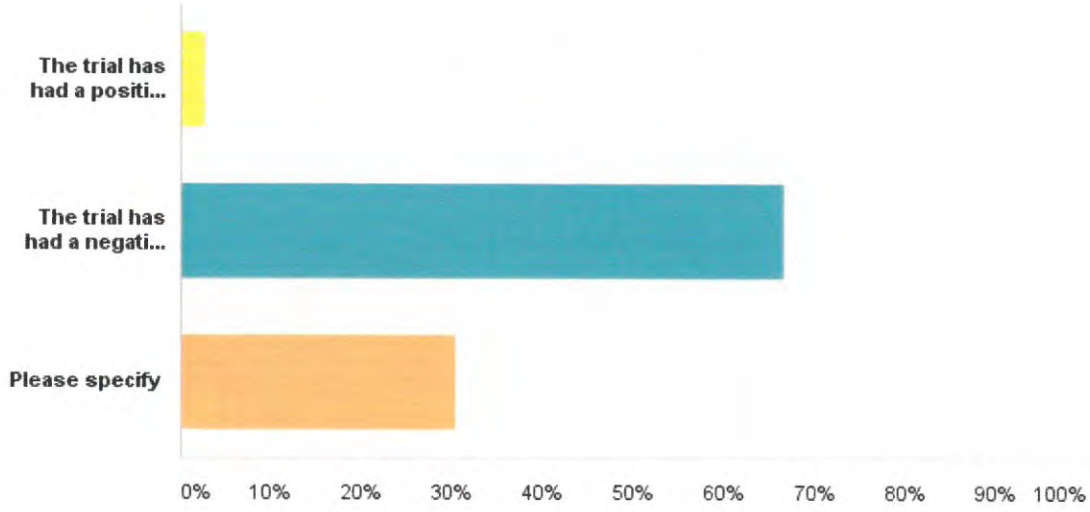
Q6 Do you use the Frank/College streets to pick up/drop off children attending Holy Cross College?

Answered: 35 Skipped: 2



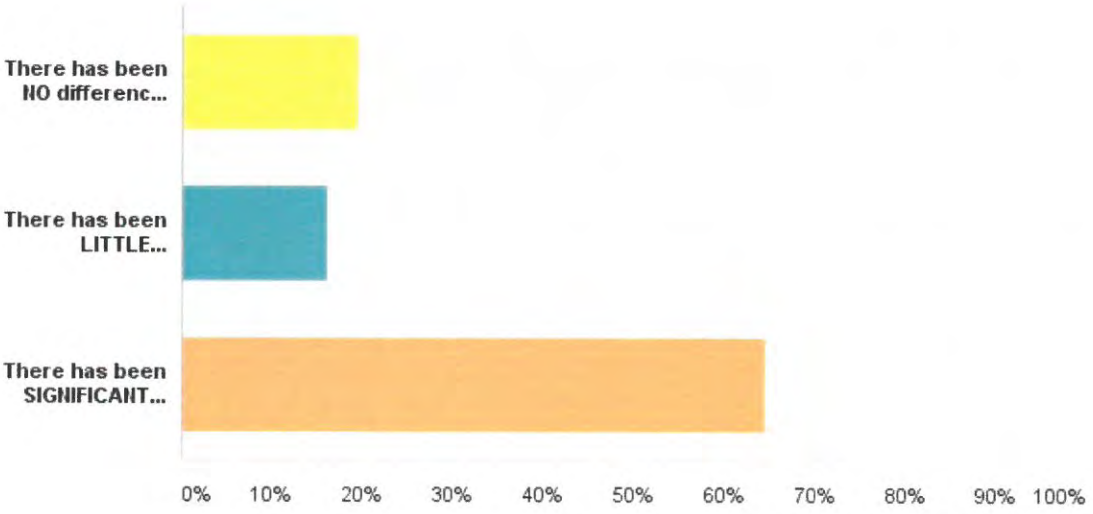
Q7 Which of the following statements captures your views on the trial road closure?

Answered: 36 Skipped: 1



Q8 How has the trial changed traffic in the local area?

Answered: 31 Skipped: 6



APPENDIX F

EXTRACT OF BITZIOS REPORT

BUNNINGS GLADESVILLE

TRAFFIC AND PARKING STUDY

FOR

CITY OF RYDE

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Project No: P1688 Version No: 004 Issue date: 22 June 2014

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1. INTRODUCTION

1.1 BACKGROUND

Gladesville is located within the City of Ryde, approximately 12km north-west of the Sydney CBD. The suburb is made up of residential, commercial, light industrial, retail, schools and recreational areas. In recent years, there has been significant redevelopment interest and there are currently a number of 'live' planning proposals, including one lodged by Bunning's Group Limited in March 2012 for amendments to the Ryde Local Environmental Plan 2010 (RLEP2010) to enable a Bunning's Warehouse and adjacent Bulky Goods Retail development (hereafter referred to as the "Bunnings Site") at 461-495 Victoria Road.

There is an emerging potential for a significant increase in traffic in the area. Victoria Road is already heavily congested in peak periods, with long delays observed in the eastbound direction in the morning peak, and westbound in the afternoon peak. This has resulted in the increasing use of parallel routes such as Morrison Road and Buffalo Road with traffic filtering through to the next order of roads such as College Street, Orient Street and Eltham Street as well. Increasing through traffic volumes is also placing pressure on a number of lower order north-south links between Victoria Road and its parallel routes.

Plans for further development under the potential in the LEP, including the Bunnings proposal, are raising concerns in the local community regarding associated traffic and parking impacts. Measures will be required to manage traffic volumes in residential streets but also on the higher order road network whilst maintaining business and residential accessibility and catering for pedestrians, cyclist and buses.

1.2 PROPOSED SITE

The proposed Bunnings development site is located at 461-495 Victoria Road, and is bounded by Frank Street to the west and College Street to the north. The broader study area is bounded by Higginbotham Street / Thompson-street to the north, Pittwater Road / Meriton Street to the east, Morrison Road to the south, and Charles Street to the west. A map of the study area is shown in Figure 1.1.

Figure 1.1: Study Area and Subject Site

The 3.83 hectare site was occupied by a variety of light industrial and commercial buildings. It is situated near the Holy Cross College Ryde, Gladesville Business Park, Ryde Aquatic Leisure Centre and a Fitness Centre.

A separate Development Application associated with the Bunnings site has been lodged to construct a new vehicle crossing at the intersection of Victoria Road and Tennyson Road. This proposal includes the demolition of an existing industrial building and construction of a new vehicle ramp from Victoria Road down to the ground level of the proposed Bunning's Site.

Also, the Bunnings Site has dedicated land across its Victoria Road frontage to allow for the widening of Victoria Road to provide a continuous bus lane in each direction through this section.

1.3 PURPOSE OF THE STUDY

Bitzios Consulting has been commissioned by the City of Ryde to develop traffic and parking strategies to manage the performance of the network in the future as growth throughout the study area occurs. The study has a particular focus on immediate impacts and needs generated by the development of the Bunnings Site but considers these impacts in the context of the cumulative impact of all expected development in the study area to 2031. Year 2031 is a common future assessment year used in similar studies reflecting a typical horizon for which planning and growth information is available. Both traffic and parking impacts have been assessed.

As part of this study, a traffic model was developed for the study area to quantify the impacts of the proposed development in the study area and determine to test a variety of mitigation measures. The key outcomes of the study are a recommended traffic network improvement strategy including implementation responsibilities and timeframes as well as a parking management strategy.

This report describes:

- the existing traffic and transport system (Chapter 2);
- the data collected for this study (Chapter 3);
- the development of the traffic model (Chapter 4);
- an assessment of the existing traffic and parking issues (Chapter 5);
- the calculation of development-related traffic volumes and parking demands (Chapter 6);
- the development of the future year traffic models and the identification of "do nothing" traffic conditions in 2031 (Chapter 7);
- the testing of mitigation treatments to manage future traffic issues (Chapter 8);
- the culmination of the modelling and evaluation in a preferred network strategy (Chapter 9) and a Parking Strategy (Chapter 10); and
- Conclusions (Chapter 11) and summary recommendations (Chapter 12).

1.4 STUDY PROCESS

The study process has been divided into four stages, namely:

- **Stage 1:** Data Collection and Validation;
- **Stage 2:** Model Development and Calibration;
- **Stage 3:** Options Development and Testing; and
- **Stage 4:** Plan Development, Consultation, Staging and Reporting.

The study process and tasks associated with each stage is shown in Figure 1.2.

Prior to the Final Report (this report) being submitted, the Draft Report and study recommendations were considered by Council at its meeting of the 28th April 2015. Council's resolution from this meeting is contained in Chapter 13.

8. MITIGATION TREATMENTS TESTING

8.1 OBJECTIVES

In most traffic and transport studies, the focus in on providing sufficient capacity in the network to cater as best as possible for future year traffic increases. Whilst this was a key consideration for this study, the study also targeted ways of reducing the use of local streets by through traffic and ensuring that additional development in the area did not exacerbate current levels of usage of local streets by through traffic. The aim therefore was, through recommended infrastructure interventions, to encourage the right type of traffic on the streets/roads most appropriate for carrying this traffic.

At a Community Forum on the 28th of August 2014 at the City of Ryde Civic Hall to introduce the study, the overwhelming feedback from the community was the need to preserve street amenity as development (and particularly the development of the Bunnings Site) occurred in the area. The consensus feedback from the meeting was that the collected data and model reflected the existing situation effectively and that amenity impacts were of greatest concern related to increasing traffic volumes in residential streets during week-day off-peak periods and weekend periods.

This feedback was critical in shaping the treatments assessed to mitigate impacts and for generating the preferred traffic network strategy. The options development process subsequently considered methods to prohibit or restrict through traffic using local streets and consequentially to introduce infrastructure upgrades on the higher order road network to cater for the traffic diverted out of residential areas due to these measures.

Before identifying local upgrades and treatments to test in the model and evaluate thereafter, it was important to clearly define the objectives of the upgrades or management measures being considered.

The primary objectives of the mitigation treatment testing and options development are outlined as follows:

- to minimise the impacts of development traffic in residential streets, particularly in off-peak times;
- to optimise traffic operations during peak periods on through traffic-carrying roads within the study area;
- to limit the impact of parking demand growth on residential streets whilst allowing business to prosper; and
- to improve pedestrian safety and convenience.

8.2 TREATMENT OPTIONS

Given the objectives listed above, treatment options needed to be considered at two levels, namely:

- localised treatments at specific locations that aim to address a particular traffic issue in accordance with the objectives above (both amenity and capacity objectives); and
- combinations of localised treatments that logically "work together" to form a network of improvements.

A total of 13 localised treatments were generated by the study team in consultation with the project steering group for testing to address the identified issues in accordance with the objectives. These treatments and their reasoning are listed in Table 8.1.

Table 8.1: Treatments Options

No.	Treatment	Reasoning
1	Cressy Road approach to Victoria Road – widened to 2 lanes (double right turn)	To offset the impacts of any closure/one-way scheme tested in Frank Street or College Street.
2	New link - Frank Street to Buffalo Road	To offset the impacts of any closure/one-way scheme tested in Frank Street or College Street.
3	Speed management scheme : Higginbotham-Thompson	To better manage the identified speed and traffic safety issues in this street.
4	College Street closed just west of Orient Street	To effectively ban through traffic to/from the Frank Street/Victoria Road intersection from using College or Orient Streets.
5	College Street/Eltham/Monash signals	To overcome issues with traffic not being able to safely exit side streets in peak periods, as well as to provide formalised pedestrian crossing opportunities as this area redevelops.
6	Ryde Road/Monash Road signals	To test if signalisation of this intersection improves operations locally and in the broader area.
7	Monash approach to Victoria Road widened	To see whether an additional (third) lane at this approach will appreciably reduce delays at peak times.
8	Signalised right turn from Victoria to Westminster	To see whether introducing this turn takes pressure off the right turn into Monash Road to and understand the consequential impacts and benefits of this.
9	Close Eltham east of Westminster	To see what impacts this closure would have on local traffic circulation and congestion.
10	Eltham Street one-way eastbound between Aldi and west of the Oxford/Westminster roundabout	To see what impacts this closure would have on local traffic circulation and congestion.
11	Afternoon peak right turn ban from Victoria into Jordan Street	To see what benefits might accrue to through traffic by taking this opposing movement away at peak times, to facilitate more northbound green time.
12	Frank Street left in/out at Victoria and new 4 way signals at Weaver/Victoria/Bunnings (all movements)	To test an alternative Bunnings Site access arrangement opposite Weaver Street rather than opposite Tennyson Road, to understand the pros and cons of this arrangement.
13	Frank Street access for Bunnings	A theoretical "what if" scenario should for some unforeseen reason access not be available off Victoria Road.

8.3 Land Use Scenarios and Model Runs

The treatment option testing was modelled across three different land use scenarios (as also discussed previously in Section 7.1). The three land use/development scenarios tested were:

- **Scenario 1:** Bunnings Site development only;
- **Scenario 2:** All other expected development only (i.e. without Bunnings Site); and
- **Scenario 3:** Bunnings Site + all other expected development.

These land use scenarios were necessary to isolate the Bunnings Site impacts from impacts caused by other development in the area, as well as to understand cumulative impacts of all development.

A total of 14 network options were subsequently created as combinations of land use scenarios and local treatment options. These network options and model run combinations are presented in Figure 8.1. Figure 8.2 shows the locations of the localised treatment options.

11. CONCLUSIONS

The Gladesville area is growing with many new residential, commercial, and retail developments planned through to 2031 and some already well into their construction phase. With the Gladesville area already experiencing some amenity and congestion issues associated with through traffic, these new developments, including the Bunnings Site development, will impact the traffic and parking across the broader road network. Traffic modelling undertaken has identified that these issues will be exacerbated unless a Traffic Management Plan is put in place.

This outcome was determined through modelling a "Do Nothing" scenario, where no mitigation measures were put in place. The issues observed from the modelling results as well as the major concerns raised by members of the community, are summarised as follows:

- through traffic from new developments, specifically the Bunnings Site development, accessing local residential streets;
- congestion and long traffic queues observed along Victoria Road corridor across all three peaks (AM, PM and Saturday peak periods) with concerns that more development will result in more congestion; and
- Saturday peak traffic growing significantly as a result of new development, particularly the retail development proposed in the Victoria Road corridor.

Based on an assessment of the current and expected future traffic and parking issues within the study area, as well as considering community input, the key objectives for "designing" mitigation treatments were identified as:

- to minimise the impacts of development, commercial, industrial and retail traffic in local residential areas, particularly in off-peak times;
- to optimise traffic operations in the study area during peak periods;
- to limit the impact of parking demand growth on residential streets whilst allowing business to prosper; and
- to improve pedestrian safety and convenience.

The most effective mitigation measures to achieve the above objectives involved a combination of full and partial street closures, intersection upgrades and Local Area Traffic Management (LATM) Schemes. Through consideration of the modelling results and the assessment of various treatment options, in consultation also with the community and the study steering group, a preferred traffic network was generated.

The main purpose of the preferred network which followed the treatments testing was to address existing and forecast capacity and amenity issues identified during the study process as best possible given the geometric and property constraints in the area. The draft preferred network was run through the Aimsun traffic model, and the results demonstrated that many of the current and expected future amenity issues in the study area will be overcome primarily surrounding the Bunnings Site development. The impacts of additional development on the operations of the major road network can also be effectively managed with targeted upgrades.

The preferred network effectively prohibited movements to/from the Bunnings Site and Victoria Road via Orient Street-College Street-Frank Street and essentially splits College Street into a light industrial section and a residential section. A one-way scheme in Eltham Street (eastbound movements allowed only) reduced traffic in this road as well whilst signalising the Monash Road/Eltham Street intersection will improve capacity and safety in this area for vehicles and pedestrians.

Other measures such as the new right turn into Westminster Road from Victoria Road and the extra turning lane for turning out of Cressy Road to Victoria Road augments existing turning capacity to cater for increased development demands and traffic diverted away from local residential streets. Also, a LATM scheme in Orient Street and in the Higginbotham-Thompson corridor will act to discourage speeding and improve safety for all road users. A new local roundabout is also proposed at the Monash Road/Buffalo Road intersection.

Traffic modelling of the preferred network showed achievement of the following key objectives:

- reducing through traffic on residential streets, including College Street, Eltham Street, and Orient Street;
- preventing any Bunnings Site related traffic from accessing residential streets including College Street, Eltham Street, and Orient Street, with minimal traffic accessing residential streets south of Victoria Road;
- preventing the pre-existing issue of westbound and eastbound "rat-running" through College Street and Eltham Street at all times of the day and week;
- separating College Street into industrial and residential sections, and effectively reducing the number of heavy vehicles accessing the residential section, including Orient Street;
- improving the safety and efficiency of intersections on Monash Road, especially as development is expected to increase nearer to Victoria Road, generating more pedestrians to and from this area; and
- optimising the major through traffic movements on Victoria Road during peak times.

Whilst more traffic is expected on Morrison Road and Tennyson Road further south, the Tennyson Road traffic is mostly associated with a new major development proposed at 2-14 Tennyson Road. The Morrison Road corridor has attracted through traffic for some time now and is related to a broader issue of congestion on most of the length of Victoria Road through Gladesville and Meadowbank.

The closure of College Street results in more traffic using Cressy Road to head north-south and there is a minor reduction in impact on Cressy Road traffic if College Road only has a one-way threshold treatment to allow eastbound movements only. In any event, Cressy Road is a major collector road to access Victoria Road, and with development and background growth expected to increase, it is evident that more traffic will be diverted to Cressy Road to Victoria Road. Furthermore, it is more appropriate for a road such as Cressy Road, as it is a current bus route and major collector road, to cater for the expected additional traffic compared to this traffic funnelling through other lower order residential streets.

Heavy Rigid Vehicle turning path assessments for each light industrial driveway in College Street have identified that these vehicles will be able to drive in or reverse in to driveways under the proposed new cul de sac arrangement. There are benefits to both truck traffic and pedestrians in this area of the full closure through the removal of passing traffic.

In terms of expected parking impacts, the Bunnings Site development concept (submitted with the planning proposal) includes well in excess of its on-site parking requirements and the potential for on-street parking by staff and customers is minimal. Other development in other areas may however impact on heavily used on-street parking areas and methods to manage this include:

- line marking of parking bays where simple parking lanes currently exist;
- introduction of more time-regulated parking areas near commercial development; and
- introduction of metered parking as needed near new retail areas.

In addition, there may be the opportunity in Eltham Street (where the trial one-way scheme is being introduced) to use the spare road space for 45 degree parking, particularly as retail/commercial development moves into the southern side of Eltham Street.

In terms of future development in the area, it will be important that it provides its parking in accordance with the rates in Council's DCP so that the risk of overspill into already heavily parked areas is minimised.

Overall, should the recommended upgrades identified in Chapter 12 be implemented, then the impacts of development traffic, and particularly Bunnings Site traffic, will be effectively managed to ensure the right types of traffic and parking in the right types of streets, and that sufficient capacity at major intersections is provided to manage the impacts of traffic growth.

12. RECOMMENDATIONS

12.1 TRAFFIC

The key infrastructure elements of the preferred network and recommended apportionment of responsibilities of these elements (and timing) are summarised in Table 12.1.

Table 12.1: Recommended Infrastructure, Responsibilities, and Staging of Works

	Preferred Network Element	Responsibility	Reasoning	Staging
1	College Street closure separating the industrial complex and residential complex	Bunnings Site	To stop Bunnings traffic accessing the site via Orient-College-Frank	(*) Stage 1 of Bunnings Site development
2	Cressy Road widened to two lanes to allow double right turn into Victoria Road	Bunnings Site	A consequential impact of Item 1	(*) Stage 1 of Bunnings Site development
3	Proposed Bunnings access point at Tennyson Road	Bunnings Site	Required for primary access	(*) Stage 1 of Bunnings Site development
4	New signalised intersection at Monash/College/Eltham	Future Development	Due to local development growth	As development occurs
5	Eltham Street one-way eastbound between Aldi and commercial development	Future Development	Due to local development growth	As development occurs
6	No parking on Monash Road (eastern side) south of Eltham Street during all peaks	Future Development	Due to local development growth	As development occurs
7	Introduce signalised (non-filtered) right turn into Westminster Road from Victoria Road	Future Development	Due to local development growth	As development occurs
8	Ban right turn into Jordan Street from Victoria Road during PM peak	Future Development	Due to local development growth	As development occurs
9	New roundabout at Buffalo Road / Monash Road intersection	City of Ryde	Cumulative impact, existing issues and safety concerns	Subject to CoR programing
10	LATM measures in Orient Street	City of Ryde	Cumulative impact, existing issues and speed management	Subject to CoR programing
11	Speed management scheme in Higginbotham/Thompson corridor	City of Ryde	Cumulative impact, existing issues and speed management	Subject to CoR programing

(*) Prior to issue of any "staged" or "interim" occupational certificate.

12.2 PARKING

The following recommendations have been made regarding parking in the study area:

- any new development in the study area be required to provide its full parking requirement in accordance with the DCP parking rates of City of Ryde (and City of Hunters Hill if outside of CoR);
- parking rates for new developments not be reduced as part of any short-to-medium term review of the DCP;
- new parking duration restrictions be put in place in areas adjacent to and surrounding proposed commercial and retail developments as future development occurs;
- line-marking of parking bays throughout the study area, where on-street parking is provided via a parking lane and is heavily occupied. This achieves a cost-effective use of street space; and
- further investigation be undertaken into accommodating additional on-street, 45 degree angled parking on the road space generated by the proposed Eltham Street one-way scheme (subject to the impending trial of the one-way scheme being successful).

13. COUNCIL DECISION

Council considered the draft of this report, along with the Council Officer's report (see Appendix H) and community representations at its meeting of the 28th April 2015. At that meeting Council made the following resolution (also see Appendix I):

a) *That Council exercise the delegation issued by the Minister for Planning and Infrastructure to make the planning proposal to amend the land use zone applicable to 461-495 Victoria Road from IN2 Light Industrial to B5 Business Development and the permissible height under Ryde Local Environmental Plan (LEP) 2014 applicable to the site from 10m to RL63, RL52 and RL42 (stepping down from 12-15m on Victoria Road to approximately 7-17m on College Street).*

b) *That in making the LEP amendment Council will adjust the exhibited map site boundaries to reflect the Victoria Road widening in accordance with recent subdivision approval to create LOT 300 DP 1194688, 461-495 Victoria Road, Gladesville.*

c) *That Council adopt the following for inclusion in the Bunnings Gladesville Traffic and Parking Study:*

   i. *Trial full closure of College Street to be implemented prior to Bunnings commencing construction (at no cost to Council by Bunnings). The trial shall be reviewed after 12 months of operation of the Bunnings store and the results reported back to Council at that time. The applicant shall cover the full cost of the traffic review, surveys and any supporting technical studies*

   ii. *Cressy Road carriageway widening to be implemented prior to Bunnings commencing operations (at no cost to council by Bunnings)*

   iii. *Cressy Road (eastern side) full width footpath and safety fence from Victoria Road corner to Holy Cross College entry to be implemented prior to Bunnings commencing operations (at no cost to council by Bunnings)*

   iv. *Tennyson Road and Frank Street site access to be implemented at stage 1 and operable on commencement of Bunnings operations (at no cost to Council by Bunnings)*

   v. *Traffic signals changes and site access at Tennyson Road to be implemented prior to Bunnings commencing operations (at no cost to Council by Bunnings)*

   vi. *Pedestrian and road safety audit and management plan be prepared that considers the high probability that parents will park at Bunnings to pick up school children or for access to sporting fields (at no cost to council by Bunnings) and also to consider the impact of the two proposed child care centres in that location*

   vii. *A parking optimisation plan for Frank Street and College Street between Frank Street and Orient Street be prepared to counteract any loss of parking due to the Bunnings development and implemented (at no cost to Council by Bunnings)*

   viii. *Roundabout at Monash/Buffalo Road intersection.*

   ix. *Detailed study into the impacts of a right hand turn at Westminster Street and a right hand turn ban during the evening peak at Jordan Street from Victoria Road (at no cost to Council - developer funded)*

   x. *Detailed study into the traffic and parking impacts be undertaken for any proposed rezoning that includes land use changes and increased densities for sites adjoining Tennyson Road. The aforementioned traffic and parking impact study is to be modelled on the Bunnings Gladesville Traffic and Parking Impact Study in terms of its scope and deliverables. (at no cost to Council – developer funded).*

   xi. *An additional traffic and parking study, as detailed in part (x) above, be undertaken for the area bounded by Pittwater Road to Monash Road and Ryde Road to Victoria Road. (at no cost to Council – developer funded).*

d) *That a Roundabout at Monash/Buffalo Road intersection be included in the 2016/2017 City of Ryde Delivery Plan with the funds drawn from the Section 94 reserve.*

e) *That Council refer the following matters to the Traffic Committee for consideration:*

   i. *Speed management for the area bounded by Cressy, Pittwater, Higginbotham and Victoria Roads*

   ii. *Parking optimisation for Eltham Street*

f) *That Council adopt a site specific Development Control Plan for 461-495 Victoria Road Gladesville amended in accordance with the above changes in the Bunnings Gladesville Traffic and Parking Study.*

g) *That Council delegate the General Manager to make amendment to the site specific Development Control Plan for 461-495 Victoria Road Gladesville to implement Council's resolutions prior to notifying the plan in accordance with the Environmental Planning and Assessment Act.*

h) *That Council notify all community members who made a submission regarding the planning proposal of the outcomes and thank them for taking the time to become involved in local planning.*

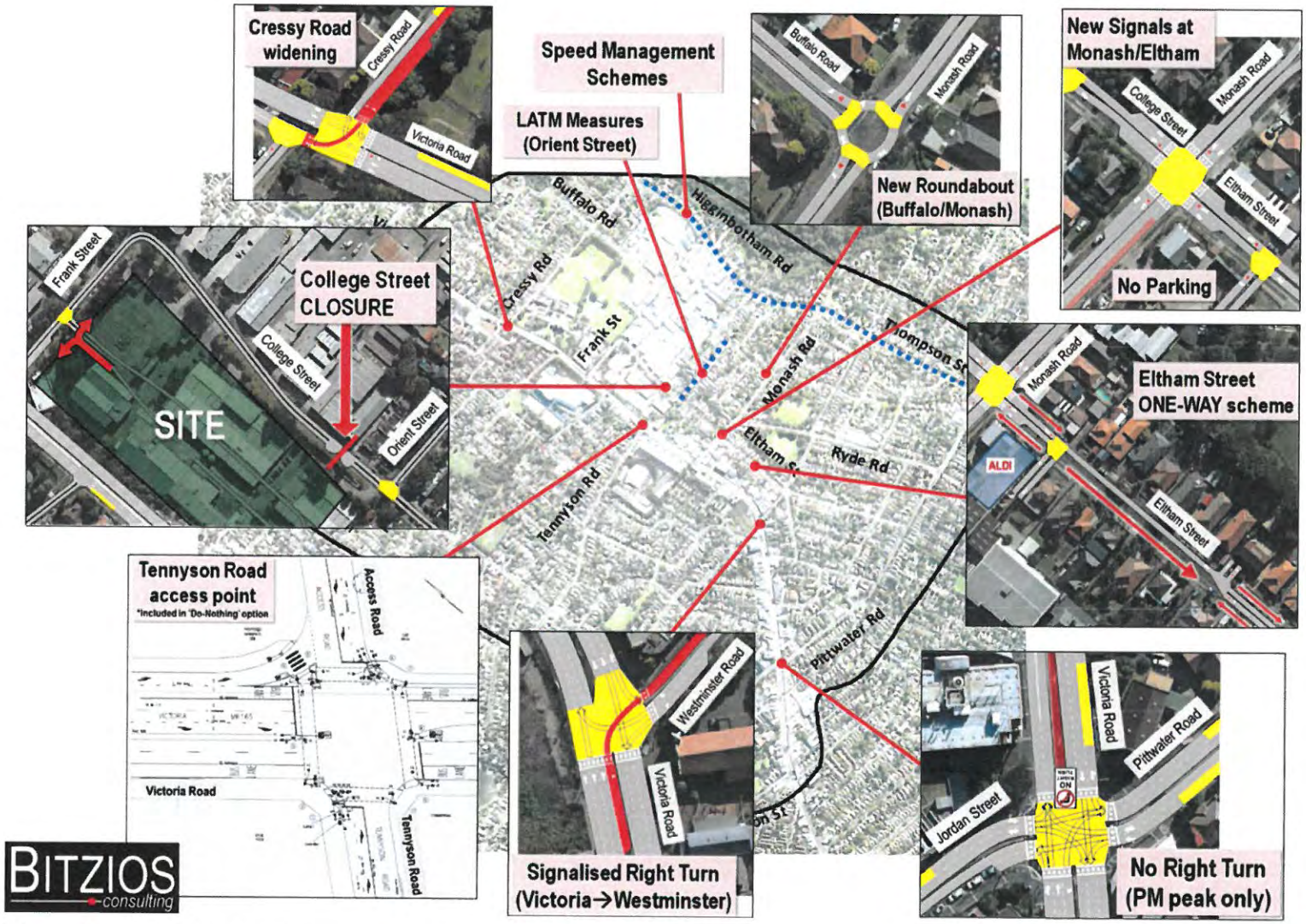


Figure ES18: Preferred Network

MODELLING RESULTS FOR THE PREFERRED OPTION

The preferred network was run in the Aimsun traffic model to test its combined performance, any refinements to intersections required and to determine if the objectives of reducing through traffic off local streets was achieved, whilst managing peak operational performance on the major road system.

Results from the preferred network option modelling were compared with the "Do Nothing" option. It is important to note that the preferred network was tested as two separate options for comparison purposes, namely:

- **Preferred Option A:** the preferred network with the College Street one-way scheme in place and existing priority intersection at Buffalo Road / Monash Road intersection; and
- **Preferred Option B:** the preferred network with adjustments following community feedback (i.e. with College Street full closure and new roundabout at Buffalo Road / Monash Road intersection).

The results show that the two preferred network options A and B effectively bring traffic volumes on College Street, Orient Street and Eltham Street back to similar levels as in 2014 weekdays, even with all of the proposed development in place by 2031. Both options also effectively prevent traffic associated with Bunnings accessing these residential streets. The Preferred Network Option B, with the full closure of College Street, means that volumes on College Street west are limited to only traffic coming into and out of the industrial sites off College Street. The closure also reduces the use of College Street as a 'rat-run', which was an issue evident in both directions in the 2014 base case and the 2031 "Do Nothing" case.

The consequence of the preferred network through closing College Street, or implementing a one-way scheme is that volumes increase on Monash Road, Cressy Road and Victoria Road in particular to accommodate the diverted traffic, particularly seen during the Saturday peak. These results are shown in Figures ES19-ES22. These roads however are more appropriate to absorb this additional traffic from an amenity impact perspective.

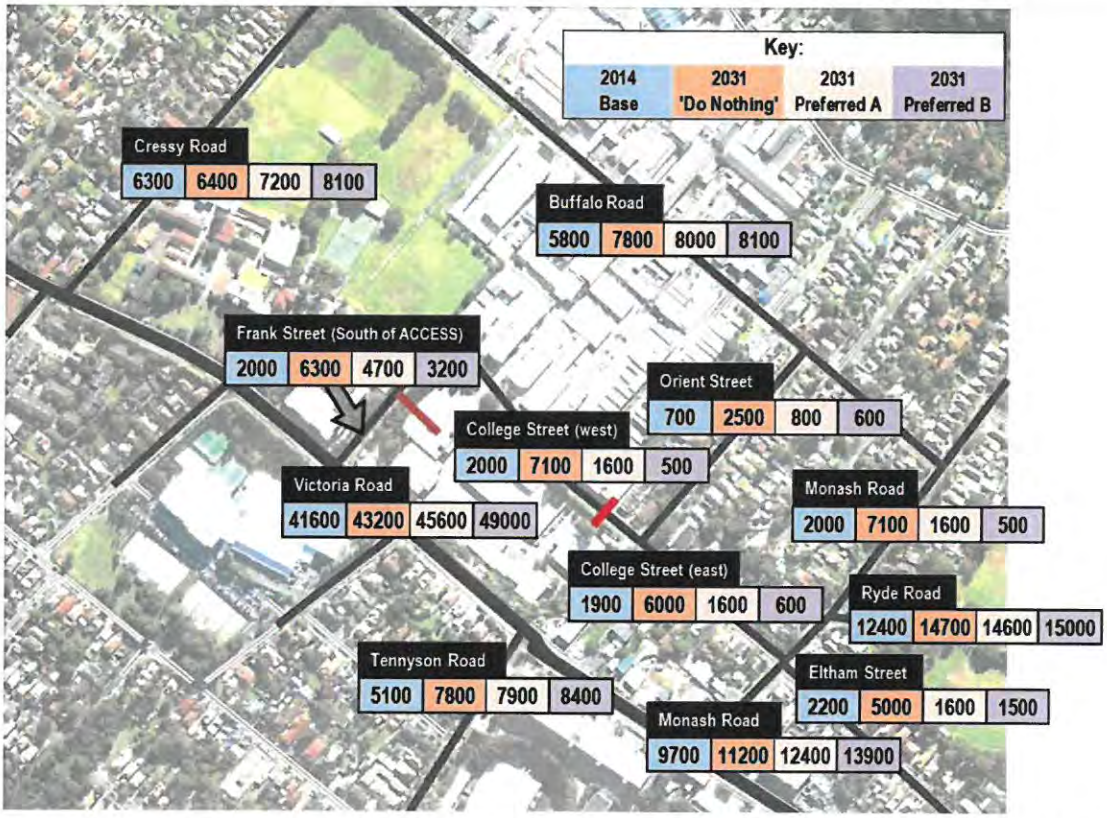


Figure ES19: Preferred Network Weekday Traffic Volume Comparison (Bunnings + Other Growth)

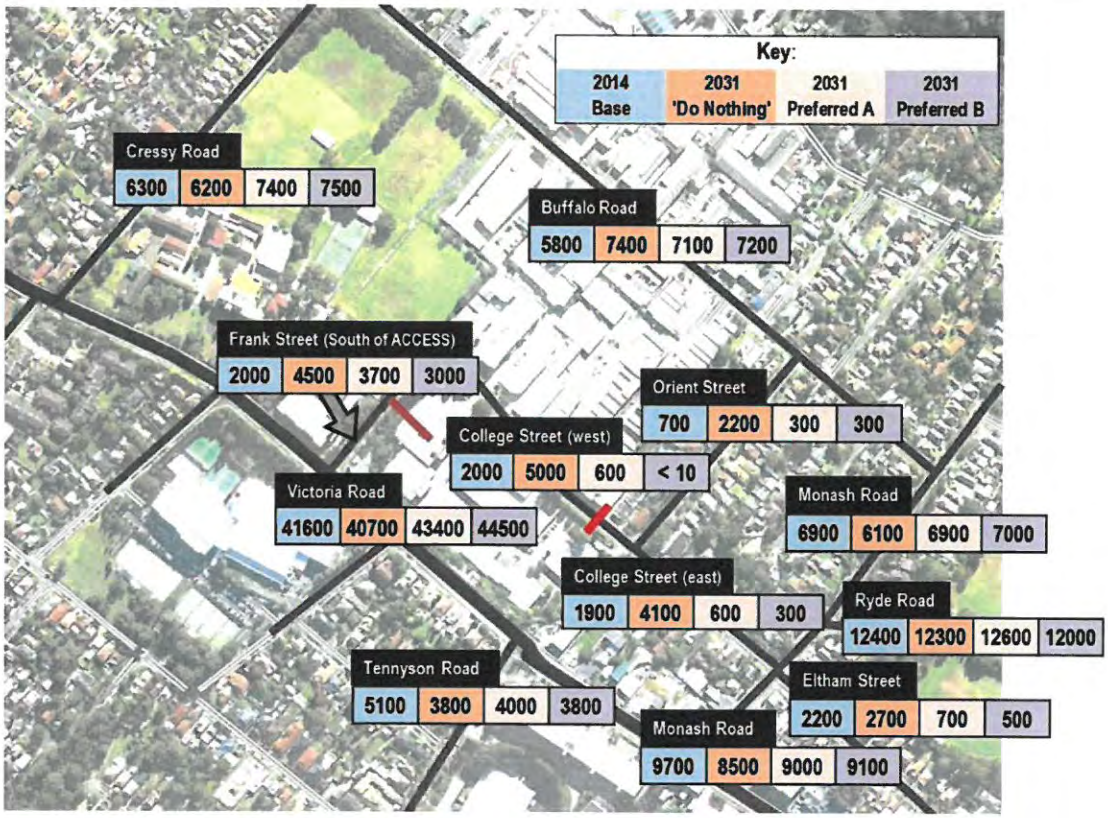


Figure ES20: Preferred Network Weekday Traffic Volume Comparison (Bunnings Site Only)

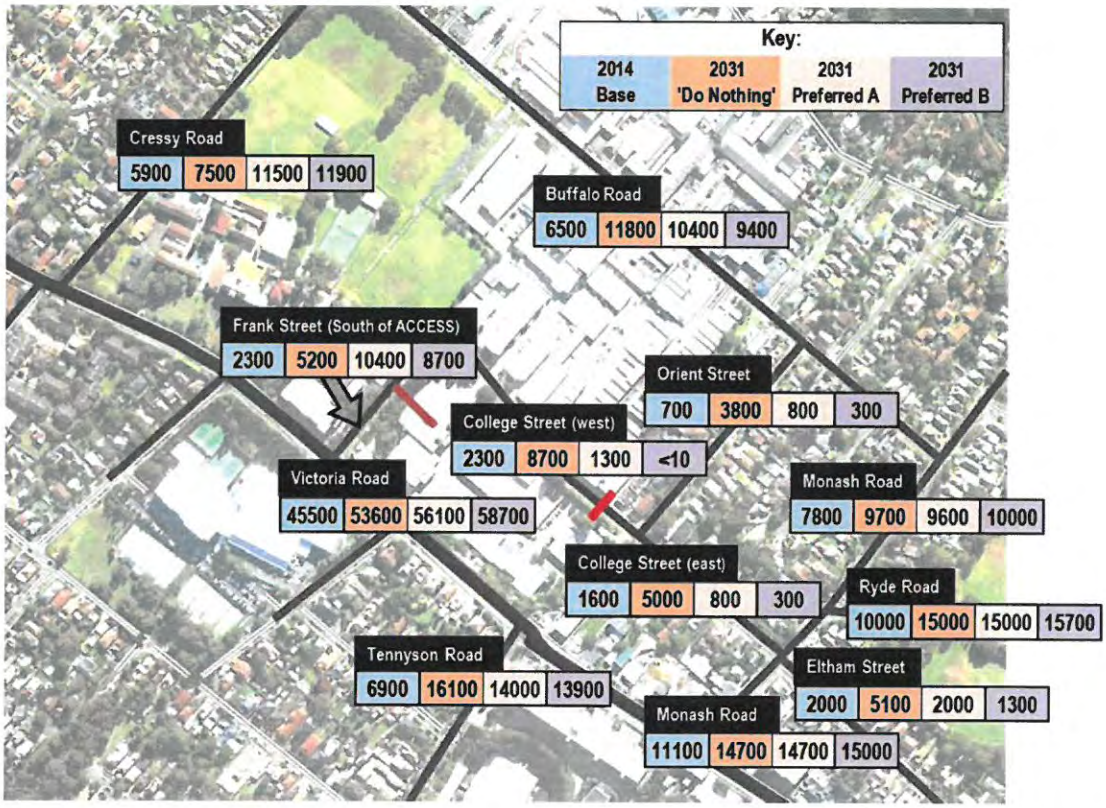


Figure ES21: Preferred Network Saturday Traffic Volume Comparison (Bunnings + Other Growth)

APPENDIX G

SCATS COUNTS

DRAWN BY CADD
DO NOT AMEND MANUALLY

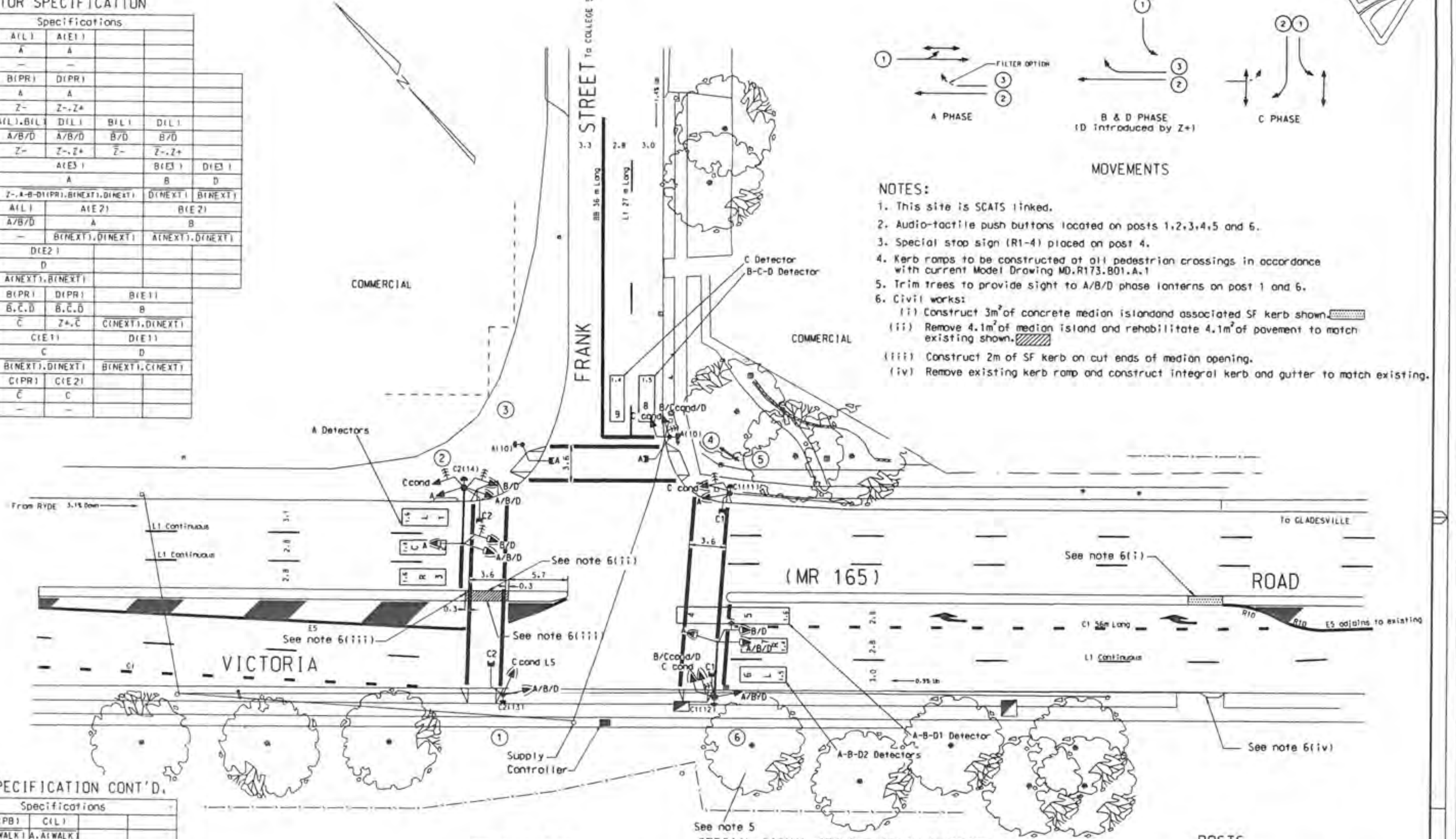
DATE IN SERVICE : 28/09/62

0165.387.VV.1987

DETECTOR SPECIFICATION

Detector		Specifications			
A	FN	A(L)	A(E1)		
	SG/PS	A	A		
	DS	—	—		
A-B-D1 Depart. & Approach	FN	B(PR)	D(PR)		
	SG/PS	A	A		
	DS	Z-	Z-.Z+		
A-B-D1 Approach	FN	A(L).B(L)	D(L)	B(L)	D(L)
	SG/PS	A/B/D	A/B/D	B/D	B/D
	DS	Z-	Z-.Z+	Z-	Z-.Z+
cont. A-B-D1 Approach	FN	A(E3)		B(E3)	D(E3)
	SG/PS	A		B	D
	DS	Z-.A-B-D1(PR).B(NEXT).D(NEXT)		D(NEXT)	B(NEXT)
A-B-D2	FN	A(L)	A(E2)	B(E2)	
	SG/PS	A/B/D	A	B	
	DS	—	B(NEXT).D(NEXT)	A(NEXT).D(NEXT)	
cont. A-B-D2	FN	D(E2)			
	SG/PS	D			
	DS	A(NEXT).B(NEXT)			
B-C-D	FN	B(PR)	D(PR)	B(E1)	
	SG/PS	B.C.D	B.C.D	B	
	DS	C	Z+.C	C(NEXT).D(NEXT)	
cont. B-C-D	FN	C(E1)		D(E1)	
	SG/PS	C		D	
	DS	B(NEXT).D(NEXT)		B(NEXT).C(NEXT)	
C	FN	C(PR)	C(E2)		
	SG/PS	C	C		
	DS	—	—		

MOVEMENTS



NOTES:

1. This site is SCATS linked.
2. Audio-tactile push buttons located on posts 1,2,3,4,5 and 6.
3. Special stop sign (R1-4) placed on post 4.
4. Kerb ramps to be constructed at all pedestrian crossings in accordance with current Model Drawing MD.R173.B01.A.1
5. Trim trees to provide sight to A/B/D phase lanterns on post 1 and 6.
6. Civil works:
   (i) Construct 3m² of concrete median islandand associated SF kerb shown.
   (ii) Remove 4.1m² of median island and rehabilitate 4.1m² of pavement to match existing shown.
   (iii) Construct 2m of SF kerb on cut ends of median opening.
   (iv) Remove existing kerb ramp and construct integral kerb and gutter to match existing.

DETECTOR SPECIFICATION CONT'D.

Detector		Specifications	
A P.B.	FN	A(PB)	C(L)
	SG/PS	A(WALK)	A.A(WALK)
	DS	—	B.C.D
C1 P.B.	FN	C(PB)	A(L)
	SG/PS	C1(WALK)	C.C1(WALK)
	DS	—	A.B.D
C2 P.B.	FN	C(PB)	A(L)
	SG/PS	C2(WALK)	C.C2(WALK)
	DS	—	A.B.D

SPECIAL SIGNAL GROUP DISPLAY SEQUENCE

SIGNAL GROUP	TABLE TYPE	REMARKS
A/B/D	3	—
B/D (RT)	39	Timed R.A. protection for A peds. Z- Filter option.
B/C Cond/D(LT)	77	Timed R.A. protection for C1 pedestrians. Δ
C Cond (LT)	23	Timed R.A. protection for A peds.
Cond	74	Timed red aspect protection for C2 pedestrian. #

Δ Pushbutton on post 6 extends R.A. subject to timer.
Pushbutton on post 2 extends R.A. subject to timer.

POSTS

POST	TYPE	LENGTH	OFFSET	REMARKS
1	2	4.1	1.0	EXISTING
2	5XL	-	1.0	EXISTING
3	2	3.2	1.0	EXISTING
4	2	4.1	0.6	EXISTING
5	2	4.1	0.6	EXISTING
6	5XL	-	1.0	EXISTING

A ORIGINAL ISSUE

DESIGN APPROVAL — APPROVED — MANAGER PROJECT DESIGN SERVICES

RTA ACCEPTANCE — RECOMMENDED — ACCEPTED

Roads and Traffic Authority.N.S.W

RYDE COUNCIL AREA
TRAFFIC SIGNALS AT
VICTORIA ROAD (MR 165) AND FRANK STREET
RYDE

DESIGN LAYOUT — TCS No 1987

EXISTING ☒ PROPOSED ☐

CADD FILE: vv1987_9D.dgn

SCALE 1:1200 — ISSUE D

FILE 387 TS 300 — SUPERSEDES SHEET/ISSUE 9C

REGN. 0165.387.VV.1987 — SHEET 9

Site: 1987 Monday, 18 May 2015 Traffic Flow filename:RYDE_20150518.VS

Monday, 18 May 2015

	Approach	detector(s)... 1	1	2	3	5	6	7	8	9	
01:00	Approach	1	2	64	38	1	99	95	0	2	301
02:00	Approach	1	0	48	17	0	52	55	0	0	172
03:00	Approach	1	1	39	26	1	36	31	0	1	135
04:00	Approach	1	6	74	26	1	29	25	0	1	162
05:00	Approach	1	17	148	87	2	57	51	1	3	366
06:00	Approach	1	111	455	375	2	175	120	4	7	1249
07:00	Approach	1	269	1049	1116	10	432	442	5	16	3339
08:00	Approach	1	213	934	964	11	799	915	8	34	3878
09:00	Approach	1	243	777	873	52	654	765	33	76	3473
10:00	Approach	1	148	754	792	12	549	627	16	22	2920
11:00	Approach	1	155	637	625	22	511	620	19	35	2624
12:00	Approach	1	127	622	557	9	482	586	20	38	2441
13:00	Approach	1	135	593	552	15	525	644	23	35	2522
14:00	Approach	1	164	599	532	13	601	691	20	28	2648
15:00	Approach	1	190	564	548	23	641	725	27	62	2780
16:00	Approach	1	217	604	588	32	677	798	33	101	3050
17:00	Approach	1	312	697	739	15	777	942	26	98	3606
18:00	Approach	1	442	807	862	16	759	913	22	85	3906
19:00	Approach	1	329	728	767	9	771	936	20	37	3597
20:00	Approach	1	146	447	424	4	522	646	4	28	2221
21:00	Approach	1	83	347	289	6	393	445	10	22	1595
22:00	Approach	1	31	283	229	3	353	389	2	17	1307
23:00	Approach	1	5	46	363	4	302	292	7	9	1028
24:00	Approach	1	0	0	200	0	193	173	0	1	567

Approach 1 AM peak 3915 06:45 - 07:45 PM peak 3954 16:45 - 17:45 Daily Total 49887

Tuesday, 19 May 2015

	Approach	detector(s)... 1	1	2	3	5	6	7	8	9	
01:00	Approach	1	0	0	103	2	119	71	1	3	299
02:00	Approach	1	0	0	61	0	59	58	2	3	183
03:00	Approach	1	0	0	62	3	41	42	3	2	153
04:00	Approach	1	7	50	56	0	53	21	1	7	195
05:00	Approach	1	23	152	84	1	64	46	1	2	373
06:00	Approach	1	117	462	387	3	172	124	2	7	1274
07:00	Approach	1	260	1042	1070	8	450	492	8	14	3344
08:00	Approach	1	261	953	1002	19	754	882	10	51	3932
09:00	Approach	1	225	771	915	63	710	812	35	95	3626
10:00	Approach	1	170	776	797	16	547	679	25	31	3041
11:00	Approach	1	151	664	628	17	498	556	17	32	2563
12:00	Approach	1	156	665	607	17	496	625	23	45	2634
13:00	Approach	1	150	621	575	6	593	693	30	40	2708
14:00	Approach	1	166	626	556	13	618	694	19	45	2737
15:00	Approach	1	166	600	532	10	656	791	21	55	2831
16:00	Approach	1	246	627	687	21	700	774	38	95	3188
17:00	Approach	1	352	715	779	37	797	871	28	102	3681
18:00	Approach	1	509	852	912	27	765	958	33	91	4147
19:00	Approach	1	380	780	797	29	750	962	22	65	3785
20:00	Approach	1	173	498	457	6	593	734	9	33	2503
21:00	Approach	1	71	361	295	5	430	497	13	42	1714

22:00	Approach	1	71	364	281	5	416	505	3	17	1662
23:00	Approach	1	30	260	152	4	325	357	3	23	1154
24:00	Approach	1	13	150	74	1	219	197	3	6	663

Approach 1 AM peak 3932 07:00 - 08:00 PM peak 4164 17:15 - 18:15 Daily Total 52390

Wednesday, 20 May 2015

	Approach		detector(s)...							
	Approach	1	1	2	3	5	6	7	8	9	
01:00	Approach	1	6	72	29	0	120	102	0	1	330
02:00	Approach	1	1	46	10	1	56	54	0	0	168
03:00	Approach	1	0	53	15	1	29	40	0	1	139
04:00	Approach	1	7	78	28	0	40	24	0	1	178
05:00	Approach	1	34	157	99	4	62	49	1	4	410
06:00	Approach	1	129	465	411	8	174	111	4	7	1309
07:00	Approach	1	231	1051	1116	5	471	452	4	23	3353
08:00	Approach	1	240	872	984	18	771	897	10	44	3836
09:00	Approach	1	224	780	879	42	659	771	30	98	3483
10:00	Approach	1	196	786	829	15	562	676	25	29	3118
11:00	Approach	1	191	710	695	12	510	608	16	35	2777
12:00	Approach	1	152	678	629	16	524	636	22	42	2699
13:00	Approach	1	155	664	607	12	580	707	34	40	2799
14:00	Approach	1	141	662	567	16	634	736	26	38	2820
15:00	Approach	1	187	574	544	17	686	756	24	51	2839
16:00	Approach	1	263	667	653	27	689	726	31	81	3137
17:00	Approach	1	362	769	786	22	777	977	30	119	3842
18:00	Approach	1	460	833	890	29	807	896	44	99	4058
19:00	Approach	1	370	782	816	12	750	937	15	66	3748
20:00	Approach	1	169	514	486	13	587	681	7	37	2494
21:00	Approach	1	104	399	305	5	449	555	6	30	1853
22:00	Approach	1	102	394	297	2	449	484	3	20	1751
23:00	Approach	1	41	296	180	1	374	398	0	6	1296
24:00	Approach	1	14	148	58	1	211	234	2	3	671

Approach 1 AM peak 3875 06:45 - 07:45 PM peak 4063 16:45 - 17:45 Daily Total 53108

Thursday, 21 May 2015

	Approach		detector(s)...							
	Approach	1	1	2	3	5	6	7	8	9	
01:00	Approach	1	1	80	41	0	128	119	0	0	369
02:00	Approach	1	2	50	19	0	81	73	0	0	225
03:00	Approach	1	4	47	16	0	51	38	0	0	156
04:00	Approach	1	4	76	24	0	38	29	0	1	172
05:00	Approach	1	18	160	72	2	46	64	0	0	362
06:00	Approach	1	136	431	385	5	176	121	0	4	1258
07:00	Approach	1	260	1075	1126	6	441	489	2	18	3417
08:00	Approach	1	222	889	931	19	752	908	4	33	3758
09:00	Approach	1	241	798	902	44	690	817	24	85	3601
10:00	Approach	1	198	804	841	17	581	680	24	33	3178
11:00	Approach	1	184	653	692	12	523	650	26	44	2784
12:00	Approach	1	154	672	637	11	553	664	23	32	2746
13:00	Approach	1	172	657	577	17	592	658	22	48	2743
14:00	Approach	1	185	676	629	13	637	768	26	43	2977
15:00	Approach	1	190	642	631	16	675	777	26	82	3039
16:00	Approach	1	262	643	643	30	719	795	28	89	3209

17:00	Approach	1	403	753	823	32	778	873	26	102	3790
18:00	Approach	1	494	825	891	25	848	969	35	107	4194
19:00	Approach	1	349	739	820	13	717	933	14	51	3636
20:00	Approach	1	196	542	492	4	613	756	13	36	2652
21:00	Approach	1	129	451	367	6	468	536	8	24	1989
22:00	Approach	1	87	414	344	6	403	555	8	10	1827
23:00	Approach	1	61	292	186	5	200	679	4	15	1442
24:00	Approach	1	14	200	104	27	36	478	0	3	862

Approach 1 AM peak 3820 06:30 - 07:30 PM peak 4194 17:00 - 18:00 Daily Total 54386

Friday, 22 May 2015

	Approach		detector(s)...							
	Approach	1	1	2	3	5	6	7	8	9	
01:00	Approach	1	7	113	49	1	149	109	0	1	429
02:00	Approach	1	2	62	20	0	94	87	0	0	265
03:00	Approach	1	5	61	16	1	60	47	1	3	194
04:00	Approach	1	6	83	24	0	57	40	0	0	210
05:00	Approach	1	14	171	77	1	65	49	2	1	380
06:00	Approach	1	118	468	358	3	149	139	2	5	1242
07:00	Approach	1	234	1000	1022	9	427	431	3	23	3149
08:00	Approach	1	210	891	949	15	697	817	11	37	3627
09:00	Approach	1	187	716	778	23	642	766	25	60	3197
10:00	Approach	1	168	767	795	23	581	702	18	26	3080
11:00	Approach	1	185	692	665	14	566	673	30	31	2856
12:00	Approach	1	163	660	641	13	539	683	11	31	2741
13:00	Approach	1	157	681	621	17	583	752	20	38	2869
14:00	Approach	1	186	659	602	18	628	766	26	55	2940
15:00	Approach	1	195	645	622	22	671	804	23	63	3045
16:00	Approach	1	258	663	664	17	669	735	24	83	3113
17:00	Approach	1	329	816	825	11	694	887	29	85	3676
18:00	Approach	1	430	778	795	11	798	921	23	86	3842
19:00	Approach	1	343	806	739	9	733	847	14	41	3532
20:00	Approach	1	165	609	508	6	539	615	7	28	2477
21:00	Approach	1	99	449	312	2	367	429	4	10	1672
22:00	Approach	1	62	405	241	4	384	461	2	15	1574
23:00	Approach	1	46	352	220	0	475	474	0	9	1576
24:00	Approach	1	34	323	173	2	376	399	2	13	1322

Approach 1 AM peak 3627 07:00 - 08:00 PM peak 3866 17:15 - 18:15 Daily Total 53008

Saturday, 23 May 2015

	Approach		detector(s)...							
	Approach	1	1	2	3	5	6	7	8	9	
01:00	Approach	1	22	216	90	2	279	259	2	14	884
02:00	Approach	1	10	134	42	0	174	144	1	4	509
03:00	Approach	1	6	132	26	1	150	123	1	2	441
04:00	Approach	1	5	118	24	2	111	84	2	4	350
05:00	Approach	1	7	128	35	0	88	60	0	1	319
06:00	Approach	1	22	253	158	3	98	70	1	0	605
07:00	Approach	1	92	538	407	0	193	168	3	7	1408
08:00	Approach	1	106	521	470	4	364	384	5	11	1865
09:00	Approach	1	154	626	561	6	441	531	5	23	2347
10:00	Approach	1	158	697	701	9	548	695	9	31	2848
11:00	Approach	1	227	830	884	13	678	827	19	32	3510

12:00	Approach	1	253	829	829	15	781	918	18	40	3683
13:00	Approach	1	243	898	846	13	789	905	23	31	3748
14:00	Approach	1	251	844	786	10	790	947	9	29	3666
15:00	Approach	1	238	763	769	11	767	911	15	23	3497
16:00	Approach	1	223	747	698	4	770	856	10	25	3333
17:00	Approach	1	289	807	770	6	730	827	11	37	3477
18:00	Approach	1	302	852	791	9	775	875	7	25	3636
19:00	Approach	1	293	876	797	2	674	766	3	11	3422
20:00	Approach	1	156	696	571	2	431	458	1	14	2329
21:00	Approach	1	65	438	348	4	386	380	4	2	1627
22:00	Approach	1	76	442	322	3	468	471	2	6	1790
23:00	Approach	1	63	485	332	4	552	602	2	8	2048
24:00	Approach	1	53	321	184	5	541	540	1	1	1646

Approach 1 AM peak 3683 11:00 - 12:00 PM peak 3748 12:00 - 13:00 Daily Total 52988

Sunday, 24 May 2015

	Approach	detector(s)...							
	Approach	1	2	3	5	6	7	8	9	
01:00	Approach	1	35	216	113	6	378	387	2	7	1144
02:00	Approach	1	14	173	61	1	234	222	1	1	707
03:00	Approach	1	12	146	46	2	182	181	0	2	571
04:00	Approach	1	9	125	26	1	159	128	0	2	450
05:00	Approach	1	4	108	25	0	118	92	0	1	348
06:00	Approach	1	11	167	71	0	95	79	0	1	424
07:00	Approach	1	24	247	160	0	134	128	0	1	694
08:00	Approach	1	61	343	328	3	186	203	3	6	1133
09:00	Approach	1	98	493	476	5	310	316	9	6	1713
10:00	Approach	1	158	701	750	2	503	576	13	15	2718
11:00	Approach	1	153	672	672	11	529	664	13	16	2730
12:00	Approach	1	213	858	839	7	670	839	13	18	3457
13:00	Approach	1	216	806	749	13	655	787	13	20	3259
14:00	Approach	1	215	765	739	11	683	788	10	26	3237
15:00	Approach	1	208	714	669	7	737	908	13	25	3281
16:00	Approach	1	188	676	655	11	756	882	10	19	3197
17:00	Approach	1	205	649	651	3	775	894	10	17	3204
18:00	Approach	1	196	706	638	5	718	809	5	33	3110
19:00	Approach	1	115	574	508	6	493	610	3	17	2326
20:00	Approach	1	71	394	283	7	371	400	1	17	1544
21:00	Approach	1	42	321	231	0	374	401	1	5	1375
22:00	Approach	1	32	289	195	2	388	409	2	6	1323
23:00	Approach	1	17	199	121	1	327	346	1	1	1013
24:00	Approach	1	7	121	64	1	200	184	0	0	577

Approach 1 AM peak 3457 11:00 - 12:00 PM peak 3418 13:30 - 14:30 Daily Total 43535

0165.387.VV.1987

DRAWN BY CADD
DO NOT AMEND MANUALLY

DATE IN SERVICE : 28/09/62

NSW GOVERNMENT Transport Roads & Maritime Services

SIGNAL GROUP PHASE CHART

SIGNAL GROUP	PHASE GREEN A	B	C	D	TABLE TYPE	REMARKS
V1	X				1	
V2	X	X		X	3	—
V3		X		X	39	Timed RA protection for 'P1' pedestrians. Z- filter Option
V4			C		74	Timed Red hold protection for 'P3' pedestrians. Push button Post 3 extends the RED subject to timer.
V5			C		23	Timed RA protection for 'P1' pedestrians.
V6		X	C	X	77	Timed RA protection for 'P2' pedestrians. Push button on Post 7 extends RA subject to timer.
P1	X				2	
P2			X		2	
P3			X		2	

POSTS

POST	TYPE	LENGTH	OFFSET	REMARKS
1	2	4.1	1.0	EXISTING
2	2	4.1	0.5	NEW
3	2	4.1	1.0	NEW
4	2	3.2	1.0	NEW
5	2	4.1	1.0	NEW
6	2	4.1	1.0	NEW
7	9	-	1.0	NEW **

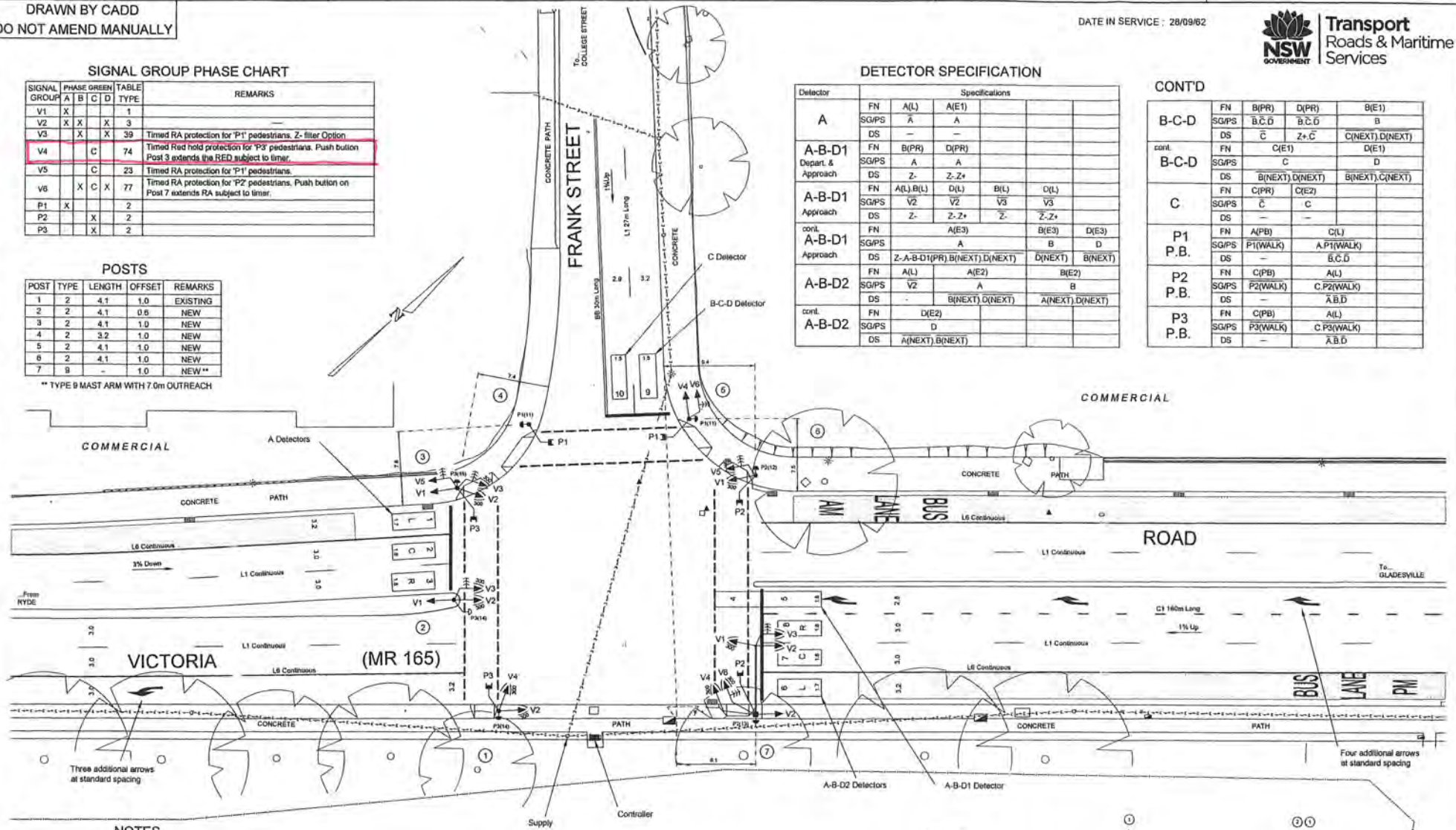
** TYPE 9 MAST ARM WITH 7.0m OUTREACH

DETECTOR SPECIFICATION

Detector		Specifications				
A	FN	A(L)	A(E1)			
	SG/PS	$\overline{A}$	A			
	DS	—	—			
A-B-D1 Depart. & Approach	FN	B(PR)	D(PR)			
	SG/PS	A	A			
	DS	Z-	Z-.Z+			
A-B-D1 Approach	FN	A(L).B(L)	D(L)	B(L)	D(L)	
	SG/PS	$\overline{V2}$	$\overline{V2}$	$\overline{V3}$	$\overline{V3}$	
	DS	Z-	Z-.Z+	$\overline{Z}$-	$\overline{Z}$-.Z+	
cont. A-B-D1 Approach	FN	A(E3)			B(E3)	D(E3)
	SG/PS	A			B	D
	DS	Z-.A-B-D1(PR).B(NEXT).D(NEXT)			$\overline{D(NEXT)}$	$\overline{B(NEXT)}$
A-B-D2	FN	A(L)	A(E2)		B(E2)	
	SG/PS	$\overline{V2}$	A		B	
	DS	-	B(NEXT).D(NEXT)		$\overline{A(NEXT).D(NEXT)}$	
cont. A-B-D2	FN	D(E2)				
	SG/PS	D				
	DS	$\overline{A(NEXT).B(NEXT)}$				

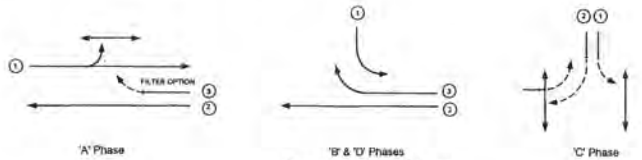
CONT'D

B-C-D	FN	B(PR)	D(PR)	B(E1)	
	SG/PS	$\overline{B}.\overline{C}.\overline{D}$	$\overline{B}.\overline{C}.\overline{D}$	B	
	DS	$\overline{C}$	Z+.$\overline{C}$	C(NEXT).D(NEXT)	
cont. B-C-D	FN	C(E1)		D(E1)	
	SG/PS	C		D	
	DS	$\overline{B(NEXT).D(NEXT)}$		B(NEXT).C(NEXT)	
C	FN	C(PR)	C(E2)		
	SG/PS	$\overline{C}$	C		
	DS	—	—		
P1 P.B.	FN	A(PB)	C(L)		
	SG/PS	P1(WALK)	A.P1(WALK)		
	DS	—	$\overline{B}.\overline{C}.\overline{D}$		
P2 P.B.	FN	C(PB)	A(L)		
	SG/PS	P2(WALK)	C.P2(WALK)		
	DS	—	$\overline{A}.\overline{B}.\overline{D}$		
P3 P.B.	FN	C(PB)	A(L)		
	SG/PS	P3(WALK)	C.P3(WALK)		
	DS	—	$\overline{A}.\overline{B}.\overline{D}$		



NOTES

1. This site is SCATS linked.
2. Special stop sign (R1-4) placed on Post 5.
3. All push buttons are audio tactile, except button on Post 2.
4. Kerb ramps to be constructed at all pedestrian crossings in accordance with Model Drawing MD.R173.B01.A.1.
5. For details of civil road works refer to plan 165.387.CD.0003 prepared by GHD Pty Ltd.



MOVEMENTS

A ORIGINAL ISSUE

ISSUE B: AS REQUESTED BY PROJECT MANAGER. REMOVED: RED PAVEMENT AND L6 LINE FROM WITHIN THE INTERSECTION. KI 12.3.2013

ISSUE B: AS REQUESTED BY RMS PROJECT MANAGER. ALTERED: LEFT TURN ALIGNMENT IN FRANKS ST REMOVED: WB BUS LANE WEST OF FRANKS ST B-LINE / GHD 27.3.2013

PUBLIC UTILITY LEGEND		REFERENCE PLANS	
HYDRANT		SYMBOLS/ABBS.	VD003-6
STOP VALVE		STD POSIT	VD001-5
GAS VALVE		VEH GROUP SPEC	TS-TN-19
SEWER MANHOLE		DEVICE SPEC.	TS-TN-20
TELECOM PIT		PED GROUP SPEC	TS-TN-21
ELECT LIGHT POLE			
POWER POLE			
STAY POLE			
TELEPHONE BOX		SURVEYOR : RMS	
TELECOM PILLAR		DATE : 2012	

U.B.D. Ref. Map 214 A3
LG.G. E: 310 970
CO-ORDS N: 1 254 205
DESIGNED J. BATES
CHECKED
J. BATES SITE CHECKED
J. BATES RECOMMENDED

DESIGN APPROVAL
APPROVED
POSITION MANAGER
DATE 21/01/13
DESIGN PREPARED BY B-Line Drafting

RMS ACCEPTANCE
RECOMMENDED
POSITION NETWORK OPERATIONS LEADER
DATE 14/2/2013
ACCEPTED
POSITION Traffic Manager, North
DATE 15.02.13

ROADS AND MARITIME SERVICES

RYDE COUNCIL AREA
TRAFFIC SIGNALS AT
VICTORIA ROAD (MR 165) AND FRANK STREET
RYDE

DESIGN LAYOUT TCS No 1987

EXISTING ☐ PROPOSED ☒
CADD FILE: VV1987_12C.dgn
SCALE 0 (1:200) 5 10
FILE 387 TS 300
SUPERSEDES SHEET/ISSUE 12/B
ISSUE C
REGN. 0165.387.VV.1987
SHEET 12

Monday, 05 March 2018

	Approach	detector(s)...								
	Approach	1	2	3	5	6	7	8	9	10	
01:00	Approach	1	6	69	31	1	3	124	99	4	0	337
02:00	Approach	1	1	67	9	1	1	59	58	1	0	197
03:00	Approach	1	3	74	17	1	3	56	50	2	1	207
04:00	Approach	1	5	84	23	1	1	53	31	1	0	199
05:00	Approach	1	28	199	119	3	2	87	58	1	5	502
06:00	Approach	1	173	610	538	8	26	226	194	6	6	1787
07:00	Approach	1	252	1082	1161	16	27	532	483	19	14	3586
08:00	Approach	1	232	923	1000	49	60	775	866	41	30	3976
09:00	Approach	1	211	769	879	107	51	673	741	49	60	3540
10:00	Approach	1	189	817	887	60	50	573	660	29	25	3290
11:00	Approach	1	155	685	679	42	39	564	627	47	33	2871
12:00	Approach	1	156	710	649	42	25	612	644	40	44	2922
13:00	Approach	1	152	655	617	31	32	638	677	58	52	2912
14:00	Approach	1	195	633	622	52	44	643	653	37	39	2918
15:00	Approach	1	191	584	581	38	48	722	755	44	50	3013
16:00	Approach	1	282	617	632	66	68	672	716	59	70	3182
17:00	Approach	1	344	770	840	61	59	790	852	76	103	3895
18:00	Approach	1	469	832	873	73	83	781	842	91	120	4164
19:00	Approach	1	394	682	729	31	82	696	775	50	63	3502
20:00	Approach	1	153	494	497	6	49	621	664	25	43	2552
21:00	Approach	1	73	399	328	4	26	502	510	19	28	1889
22:00	Approach	1	70	387	265	4	15	395	411	5	9	1561
23:00	Approach	1	29	252	156	0	12	356	326	8	8	1147
24:00	Approach	1	7	160	52	0	5	229	176	1	3	633

Approach 1 AM peak 3976 07:00 - 08:00 PM peak 4229 16:40 - 17:40 Daily Total 54782

Tuesday, 06 March 2018

	Approach	detector(s)...								
	Approach	1	2	3	5	6	7	8	9	10	
01:00	Approach	1	6	96	34	1	6	132	106	3	2	386
02:00	Approach	1	3	56	18	0	1	86	47	2	1	214
03:00	Approach	1	4	69	12	0	2	64	51	2	1	205
04:00	Approach	1	6	86	23	2	2	45	28	3	1	196
05:00	Approach	1	33	191	125	4	1	86	47	1	3	491
06:00	Approach	1	161	544	520	7	13	227	178	3	1	1654
07:00	Approach	1	259	1093	1129	23	26	562	523	15	13	3643
08:00	Approach	1	207	909	961	66	58	762	844	50	48	3905
09:00	Approach	1	233	830	840	106	58	650	715	55	72	3559
10:00	Approach	1	199	870	920	68	48	604	686	41	26	3462
11:00	Approach	1	195	767	787	33	27	564	628	43	29	3073
12:00	Approach	1	150	718	622	28	31	597	646	36	35	2863
13:00	Approach	1	159	682	664	46	33	673	698	46	44	3045
14:00	Approach	1	161	705	633	35	35	679	707	40	37	3032
15:00	Approach	1	181	606	616	41	46	726	766	40	44	3066
16:00	Approach	1	236	665	680	47	60	639	722	57	86	3192
17:00	Approach	1	390	791	827	69	59	802	873	77	84	3972
18:00	Approach	1	488	850	900	60	50	784	810	95	100	4137
19:00	Approach	1	379	783	809	19	47	785	881	33	52	3788
20:00	Approach	1	188	559	537	15	44	705	734	22	26	2830
21:00	Approach	1	94	482	374	5	26	531	563	19	43	2137
22:00	Approach	1	69	398	332	4	23	514	529	8	29	1906

23:00	Approach	1	47	282	207	2	13	406	376	3	5	1341
24:00	Approach	1	8	183	79	1	10	279	231	1	2	794

Approach 1 AM peak 3988 06:40 - 07:40 PM peak 4227 16:30 - 17:30 Daily Total 56891

Wednesday, 07 March 2018

	Approach	1	1	2	3	5	6	7	8	9	10	
01:00	Approach	1	4	98	47	1	4	143	114	1	2	414
02:00	Approach	1	2	56	24	1	2	90	70	1	2	248
03:00	Approach	1	3	66	16	3	2	64	43	0	4	201
04:00	Approach	1	9	94	27	1	1	47	45	3	2	229
05:00	Approach	1	28	200	117	2	1	88	53	0	3	492
06:00	Approach	1	180	553	550	7	18	257	172	4	6	1747
07:00	Approach	1	225	1069	1102	23	22	563	540	26	9	3579
08:00	Approach	1	239	946	1000	55	57	766	852	37	36	3988
09:00	Approach	1	229	829	929	102	57	661	726	57	84	3674
10:00	Approach	1	196	707	679	77	89	479	586	49	43	2905
11:00	Approach	1	181	756	747	38	29	596	625	52	40	3064
12:00	Approach	1	188	750	692	32	26	601	660	36	36	3021
13:00	Approach	1	178	734	660	31	32	647	648	47	45	3022
14:00	Approach	1	173	682	641	44	39	691	706	34	36	3046
15:00	Approach	1	228	661	635	41	47	756	837	41	56	3302
16:00	Approach	1	297	752	735	49	77	698	743	65	72	3488
17:00	Approach	1	379	815	850	52	54	794	826	67	91	3928
18:00	Approach	1	476	888	908	61	86	801	852	82	94	4248
19:00	Approach	1	357	784	846	24	62	787	859	39	36	3794
20:00	Approach	1	192	596	583	18	47	661	749	20	27	2893
21:00	Approach	1	105	486	402	6	32	577	592	15	26	2241
22:00	Approach	1	80	420	328	4	19	519	522	12	21	1925
23:00	Approach	1	46	338	221	3	9	478	471	8	14	1588
24:00	Approach	1	20	205	102	0	11	307	272	4	4	925

Approach 1 AM peak 3990 06:55 - 07:55 PM peak 4287 16:45 - 17:45 Daily Total 57962

Thursday, 08 March 2018

	Approach	1	1	2	3	5	6	7	8	9	10	
01:00	Approach	1	6	87	51	0	7	178	138	2	2	471
02:00	Approach	1	4	64	18	0	1	112	86	1	0	286
03:00	Approach	1	3	54	15	0	4	78	59	0	0	213
04:00	Approach	1	5	97	30	0	1	57	51	6	3	250
05:00	Approach	1	27	205	106	4	2	89	71	0	2	506
06:00	Approach	1	183	560	526	9	16	239	170	4	3	1710
07:00	Approach	1	269	1108	1151	19	20	535	519	17	19	3657
08:00	Approach	1	249	954	990	43	39	770	815	29	32	3921
09:00	Approach	1	233	817	890	115	49	634	744	53	75	3610
10:00	Approach	1	187	851	898	62	40	621	646	43	29	3377
11:00	Approach	1	206	771	799	40	53	573	613	44	35	3134
12:00	Approach	1	178	713	673	34	110	644	634	43	42	3071
13:00	Approach	1	179	698	623	32	48	674	719	45	43	3061
14:00	Approach	1	181	695	651	50	92	719	752	43	39	3222
15:00	Approach	1	244	689	670	53	171	695	716	57	80	3375
16:00	Approach	1	296	719	729	55	60	654	729	55	53	3350
17:00	Approach	1	400	845	882	58	64	820	866	67	86	4088
18:00	Approach	1	507	866	894	68	64	825	894	93	106	4317
19:00	Approach	1	371	788	824	24	65	806	876	32	65	3851

20:00	Approach	1	180	579	572	11	49	730	775	15	47	2958
21:00	Approach	1	125	522	459	6	42	584	595	20	49	2402
22:00	Approach	1	96	457	384	3	28	531	554	11	12	2076
23:00	Approach	1	49	325	238	5	18	502	492	3	5	1637
24:00	Approach	1	19	250	106	1	11	322	299	1	1	1010

Approach 1 AM peak 3983 06:45 - 07:45 PM peak 4365 16:40 - 17:40 Daily Total 59553

Friday, 09 March 2018

	Approach	1	1	2	3	5	6	7	8	9	10	
01:00	Approach	1	4	127	39	1	8	188	165	2	3	537
02:00	Approach	1	3	94	30	0	1	125	97	2	2	354
03:00	Approach	1	3	88	32	2	3	100	75	0	1	304
04:00	Approach	1	6	101	36	3	1	75	52	4	3	281
05:00	Approach	1	23	194	111	2	4	90	65	2	3	494
06:00	Approach	1	182	579	502	12	26	238	174	5	6	1724
07:00	Approach	1	258	1095	1129	23	26	508	484	20	14	3557
08:00	Approach	1	223	914	977	47	48	753	769	30	27	3788
09:00	Approach	1	246	795	901	107	50	619	690	54	87	3549
10:00	Approach	1	182	814	885	61	49	582	621	30	42	3266
11:00	Approach	1	234	777	790	42	30	614	615	44	42	3188
12:00	Approach	1	164	738	689	31	27	663	664	36	35	3047
13:00	Approach	1	175	683	673	55	30	695	696	48	59	3114
14:00	Approach	1	209	702	654	40	30	758	763	49	37	3242
15:00	Approach	1	243	668	655	37	55	756	792	41	71	3318
16:00	Approach	1	271	738	746	44	80	673	770	48	50	3420
17:00	Approach	1	387	834	906	50	59	770	829	58	74	3967
18:00	Approach	1	483	903	914	40	58	788	846	67	80	4179
19:00	Approach	1	309	762	750	28	106	777	827	31	47	3637
20:00	Approach	1	177	676	608	15	46	701	729	20	43	3015
21:00	Approach	1	101	555	450	2	18	527	506	8	9	2176
22:00	Approach	1	83	489	366	5	18	519	546	3	11	2040
23:00	Approach	1	76	443	284	1	19	562	559	5	15	1964
24:00	Approach	1	42	379	209	2	11	431	478	3	0	1555

Approach 1 AM peak 3803 06:25 - 07:25 PM peak 4238 16:50 - 17:50 Daily Total 59716

Saturday, 10 March 2018

	Approach	1	1	2	3	5	6	7	8	9	10	
01:00	Approach	1	17	238	113	1	12	325	289	0	0	995
02:00	Approach	1	10	178	54	1	6	246	208	1	2	706
03:00	Approach	1	8	148	34	2	7	202	143	2	3	549
04:00	Approach	1	9	140	46	0	3	153	109	2	1	463
05:00	Approach	1	15	162	65	3	2	133	104	3	4	491
06:00	Approach	1	40	311	223	5	3	153	109	0	4	848
07:00	Approach	1	144	618	520	6	19	266	205	3	10	1791
08:00	Approach	1	138	623	599	7	31	375	361	4	8	2146
09:00	Approach	1	197	723	717	32	38	493	516	11	17	2744
10:00	Approach	1	223	760	817	22	44	616	703	29	33	3247
11:00	Approach	1	221	811	824	27	47	727	743	17	18	3435
12:00	Approach	1	242	820	827	22	37	735	776	27	45	3531
13:00	Approach	1	232	828	781	21	41	779	854	25	29	3590
14:00	Approach	1	233	813	812	16	57	821	843	17	12	3624
15:00	Approach	1	220	803	783	9	34	750	822	23	30	3474
16:00	Approach	1	212	789	765	5	27	765	841	10	15	3429

17:00	Approach	1	239	797	744	10	40	817	866	6	10	3529
18:00	Approach	1	252	852	820	12	60	788	813	14	11	3622
19:00	Approach	1	220	851	785	4	33	724	704	9	5	3335
20:00	Approach	1	174	710	579	4	26	567	560	2	9	2631
21:00	Approach	1	84	583	441	3	16	521	529	5	5	2187
22:00	Approach	1	89	516	397	1	17	529	539	4	4	2096
23:00	Approach	1	58	478	330	2	14	575	595	0	6	2058
24:00	Approach	1	50	418	256	1	17	569	614	3	1	1929

Approach 1 AM peak 3531 11:00 - 12:00 PM peak 3744 13:25 - 14:25 Daily Total 56450

Sunday, 11 March 2018

	Approach	1	1	2	3	5	6	7	8	9	10	
01:00	Approach	1	17	270	121	1	10	425	396	0	1	1241
02:00	Approach	1	10	207	80	0	4	267	243	0	0	811
03:00	Approach	1	12	156	52	1	5	201	202	1	2	632
04:00	Approach	1	10	162	52	0	6	186	152	0	2	570
05:00	Approach	1	5	119	52	0	2	133	108	2	3	424
06:00	Approach	1	17	200	106	0	1	106	73	1	3	507
07:00	Approach	1	32	302	178	0	10	152	115	2	3	794
08:00	Approach	1	71	395	328	7	18	215	193	3	5	1235
09:00	Approach	1	106	504	521	9	26	334	318	7	11	1836
10:00	Approach	1	179	746	746	55	39	475	505	18	51	2814
11:00	Approach	1	196	752	790	28	56	604	650	11	25	3112
12:00	Approach	1	224	854	852	56	177	653	664	32	42	3554
13:00	Approach	1	251	808	825	30	43	717	754	44	83	3555
14:00	Approach	1	205	807	775	16	26	710	744	25	59	3367
15:00	Approach	1	183	792	745	21	51	669	744	27	71	3303
16:00	Approach	1	176	739	693	13	108	761	819	11	10	3330
17:00	Approach	1	179	656	665	9	36	753	816	12	14	3140
18:00	Approach	1	174	686	628	11	29	725	764	7	16	3040
19:00	Approach	1	108	595	489	8	23	663	665	9	6	2566
20:00	Approach	1	105	499	406	8	17	586	558	8	1	2188
21:00	Approach	1	57	400	312	5	23	533	530	7	1	1868
22:00	Approach	1	55	413	266	1	11	483	443	1	3	1676
23:00	Approach	1	23	284	185	0	10	398	355	0	2	1257
24:00	Approach	1	10	141	87	0	6	250	223	3	1	721

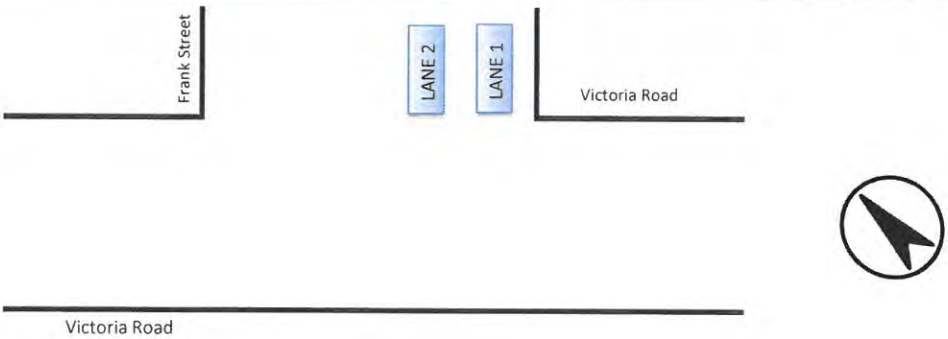
Approach 1 AM peak 3554 11:00 - 12:00 PM peak 3555 12:00 - 13:00 Daily Total 47541

APPENDIX H

QUEUE RECORDING RESULTS

Client	T.T.P.A.			
	NORTH EAST	SOUTH EAST	SOUTH WEST	NORTH WEST
Location	Frank Street	Victoria Road	-	Victoria Road
Date	Monday, 26 March 2018			
Survey Time	0800 - 0930	1430 - 1800		
Description	Queue length survey			

Traffic Information Specialist

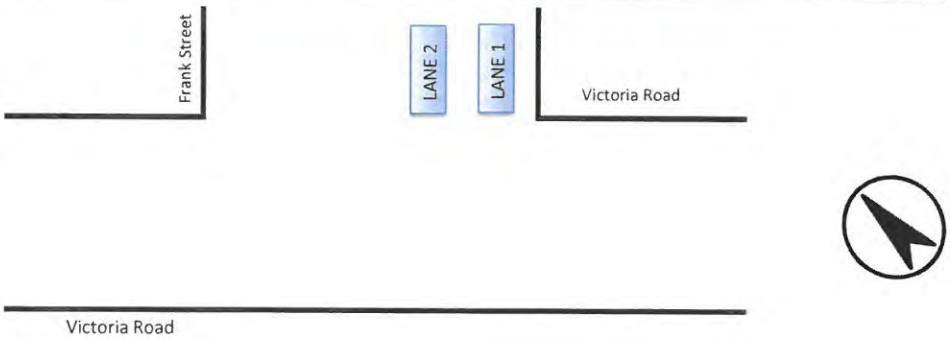


AM			LANE 1	LANE 2
8:00	to	8:15	2	2
8:15	to	8:30	3	6
8:30	to	8:45	3	8
8:45	to	9:00	3	6
9:00	to	9:15	2	2
9:15	to	9:30	3	2

PM			LANE 1	LANE 2
14:30	to	14:45	2	3
14:45	to	15:00	3	3
15:00	to	15:15	3	18
15:15	to	15:30	3	18
15:30	to	15:45	3	6
15:45	to	16:00	3	4
16:00	to	16:15	3	9
16:15	to	16:30	3	4
16:30	to	16:45	3	5
16:45	to	17:00	6	10
17:00	to	17:15	3	7
17:15	to	17:30	4	8
17:30	to	17:45	5	9
17:45	to	18:00	3	6

Client	T.T.P.A.			
	NORTH EAST	SOUTH EAST	SOUTH WEST	NORTH WEST
Location	Frank Street	Victoria Road	-	Victoria Road
Date	Tuesday, 27 March 2018			
Survey Time	0800 - 0930	1430 - 1800		
Description	Queue length survey			

Traffic Information Specialist

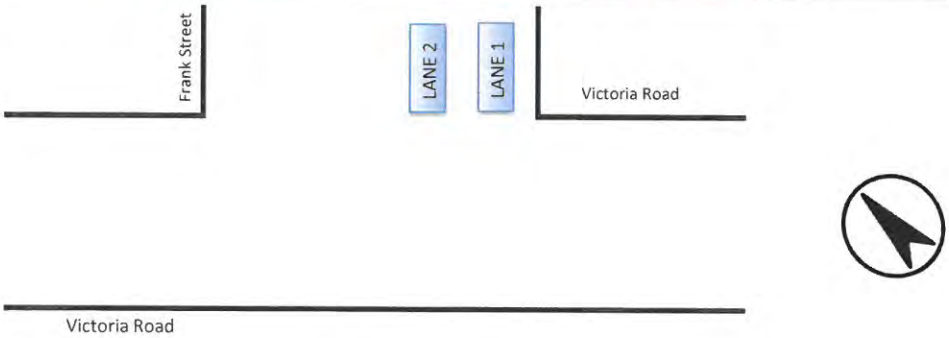


AM			LANE 1	LANE 2
8:00	to	8:15	3	3
8:15	to	8:30	2	4
8:30	to	8:45	4	4
8:45	to	9:00	3	3
9:00	to	9:15	2	2
9:15	to	9:30	2	2

PM			LANE 1	LANE 2
14:30	to	14:45	2	4
14:45	to	15:00	2	4
15:00	to	15:15	3	9
15:15	to	15:30	2	16
15:30	to	15:45	3	7
15:45	to	16:00	3	5
16:00	to	16:15	3	5
16:15	to	16:30	2	3
16:30	to	16:45	3	4
16:45	to	17:00	4	3
17:00	to	17:15	5	5
17:15	to	17:30	7	4
17:30	to	17:45	4	3
17:45	to	18:00	7	3

Client	T.T.P.A.			
	NORTH EAST	SOUTH EAST	SOUTH WEST	NORTH WEST
Location	Frank Street	Victoria Road	-	Victoria Road
Date	Wednesday, 28 March 2018			
Survey Time	0800 - 0930	1430 - 1800		
Description	Queue length survey			

Traffic Information Specialist

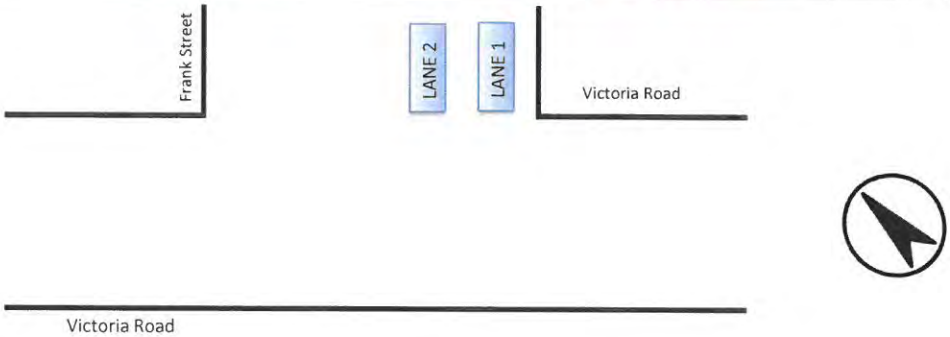


AM				
			LANE 1	LANE 2
8:00	to	8:15	3	2
8:15	to	8:30	3	4
8:30	to	8:45	4	5
8:45	to	9:00	4	3
9:00	to	9:15	1	3
9:15	to	9:30	1	2

PM				
			LANE 1	LANE 2
14:30	to	14:45	3	5
14:45	to	15:00	2	4
15:00	to	15:15	2	18
15:15	to	15:30	3	18
15:30	to	15:45	3	6
15:45	to	16:00	2	2
16:00	to	16:15	3	4
16:15	to	16:30	3	3
16:30	to	16:45	4	6
16:45	to	17:00	3	5
17:00	to	17:15	7	7
17:15	to	17:30	8	5
17:30	to	17:45	4	5
17:45	to	18:00	7	3

Client	**T.T.P.A.**			
	NORTH EAST	SOUTH EAST	SOUTH WEST	NORTH WEST
Location	Frank Street	Victoria Road	-	Victoria Road
Date	Thursday, 29 March 2018			
Survey Time	0800 - 0930	1430 - 1800		
Description	Queue length survey			

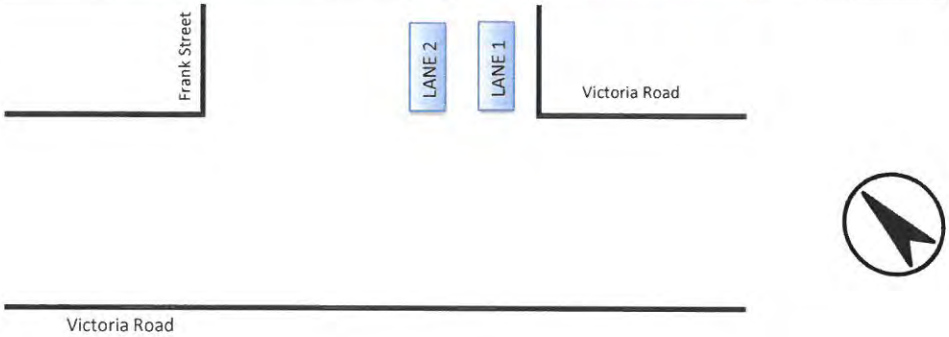
Traffic Information Specialist



AM				
			LANE 1	LANE 2
8:00	to	8:15	2	5
8:15	to	8:30	3	3
8:30	to	8:45	3	6
8:45	to	9:00	6	6
9:00	to	9:15	7	3
9:15	to	9:30	3	4

PM				
			LANE 1	LANE 2
14:30	to	14:45	6	3
14:45	to	15:00	3	3
15:00	to	15:15	4	5
15:15	to	15:30	4	8
15:30	to	15:45	5	3
15:45	to	16:00	2	4
16:00	to	16:15	5	3
16:15	to	16:30	5	6
16:30	to	16:45	6	5
16:45	to	17:00	4	5
17:00	to	17:15	5	7
17:15	to	17:30	5	7
17:30	to	17:45	4	7
17:45	to	18:00	3	7

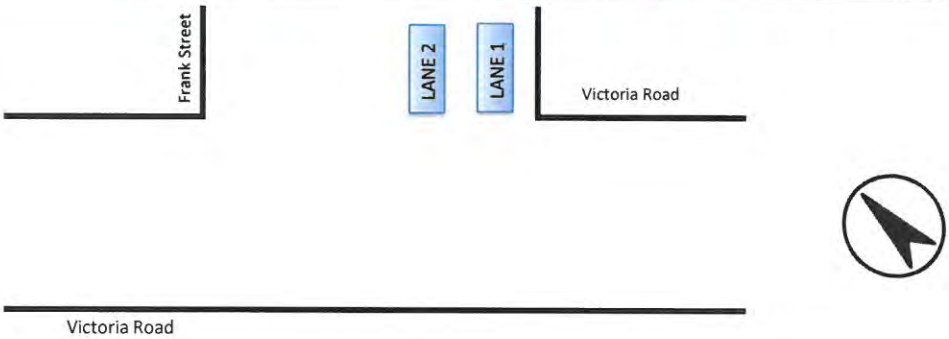
Client	T.T.P.A.			
	NORTH EAST	SOUTH EAST	SOUTH WEST	NORTH WEST
Location	Frank Street	Victoria Road	-	Victoria Road
Date	Friday, 16 March 2018			
Survey Time	0800 - 0930	1430 - 1800		
Description	Queue length survey			



AM				
			LANE 1	LANE 2
8:00	to	8:15	1	4
8:15	to	8:30	2	6
8:30	to	8:45	3	5
8:45	to	9:00	6	5
9:00	to	9:15	4	4
9:15	to	9:30	2	4

PM				
			LANE 1	LANE 2
14:30	to	14:45	3	5
14:45	to	15:00	5	5
15:00	to	15:15	3	6
15:15	to	15:30	2	15
15:30	to	15:45	3	4
15:45	to	16:00	4	7
16:00	to	16:15	4	5
16:15	to	16:30	6	6
16:30	to	16:45	4	6
16:45	to	17:00	2	5
17:00	to	17:15	5	9
17:15	to	17:30	5	3
17:30	to	17:45	3	4
17:45	to	18:00	4	3

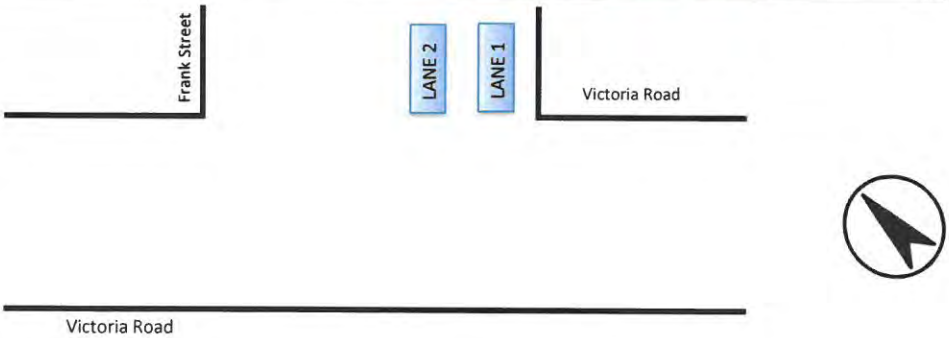
Client	T.T.P.A.			
	NORTH EAST	SOUTH EAST	SOUTH WEST	NORTH WEST
Location	Frank Street	Victoria Road	-	Victoria Road
Date	Monday, 26 March 2018			
Survey Time	1500 - 1530			
Description	Queue length survey			



AM	Number of Car queue at start of Green Phase		Number of cars Left in Queue after Green Phase	
	LANE 1	LANE 2	LANE 1	LANE 2
1st Cycle	1	2	0	0
2nd Cycle	1	2	0	0
3rd Cycle	1	2	0	0
4th Cycle	3	2	0	0
5th Cycle	3	13	0	10
6th Cycle	1	11	0	8
7th Cycle	2	14	0	10
8th Cycle	5	17	0	13
9th Cycle	2	18	0	10
10th Cycle	3	10	0	4
11th Cycle	1	6	0	2
12th Cycle	2	5	0	0
13th Cycle	2	3	0	0
14th Cycle	1	1	0	0

Client	T.T.P.A.			
	NORTH EAST	SOUTH EAST	SOUTH WEST	NORTH WEST
Location	Frank Street	Victoria Road	-	Victoria Road
Date	Wednesday, 28 March 2018			
Survey Time	1500 - 1530			
Description	Queue length survey			

Traffic Information Specialist



AM	Number of Car queue at start of Green Phase		Number of cars Left in Queue after Green Phase	
	LANE 1	LANE 2	LANE 1	LANE 2
1st Cycle	0	1	0	0
2nd Cycle	2	0	0	0
3rd Cycle	3	4	0	0
4th Cycle	1	4	0	0
5th Cycle	2	5	0	0
6th Cycle	1	3	0	0
7th Cycle	3	16	0	12
8th Cycle	3	18	0	14
9th Cycle	3	18	0	15
10th Cycle	2	18	0	12
11th Cycle	7	8	1	6
12th Cycle	1	1	0	0
13th Cycle	4	4	0	0
14th Cycle	1	2	0	0
15th Cycle	2	3	0	0

APPENDIX I

SCHOOL ACCESS COUNTS

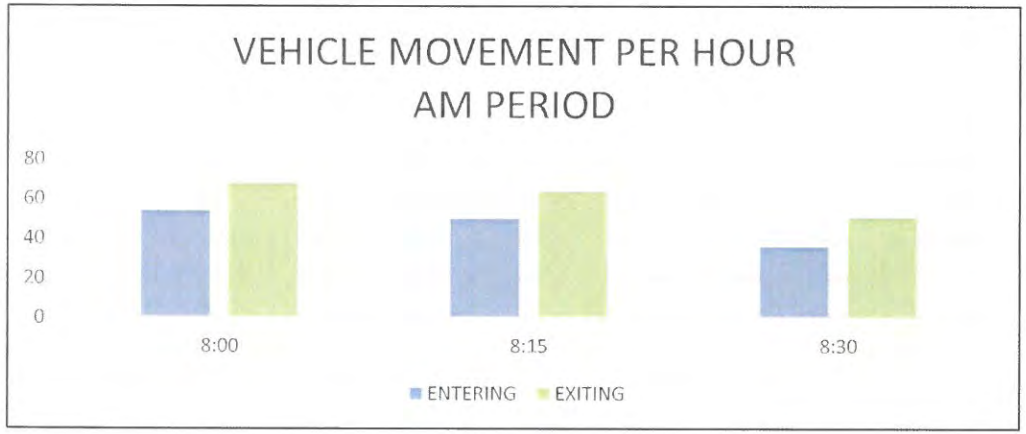
Traffic Information Specialist

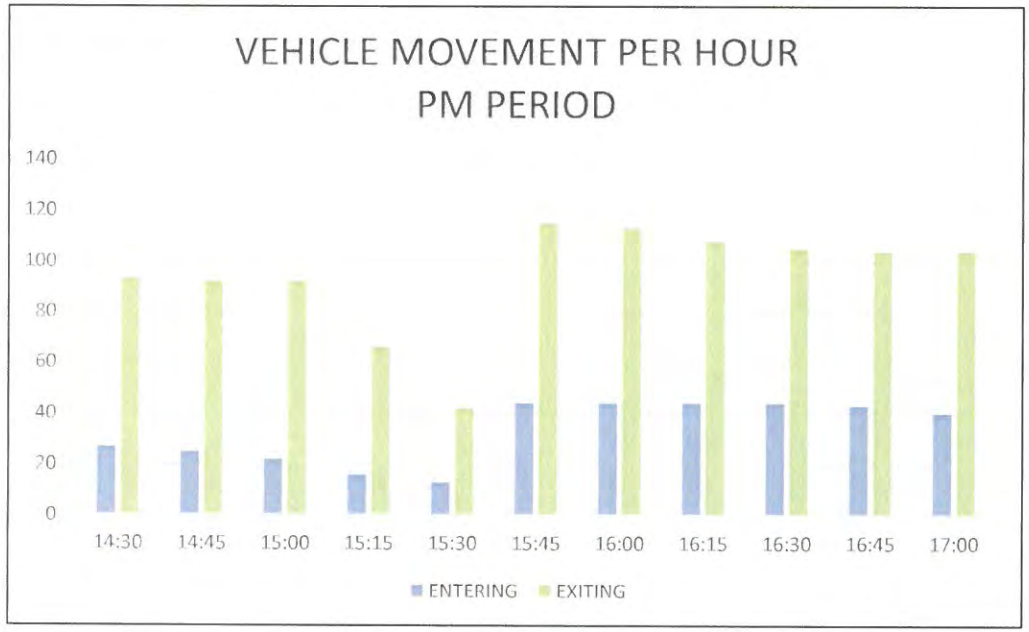
LOCATION	NORTH	Frank Street	TIME PERIOD	0800 - 0930
	EAST	-		1430 - 1800
	SOUTH	-		-
	WEST	-	DATE	Wednesday, 28 March 2018
SUBURB		GLADESVILLE	WEATHER	-

Vehicle ENTERING

Vehicle EXITING

MOVEMENTS Time Per HOUR			1 ENTERING	2 EXITING	
8:00	-	9:00	54	68	122
8:15	-	9:15	50	64	114
8:30	-	9:30	36	51	87
Period End			140	183	323
14:30	-	15:30	27	93	120
14:45	-	15:45	25	92	117
15:00	-	16:00	22	92	114
15:15	-	16:15	16	66	82
15:30	-	16:30	13	42	55
15:45	-	16:45	44	115	159
16:00	-	17:00	44	113	157
16:15	-	17:15	44	108	152
16:30	-	17:30	44	105	149
16:45	-	17:45	43	104	147
17:00	-	18:00	40	104	144
Period End			362	1034	1396


VEHICLE MOVEMENT PER HOUR
AM PERIOD
80
60
40
20
0
8:00
8:15
8:30
ENTERING
EXITING


VEHICLE MOVEMENT PER HOUR
PM PERIOD
140
120
100
80
60
40
20
0
14:30
14:45
15:00
15:15
15:30
15:45
16:00
16:15
16:30
16:45
17:00
ENTERING
EXITING

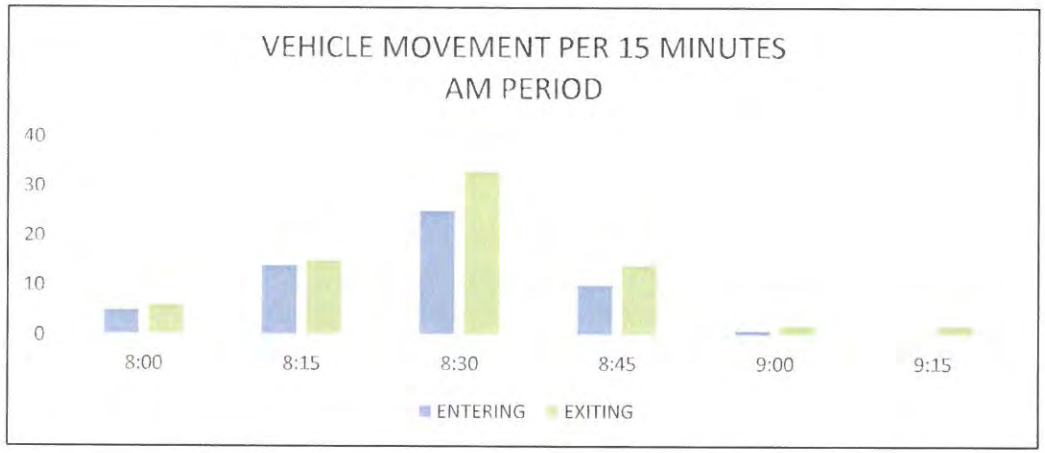
Traffic Information Specialist

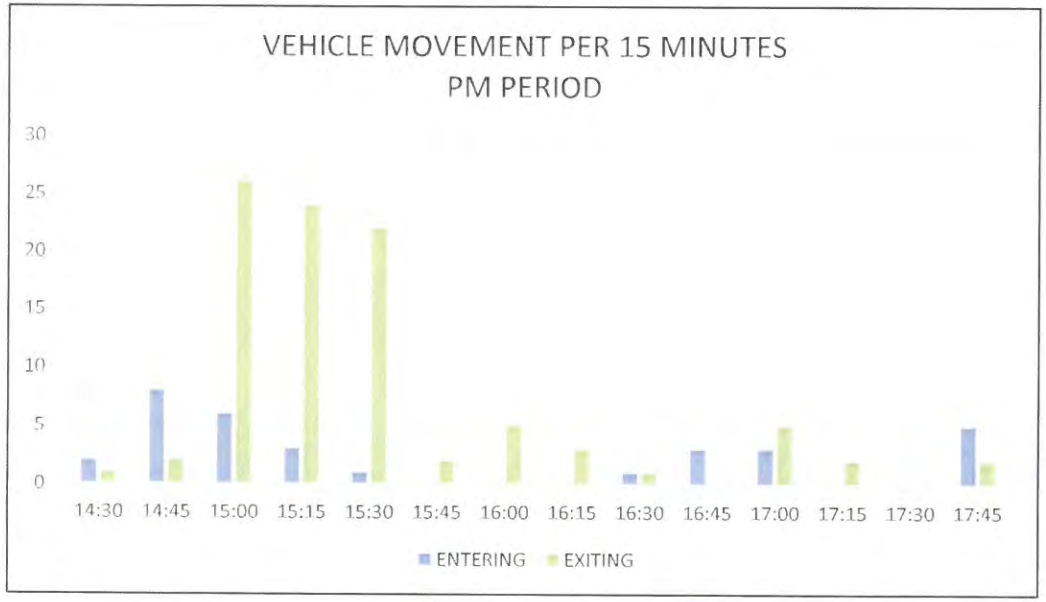
LOCATION	NORTH	Frank Street	TIME PERIOD	0800 - 0930
	EAST	-		1430 - 1800
	SOUTH	-		-
	WEST	-	DATE	Wednesday, 28 March 2018
SUBURB		GLADESVILLE	WEATHER	-

Vehicle ENTERING

Vehicle EXITING

MOVEMENTS Time Per 15 Mins			1 ENTERING	2 EXITING	
8:00	-	8:15	5	6	11
8:15	-	8:30	14	15	29
8:30	-	8:45	25	33	58
8:45	-	9:00	10	14	24
9:00	-	9:15	1	2	3
9:15	-	9:30	0	2	2
Period End			55	72	127
14:30	-	14:45	2	1	3
14:45	-	15:00	8	2	10
15:00	-	15:15	6	26	32
15:15	-	15:30	3	24	27
15:30	-	15:45	1	22	23
15:45	-	16:00	0	2	2
16:00	-	16:15	0	5	5
16:15	-	16:30	0	3	3
16:30	-	16:45	1	1	2
16:45	-	17:00	3	0	3
17:00	-	17:15	3	5	8
17:15	-	17:30	0	2	2
17:30	-	17:45	0	0	0
17:45	-	18:00	5	2	7
Period End			32	95	127


VEHICLE MOVEMENT PER 15 MINUTES
AM PERIOD
40
30
20
10
0
8:00
8:15
8:30
8:45
9:00
9:15
ENTERING
EXITING


VEHICLE MOVEMENT PER 15 MINUTES
PM PERIOD
30
25
20
15
10
5
0
14:30
14:45
15:00
15:15
15:30
15:45
16:00
16:15
16:30
16:45
17:00
17:15
17:30
17:45
ENTERING
EXITING

APPENDIX J

INTERSECTION SURVEY RESULTS

Location	Frank Street	Duration	0800 - 0930
	Victoria Road		1430 - 1800
	-		-
	Victoria Road	Day/Date	Friday, 23 March 2018
Suburb	GLADESVILLE	Weather	-

All Vehicles Time Per Hour	NORTH EAST *Frank Street*				SOUTH EAST *Victoria Road*				SOUTH WEST -				NORTH WEST *Victoria Road*				
	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL	TOTAL
8:00 - 9:00	45	0	90	135	0	1313	103	1416	0	0	0	0	77	1853	0	1930	3481
8:15 - 9:15	54	0	86	140	0	1329	99	1428	0	0	0	0	72	1839	0	1911	3479
8:30 - 9:30	53	0	77	130	0	1287	82	1369	0	0	0	0	80	1853	0	1933	3432
Period End	152	0	253	405	0	3929	284	4213	0	0	0	0	229	5545	0	5774	10392
14:30 - 15:30	56	0	93	149	0	1437	44	1481	0	0	0	0	48	1587	0	1635	3265
14:45 - 15:45	56	0	103	159	0	1486	47	1533	0	0	0	0	50	1653	0	1703	3395
15:00 - 16:00	57	0	110	167	0	1516	48	1564	0	0	0	0	43	1733	0	1776	3507
15:15 - 16:15	60	0	106	166	0	1555	42	1597	0	0	0	0	43	1866	0	1909	3672
15:30 - 16:30	70	0	84	154	0	1623	35	1658	0	0	0	0	38	1888	0	1926	3738
15:45 - 16:45	77	0	89	166	0	1674	35	1709	0	0	0	0	35	1994	0	2029	3904
16:00 - 17:00	80	0	84	164	0	1682	33	1715	0	0	0	0	41	2080	0	2121	4000
16:15 - 17:15	83	0	91	174	0	1676	45	1721	0	0	0	0	38	2079	0	2117	4012
16:30 - 17:30	69	0	88	157	0	1681	53	1734	0	0	0	0	38	2135	0	2173	4064
16:45 - 17:45	61	0	86	147	0	1673	54	1727	0	0	0	0	37	2032	0	2069	3943
17:00 - 18:00	61	0	77	138	0	1642	56	1698	0	0	0	0	31	2006	0	2037	3873
Period End	730	0	1011	1741	0	17645	492	18137	0	0	0	0	442	21053	0	21495	41373

Traffic Information Specialists
ABN: 42 613 389 923
Email info@trafficinfospecialist.com.au

Traffic Information Specialist

Location	Frank Street	Duration	0800 - 0930
	Victoria Road		1430 - 1800
	-		-
	Victoria Road	Day/Date	Friday, 23 March 2018
Suburb	GLADESVILLE	Weather	-

All Vehicles Time Per 15 Mins	NORTH EAST *Frank Street*				SOUTH EAST *Victoria Road*				SOUTH WEST -				NORTH WEST *Victoria Road*				
	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL	L	T	R	TOTAL	TOTAL
8:00 - 8:15	4		15	19		341	20	361					20	453		473	853
8:15 - 8:30	6		20	26		334	28	362					16	451		467	855
8:30 - 8:45	18		30	48		315	35	350					14	469		483	881
8:45 - 9:00	17		25	42		323	20	343					27	480		507	892
9:00 - 9:15	13		11	24		357	16	373					15	439		454	851
9:15 - 9:30	5		11	16		292	11	303					24	465		489	808
Period End	63		112	175		1962	130	2092					116	2757		2873	5140
14:30 - 14:45	13		10	23		352	8	360					8	375		383	766
14:45 - 15:00	11		13	24		375	8	383					13	394		407	814
15:00 - 15:15	12		27	39		387	13	400					13	354		367	806
15:15 - 15:30	20		43	63		323	15	338					14	464		478	879
15:30 - 15:45	13		20	33		401	11	412					10	441		451	896
15:45 - 16:00	12		20	32		405	9	414					6	474		480	926
16:00 - 16:15	15		23	38		426	7	433					13	487		500	971
16:15 - 16:30	30		21	51		391	8	399					9	486		495	945
16:30 - 16:45	20		25	45		452	11	463					7	547		554	1062
16:45 - 17:00	15		15	30		413	7	420					12	560		572	1022
17:00 - 17:15	18		30	48		420	19	439					10	486		496	983
17:15 - 17:30	16		18	34		396	16	412					9	542		551	997
17:30 - 17:45	12		23	35		444	12	456					6	444		450	941
17:45 - 18:00	15		6	21		382	9	391					6	534		540	952
Period End	222		294	516		5567	153	5720					136	6588		6724	12960

Traffic Information Specialists

ABN: 42 613 389 923

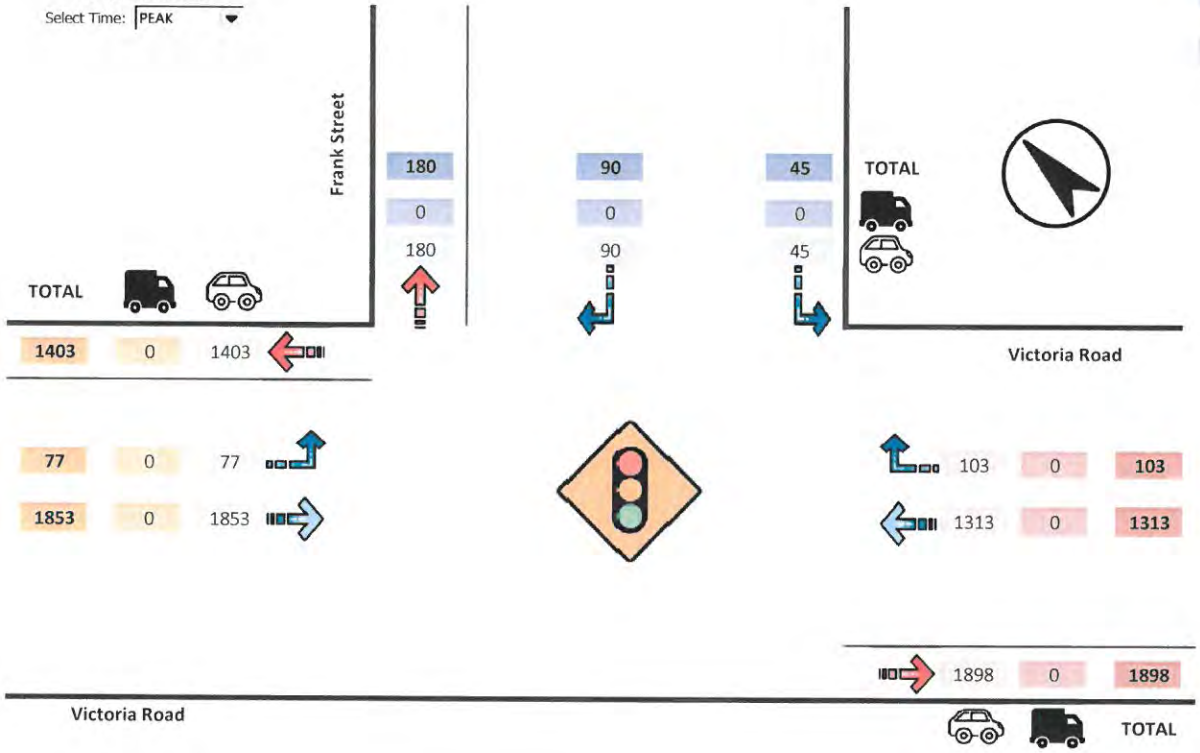
Email info@trafficinfospecialist.com.au

Location	Frank Street	Duration	0800 - 0930
	Victoria Road		1430 - 1800
	-		-
	Victoria Road	Day/Date	Friday, 23 March 2018
Suburb	GLADESVILLE	Weather	-

DATA SELECTION

Select Time: PEAK

TIME RANGE		
PEAK	-	AM
PEAK		
8:00	-	9:00



Traffic Information Specialists

ABN: 42 613 389 923

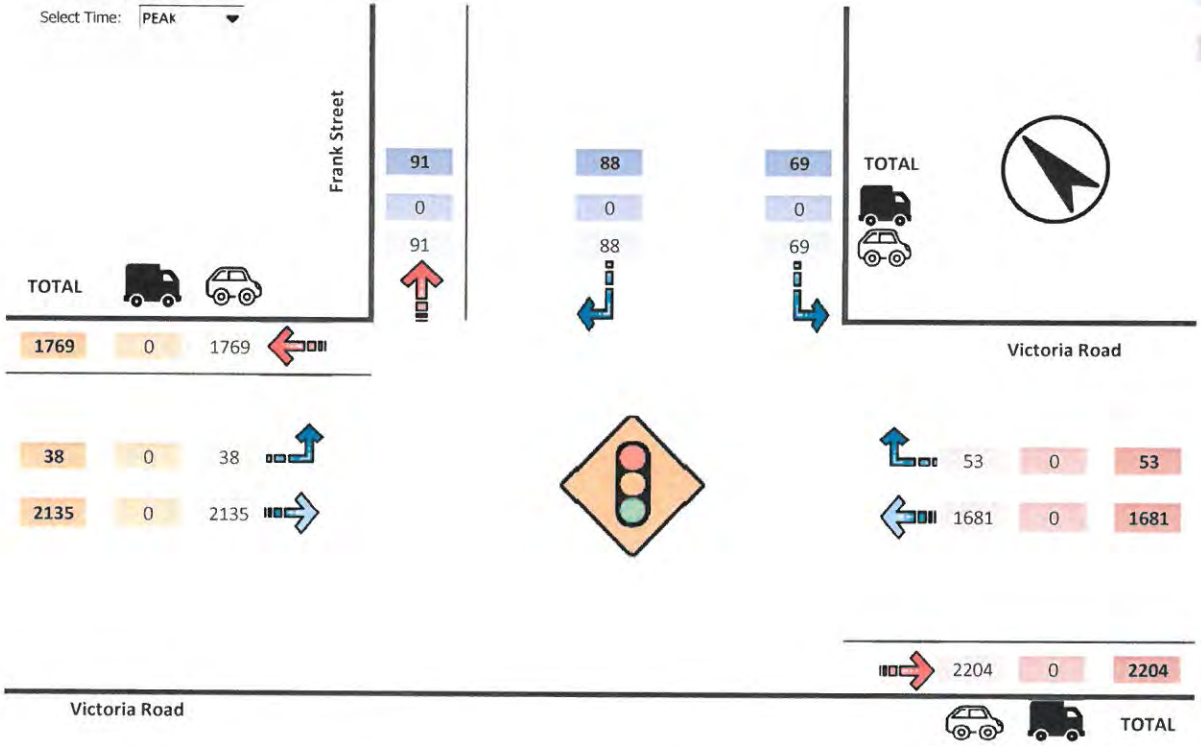
Email info@trafficinfospecialist.com.au

Location	Frank Street	Duration	0800 - 0930
	Victoria Road		1430 - 1800
	-		-
	Victoria Road	Day/Date	Friday, 23 March 2018
Suburb	GLADESVILLE	Weather	-

DATA SELECTION

Select Time: PEAK

TIME RANGE		
PEAK	-	PM
PEAK		
16:30	-	17:30



Traffic Information Specialists

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APPENDIX K

SIDRA RESULTS

MOVEMENT SUMMARY

Site: 101 [VICTORIA RD - FRANK ST WITH ROAD CLOSURE AM - 8.00-900AM]

New Site
Signals - Fixed Time Coordinated Cycle Time = 140 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: VICTORIA ROAD											
5	T1	1313	2.0	0.332	0.6	LOS A	0.9	6.1	0.03	0.03	59.0
6	R2	103	2.0	0.481	6.8	LOS A	0.4	3.1	0.06	0.60	50.5
Approach		1416	2.0	0.481	1.0	LOS A	0.9	6.1	0.03	0.07	58.0
North: FRANK ST											
7	L2	45	2.0	0.202	44.1	LOS D	2.2	15.6	0.94	0.73	27.6
9	R2	90	2.0	0.860	85.6	LOS F	6.8	48.7	1.00	0.95	20.3
Approach		135	2.0	0.860	71.8	LOS E	6.8	48.7	0.98	0.88	22.1
West: VICTORIA ROAD											
10	L2	77	2.0	0.062	6.1	LOS A	0.1	0.8	0.02	0.58	51.7
11	T1	1853	2.0	0.832	1.2	LOS A	6.7	47.9	0.12	0.11	57.9
Approach		1930	2.0	0.832	1.4	LOS A	6.7	47.9	0.11	0.13	57.5
All Vehicles		3481	2.0	0.860	4.0	LOS A	6.8	48.7	0.12	0.13	53.2

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.
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.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	50	64.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	50	15.6	LOS B	0.1	0.1	0.47	0.47
P4	West Full Crossing	50	64.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		150	48.0	LOS E			0.80	0.80

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [VICTORIA RD - FRANK ST WITH ROAD CLOSURE SCHOOL PEAK - 3.00-4.00PM]

New Site
Signals - Fixed Time Coordinated Cycle Time = 140 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: VICTORIA ROAD											
5	T1	1516	2.0	0.387	0.6	LOS A	1.1	7.7	0.03	0.03	58.9
6	R2	48	2.0	0.248	6.2	LOS A	0.1	0.7	0.03	0.58	51.1
Approach		1564	2.0	0.387	0.8	LOS A	1.1	7.7	0.03	0.05	58.5
North: FRANK ST											
7	L2	57	2.0	0.291	47.0	LOS D	2.9	21.0	0.96	0.74	26.8
9	R2	110	2.0	0.935	94.1	LOS F	8.9	63.4	1.00	1.04	19.1
Approach		167	2.0	0.935	78.0	LOS E	8.9	63.4	0.99	0.94	21.1
West: VICTORIA ROAD											
10	L2	43	2.0	0.034	6.0	LOS A	0.1	0.4	0.02	0.58	51.8
11	T1	1733	2.0	0.759	1.1	LOS A	4.5	32.3	0.08	0.08	58.1
Approach		1776	2.0	0.759	1.2	LOS A	4.5	32.3	0.08	0.09	57.9
All Vehicles		3507	2.0	0.935	4.7	LOS A	8.9	63.4	0.10	0.11	52.2

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.
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.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	50	64.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	50	14.7	LOS B	0.1	0.1	0.46	0.46
P4	West Full Crossing	50	64.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		150	47.7	LOS E			0.79	0.79

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [VICTORIA RD - FRANK ST WITH ROAD CLOSURE SCHOOL PEAK - 4.30-5.30PM]

New Site
Signals - Fixed Time Coordinated Cycle Time = 140 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: VICTORIA ROAD											
5	T1	1681	2.0	0.416	0.6	LOS A	1.3	9.0	0.04	0.03	58.9
6	R2	53	2.0	0.341	6.5	LOS A	0.1	1.0	0.04	0.59	50.8
Approach		1734	2.0	0.416	0.8	LOS A	1.3	9.0	0.04	0.05	58.5
North: FRANK ST											
7	L2	69	2.0	0.440	50.0	LOS D	3.7	26.4	0.99	0.75	26.0
9	R2	88	2.0	1.121	196.4	LOS F	10.9	77.9	1.00	1.30	11.1
Approach		157	2.0	1.121	132.1	LOS F	10.9	77.9	1.00	1.06	14.7
West: VICTORIA ROAD											
10	L2	38	2.0	0.030	6.0	LOS A	0.1	0.4	0.02	0.58	51.8
11	T1	2135	2.0	0.903	3.0	LOS A	14.1	100.1	0.19	0.19	55.0
Approach		2173	2.0	0.903	3.1	LOS A	14.1	100.1	0.19	0.20	55.0
All Vehicles		4064	2.0	1.121	7.1	LOS A	14.1	100.1	0.15	0.17	49.1

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.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	50	64.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	50	13.3	LOS B	0.1	0.1	0.44	0.44
P4	West Full Crossing	50	64.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		150	47.3	LOS E			0.78	0.78

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [VICTORIA RD - FRANK ST WITH ROAD CLOSURE SCHOOL PEAK - 3.15-3.30PM]

New Site
Signals - Fixed Time Coordinated Cycle Time = 140 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: VICTORIA ROAD											
5	T1	1292	2.0	0.360	0.7	LOS A	0.9	6.3	0.03	0.03	58.8
6	R2	60	2.0	0.353	6.6	LOS A	0.1	1.1	0.04	0.59	50.8
Approach		1352	2.0	0.360	1.0	LOS A	0.9	6.3	0.03	0.05	58.2
North: FRANK ST											
7	L2	80	2.0	0.322	42.4	LOS D	3.9	27.4	0.94	0.75	28.1
9	R2	172	2.0	1.012	122.3	LOS F	16.4	116.6	1.00	1.16	16.1
Approach		252	2.0	1.012	96.9	LOS F	16.4	116.6	0.98	1.03	18.5
West: VICTORIA ROAD											
10	L2	56	2.0	0.046	6.1	LOS A	0.1	0.6	0.02	0.58	51.7
11	T1	1856	2.0	0.900	3.6	LOS A	12.4	88.1	0.18	0.19	54.2
Approach		1912	2.0	0.900	3.7	LOS A	12.4	88.1	0.18	0.20	54.1
All Vehicles		3516	2.0	1.012	9.3	LOS A	16.4	116.6	0.18	0.20	46.6

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.
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.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	200	64.7	LOS F	0.8	0.8	0.97	0.97
P3	North Full Crossing	200	18.7	LOS B	0.4	0.4	0.52	0.52
P4	West Full Crossing	200	64.7	LOS F	0.8	0.8	0.97	0.97
All Pedestrians		600	49.3	LOS E			0.82	0.82

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Our Reference: P3583.002L

9 May 2018

Traffic and Development Engineer
City of Ryde
Locked Bag 2069
NORTH RYDE NSW 1670

RE : COLLEGE STREET CLOSURE: 12 MONTH POST IMPLEMENTATION REVIEW
ASSESSMENT OF TTPA FINDINGS AND RECOMMENDATIONS

Bitzios Consulting has been commissioned by the City of Ryde (CoR) to provide independent recommendations for the proposed traffic management (either one-way closure or full closure) of College Street as part of the proposed Bunning development at 461-495 Victoria Road, Gladesville. The College Street full road closure trial was implemented, and the assessment of the closure impacts and benefits were documented in the "*12 Month Post Implementation Review Report*" by TTPA (April 2018, Version E).

This letter provides our review of TTPA's findings and offers our recommendations as to a way forward with the closure.

1.0 KEY FINDINGS/CONCLUSIONS

Key findings from the review of the TTPA report are as follows:

- in terms of north-south travel, the closure appeared to remove approximately 80 vph in the AM peak from Orient Street with approximately 50 vph more appearing on Cressy Road. In the PM peak approximately 50 vph - 60 vph was removed off Orient Street and very few (if any) of these trips appeared on Cressy Road. A conclusion that could be drawn is that the AM peak traffic re-assignment onto Cressy Road may be associated with school-related traffic, given that the PM commuter peak is outside school hours;
- the closure has achieved its objective of significantly reducing traffic volumes on Orient Street and on College Street east of Orient Street;
- the impacts of the closure on Cressy Road traffic volumes are less than expected in pre-closure modelling and may suggest some broader route choice influences on roads such as Monash Road (but this is not expected to be significant);
- the site visits have confirmed the presence of very long queues in the Frank Street approach to the Frank Street/Victoria Road intersection at school peak times. This is particularly evident in the school PM (pick-up) peak when departures profiles are generally more condensed. The site visit also identified that when all of the available parking is taken, there is no opportunity to recirculate efficiently back to Frank Street to again search for a vacant space, leading to risky manoeuvres;

- the site visits have confirmed that the right turn out of Frank Street is now held at red for the entire pedestrian clearance time for pedestrians crossing the western side of the intersection. This additional delay to right turning vehicles out of Frank Street is expected to be the primary cause of the longer queues;
- TTPA has recommended that RMS be requested to change the 'red for pedestrian' protection time back to the former 'walk only' time until the Frank Street approach is widened to provide more green time for the right turn movement out of Frank Street and reduce its queues. As an alternative TTPA suggested that the College Street closure be modified to allow eastbound movements (i.e. allow the movements that must exit via the Frank Street/Victoria Road intersection an alternative egress); and
- it is unlikely that RMS will modify the signal timings back to the previous condition.

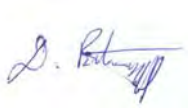
2.0 RECOMMENDATIONS

It is recommended that:

1. The College Street closure be made as a permanent one-way closure allowing eastbound traffic movements and prohibiting westbound traffic movements, consistent with the recommendations of the *Bunnings Gladesville Traffic and Parking Study (2015).* The one-way closure achieves a balance between limiting the volume of through traffic along College Street and along Orient Street whilst supporting sufficient egress and circulation opportunities for school-related and local business-related traffic.

Please do not hesitate to contact me with any questions regarding this advice.

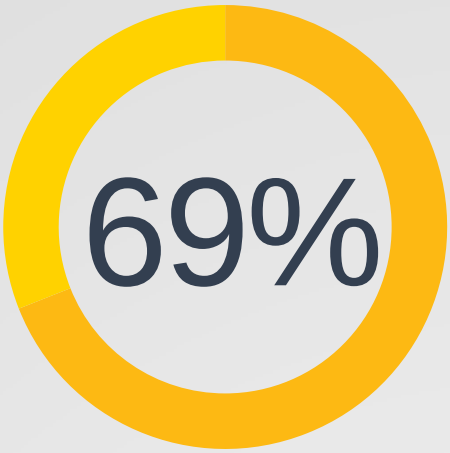
Yours faithfully



Damien Bitzios
Director
BITZIOS CONSULTING

College Street Partial Closure Feedback July 2018

Households/addresses (n=746**)



Supported some form of road opening*

50% One way / general support*

18% Two ways*

1% Mixed feedback*

* Percentage rounded to the nearest whole percent
**Duplicates (by household) were removed

60%	of respondents directly affected supported some form of road opening*	**73%**	of respondents in the Ryde LGA supported some form of road opening*	**66%**	of respondents out of the LGA/unknown supported some form of road opening*
n=105**		**n=346****		**n=295****	

Top themes of respondent comments who want College St open

Size of text indicate the relative frequency of the response

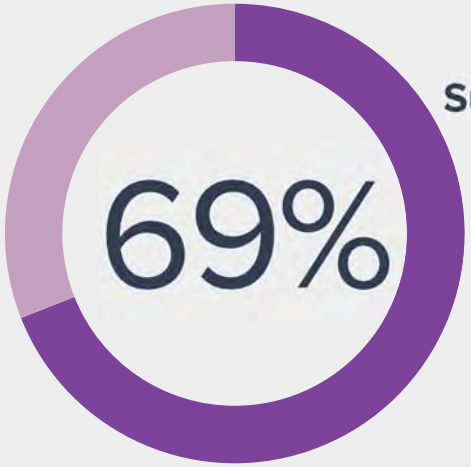
Top themes of respondent comments who want College St closed

Size of text indicate the relative frequency of the response

CONSULTATION RESULTS

TOTAL Respondents

Households/addresses (n=745*)



Supported some form of road opening:

50% One way / general support

18% Two ways

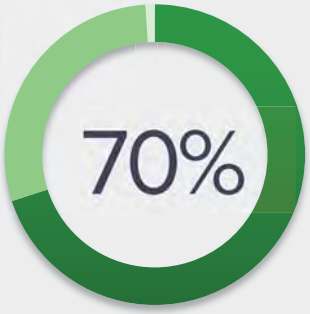
1% Mixed feedback

*Duplicates (by household) were removed

CONSULTATION RESULTS

Respondents who live INSIDE the Ryde Local Government Area

Households/addresses (n=450*)



Support some form of road opening:

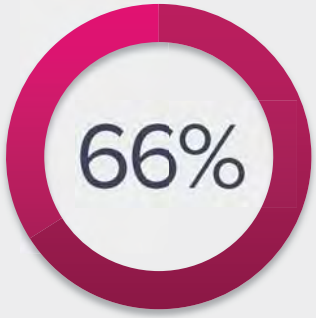
49% One way / general support

19% Two ways

2% Mixed feedback

Respondents who live OUTSIDE the Ryde Local Government Area

Households/addresses (n=273*)



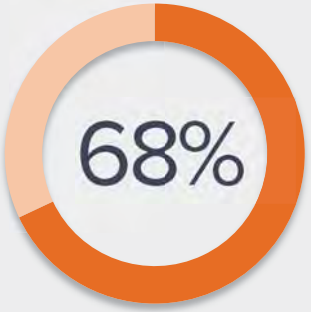
Support some form of road opening:

51% One way / general support

15% Two ways

Respondents whose addresses were UNIDENTIFIED

Households/addresses (n=22*)



Support some form of road opening:

50% One way / general support

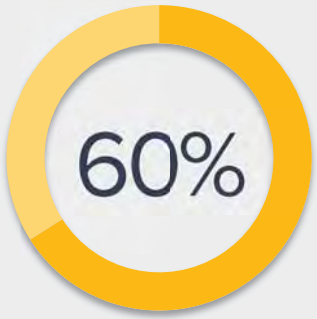
18% Two ways

*Duplicates (by household) were removed

CONSULTATION RESULTS

Respondents who are DIRECTLY affected

Households/addresses (n=105*)

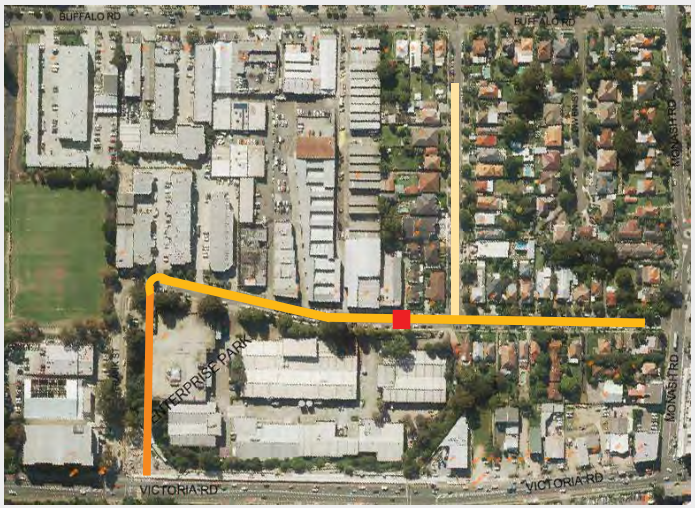


Support some form of road opening:

37% One way / general support

20% Two ways

3% Mixed Feedback

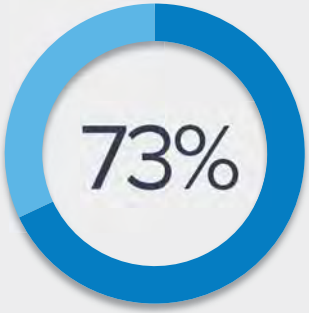


Legend:

- Frank St
- College St
- Orient St
- Closure point

Respondents who live in the WIDER Local Government Area

Households/addresses (n=345*)



Support some form of road opening:

52% One way / general support

19% Two ways

1% Mixed Feedback

*Duplicates (by household) were removed