15 February 2021

Anthony Witherdin
Director
Key Sites Assessments
NSW Department of Planning, Industry & Environment
4 Parramatta Square
12 Darcy Street, Parramatta
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Dear Anthony

1. Waterloo Metro Quarter Over Station Development – Response to Authority Comments

ptc. have been engaged by WL Developer Trust (WLD) to prepare a response to traffic related comments raised by the Authorities in relation to the proposed Waterloo Metro Quarter Over Station Development.

2. Authority Comments and ptc. Responses

2.1 City of Sydney

2.1.1 Item 60 (a)

Concerns remain as to the pedestrian priority and functionality of the new shared street and the surrounding intersections during peak hours (having regard to Section 3D of the Waterloo Metro Design and Amenity Guide), particularly morning peak is of concern. The area will experience high levels of people walking to and from the station in the morning and afternoon peaks. Vehicle parking on the site should be constrained further to reduce conflicts between people walking to and from the site and people driving through the shared zone.

2.1.2 ptc. Response to Item 60 (a)

The projected AM and PM peak hour trip generation associated with the WMQ basement car park is approximately 57 trips within each peak period. This represents a net reduction of 41 trips when compared to the Concept Approval, which projected 98 trips. This net decrease of approx. 40% in vehicular trips effectively translates to reduced conflicts between pedestrians and vehicles.

Consideration has also been given to the design of the Shared Zone to ensure that drivers are aware that pedestrians have clear priority and appropriate speed control devices can be provided to forcibly reduce vehicle speeds within the Shared Zone for improved pedestrian safety.

With reference to the TfNSW Technical Direction TTD 2016/001, *'Design and Implementation of Shared Zones including Provision for Parking'*;

Shared zones are specifically designed for pedestrian priority and may be appropriate for a road, a network of roads or road related areas where there are comparatively high pedestrian volumes, and;

A shared zone will only be considered where adequate footpaths cannot be retained within the road reserve and where there are very low numbers of slow moving vehicles.

The projected traffic generation of 57 vehicles is deemed a low traffic volume (approximately 1 per minute) and the shared zone will be fully designed at the detailed design stage and submitted to TfNSW for approval.

As part of the detailed design process, the shared zone design will be subject to an independent safety audit process to assess the safety aspects of the proposed layout. Also, a Traffic Management Plan in accordance with the *TfNSW' Procedures for Use in the Preparation of a Traffic Management Plan (TMP)'* will be prepared and submitted to TfNSW for approval of the shared zone design and suitability.

2.1.3 Item 60 (b)

It is recommended that level of service for walking follow Transport for NSW's guidance to ensure that sufficient space is provided to achieve comfortable environments which encourage people to walk as relevant to the NSW context - https://www.rms.nsw.gov.au/business-industry/partners-suppliers/document-types/guides-manuals/walking-space-guide.html

2.1.4 ptc. Response to Item 60 (b) (Response provided by WSP)

The Walking Space Guide recommends:

- *A minimum of LoS C should be achieved.*
    - *Footpaths internal and adjacent to WMQ achieve LoS C or better for both LoS criteria typically adopted in high pedestrian environment (interchange and the more onerous street criteria)*
- *Raglan Lane and Grit Lane can be treated as a Type 3 or 4 footpath due to the proximity to the metro station (within 200m) and the peak hour users (70-2000 per hour). For these footpath types, a minimum footpath width of 3.0-3.7m is recommended for LoS C. The 'not adjacent' width has been adopted as the proposed design includes additional footpath space (in addition to the clear width) that may include street furniture or retail frontage.*
    - *As per the MQD PDA which were adopted as the minimum footpath requirements for the project. A minimum clear width (free of retail frontages or furniture) of 3.5m for key connections has been provided. It is noted that the footpath provision at these locations is significantly wider, though may include some retail frontage or furniture. Based on the current designs, the minimum requirements are satisfied.*
- *Raglan Place may represent a Type 5 (minimum of 3.9m) footpath (within 50m of the metro station).*
    - *A footpath width 5.5-6.5m is proposed in the design, and LoS C or better is achieved based on the peak pedestrians per hour, hence the minimum requirements are satisfied.*
- *Other internal connections are treated as Type 2 or 3 due to their proximity and comparatively lower patronage:*
    - *Cope Street Plaza – shared zone of sufficient width is proposed*
    - *Church Square – shared zone of sufficient width is proposed*
    - *Church Lane and Church Yard – behave as Type 2 connections as both developments front onto Wellington Street as their main walkable connection, hence the proposed widths in combination with the adjacent walkable landscaped areas provide sufficient width and capacity.*

2.1.5 Item 61 (a)

The first objective of Section 3N of the Waterloo Metro Design and Amenity Guideline is to "prioritise walking and cycling trips in and around the Metro Quarter over vehicles". The vehicle parking proposed for residential and commercial use is excessive for a transit-oriented development

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and should be minimised to reflect and support the public transport access of the site and the significant investment in public transport.

2.1.6 Item 61 (b)

The amount of parking directly impacts the overall objective of the new metro line which aims to shift people from car driving to using the train and, in line with the desired outcomes under the Waterloo Metro Design and Amenity Guideline "create an urban environment that drives high usage of the Sydney Metro network responding directly to the principle of transit oriented development". The mode share targets to shift private car users to public and active transport uses will never be achieved without making the parking supply competitive. Availability of car parking spaces at origin and destination points is considered the most difficult obstacle to shifting people to use more sustainable transport methods.

2.1.7 Item 61 (c)

DPIE are strongly advised to insist the proponent work together with the development partners, TfNSW, RMS and strive for 'zero' car parking provision or absolute minimums. This way the development can be expected to generate much fewer new car trips and will not adversely affect the existing adjacent road network, which is already congested.

- *This site should aim to be a world class transit-oriented development.*
- *Providing car parking on the site contradicts the transport and sustainability objectives and the investment in public transport. The development aims to shift people from private vehicles into public transport.*
- *65 spaces were outlined in the Explanation of Intended Effect accompanying the proposed SEPP (State Significant Precincts) amendment. The proposal is for more than double this.*

2.1.8 ptc. Response to Item 61(a) to (c)

The parking provisions within the development have been determined for each separate land-use in the context of the TOD character of the development. While some car parking is proposed rather than a zero provision as suggested by DPIE, the number of spaces has been determined to balance the demand for parking within the development and the surrounding on-street parking. This goes to car ownership within the residential component and the need to accommodate for all travel options in relation to the office component (i.e. the site as a destination is well connected but the origin may not be).

In reviewing the parking provision, it is important to assess each component as follows:

1. The residential component will accommodate 150 dwellings, which under the LEP would be permitted a maximum of 80 parking spaces. The capping of the parking provision is inline with the points raised by DPIE with regard to limiting car usage and encouraging the use public transport etc. The LEP recognises the need to limit parking (which typically averages 1 space per apartment in most NSW Government areas (when the mix of apartment sizes is considered) and in this case the maximum would represent 1 space per 1.8 apartments (or 0.55 cars per dwelling). This compares with an average car ownership of 0.8 cars per dwelling in Waterloo. In this regard, the maximum provision permitted under the LEP represents a 33% reduction in current car ownership in the area. The proposal further reduces the provision by providing 67 spaces for residents or 0.45 spaces per dwelling, which represents 84% of the maximum provision, and almost half the current average for the area. This represents a significant limitation of car ownership within the development.

Dwellings	Waterloo Car Ownership (Demand)	LEP Max.	Proposed
150	120 spaces	80 spaces 67% of demand	67 spaces 56% of demand

It is noted that car ownership and car usage are separate metrics in the context of residential development in that the restriction of parking at the destination is often the key to reducing car usage,

while car ownership is more driven by convenience for less regular trips outside the typical weekday commute.

In terms of consistency with other developments, we note that sites within Green Square Town Centre (completed or approved) provide parking for residents ranging from 65 – 100% of the LEP maximum provision. This area is comparable being located immediately adjacent to Green Square station.

2. The office component will accommodate 38,800m^2, which based on an average occupancy rate of 1 person 1 per 10m^2 (active office space) indicates a population of 3,200 persons. Given that the development represents a TOD, this has been taken into consideration when developing the parking provision. The LEP provides a maximum cap on the parking provision in recognition of the level of public transport accessibility throughout the CoS LGA but recognises that some parking demand occurs. The maximum permitted parking provision is 78 spaces under the LEP, and this is clearly reduced compared to commercial developments in unconstrained areas (1 space per 40m^2 would result in 970 parking spaces, which is not compatible with the inner-city areas, but highlights the degree to which that LEP restrains parking to less than 10% of the unrestrained demand. The parking provision further restricts parking within the development to 63 spaces (80% of the LEP maximum). The provision of 63 spaces in the context of 3,200 people within the buildings will not represent a notable shift in mode share towards car usage (if all spaces were used, this would represent less than 2% of occupants driving to the development). While the Metro will provide a high level of accessibility, combined with the high-density residential areas in relative close proximity of the site (Green Square, Redfern, Surry Hills, Newtown etc.). It is unrealistic that the commercial component of the development will not generate some parking demand. The development proposal dramatically restricts the number of trips that can be made to/from the development. In terms of traffic generation, the trips generated by the development have been assessed and found to have minimal impact on the surrounding road network, particularly compared to the approved scheme and the former uses of the site.
3. The student accommodation component has been designed with no parking provision, which is consistent with numerous similar developments in the area (Newtown, Chippendale, Broadway etc.) and reflects the low car ownership within the student demographic.
4. The retail and gym components of the development are not provided with any parking as these are considered to be ancillary to the overall development and the Metro station. In this regard they are not destination uses requiring the use of a car.

2.1.9 Item 61 (d)

If parking is to be provided, accessible car parking space provision should be prioritised and provided for as per SDCP. All accessible car spaces are to be allocated to adaptable units.

2.1.10ptc. Response to Item 61 (d)

The accessible car parking provision is allocated to adaptable units and based on the rationale provided by Morris Godding Access Consultants. Refer to the DDA Assessment in Appendix S of the SSD DA EIS for details.

*2.1.11*Item 61 (e)

Parking for loading and servicing should be prioritised over general vehicle parking.

- *Given the rate of vehicle parking provided the site should provide for the required amount of loading and servicing.*

2.1.12ptc. Response to Item 61 (e)

Refer to response for Item 64(a).

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2.1.13 Item 62 (a)

It is unclear from the submitted documentation if the traffic modelling includes the cumulative traffic generation from adjacent developments plus the projected traffic generation for the subject proposal.

2.1.14 ptc. Response to Item 62 (a)

The traffic modelling does not currently include defined traffic generation from adjacent developments as this information it not currently finalised or available. However, to ensure that the network is being tested to the extent that new developments are expected, the traffic modelling includes a background traffic growth up to the design year. State arterial roads such as Botany Road carry regional traffic from a vast coverage of areas within Greater Sydney and it is general industry practice to apply an overall background traffic growth rate to the existing surveyed traffic data. This is to account for the increase in traffic activity associated with developments within the Greater Sydney area, as it is not possible to account for individual developments.

2.1.15 Item 62 (b)

The zero trip generation rates for student housing are unrealistic.

2.1.16 ptc. Response to Item 62 (b)

As outlined in Table 15 in WMQ-SITE-PTC-TF-RPT-001, there is no car parking provision proposed for the student accommodation component of the development, which is consistent with the numerous similar student accommodation developments in the area, which have no parking for residents. (e.g.; Iglu Broadway, Urbanest Darlington etc).

Furthermore, the proximity to high-frequency public transport services means residents and visitors to the student accommodation have numerous transport options when travelling to and from the site.

While there may also be some activity associated with taxi and carshare services, these vehicles are including within the background movements on the road network and generally occur as activity throughout the day, rather than concentrated within the morning or evening peak periods.

Based on the evidence of similar developments/buildings in the area (particularly those located where on-street parking is severely restricted (e.g. Broadway) it is expected that the majority of student residents will not own motor vehicles and will utilise public transport. In the context of the WMQ site, the parking restrictions in the area would effectively discourage car ownership and the related trip generation.

In light of the above, the zero-trip generation is reflective of this car parking provision and the proposal has sought to minimise car parking, consistent with the objectives of the CoS to reduce car dependency.

2.1.17 Item 62 (c)

The traffic modelling should include changes to the street network and intersections proposed as part of the Metro development.

2.1.18 ptc. Response to Item 62 (c)

The future road network improvements associated with the Metro development have been included in the traffic modelling and the findings can be found in Attachment 1.

2.1.19 Item 63 (b)

Bike parking for the student accommodation should be provided as per residential studio apartment rates (i.e. 1 per studio apartment) in accordance with design criteria 3 Section 3N of the Waterloo Metro Design and Amenity Guideline.

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2.1.20 ptc. Response to Item 63 (b)

The proposed student accommodation is more akin to a boarding house configuration rather than a typical studio apartment. Therefore, the bike parking for the student accommodation has been calculated based on the requirements stipulated within the AHSEPP 2009 using rate of 1 space per 5 boarding rooms. Real-world bicycle parking occupancy surveys from other Iglu sites within the CoS were provided by Iglu to WLD.

The surveys found that the maximum utilisation of the provided bike spaces as a percentage of total rooms in the site was approx. 5%. This is significantly lower than the proposed bike parking provision which caters for 20% of rooms based on AHSEPP rates. As such, the proposed provision of 87 bike spaces for student accommodation is considered generous, appropriate and consistent with similar approved developments within the City of Sydney.

2.1.21 Item 64 (a)

> *The proposal presents a shortfall of loading and servicing and should be provided as per the SDCP 2012 rates.*

2.1.22 ptc. Response to Item 64 (a)

The purpose of the proposed loading docks is to serve the servicing and maintenance needs of the WMQ site as a whole. Taking this into consideration, the approach for determining the service vehicle parking provision takes into account the ability of the service bays to accommodate more than one vehicle per day in each dock and the courier bays located within the basement. The efficiencies of grouping land uses are maximised when the service bays are shared amongst the various uses within the development.

The calculations for the loading dock provision for the combined uses within the Northern and Southern Precincts are as follows:

User Type	Units / GFA / Spaces	LEP/DCP Parking Rate	Minimum Required Spaces	Proposed Parking Spaces
Northern Precinct - Commercial	33,843m^2	1 space per 3,300m^2 (DCP min)	10	4
Southern Precinct – Social Housing	70 units	1 space for 1st 50 units & 0.5 spaces per 50 units + (DCP min)	2	2
Shared B99 Courier Bays within Basement Car Park	-	-	-	5
Total Required Service Bays (Minimum)			**12**	**11**

The proposed loading docks and service bays within the basement car park will be managed by means of an integrated site-wide booking system. This will allow each bay to be pre-booked prior to arrival to ensure that there are available bays for any delivery or service vehicles. A concept timetable has been prepared as part of the FSMP to demonstrate that there are a large number of time slots available which allow the bays to be shared across the site amongst the different components of the development. In this regard, the

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proposed loading/servicing provision is considered acceptable and able to be managed for the coordination of deliveries and servicing.

It should also be noted that the Southern Loading Dock has been amended to provide an additional B99 courier service vehicle bay. The revised concept loading dock layout has been reviewed and a swept path assessment has been undertaken. A B99 vehicle is able to enter the site in a forward direction upon entry and egress from the loading dock in a forward direction is also achieved. It is noted that the egress of the B99 courier/service vehicle will require the turntable to be vacant. This can be readily managed as deliveries and maintenance vehicles are managed through the site-wide online booking system.

Overall, ptc.'s review finds that the concept design for the Southern Loading Dock generally meets or is capable of complying with AS2890.1:2004 and AS2890.2:2018. Details of the swept path assessment is provided in Attachment 2.

2.1.23 Item 64 (b)

> *All loading and servicing should occur onsite and the development should not be potentially reliant on kerbside loading arrangements which are open to other users and subject to change.*

2.1.24 ptc. Response to Item 64 (b)

Loading and servicing will occur within the designated loading docks on-site or the service vehicle bays within the basement car park. The proposed development does not rely on kerbside Loading Zones.

2.1.25 Item 64 (c)

> *Parking for loading and servicing should be prioritised over general vehicle parking.*

2.1.26 ptc. Response to Item 64 (c)

The Northern and Southern loading docks are provided with access and egress driveways separate from the basement parking area and therefore have do not interact with the general parking activity.

The Northern loading dock includes provision for two MRV bays and two SRV bays whereas the Southern loading dock comprises one MRV bay and one B99 courier bay. The SRV bays will accommodate small delivery trucks and resident removalist trucks up to 6.4m in length. The MRV bays will accommodate the 9.25m CoS waste collection vehicle as well as delivery trucks up to 9.25m in length.

The remaining service bays located in the basement accommodates B99 car-derived vans and utes for the purposes of maintenance contractors (such as plumbers, electricians etc.). These service bays will be line marked and signed accordingly and will be solely for the use for service vehicles.

2.1.27 Item 64 (d)

> *The design of the loading areas to accommodate a City of Sydney 9.25m waste collection vehicle is supported. This needs to be ensured and should be conditioned.*

2.1.28 ptc. Response to Item 64 (d)

ptc. confirms that the loading docks have been designed to accommodate entry and egress of a 9.25m Council waste vehicle.

2.1.29 Item 72

> *The City has developed a waste calculator to ensure development provides sufficient waste storage facilities in accordance with the City's Guidelines for Waste Management in New Developments. Please find attached a PDF with the estimated area required for waste bins. The City requests that the developer use the waste calculator and demonstrate that sufficient area has been provided to meet the needs of each use proposed on site. Please note that the City discourages more than 3 collections per week to minimise traffic movements.*

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2.1.30ptc. Response to Item 72

Due to the large scale of the development, waste collection will exceed the three collections per week recommended by the CoS. WLD intend to undertake five general waste pickups per week for the commercial uses. In terms of impact on the road network, the provision of a waste collection service on any particular day would not register in any form of modelling or analysis. While the aim of 3 services per week for developments is noted and beneficial as an average across many types/sizes of development, it does not necessarily address the needs of large developments that by virtue of the populations involved required more regular waste collection.

It is highlighted that waste collection for the commercial, retail, childcare, student accommodation and retail (gym) uses will be undertaken by a private waste contractor. As such, waste collection can be scheduled and coordinated to ensure that they occur outside of peak periods to minimise any potential impact on the surrounding road network.

Where waste collection is to be undertaken by Council (i.e. for the market residential/affordable housing, and social housing uses), the estimated pickups required are approximately four pick-ups for market residential/affordable housing and three pick-ups for social housing. It is noted that these pickup frequencies include both general waste and recycling collection.

2.1.31 Item 73

> *The turntable is to be a minimum dimension of 10.5 metres in accordance with the City's Guidelines for Waste Management in New Developments and Section 3P of the Waterloo Metro Design and Amenity Guidelines.*

2.1.32 ptc. Response to Item 73

Section B19 of the 'Policy for Waste Minimisation in New Developments' states the following:

'Minimum radius turning circle required 10.5 metres'.

The requirement relates to the turning radius of the waste vehicle accessing the service area and does not relate to the diameter of the turntable.

The Northern and Southern Loading Docks have been designed to include a 9.25m diameter turntable based on a swept path assessment for the 9.25m Council refuse vehicle. The swept paths demonstrate that there is a minimum of 300mm clearance around the body of the vehicle to any walls or vertical obstructions when the turntable is in operation. The provided turntable clearance satisfies the requirements of AS2890.2.

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2.2 Transport for New South Wales

2.2.1 Freight and Servicing Management

It is noted that a Freight and Servicing Management Plan has been prepared as part of the development application. It is noted that:

Northern loading dock, Southern loading dock and Basement service bays are proposed to provide the freight and servicing requirements for the proposed OSD sites within the Waterloo Metro Quarter (WMQ); and Northern loading dock comprises two SRV bays and two MRV bays and the Southern loading dock accommodates one MRV bay. In addition, five courier bays accommodating B99 car-derived vans/utes are provided within the Basement car park. The shared use of the 10 proposed service bays are to be managed through the implementation of a Freight and Servicing Management Plan.

It is advised that:

The Freight and Servicing Management Plan for the subject development needs to reflect that the total ten (10) spaces are being managed centrally by a single booking management system for the whole of WMQ. This would minimise queuing of freight vehicles to access the loading bays and the impact on the general traffic and public transport operation in the vicinity of the WMQ;

There are inconsistencies between development applications in relation to the management of service bays for the whole of Waterloo Metro Quarter (WMQ) in particular in the documents prepared for the Southern Precinct SSDA; and

Any new development should not rely on on-street parking or loading zones. Kerb side restrictions can be changed at any time and the development should not rely on current kerb side restrictions to service the site.

Recommendations –

It is requested that:

The applicant provides further details in relation to the management of service bays for the whole of WMQ as part of the response to submissions; and the applicant be conditioned to update the Freight and Servicing Management Plan in consultation with TfNSW, prior to the issue of any Construction Certificate.

2.2.2 ptc. Response to Freight and Servicing Management

The loading and servicing associated with the Northern, Central and Southern Precincts are wholly undertaken within the site in the dedicated loading docks and within the courier bays situated within the basement and do not rely on on-street parking controls. The use of the loading docks and courier bays will be coordinated and managed through the implementation of a site-wide Freight and Servicing Management Plan (FSMP). ptc. confirm that WL Developer Trust will provide a site wide FSMP, prior to the issue of the construction certificate.

2.2.3 Safety Assessment of the Proposed Development

The proposed development is located in an environment where high level pedestrian activities associated with the Sydney Metro operation would occur. There are potential conflicts between vehicles (including freight and servicing vehicles) accessing the over station developments and pedestrians accessing the Sydney Metro station. It is noted that Section 3.1 of the Transport, Traffic and Parking Impact Assessment (Traffic Report) prepared to support the subject development application states that independent road safety audits have not been undertaken for the concept design scheme and will be undertaken (by a suitably qualified consultant) in the detailed design stage prior to issue of Construction Certification. It is advised that the earlier a project is audited the more likely that the road safety issues or risks identified can be significantly reduced or eliminated.

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As a result this minimises compromises in road safety and costly treatments at later stages of the project.

Recommendation:

It is requested that the applicant undertakes a Stage 2 (Concept Plan) Road Safety Audit as part of the applicant's Response to Submissions for the proposed access arrangements to the loading docks in accordance with Austroads Guide to Road Safety Part 6: Managing Road Safety Audits and Austroads Guide to Road Safety Part 6A: Implementing Road Safety Audits by an independent TfNSW accredited road safety auditor. Based on the results of the road safety audit, the applicant shall review the design drawings and implement safety measures in consultation with TfNSW as required.

2.2.4 ptc. Response to Safety Assessment of the Proposed Development

An independent Road Safety Audit in accordance with the *Austroads Guide to Road Safety Part 6A: Implementing Road Safety Audits* will be undertaken by an independent TfNSW accredited road safety auditor in the detailed design stage, prior to the issue of the relevant Construction Certification.

2.2.5 Green Travel Plan

It is noted that a Green Travel Plan has been prepared as part of the development application. It is advised that the implementation of a Green Travel Plan could be an effective measure to reduce travel demand generated by private vehicle movements and reallocate, through encouragement and various other methods programs, these trips towards other modes of transportation.

Recommendation:

It is requested that:
The applicant be conditioned to update the Green Travel Plan in consultation with TfNSW, prior to the issue of the Occupation Certificate; and The Green Travel Plan must be implemented accordingly and updated annually to ensure sustainable transport outcomes and achieve the overall strategic planning objectives in the Future Transport 2056.

2.2.6 ptc. Response to Green Travel Plan

The Green Travel Plan (GTP) submitted as part of the SSDA application will be revised during the post-approval stages in consultation with TfNSW, prior to implementation of the GTP and the issue of the Occupation Certificate.

2.2.7 Transport Access Guide

It is noted that a Travel Access Guide has been prepared as part of the development application. It is advised that a Transport Access Guide would inform residents, employees and visitors the travel choices available to them.

Recommendation:

It is requested that the applicant be conditioned to update the Transport Access Guide, in consultation with TfNSW, prior to the issue of the Occupation Certificate.

2.2.8 ptc. Response to Transport Access Guide

The Transport Access Guide submitted as part of the Freight and Services Management Plans for the SSDA will be updated in consultation with TfNSW, prior to the issue of the Occupation Certificate.

2.2.9 Construction, Pedestrian and Traffic Management

Several construction projects, including the Sydney Metro City and Southwest Project, are likely to occur at the same time as this development. The cumulative increase in construction vehicle movements from these projects could have the potential to impact on general traffic and public

transport operations within the Waterloo Precinct, as well as the safety of pedestrians and cyclists particularly during commuter peak periods.

Recommendation:

It is requested that the applicant be conditioned to prepare a Construction Pedestrian and Traffic Management Plan (CPTMP) in consultation with TfNSW and submit a copy of the final CPTMP to sco@transport.nsw.gov.au for endorsement, prior to the issue of any construction certificate or any preparatory, demolition or excavation works, whichever is the earlier.

2.2.10ptc. Response to Construction, Pedestrian and Traffic Management

The Construction Pedestrian and Traffic Management Plan submitted as part of the SSDA application will be updated in consultation with TfNSW and submitted to the Sydney Coordination Office for endorsement, prior to the issue of the Construction Certification or any preparatory, demolition or excavation works.

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2.3 NSW Department of Planning, Industry & Environment

2.3.1 Item 7(b)

Provide further justification that the proposed childcare centre use is suitable for the tenancy and consent can be granted for the use, without operational management and fit-out details. This must include further consideration and demonstration of:

- *Children and staff numbers with respect to car parking and access.*

2.3.2 ptc. Response to Item 7(b)

The car parking provision for the childcare centre balances the parking requirements outlined within Section 7.8.3 of the Sydney DCP as well as the likely demographics of the end users. Being a development which provides a place for people to live, work and play, it is expected that the child care centre will primarily serve the residents and employees within the WMQ development. Therefore, trips associated with the childcare centre would be undertaken as part of a combined trip, utilising the parking already provided within the development or the numerous public transport modes available.

It is highlighted that there are similar approved developments within the CoS such as the Barangaroo Early Learning Centre (BELC)located at 62 Sussex Street, Barangaroo South (DA Ref: D/2016/1012) and 505 George Street, Sydney (DA Ref: D/2019/857) which does not provide off-street car parking for staff or visitors. The BELC approval states that there is some underlying traffic generation associated with the BELC which has been absorbed into the parking generation of the entire building. Furthermore, the BELC utilises existing kerbside parking for short term parking to support the operation of the childcare centre.

Similarly, the WMQ development is a mixed-use, transit-oriented development (TOD) which provides a large number of public transport services including buses, trains and metro within close proximity, which reduces the demand for driving to and from the site. The City of Sydney also has plans to provide 10 priority routes across the inner city including the Waterloo Precinct as part of its cycle network strategy to facilitate cycling. As such, the proposed zero parking provision for pick-up/drop-off is consistent with other approved developments within the CoS.

2.3.3 Item 7(e)

Provide further information on how the proposed retail premises can be serviced from basement loading docks.

2.3.4 ptc. Response to Item 7(e)

Access between the Northern and Southern loading docks and the retail tenancies is provided as outlined in the following diagrams:

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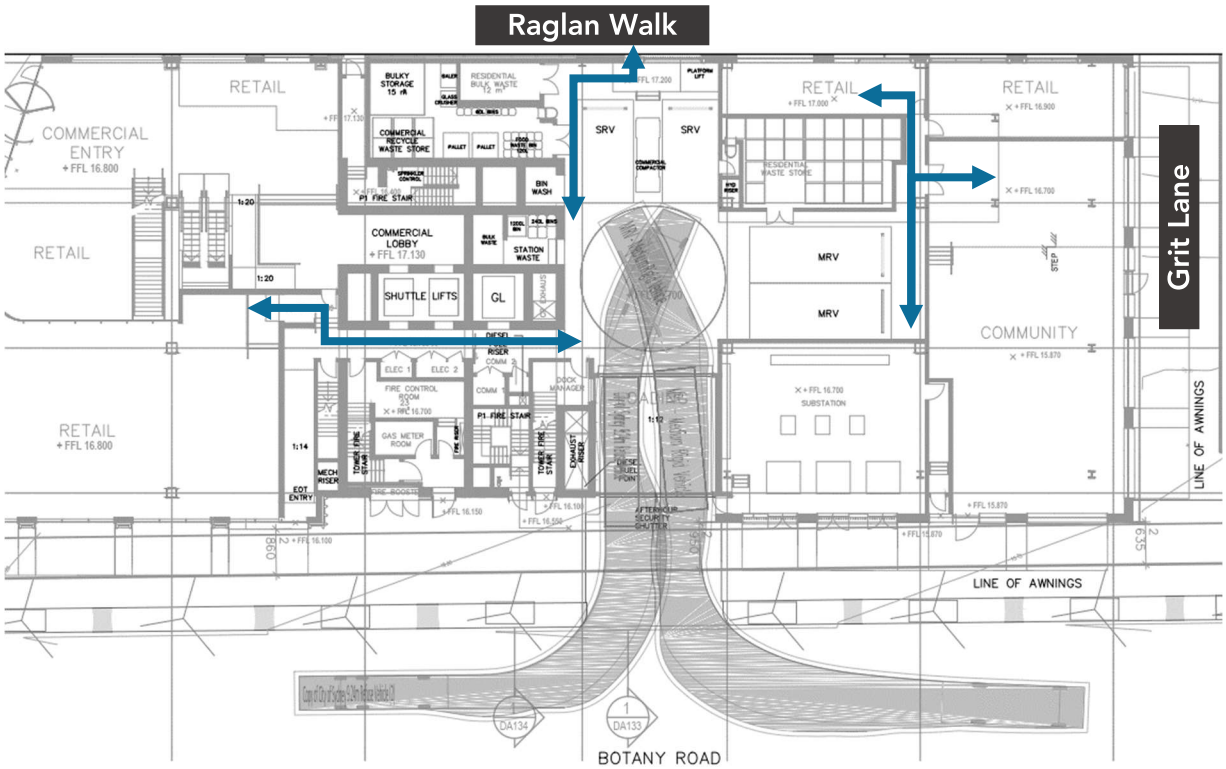

Figure 1 - Access to Retail Tenancies from Northern Loading Dock

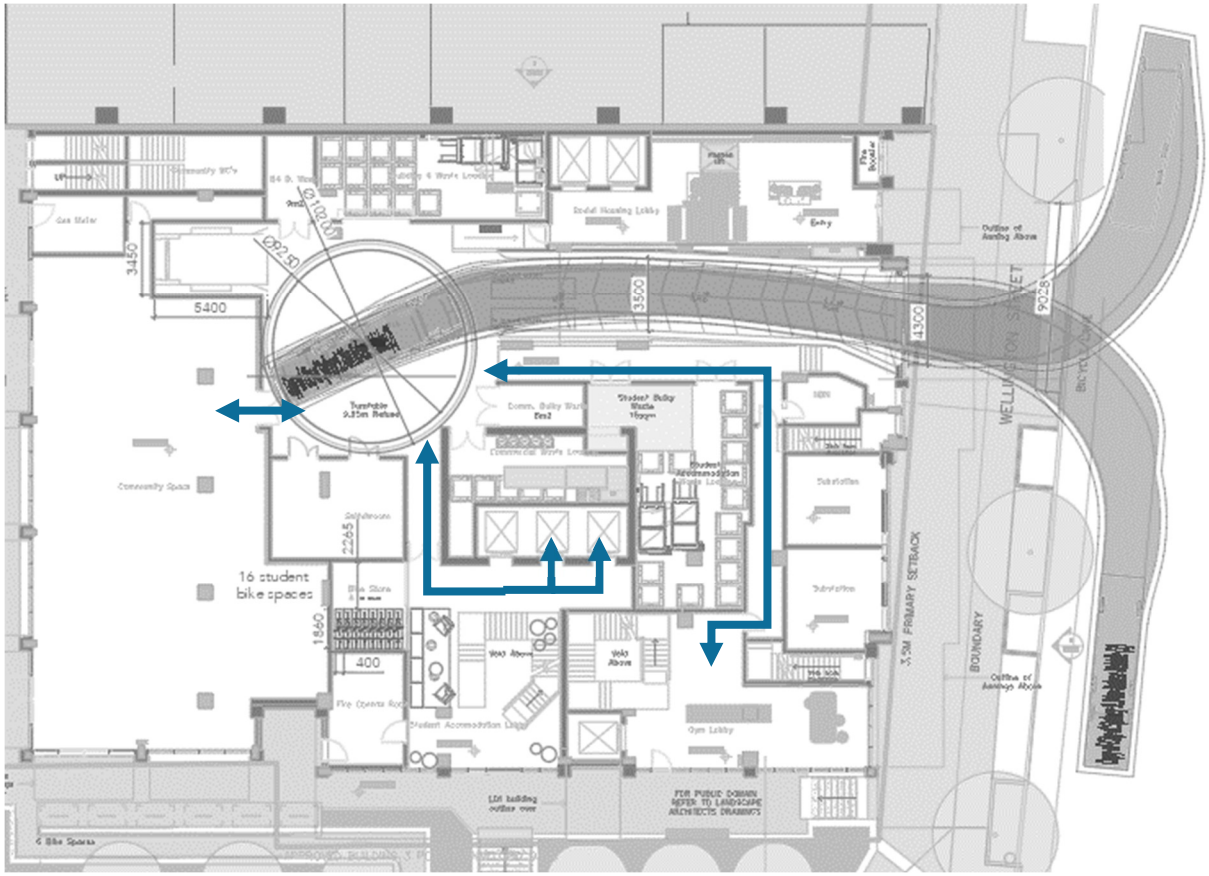

Figure 2 - Access to Tenancies from Southern Loading Dock

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3. Conclusion

We trust this additional information satisfies the issues raised. However, if you require any additional details, please do not hesitate to contact me.

Regards,

Steve Wellman
Project Director / Senior Traffic Engineer

Document Control: Prepared by *SW/HL* on *15 February 2021*. Reviewed by *AM* on *15 February 2021*.

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Attachment 1 - Traffic Modelling Statement

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10 February 2021

ptc.

Anthony Witherdin
Department of Planning, Industry and Environment
4 Paramatta Square 12 Darcy Street
Parramatta
NSW 2150

Dear Anthony

1. Waterloo Metro Quarter Overstation Development – Response to Authority Comments

ptc. has previously been engaged to undertake traffic modelling for the Waterloo Metro Quarter development. The following comment has been received from City of Sydney in relation to the traffic model prepared by **ptc.**:

"The traffic modelling should include changes to the street network and intersections proposed as part of the Metro development."

ptc. has been advised that there are currently two intersection upgrades in the planning stage. The following are the intersections currently in the discussion stage:

- Cope Street and Raglan Street Intersection
- Cope Street and Wellington Street Intersection

Therefore, the proposed future layout has been integrated into the traffic model to assess the performance of the local road network in 2036 and the consequent potential impact of the proposed development. This letter is to be read in conjunction with the Transport, Traffic and Parking Impact Assessments prepared by **ptc.**

1.1 Planned Upgrades

The planned works for the two intersections are as follows:

1.1.1 Cope Street / Raglan Street

The intersection is currently configured as a roundabout. The intersection is planned to be converted to a signalised intersection. The arrangement of the intersection is illustrated in Figure 1.

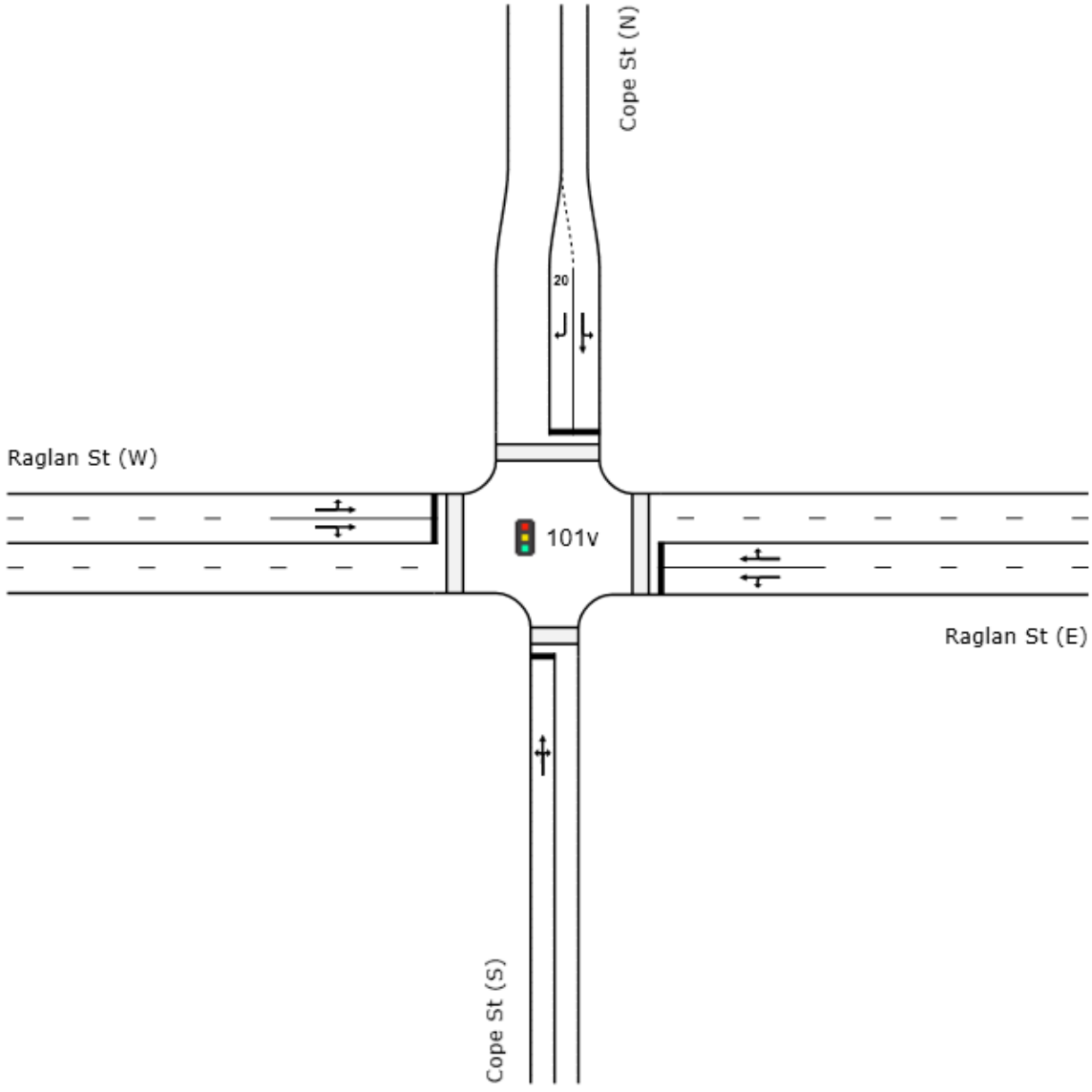

Figure 1 - Cope Street and Raglan Street Intersection Upgrade

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1.1.2 Cope Street / Wellington Street

The intersection is currently configured as a roundabout. The intersection is planned to be converted to a priority intersection. The arrangement of the intersection is illustrated in Figure 2.

It is noted that the future layout provides pedestrian crossings along the northern leg of Cope Street and eastern leg of Wellington Street. The model takes a conservative approach whereby it assumes that 500 pedestrians will be utilising the pedestrian crossings during the peak hour. The assumption will provide a more robust assessment of the projected performance of the intersection in the future scenario.

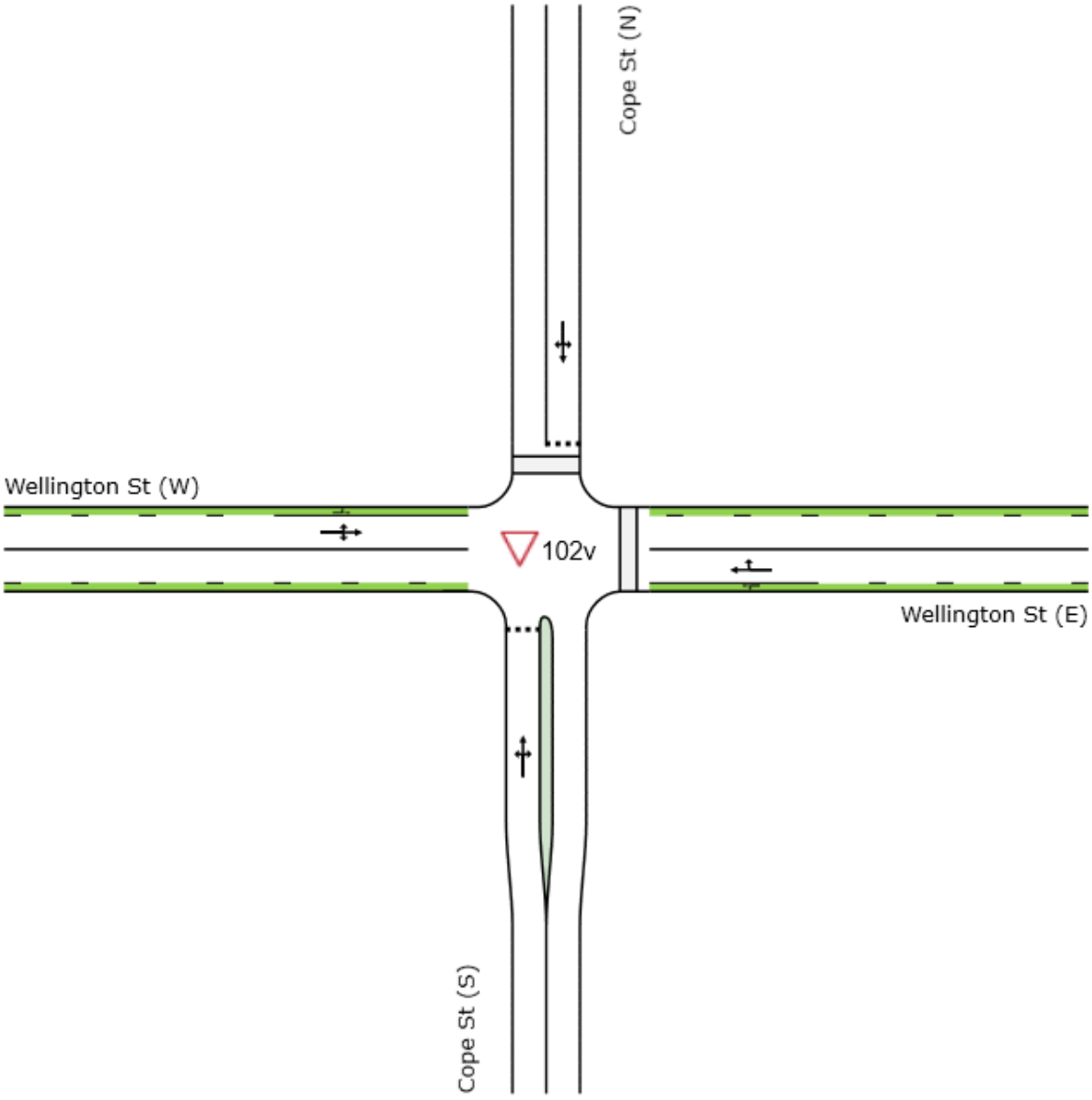

Figure 2 - Cope Street and Wellington Street Intersection Upgrade

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1.2 Traffic Modelling

Traffic modelling of the new layout has been undertaken. The network layout has been amended to reflect future road upgrades. The layout of the road network is illustrated in Figure 3.

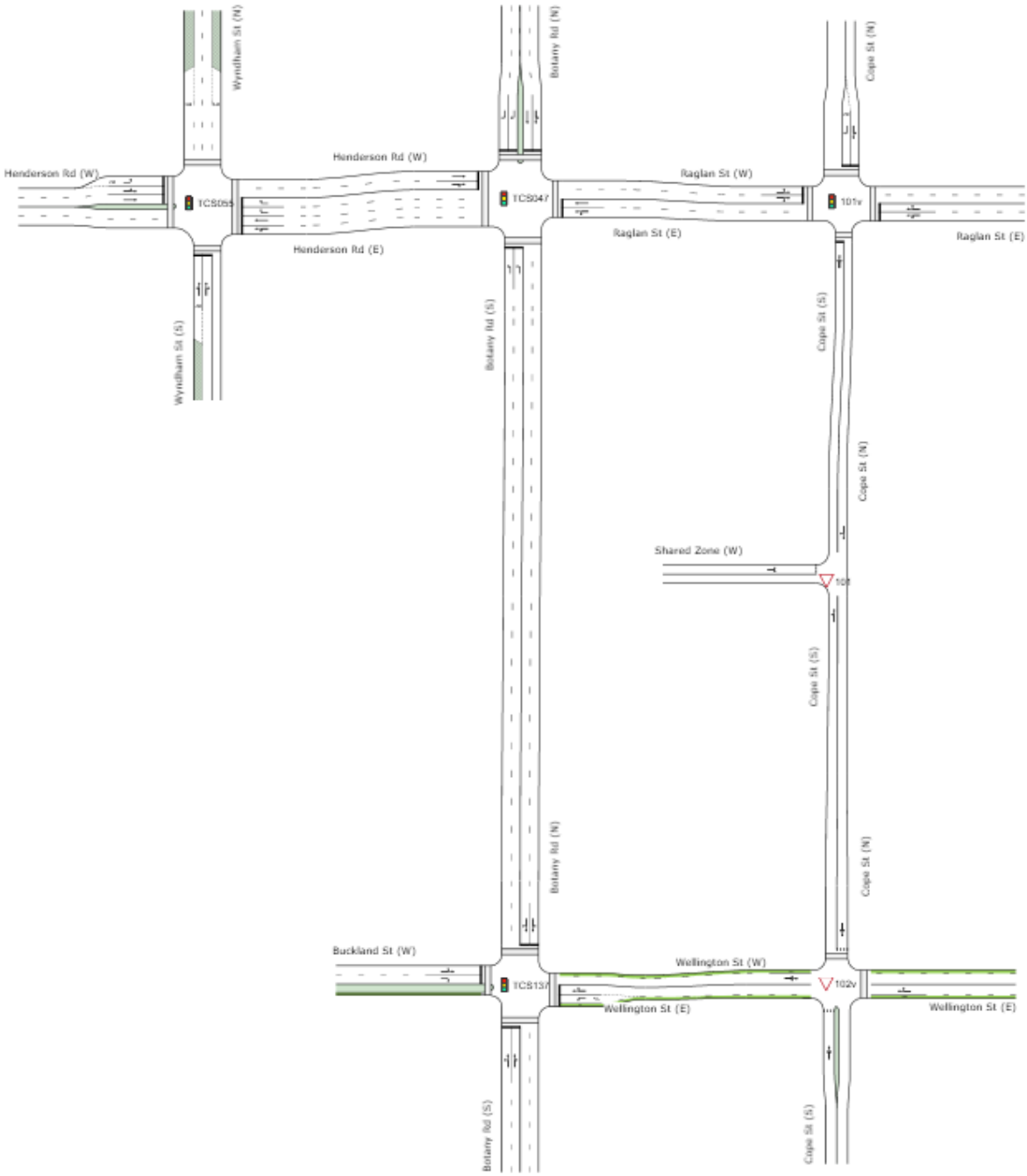

Figure 3 - Local Road Network Layout

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A volume analysis was performed using the SIDRA Intersection 8 software, a micro-analytical tool for individual intersection and whole-network modelling. The models are based on the collected traffic survey data. SIDRA provides a number of performance indicators outlined below:

- Degree of Saturation – The total usage of the intersection expressed as a factor of 1 with 1 representing 100% use/saturation. (e.g. 0.8=80% saturation)
- Average Delay – The average delay encountered by all vehicles passing through the intersection. It is often important to review the average delay of each approach as a side road could have a long delay time, while the large free flowing major traffic will provide an overall low average delay.
- 95% Queue Lengths (Q95) – is defined to be the queue length in metres that has only a 5-percent probability of being exceeded during the analysis time period. It transforms the average delay into measurable distance units.
- Level of Service (LoS) – This is a categorization of average delay, intended for simple reference. It is a good indicator of overall performance for individual intersections. The RMS adopts the following bands:

Table 1 - Intersection Performance - Levels of Service

Level of Service	Average Delay (secs/vehicle)	Traffic Signals, Roundabout	Give Way & Stop Signs
A	<14	Good operation	
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity. At signals, incidents would cause excessive delays. Roundabouts require other control mode	At capacity, requires other control mode
F	>70	Extra capacity required	Extreme delay, major treatment required

The summary of the 2036 model and 2036 model + post development performance of the local road network is summarised in Table 2.

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Table 2 - Summary of Intersection Performance

Intersection	Time	Period (2036)	Level of Service	Degree of Saturation (v/c)	Average Delay (s)	95% Queue Length (m)
Henderson Street and Wyndham Street	AM Peak	Base	D	1.028	56.3	172.7
		Development	D	1.028	54.6	172.7
	PM Peak	Base	D	1.037	47.6	176.1
		Development	D	1.037	50.8	176.1
Botany Road and Raglan Street	AM Peak	Base	D	1.000	48.0	340.2
		Development	D	1.000	45.3	323.3
	PM Peak	Base	C	0.884	35.1	211.9
		Development	D	1.059	53.7	317.7
Cope Street and Raglan Street	AM Peak	Base	B	0.159	20.7	47.0
		Development	B	0.195	27.3	58.3
	PM Peak	Base	B	0.206	26.0	61.9
		Development	B	0.219	25.9	61.8
Cope Street and Wellington Street	AM Peak	Base	B	0.293	17.3	8.7
		Development	B	0.296	17.3	8.8
	PM Peak	Base	B	0.378	20.8	11.4
		Development	B	0.420	22.0	12.2
Botany Road, Wellington Road and Buckland Street	AM Peak	Base	B	0.582	14.9	164.5
		Development	A	0.573	13.5	160.5
	PM Peak	Base	B	0.518	17.2	139.2
		Development	B	0.716	16.3	172.1
Cope Street and Shared Zone	AM Peak	Base	A	0.051	5.0	0.0
		Development	A	0.052	5.1	0.8
	PM Peak	Base	A	0.053	5.1	0.0
		Development	A	0.06	5.2	1.0

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1.3 Conclusion

ptc. has undertaken an assessment of the potential performance of the local road network in 2036 with the proposed intersection upgrades along Cope Street & Raglan Street and Cope Street & Wellington Street. The assessment indicates that the local road network will operate at acceptable levels of service or at a level of service less than the approved development SSD 9393 and therefore, the development will have no detrimental impact on the network operation, over and above the approved scheme.

Kind regards,

Steve Wellman

Project Director

Document Control: Prepared by *JJ* on *10 February 2021*. Reviewed by *AP/AM* on *10 February 2021*.

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Attachment 1 SIDRA Movement Summaries

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MOVEMENT SUMMARY

Site: TCS055 [1. AM Base Henderson Road / Wyndham Street]

Network: N101 [AM Base (2036)]

Traffic Surveys 12/03/2020
AM Peak: 7:45 - 8:45
PM Peak: 17:15 - 18:15
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Wyndham St (S)														
1	L2	13	8.3	13	8.3	1.013	115.2	LOS F	21.9	158.9	1.00	1.36	1.79	19.4
2	T1	487	7.6	487	7.6	1.013	110.8	LOS F	23.2	169.0	1.00	1.36	1.79	19.7
3	R2	3	33.3	3	33.3	1.013	114.7	LOS F	23.2	169.0	1.00	1.36	1.78	12.6
Approach		503	7.7	503	7.7	1.013	111.0	LOS F	23.2	169.0	1.00	1.36	1.79	19.7
East: Henderson Rd (E)														
4	L2	197	3.2	197	3.2	0.337	8.9	LOS A	3.9	27.8	0.19	0.39	0.19	42.5
5	T1	634	4.8	634	4.8	0.337	3.6	LOS A	4.2	30.2	0.18	0.22	0.18	45.4
6	R2	927	5.1	927	5.1	0.882	43.4	LOS D	15.7	114.2	1.00	0.98	1.26	24.1
Approach		1758	4.8	1758	4.8	0.882	25.2	LOS B	15.7	114.2	0.61	0.64	0.75	30.8
West: Henderson Rd (W)														
10	L2	526	6.6	526	6.6	1.028	118.8	LOS F	23.4	172.7	1.00	1.20	1.76	18.8
11	T1	288	3.6	288	3.6	0.487	36.3	LOS C	13.7	98.4	0.87	0.74	0.87	25.2
Approach		815	5.6	815	5.6	1.028	89.6	LOS F	23.4	172.7	0.95	1.04	1.45	19.9
All Vehicles		3076	5.5	3076	5.5	1.028	56.3	LOS D	23.4	172.7	0.77	0.86	1.10	23.7

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

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
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	54.3	LOS E			0.95	0.95

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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MOVEMENT SUMMARY

Site: TCS047 [2. AM Base Botany Road / Raglan Street - Lane Widening]

Network: N101 [AM Base (2036)]

Traffic Surveys 12/03/2020
AM Peak: 7:45 - 8:45
PM Peak: 17:15 - 18:15
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Botany Rd (S)														
1	L2	892	5.3	892	5.3	1.000	105.6	LOS F	46.6	340.2	1.00	1.20	1.63	6.9
Approach		892	5.3	892	5.3	1.000	105.6	LOS F	46.6	340.2	1.00	1.20	1.63	6.9
East: Raglan St (E)														
4	L2	4	0.0	4	0.0	0.541	64.9	LOS E	7.9	56.7	1.00	0.80	1.00	4.4
5	T1	267	3.9	267	3.9	0.541	59.7	LOS E	8.1	58.4	1.00	0.80	1.00	4.5
Approach		272	3.9	272	3.9	0.541	59.8	LOS E	8.1	58.4	1.00	0.80	1.00	4.5
North: Botany Rd (N)														
7	L2	61	8.6	61	8.6	0.496	11.7	LOS A	16.1	120.0	0.45	0.44	0.45	41.6
8	T1	1327	7.6	1327	7.6	0.496	6.1	LOS A	16.1	120.0	0.42	0.40	0.42	42.8
9	R2	609	5.0	609	5.0	0.656	47.7	LOS D	16.1	117.0	0.95	0.84	0.95	21.8
Approach		1998	6.8	1998	6.8	0.656	18.9	LOS B	16.1	120.0	0.58	0.54	0.58	33.2
West: Henderson Rd (W)														
11	T1	251	2.1	250	2.1	0.856	57.5	LOS E	10.5	74.1	1.00	0.86	1.09	4.9
12	R2	49	14.9	49	14.9	0.856	67.4	LOS E	7.8	57.7	1.00	0.94	1.26	4.5
Approach		300	4.2	300	4.2	0.856	59.1	LOS E	10.5	74.1	1.00	0.87	1.12	4.8
All Vehicles		3461	6.0	3461	6.0	1.000	48.0	LOS D	46.6	340.2	0.76	0.76	0.93	18.0

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

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
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	54.3	LOS E			0.95	0.95

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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MOVEMENT SUMMARY

Site: 101v [3. AM Base Cope Street / Raglan Street - Signal]

Network: N101 [AM Base (2036)]

Traffic Surveys 12/03/2020
AM Peak: 7:45 - 8:45
PM Peak: 17:15 - 18:15
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Cope St (S)														
1	L2	32	0.0	32	0.0	0.158	32.2	LOS C	5.1	28.7	0.72	0.63	0.72	12.0
2	T1	87	1.2	87	1.2	0.158	27.7	LOS B	5.1	28.7	0.72	0.63	0.72	26.8
3	R2	12	0.0	12	0.0	0.158	32.2	LOS C	5.1	28.7	0.72	0.63	0.72	29.4
Approach		131	0.8	131	0.8	0.158	29.2	LOS C	5.1	28.7	0.72	0.63	0.72	25.1
East: Raglan St (E)														
4	L2	4	75.0	4	75.0	0.130	19.5	LOS B	3.7	27.4	0.52	0.44	0.52	35.9
5	T1	205	5.6	205	5.6	0.130	14.7	LOS B	3.7	27.4	0.53	0.46	0.53	34.8
6	R2	28	0.0	28	0.0	0.130	18.9	LOS B	3.1	20.9	0.54	0.50	0.54	36.8
Approach		238	6.2	238	6.2	0.130	15.3	LOS B	3.7	27.4	0.53	0.47	0.53	35.2
North: Cope St (N)														
7	L2	14	0.0	14	0.0	0.055	30.7	LOS C	1.7	10.1	0.68	0.57	0.68	34.1
8	T1	31	0.0	31	0.0	0.055	26.5	LOS B	1.7	10.1	0.68	0.57	0.68	27.1
9	R2	47	4.4	47	4.4	0.108	34.3	LOS C	1.9	13.7	0.72	0.71	0.72	25.9
Approach		92	2.3	92	2.3	0.108	31.2	LOS C	1.9	13.7	0.70	0.64	0.70	28.0
West: Raglan St (W)														
10	L2	54	3.9	54	3.9	0.159	15.6	LOS B	3.1	22.5	0.36	0.42	0.36	37.8
11	T1	232	3.6	232	3.6	0.159	18.0	LOS B	6.6	47.0	0.61	0.57	0.61	34.3
12	R2	21	5.0	21	5.0	0.159	28.2	LOS B	6.6	47.0	0.82	0.70	0.82	9.6
Approach		306	3.8	306	3.8	0.159	18.2	LOS B	6.6	47.0	0.58	0.55	0.58	34.0
All Vehicles		766	3.8	766	3.8	0.159	20.7	LOS B	6.6	47.0	0.60	0.55	0.60	31.7

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

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
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	54.3	LOS E			0.95	0.95

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.

MOVEMENT SUMMARY

Site: 102v [4. AM Base Cope Street / Wellington Street - Priority]

Network: N101 [AM Base (2036)]

Traffic Surveys 12/03/2020
AM Peak: 7:45 - 8:45
PM Peak: 17:15 - 18:15
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Cope St (S)														
1	L2	15	0.0	15	0.0	0.087	6.9	LOS A	0.3	2.0	0.62	0.76	0.62	36.3
2	T1	20	0.0	20	0.0	0.087	11.5	LOS A	0.3	2.0	0.62	0.76	0.62	36.3
3	R2	5	0.0	5	0.0	0.087	14.0	LOS A	0.3	2.0	0.62	0.76	0.62	40.2
Approach		40	0.0	40	0.0	0.087	10.1	LOS A	0.3	2.0	0.62	0.76	0.62	37.1
East: Wellington St (E)														
4	L2	12	0.0	12	0.0	0.029	6.7	LOS A	0.1	0.6	0.52	0.53	0.52	40.4
5	T1	46	2.3	46	2.3	0.127	4.5	LOS A	0.5	3.6	0.61	0.64	0.61	39.2
6	R2	22	0.0	22	0.0	0.127	15.7	LOS B	0.5	3.6	0.63	0.67	0.63	40.4
Approach		80	1.3	80	1.3	0.127	7.9	NA	0.5	3.6	0.60	0.63	0.60	39.7
North: Cope St (N)														
7	L2	13	0.0	13	0.0	0.164	14.2	LOS A	0.6	4.0	0.72	0.85	0.72	36.6
8	T1	21	0.0	21	0.0	0.164	11.0	LOS A	0.6	4.0	0.72	0.85	0.72	33.4
9	R2	21	15.0	21	15.0	0.164	17.3	LOS B	0.6	4.0	0.72	0.85	0.72	14.7
Approach		55	5.8	55	5.8	0.164	14.2	LOS A	0.6	4.0	0.72	0.85	0.72	31.1
West: Wellington St (W)														
10	L2	85	1.2	85	1.2	0.293	5.9	LOS A	1.2	8.7	0.39	0.46	0.40	22.1
11	T1	158	3.3	158	3.3	0.293	5.3	LOS A	1.2	8.7	0.36	0.45	0.37	43.4
12	R2	33	3.2	33	3.2	0.293	4.7	LOS A	1.2	8.7	0.33	0.44	0.35	41.3
Approach		276	2.7	276	2.7	0.293	5.4	NA	1.2	8.7	0.37	0.45	0.38	40.9
All Vehicles		451	2.6	451	2.6	0.293	7.4	NA	1.2	8.7	0.47	0.56	0.48	38.9

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

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MOVEMENT SUMMARY

Site: TCS137 [5. AM Base Botany Road / Wellington Street / Buckland Street - Upgrade]

Network: N101 [AM Base (2036)]

Traffic Surveys 12/03/2020
AM Peak: 7:45 - 8:45
PM Peak: 17:15 - 18:15
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Botany Rd (S)														
1	L2	2	0.0	2	0.0	0.582	12.0	LOS A	22.5	164.5	0.56	0.51	0.56	34.6
2	T1	849	5.7	849	5.7	0.582	11.2	LOS A	22.5	164.5	0.58	0.53	0.58	38.2
3	R2	81	5.2	81	5.2	0.582	25.1	LOS B	7.0	51.2	0.72	0.70	0.72	31.1
Approach		933	5.6	933	5.6	0.582	12.4	LOS A	22.5	164.5	0.59	0.55	0.59	37.4
East: Wellington St (E)														
4	L2	52	6.1	52	6.1	0.080	48.1	LOS D	1.3	9.4	0.86	0.70	0.86	22.8
5	T1	22	0.0	22	0.0	0.127	46.8	LOS D	2.2	11.1	0.89	0.70	0.89	17.8
6	R2	22	4.8	22	4.8	0.127	51.1	LOS D	2.2	11.1	0.89	0.70	0.89	4.8
Approach		96	4.4	96	4.4	0.127	48.5	LOS D	2.2	11.1	0.88	0.70	0.88	18.7
North: Botany Rd (N)														
7	L2	21	0.0	21	0.0	0.536	14.0	LOS A	19.2	143.2	0.53	0.49	0.53	31.9
8	T1	1340	8.1	1340	8.1	0.536	9.6	LOS A	19.2	143.2	0.53	0.49	0.53	42.3
9	R2	2	0.0	2	0.0	0.536	11.6	LOS A	19.1	142.6	0.53	0.49	0.53	31.1
Approach		1363	8.0	1363	8.0	0.536	9.6	LOS A	19.2	143.2	0.53	0.49	0.53	42.2
West: Buckland St (W)														
10	L2	11	0.0	11	0.0	0.346	48.0	LOS D	9.4	50.7	0.90	0.74	0.90	21.2
11	T1	178	1.2	178	1.2	0.346	43.5	LOS D	9.4	50.7	0.90	0.74	0.90	21.2
12	R2	24	17.4	24	17.4	0.093	49.1	LOS D	1.2	9.6	0.86	0.71	0.86	29.5
Approach		213	3.0	213	3.0	0.346	44.4	LOS D	9.4	50.7	0.90	0.73	0.90	22.5
All Vehicles		2604	6.6	2604	6.6	0.582	14.9	LOS B	22.5	164.5	0.59	0.54	0.59	37.1

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

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
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	54.3	LOS E			0.95	0.95

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.

MOVEMENT SUMMARY

Site: 101 [6. AM Base Cope Street / Shared Zone]

Network: N101 [AM Base (2036)]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Cope St (S)														
1	L2	1	0.0	1	0.0	0.051	3.8	LOS A	0.0	0.0	0.00	0.01	0.00	43.2
2	T1	127	0.8	127	0.8	0.051	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	43.0
Approach		128	0.8	128	0.8	0.051	0.0	NA	0.0	0.0	0.00	0.01	0.00	43.0
North: Cope St (N)														
8	T1	55	7.7	55	7.7	0.027	0.1	LOS A	0.0	0.0	0.01	0.04	0.01	46.3
9	R2	1	0.0	1	0.0	0.027	4.9	LOS A	0.0	0.0	0.01	0.04	0.01	47.7
Approach		56	7.5	56	7.5	0.027	0.2	NA	0.0	0.0	0.01	0.04	0.01	46.4
West: Shared Zone (W)														
10	L2	1	0.0	1	0.0	0.002	4.8	LOS A	0.0	0.0	0.20	0.50	0.20	43.7
12	R2	1	0.0	1	0.0	0.002	5.0	LOS A	0.0	0.0	0.20	0.50	0.20	43.7
Approach		2	0.0	2	0.0	0.002	4.9	LOS A	0.0	0.0	0.20	0.50	0.20	43.7
All Vehicles		186	2.8	186	2.8	0.051	0.2	NA	0.0	0.0	0.00	0.02	0.00	44.3

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

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MOVEMENT SUMMARY

Site: TCS055 [1. PM Base Henderson Road / Wyndham Street]

Network: N101 [PM Base (2036)]

Traffic Surveys 12/03/2020
AM Peak: 7:45 - 8:45
PM Peak: 17:15 - 18:15
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Wyndham St (S)														
1	L2	16	0.0	16	0.0	1.037	129.3	LOS F	23.5	164.6	1.00	1.41	1.90	18.3
2	T1	493	1.5	493	1.5	1.037	124.6	LOS F	25.2	176.1	1.00	1.41	1.89	18.3
3	R2	2	0.0	2	0.0	1.037	128.9	LOS F	25.2	176.1	1.00	1.42	1.88	11.5
Approach		511	1.4	511	1.4	1.037	124.7	LOS F	25.2	176.1	1.00	1.41	1.89	18.3
East: Henderson Rd (E)														
4	L2	165	1.3	165	1.3	0.410	15.6	LOS B	14.1	98.5	0.52	0.55	0.52	38.0
5	T1	915	0.9	915	0.9	0.410	8.3	LOS A	14.1	98.5	0.42	0.41	0.42	40.9
6	R2	851	3.5	851	3.5	0.759	12.2	LOS A	10.1	72.6	0.58	0.73	0.58	37.7
Approach		1931	2.1	1931	2.1	0.759	10.7	LOS A	14.1	98.5	0.50	0.56	0.50	39.2
West: Henderson Rd (W)														
10	L2	525	1.6	525	1.6	1.021	114.1	LOS F	22.8	161.6	1.00	1.18	1.73	19.3
11	T1	311	0.0	311	0.0	0.522	37.5	LOS C	15.1	103.9	0.88	0.76	0.88	24.8
Approach		836	1.0	836	1.0	1.021	85.7	LOS F	22.8	161.6	0.96	1.02	1.41	20.4
All Vehicles		3277	1.7	3277	1.7	1.037	47.6	LOS D	25.2	176.1	0.69	0.81	0.95	25.7

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

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
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	54.3	LOS E			0.95	0.95

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: TCS047 [2. PM Base Botany Road / Raglan Street - Lane Widening]

Network: N101 [PM Base (2036)]

Traffic Surveys 12/03/2020
AM Peak: 7:45 - 8:45
PM Peak: 17:15 - 18:15
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Botany Rd (S)														
1	L2	838	2.9	838	2.9	0.884	61.4	LOS E	29.6	211.9	1.00	0.98	1.23	10.8
Approach		838	2.9	838	2.9	0.884	61.4	LOS E	29.6	211.9	1.00	0.98	1.23	10.8
East: Raglan St (E)														
4	L2	9	0.0	9	0.0	0.600	62.8	LOS E	7.9	54.9	1.00	0.82	1.00	4.5
5	T1	315	1.3	315	1.3	0.600	56.3	LOS D	11.0	76.5	1.00	0.82	1.00	4.7
Approach		324	1.3	324	1.3	0.600	56.5	LOS E	11.0	76.5	1.00	0.82	1.00	4.7
North: Botany Rd (N)														
7	L2	87	8.4	87	8.4	0.498	15.6	LOS B	18.2	130.0	0.55	0.53	0.55	38.0
8	T1	1227	3.2	1227	3.2	0.498	9.2	LOS A	18.2	130.0	0.51	0.48	0.51	39.7
9	R2	757	1.5	757	1.5	0.746	42.5	LOS C	22.8	159.9	0.94	0.87	0.97	23.1
Approach		2072	2.8	2072	2.8	0.746	21.7	LOS B	22.8	159.9	0.67	0.62	0.68	31.5
West: Henderson Rd (W)														
11	T1	262	0.8	262	0.8	0.634	28.7	LOS C	6.4	44.4	0.66	0.53	0.66	8.8
12	R2	37	0.0	37	0.0	0.634	54.3	LOS D	6.4	44.4	0.95	0.77	0.96	5.5
Approach		299	0.7	299	0.7	0.634	31.8	LOS C	6.4	44.4	0.69	0.56	0.70	8.2
All Vehicles		3533	2.5	3533	2.5	0.884	35.1	LOS C	29.6	211.9	0.78	0.72	0.84	21.7

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

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
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	54.3	LOS E			0.95	0.95

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: 101v [3. PM Base Cope Street / Raglan Street - Conversion]

Network: N101 [PM Base (2036)]

Traffic Surveys 12/03/2020
AM Peak: 7:45 - 8:45
PM Peak: 17:15 - 18:15
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Cope St (S)														
1	L2	55	0.0	55	0.0	0.127	25.3	LOS B	3.9	24.6	0.62	0.61	0.62	14.5
2	T1	54	0.0	54	0.0	0.127	20.9	LOS B	3.9	24.6	0.62	0.61	0.62	30.9
3	R2	5	20.0	5	20.0	0.127	25.7	LOS B	3.9	24.6	0.62	0.61	0.62	32.0
Approach		114	0.9	114	0.9	0.127	23.3	LOS B	3.9	24.6	0.62	0.61	0.62	26.1
East: Raglan St (E)														
4	L2	1	100.0	1	100.0	0.135	24.8	LOS B	4.0	28.3	0.61	0.50	0.61	32.4
5	T1	197	2.1	197	2.1	0.135	20.4	LOS B	4.0	28.3	0.62	0.51	0.62	32.0
6	R2	9	0.0	9	0.0	0.135	25.5	LOS B	3.0	21.1	0.63	0.53	0.63	37.6
Approach		207	2.5	207	2.5	0.135	20.6	LOS B	4.0	28.3	0.62	0.51	0.62	32.4
North: Cope St (N)														
7	L2	24	0.0	24	0.0	0.074	23.8	LOS B	3.4	15.5	0.61	0.53	0.61	32.7
8	T1	79	1.3	79	1.3	0.074	20.2	LOS B	3.4	15.5	0.61	0.53	0.61	26.8
9	R2	94	0.0	94	0.0	0.205	28.3	LOS B	3.5	22.2	0.67	0.72	0.67	27.4
Approach		197	0.5	197	0.5	0.205	24.5	LOS B	3.5	22.2	0.64	0.62	0.64	28.1
West: Raglan St (W)														
10	L2	83	1.3	83	1.3	0.206	31.4	LOS C	8.2	57.5	0.85	0.75	0.85	29.0
11	T1	256	3.3	256	3.3	0.206	30.6	LOS C	8.8	61.9	0.91	0.77	0.91	28.3
12	R2	11	0.0	11	0.0	0.206	37.0	LOS C	8.8	61.9	0.94	0.79	0.94	7.5
Approach		349	2.7	349	2.7	0.206	31.0	LOS C	8.8	61.9	0.89	0.77	0.89	28.2
All Vehicles		867	1.9	867	1.9	0.206	26.0	LOS B	8.8	61.9	0.73	0.65	0.73	28.8

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

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
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	54.3	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

MOVEMENT SUMMARY

Site: 102v [4. PM Base Cope Street / Wellington Street - Priority]

Network: N101 [PM Base (2036)]

Traffic Surveys 12/03/2020
AM Peak: 7:45 - 8:45
PM Peak: 17:15 - 18:15
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Cope St (S)														
1	L2	29	0.0	29	0.0	0.095	7.2	LOS A	0.3	2.2	0.60	0.76	0.60	37.9
2	T1	14	0.0	14	0.0	0.095	13.1	LOS A	0.3	2.2	0.60	0.76	0.60	37.9
3	R2	4	0.0	4	0.0	0.095	16.8	LOS B	0.3	2.2	0.60	0.76	0.60	42.5
Approach		47	0.0	47	0.0	0.095	9.8	LOS A	0.3	2.2	0.60	0.76	0.60	38.6
East: Wellington St (E)														
4	L2	8	0.0	8	0.0	0.053	6.5	LOS A	0.2	0.8	0.55	0.50	0.55	36.8
5	T1	141	1.5	141	1.5	0.325	5.7	LOS A	1.6	11.4	0.65	0.72	0.76	37.9
6	R2	43	0.0	43	0.0	0.325	18.6	LOS B	1.6	11.4	0.67	0.77	0.81	39.7
Approach		193	1.1	193	1.1	0.325	8.6	NA	1.6	11.4	0.65	0.72	0.77	37.9
North: Cope St (N)														
7	L2	15	0.0	15	0.0	0.378	9.3	LOS A	1.7	8.6	0.78	0.95	1.02	31.7
8	T1	24	0.0	24	0.0	0.378	15.0	LOS B	1.7	8.6	0.78	0.95	1.02	28.3
9	R2	75	2.8	75	2.8	0.378	20.8	LOS B	1.7	8.6	0.78	0.95	1.02	11.8
Approach		114	1.9	114	1.9	0.378	18.1	LOS B	1.7	8.6	0.78	0.95	1.02	22.3
West: Wellington St (W)														
10	L2	54	2.0	54	2.0	0.243	6.6	LOS A	0.9	6.6	0.45	0.51	0.45	23.7
11	T1	118	1.8	118	1.8	0.243	5.0	LOS A	0.9	6.6	0.45	0.51	0.45	43.8
12	R2	22	0.0	22	0.0	0.243	4.9	LOS A	0.9	6.6	0.45	0.52	0.45	43.1
Approach		194	1.6	194	1.6	0.243	5.4	NA	0.9	6.6	0.45	0.51	0.45	42.0
All Vehicles		547	1.3	547	1.3	0.378	9.6	NA	1.7	11.4	0.60	0.70	0.69	36.2

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

MOVEMENT SUMMARY

Site: TCS137 [5. PM Base Botany Road / Wellington Street / Buckland Street - Upgrade]

Network: N101 [PM Base (2036)]

Traffic Surveys 12/03/2020
AM Peak: 7:45 - 8:45
PM Peak: 17:15 - 18:15
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Botany Rd (S)														
1	L2	2	0.0	2	0.0	0.518	13.2	LOS A	19.5	139.2	0.56	0.51	0.56	34.2
2	T1	783	2.8	783	2.8	0.518	12.7	LOS A	19.5	139.2	0.58	0.54	0.58	37.0
3	R2	76	0.0	76	0.0	0.518	24.9	LOS B	8.0	57.0	0.70	0.67	0.70	31.4
Approach		861	2.6	861	2.6	0.518	13.8	LOS A	19.5	139.2	0.59	0.55	0.59	36.4
East: Wellington St (E)														
4	L2	147	2.9	147	2.9	0.191	45.8	LOS D	3.6	26.0	0.86	0.75	0.86	23.5
5	T1	59	0.0	59	0.0	0.252	41.8	LOS C	5.6	27.3	0.87	0.73	0.87	18.6
6	R2	58	0.0	58	0.0	0.252	46.1	LOS D	5.6	27.3	0.87	0.73	0.87	5.3
Approach		264	1.6	264	1.6	0.252	45.0	LOS D	5.6	27.3	0.86	0.74	0.86	19.7
North: Botany Rd (N)														
7	L2	21	0.0	21	0.0	0.501	15.5	LOS B	18.4	131.2	0.55	0.51	0.55	30.2
8	T1	1239	3.1	1239	3.1	0.501	11.0	LOS A	18.5	131.7	0.55	0.50	0.55	41.2
9	R2	1	0.0	1	0.0	0.501	13.0	LOS A	18.5	131.7	0.55	0.50	0.55	30.6
Approach		1261	3.1	1261	3.1	0.501	11.1	LOS A	18.5	131.7	0.55	0.50	0.55	41.1
West: Buckland St (W)														
10	L2	12	0.0	12	0.0	0.200	43.4	LOS D	4.8	30.7	0.84	0.68	0.84	23.4
11	T1	93	2.3	93	2.3	0.200	38.9	LOS C	4.8	30.7	0.84	0.68	0.84	23.4
12	R2	33	0.0	33	0.0	0.110	46.4	LOS D	1.6	10.9	0.84	0.72	0.84	30.2
Approach		137	1.5	137	1.5	0.200	41.1	LOS C	4.8	30.7	0.84	0.69	0.84	25.6
All Vehicles		2523	2.7	2523	2.7	0.518	17.2	LOS B	19.5	139.2	0.61	0.55	0.61	35.6

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	54.3	LOS E			0.95	0.95

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.

MOVEMENT SUMMARY

Site: 101 [6. PM Base Cope Street / Shared Zone]

Network: N101 [PM Base (2036)]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Cope St (S)														
1	L2	1	0.0	1	0.0	0.053	4.3	LOS A	0.0	0.0	0.00	0.01	0.00	47.3
2	T1	111	1.0	111	1.0	0.053	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	47.6
Approach		112	0.9	112	0.9	0.053	0.0	NA	0.0	0.0	0.00	0.01	0.00	47.5
North: Cope St (N)														
8	T1	91	2.3	91	2.3	0.029	0.2	LOS A	0.0	0.0	0.01	0.05	0.01	38.4
9	R2	1	0.0	1	0.0	0.029	4.9	LOS A	0.0	0.0	0.01	0.05	0.01	45.7
Approach		92	2.3	92	2.3	0.029	0.2	NA	0.0	0.0	0.01	0.05	0.01	38.7
West: Shared Zone (W)														
10	L2	1	0.0	1	0.0	0.002	4.8	LOS A	0.0	0.0	0.20	0.50	0.20	43.7
12	R2	1	0.0	1	0.0	0.002	5.1	LOS A	0.0	0.0	0.20	0.50	0.20	43.7
Approach		2	0.0	2	0.0	0.002	5.0	LOS A	0.0	0.0	0.20	0.50	0.20	43.7
All Vehicles		205	1.5	205	1.5	0.053	0.2	NA	0.0	0.0	0.00	0.03	0.00	42.2

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

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MOVEMENT SUMMARY

Site: TCS055 [1. AM Base + Dev 3 Henderson Road / Wyndham Street]

Network: N101 [AM Base + Prop Dev (2036)]

Traffic Surveys 12/03/2020
AM Peak: 7:45 - 8:45
PM Peak: 17:15 - 18:15
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Wyndham St (S)														
1	L2	13	8.3	13	8.3	1.013	115.2	LOS F	21.9	158.9	1.00	1.36	1.79	19.4
2	T1	487	7.6	487	7.6	1.013	110.8	LOS F	23.2	169.0	1.00	1.36	1.79	19.7
3	R2	3	33.3	3	33.3	1.013	114.7	LOS F	23.2	169.0	1.00	1.36	1.78	12.6
Approach		503	7.7	503	7.7	1.013	111.0	LOS F	23.2	169.0	1.00	1.36	1.79	19.7
East: Henderson Rd (E)														
4	L2	197	3.2	197	3.2	0.339	9.6	LOS A	4.5	32.4	0.22	0.41	0.22	41.9
5	T1	640	4.8	640	4.8	0.339	3.3	LOS A	4.5	32.4	0.16	0.21	0.16	45.6
6	R2	937	5.1	937	5.1	0.891	38.2	LOS C	15.7	114.2	0.98	0.96	1.22	25.7
Approach		1774	4.7	1774	4.7	0.891	22.4	LOS B	15.7	114.2	0.60	0.63	0.73	32.1
West: Henderson Rd (W)														
10	L2	526	6.6	526	6.6	1.028	118.8	LOS F	23.4	172.7	1.00	1.20	1.76	18.8
11	T1	291	3.6	291	3.6	0.491	36.3	LOS C	13.8	99.3	0.87	0.74	0.87	25.2
Approach		817	5.5	817	5.5	1.028	89.5	LOS F	23.4	172.7	0.95	1.04	1.44	19.9
All Vehicles		3094	5.4	3094	5.4	1.028	54.6	LOS D	23.4	172.7	0.76	0.86	1.09	24.1

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

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
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	54.3	LOS E			0.95	0.95

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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MOVEMENT SUMMARY

Site: TCS047 [2. AM Base + Dev 3 Botany Road / Raglan Street]

Network: N101 [AM Base + Prop Dev (2036)]

Traffic Surveys 12/03/2020
AM Peak: 7:45 - 8:45
PM Peak: 17:15 - 18:15
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Botany Rd (S)														
1	L2	892	5.3	892	5.3	1.000	96.4	LOS F	44.3	323.3	1.00	1.16	1.55	7.5
Approach		892	5.3	892	5.3	1.000	96.4	LOS F	44.3	323.3	1.00	1.16	1.55	7.5
East: Raglan St (E)														
4	L2	4	0.0	4	0.0	0.571	64.6	LOS E	8.4	59.8	1.00	0.80	1.00	4.4
5	T1	283	3.7	283	3.7	0.571	59.7	LOS E	8.6	61.7	1.00	0.80	1.00	4.5
Approach		287	3.7	287	3.7	0.571	59.7	LOS E	8.6	61.7	1.00	0.80	1.00	4.5
North: Botany Rd (N)														
7	L2	63	8.3	63	8.3	0.497	11.7	LOS A	16.2	120.2	0.45	0.44	0.45	41.6
8	T1	1327	7.6	1327	7.6	0.497	6.1	LOS A	16.2	120.2	0.42	0.40	0.42	42.8
9	R2	609	5.0	609	5.0	0.656	47.7	LOS D	16.1	117.0	0.95	0.84	0.95	21.8
Approach		2000	6.8	2000	6.8	0.656	18.9	LOS B	16.2	120.2	0.59	0.54	0.59	33.2
West: Henderson Rd (W)														
11	T1	252	2.1	252	2.1	0.869	52.6	LOS D	9.9	69.8	0.97	0.83	1.05	5.3
12	R2	49	14.9	49	14.9	0.869	70.0	LOS E	7.7	57.1	1.00	0.91	1.21	4.3
Approach		301	4.2	301	4.2	0.869	55.4	LOS D	9.9	69.8	0.97	0.84	1.07	5.1
All Vehicles		3480	6.0	3480	6.0	1.000	45.3	LOS D	44.3	323.3	0.76	0.75	0.91	18.6

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

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
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	54.3	LOS E			0.95	0.95

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: 101v [3. AM Base + Dev 3 Cope Street / Raglan Street - Signal]

Network: N101 [AM Base + Prop Dev (2036)]

Traffic Surveys 12/03/2020
AM Peak: 7:45 - 8:45
PM Peak: 17:15 - 18:15
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Cope St (S)														
1	L2	47	0.0	47	0.0	0.176	26.0	LOS B	5.7	33.5	0.64	0.62	0.64	14.1
2	T1	87	1.2	87	1.2	0.176	21.5	LOS B	5.7	33.5	0.64	0.62	0.64	28.8
3	R2	28	0.0	28	0.0	0.176	26.0	LOS B	5.7	33.5	0.64	0.62	0.64	31.9
Approach		163	0.6	163	0.6	0.176	23.6	LOS B	5.7	33.5	0.64	0.62	0.64	27.1
East: Raglan St (E)														
4	L2	7	42.9	7	42.9	0.159	25.0	LOS B	4.6	33.7	0.62	0.52	0.62	32.2
5	T1	205	5.6	205	5.6	0.159	21.3	LOS B	4.6	33.7	0.63	0.54	0.63	31.0
6	R2	28	0.0	28	0.0	0.159	26.8	LOS B	3.8	25.3	0.66	0.58	0.66	34.1
Approach		241	6.1	241	6.1	0.159	22.0	LOS B	4.6	33.7	0.64	0.55	0.64	31.6
North: Cope St (N)														
7	L2	14	0.0	14	0.0	0.045	24.2	LOS B	1.4	8.7	0.60	0.52	0.60	36.3
8	T1	31	0.0	31	0.0	0.045	20.0	LOS B	1.4	8.7	0.60	0.52	0.60	30.0
9	R2	47	4.4	47	4.4	0.090	27.8	LOS B	1.7	12.1	0.64	0.69	0.64	28.5
Approach		92	2.3	92	2.3	0.090	24.7	LOS B	1.7	12.1	0.62	0.61	0.62	30.6
West: Raglan St (W)														
10	L2	54	3.9	54	3.9	0.195	35.6	LOS C	8.1	58.3	0.90	0.77	0.90	27.8
11	T1	232	3.6	232	3.6	0.195	33.2	LOS C	8.1	58.3	0.94	0.79	0.94	27.4
12	R2	24	4.3	24	4.3	0.195	39.6	LOS C	7.7	55.0	0.97	0.81	0.97	6.9
Approach		309	3.7	309	3.7	0.195	34.1	LOS C	8.1	58.3	0.94	0.79	0.94	26.6
All Vehicles		805	3.7	805	3.7	0.195	27.3	LOS B	8.1	58.3	0.75	0.66	0.75	28.6

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

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
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	54.3	LOS E			0.95	0.95

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.

MOVEMENT SUMMARY

Site: 102v [4. AM Base + Dev 3 Cope Street / Wellington Street - Priority]

Network: N101 [AM Base + Prop Dev (2036)]

Traffic Surveys 12/03/2020
AM Peak: 7:45 - 8:45
PM Peak: 17:15 - 18:15
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Cope St (S)														
1	L2	15	0.0	15	0.0	0.080	4.1	LOS A	0.3	1.8	0.04	0.46	0.04	37.0
2	T1	20	0.0	20	0.0	0.080	11.6	LOS A	0.3	1.8	0.04	0.46	0.04	37.0
3	R2	5	0.0	5	0.0	0.080	14.2	LOS A	0.3	1.8	0.04	0.46	0.04	40.6
Approach		40	0.0	40	0.0	0.080	9.2	LOS A	0.3	1.8	0.04	0.46	0.04	37.8
East: Wellington St (E)														
4	L2	12	0.0	12	0.0	0.029	6.7	LOS A	0.1	0.6	0.52	0.53	0.52	40.4
5	T1	46	2.3	46	2.3	0.132	4.5	LOS A	0.5	3.7	0.61	0.64	0.61	39.0
6	R2	23	0.0	23	0.0	0.132	16.0	LOS B	0.5	3.7	0.63	0.67	0.63	40.2
Approach		81	1.3	81	1.3	0.132	8.1	NA	0.5	3.7	0.60	0.64	0.60	39.6
North: Cope St (N)														
7	L2	18	0.0	18	0.0	0.204	14.5	LOS B	0.8	5.2	0.74	0.87	0.75	36.3
8	T1	21	0.0	21	0.0	0.204	11.4	LOS A	0.8	5.2	0.74	0.87	0.75	33.1
9	R2	28	11.1	28	11.1	0.204	17.3	LOS B	0.8	5.2	0.74	0.87	0.75	14.4
Approach		67	4.7	67	4.7	0.204	14.8	LOS B	0.8	5.2	0.74	0.87	0.75	30.4
West: Wellington St (W)														
10	L2	87	1.2	87	1.2	0.296	6.0	LOS A	1.2	8.8	0.39	0.46	0.40	22.1
11	T1	158	3.3	158	3.3	0.296	5.4	LOS A	1.2	8.8	0.36	0.45	0.38	43.4
12	R2	33	3.2	33	3.2	0.296	4.7	LOS A	1.2	8.8	0.34	0.44	0.35	41.3
Approach		278	2.7	278	2.7	0.296	5.5	NA	1.2	8.8	0.37	0.45	0.38	40.8
All Vehicles		466	2.5	466	2.5	0.296	7.6	NA	1.2	8.8	0.43	0.55	0.44	38.6

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

MOVEMENT SUMMARY

Site: TCS137 [5. AM Base + Dev 3 Botany Road / Wellington Street / Buckland Street]

Network: N101 [AM Base + Prop Dev (2036)]

Traffic Surveys 12/03/2020
AM Peak: 7:45 - 8:45
PM Peak: 17:15 - 18:15
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Botany Rd (S)														
1	L2	2	0.0	2	0.0	0.573	11.9	LOS A	22.0	160.5	0.55	0.51	0.55	34.6
2	T1	849	5.7	849	5.7	0.573	10.9	LOS A	22.0	160.5	0.57	0.53	0.57	38.4
3	R2	83	5.1	83	5.1	0.573	22.0	LOS B	7.0	51.3	0.67	0.67	0.67	32.9
Approach		935	5.6	935	5.6	0.573	11.9	LOS A	22.0	160.5	0.58	0.54	0.58	37.8
East: Wellington St (E)														
4	L2	59	5.4	59	5.4	0.091	48.3	LOS D	1.5	10.7	0.86	0.71	0.86	22.8
5	T1	22	0.0	22	0.0	0.127	46.8	LOS D	2.2	11.1	0.89	0.70	0.89	17.8
6	R2	22	4.8	22	4.8	0.127	51.1	LOS D	2.2	11.1	0.89	0.70	0.89	4.8
Approach		103	4.1	103	4.1	0.127	48.6	LOS D	2.2	11.1	0.88	0.70	0.88	19.0
North: Botany Rd (N)														
7	L2	21	0.0	21	0.0	0.536	10.9	LOS A	12.7	94.3	0.35	0.33	0.35	36.0
8	T1	1340	8.1	1340	8.1	0.536	7.0	LOS A	14.3	106.8	0.37	0.35	0.37	44.0
9	R2	2	0.0	2	0.0	0.536	9.6	LOS A	14.3	106.8	0.40	0.36	0.40	31.9
Approach		1363	8.0	1363	8.0	0.536	7.1	LOS A	14.3	106.8	0.37	0.35	0.37	44.0
West: Buckland St (W)														
10	L2	11	0.0	11	0.0	0.346	48.0	LOS D	9.4	50.7	0.90	0.74	0.90	21.2
11	T1	178	1.2	178	1.2	0.346	43.5	LOS D	9.4	50.7	0.90	0.74	0.90	21.2
12	R2	24	17.4	24	17.4	0.094	49.1	LOS D	1.2	9.6	0.86	0.71	0.86	29.5
Approach		213	3.0	213	3.0	0.346	44.4	LOS D	9.4	50.7	0.90	0.73	0.90	22.5
All Vehicles		2614	6.6	2614	6.6	0.573	13.5	LOS A	22.0	160.5	0.51	0.46	0.51	38.0

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

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
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	54.3	LOS E			0.95	0.95

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.

MOVEMENT SUMMARY

Site: 101 [6. AM Base + Dev 3 Cope Street / Shared Zone]

Network: N101 [AM Base + Prop Dev (2036)]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Cope St (S)														
1	L2	3	0.0	3	0.0	0.052	3.8	LOS A	0.0	0.0	0.00	0.02	0.00	43.3
2	T1	127	0.8	127	0.8	0.052	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	42.6
Approach		131	0.8	131	0.8	0.052	0.1	NA	0.0	0.0	0.00	0.02	0.00	42.7
North: Cope St (N)														
8	T1	55	7.7	55	7.7	0.032	0.2	LOS A	0.0	0.3	0.05	0.10	0.05	43.5
9	R2	8	0.0	8	0.0	0.032	4.9	LOS A	0.0	0.3	0.05	0.10	0.05	47.0
Approach		63	6.7	63	6.7	0.032	0.8	NA	0.0	0.3	0.05	0.10	0.05	44.9
West: Shared Zone (W)														
10	L2	32	0.0	32	0.0	0.032	4.9	LOS A	0.1	0.8	0.20	0.51	0.20	43.7
12	R2	13	0.0	13	0.0	0.032	5.1	LOS A	0.1	0.8	0.20	0.51	0.20	43.7
Approach		44	0.0	44	0.0	0.032	4.9	LOS A	0.1	0.8	0.20	0.51	0.20	43.7
All Vehicles		238	2.2	238	2.2	0.052	1.2	NA	0.1	0.8	0.05	0.13	0.05	43.8

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

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MOVEMENT SUMMARY

Site: TCS055 [1. PM Base + Dev 3 Henderson Road / Wyndham Street]

Network: N101 [PM Base + Prop Dev (2036)]

Traffic Surveys 12/03/2020
AM Peak: 7:45 - 8:45
PM Peak: 17:15 - 18:15
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Wyndham St (S)														
1	L2	16	0.0	16	0.0	1.037	129.3	LOS F	23.5	164.6	1.00	1.41	1.90	18.3
2	T1	493	1.5	493	1.5	1.037	124.6	LOS F	25.2	176.1	1.00	1.41	1.89	18.3
3	R2	2	0.0	2	0.0	1.037	128.9	LOS F	25.2	176.1	1.00	1.42	1.88	11.5
Approach		511	1.4	511	1.4	1.037	124.7	LOS F	25.2	176.1	1.00	1.41	1.89	18.3
East: Henderson Rd (E)														
4	L2	165	1.3	161	1.3	0.401	15.7	LOS B	14.7	102.7	0.56	0.58	0.56	37.9
5	T1	916	0.9	894	0.9	0.401	8.7	LOS A	14.7	102.7	0.45	0.43	0.45	40.6
6	R2	854	3.5	833	3.4	0.743	22.5	LOS B	12.3	88.4	0.86	0.82	0.87	31.8
Approach		1935	2.1	1888 N1	2.0	0.743	15.4	LOS B	14.7	102.7	0.64	0.62	0.65	36.0
West: Henderson Rd (W)														
10	L2	525	1.6	525	1.6	1.021	114.1	LOS F	22.8	161.6	1.00	1.18	1.73	19.3
11	T1	317	0.0	317	0.0	0.533	37.6	LOS C	15.4	106.5	0.89	0.76	0.89	24.7
Approach		842	1.0	842	1.0	1.021	85.3	LOS F	22.8	161.6	0.96	1.02	1.41	20.4
All Vehicles		3287	1.7	3241 N1	1.7	1.037	50.8	LOS D	25.2	176.1	0.78	0.85	1.04	24.9

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

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	54.3	LOS E			0.95	0.95

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: TCS047 [2. PM Base + Dev 3 Botany Road / Raglan Street]

Network: N101 [PM Base + Prop Dev (2036)]

Traffic Surveys 12/03/2020
AM Peak: 7:45 - 8:45
PM Peak: 17:15 - 18:15
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Botany Rd (S)														
1	L2	838	2.9	838	2.9	1.059	137.7	LOS F	44.3	317.7	1.00	1.27	1.82	5.4
Approach		838	2.9	838	2.9	1.059	137.7	LOS F	44.3	317.7	1.00	1.27	1.82	5.4
East: Raglan St (E)														
4	L2	9	0.0	9	0.0	0.640	63.4	LOS E	8.0	55.6	1.00	0.84	1.03	4.5
5	T1	319	1.3	319	1.3	0.640	53.4	LOS D	11.1	77.4	1.00	0.83	1.01	4.9
Approach		328	1.3	328	1.3	0.640	53.7	LOS D	11.1	77.4	1.00	0.83	1.01	4.9
North: Botany Rd (N)														
7	L2	97	7.6	97	7.6	0.504	16.1	LOS B	18.7	133.5	0.56	0.55	0.56	37.5
8	T1	1227	3.2	1227	3.2	0.504	9.5	LOS A	18.7	133.5	0.52	0.49	0.52	39.4
9	R2	757	1.5	757	1.5	0.786	45.7	LOS D	24.3	170.4	0.96	0.90	1.03	22.2
Approach		2081	2.8	2081	2.8	0.786	23.0	LOS B	24.3	170.4	0.68	0.64	0.71	30.8
West: Henderson Rd (W)														
11	T1	268	0.8	268	0.8	0.666	29.3	LOS C	6.5	44.9	0.67	0.54	0.67	8.7
12	R2	37	0.0	37	0.0	0.666	58.1	LOS E	6.5	44.9	0.98	0.79	1.00	5.2
Approach		305	0.7	305	0.7	0.666	32.8	LOS C	6.5	44.9	0.70	0.57	0.71	8.0
All Vehicles		3553	2.5	3553	2.5	1.059	53.7	LOS D	44.3	317.7	0.79	0.80	1.00	16.5

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	54.3	LOS E			0.95	0.95

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: 101v [3. PM Base + Dev 3 Cope Street / Raglan Street - Conversion]

Network: N101 [PM Base + Prop Dev (2036)]

Traffic Surveys 12/03/2020
AM Peak: 7:45 - 8:45
PM Peak: 17:15 - 18:15
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Cope St (S)														
1	L2	59	0.0	59	0.0	0.145	26.8	LOS B	4.3	27.6	0.65	0.63	0.65	13.8
2	T1	54	0.0	54	0.0	0.145	22.4	LOS B	4.3	27.6	0.65	0.63	0.65	30.2
3	R2	9	11.1	9	11.1	0.145	27.0	LOS B	4.3	27.6	0.65	0.63	0.65	31.5
Approach		122	0.9	122	0.9	0.145	24.9	LOS B	4.3	27.6	0.65	0.63	0.65	25.4
East: Raglan St (E)														
4	L2	18	5.9	18	5.9	0.142	23.3	LOS B	4.2	29.8	0.60	0.52	0.60	32.8
5	T1	197	2.1	197	2.1	0.142	19.3	LOS B	4.2	29.8	0.60	0.52	0.60	32.4
6	R2	9	0.0	9	0.0	0.142	24.4	LOS B	3.2	22.2	0.61	0.52	0.61	38.1
Approach		224	2.3	224	2.3	0.142	19.8	LOS B	4.2	29.8	0.60	0.52	0.60	32.9
North: Cope St (N)														
7	L2	24	0.0	24	0.0	0.077	25.1	LOS B	3.5	16.0	0.63	0.54	0.63	32.3
8	T1	79	1.3	79	1.3	0.077	21.5	LOS B	3.5	16.0	0.63	0.54	0.63	26.3
9	R2	94	0.0	94	0.0	0.219	29.8	LOS C	3.6	22.9	0.69	0.72	0.69	26.8
Approach		197	0.5	197	0.5	0.219	25.9	LOS B	3.6	22.9	0.66	0.63	0.66	27.6
West: Raglan St (W)														
10	L2	83	1.3	83	1.3	0.214	30.3	LOS C	8.7	61.3	0.84	0.74	0.84	29.5
11	T1	256	3.3	256	3.3	0.214	29.4	LOS C	8.8	61.8	0.89	0.77	0.89	28.7
12	R2	26	0.0	26	0.0	0.214	36.5	LOS C	8.8	61.8	0.93	0.79	0.93	7.5
Approach		365	2.6	365	2.6	0.214	30.1	LOS C	8.8	61.8	0.88	0.76	0.88	28.1
All Vehicles		908	1.9	908	1.9	0.219	25.9	LOS B	8.8	61.8	0.73	0.66	0.73	28.7

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

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
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	54.3	LOS E			0.95	0.95

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.

MOVEMENT SUMMARY

Site: 102v [4. PM Base + Dev 3 Cope Street / Wellington Street - Priority]

Network: N101 [PM Base + Prop Dev (2036)]

Traffic Surveys 12/03/2020
AM Peak: 7:45 - 8:45
PM Peak: 17:15 - 18:15
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Cope St (S)														
1	L2	29	0.0	29	0.0	0.097	7.2	LOS A	0.3	2.2	0.60	0.76	0.60	37.8
2	T1	14	0.0	14	0.0	0.097	13.4	LOS A	0.3	2.2	0.60	0.76	0.60	37.8
3	R2	4	0.0	4	0.0	0.097	17.1	LOS B	0.3	2.2	0.60	0.76	0.60	42.4
Approach		47	0.0	47	0.0	0.097	9.9	LOS A	0.3	2.2	0.60	0.76	0.60	38.5
East: Wellington St (E)														
4	L2	8	0.0	8	0.0	0.053	6.5	LOS A	0.2	0.8	0.55	0.50	0.55	36.8
5	T1	141	1.5	141	1.5	0.343	5.9	LOS A	1.7	12.2	0.65	0.73	0.79	37.5
6	R2	47	0.0	47	0.0	0.343	19.4	LOS B	1.7	12.2	0.67	0.79	0.85	39.1
Approach		197	1.1	197	1.1	0.343	9.2	NA	1.7	12.2	0.65	0.74	0.79	37.5
North: Cope St (N)														
7	L2	17	0.0	17	0.0	0.420	17.8	LOS B	1.9	9.9	0.82	1.00	1.12	31.0
8	T1	24	0.0	24	0.0	0.420	16.1	LOS B	1.9	9.9	0.82	1.00	1.12	27.5
9	R2	77	2.7	77	2.7	0.420	22.0	LOS B	1.9	9.9	0.82	1.00	1.12	11.0
Approach		118	1.8	118	1.8	0.420	20.2	LOS B	1.9	9.9	0.82	1.00	1.12	21.4
West: Wellington St (W)														
10	L2	61	1.7	61	1.7	0.252	6.6	LOS A	1.0	6.9	0.46	0.52	0.46	23.6
11	T1	118	1.8	118	1.8	0.252	5.0	LOS A	1.0	6.9	0.46	0.52	0.46	43.7
12	R2	22	0.0	22	0.0	0.252	4.9	LOS A	1.0	6.9	0.45	0.53	0.45	43.0
Approach		201	1.6	201	1.6	0.252	5.5	NA	1.0	6.9	0.46	0.52	0.46	41.7
All Vehicles		563	1.3	563	1.3	0.420	10.2	NA	1.9	12.2	0.61	0.72	0.73	35.6

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

MOVEMENT SUMMARY

Site: TCS137 [5. PM Base + Dev 3 Botany Road / Wellington Street / Buckland Street]

Network: N101 [PM Base + Prop Dev (2036)]

Traffic Surveys 12/03/2020
AM Peak: 7:45 - 8:45
PM Peak: 17:15 - 18:15
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Botany Rd (S)														
1	L2	2	0.0	2	0.0	0.716	16.1	LOS B	24.1	172.1	0.70	0.65	0.70	33.3
2	T1	783	2.8	783	2.8	0.716	16.0	LOS B	24.1	172.1	0.71	0.67	0.73	34.7
3	R2	83	0.0	83	0.0	0.716	28.5	LOS B	10.7	75.7	0.77	0.78	0.84	29.6
Approach		868	2.5	868	2.5	0.716	17.2	LOS B	24.1	172.1	0.72	0.68	0.74	34.2
East: Wellington St (E)														
4	L2	149	2.8	149	2.8	0.194	45.8	LOS D	3.7	26.4	0.86	0.75	0.86	23.5
5	T1	59	0.0	59	0.0	0.326	43.0	LOS D	5.8	28.1	0.89	0.74	0.89	18.4
6	R2	58	0.0	58	0.0	0.326	47.3	LOS D	5.8	28.1	0.89	0.74	0.89	5.2
Approach		266	1.6	266	1.6	0.326	45.5	LOS D	5.8	28.1	0.87	0.74	0.87	19.6
North: Botany Rd (N)														
7	L2	21	0.0	21	0.0	0.502	10.6	LOS A	10.3	73.7	0.31	0.29	0.31	36.4
8	T1	1239	3.1	1239	3.1	0.502	6.8	LOS A	12.1	86.1	0.34	0.31	0.34	44.1
9	R2	1	0.0	1	0.0	0.502	9.4	LOS A	12.1	86.1	0.36	0.33	0.36	31.9
Approach		1261	3.1	1261	3.1	0.502	6.9	LOS A	12.1	86.1	0.33	0.31	0.33	44.0
West: Buckland St (W)														
10	L2	12	0.0	12	0.0	0.209	43.5	LOS D	4.9	30.8	0.84	0.68	0.84	23.3
11	T1	93	2.3	93	2.3	0.209	39.0	LOS C	4.9	30.8	0.84	0.68	0.84	23.3
12	R2	33	0.0	33	0.0	0.111	46.4	LOS D	1.6	11.0	0.84	0.72	0.84	30.2
Approach		137	1.5	137	1.5	0.209	41.2	LOS C	4.9	30.8	0.84	0.69	0.84	25.6
All Vehicles		2533	2.7	2533	2.7	0.716	16.3	LOS B	24.1	172.1	0.55	0.50	0.56	36.1

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

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
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	54.3	LOS E			0.95	0.95

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.

MOVEMENT SUMMARY

Site: 101 [6. PM Base + Dev 3 Cope Street / Shared Zone]

Network: N101 [PM Base + Prop Dev (2036)]

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

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Cope St (S)														
1	L2	13	0.0	13	0.0	0.060	4.4	LOS A	0.0	0.0	0.00	0.06	0.00	47.0
2	T1	111	1.0	111	1.0	0.060	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	44.6
Approach		123	0.9	123	0.9	0.060	0.5	NA	0.0	0.0	0.00	0.06	0.00	45.7
North: Cope St (N)														
8	T1	91	2.3	91	2.3	0.053	0.3	LOS A	0.2	1.0	0.11	0.17	0.11	35.9
9	R2	32	0.0	32	0.0	0.053	4.9	LOS A	0.2	1.0	0.11	0.17	0.11	44.9
Approach		122	1.7	122	1.7	0.053	1.5	NA	0.2	1.0	0.11	0.17	0.11	41.1
West: Shared Zone (W)														
10	L2	8	0.0	8	0.0	0.009	4.8	LOS A	0.0	0.2	0.20	0.50	0.20	43.7
12	R2	3	0.0	3	0.0	0.009	5.2	LOS A	0.0	0.2	0.20	0.50	0.20	43.7
Approach		12	0.0	12	0.0	0.009	4.9	LOS A	0.0	0.2	0.20	0.50	0.20	43.7
All Vehicles		257	1.2	257	1.2	0.060	1.2	NA	0.2	1.0	0.06	0.13	0.06	42.7

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

Attachment 2 - Southern Loading Dock Swept Path Assessment

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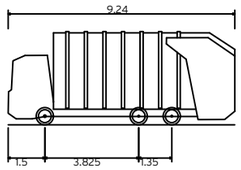
comments

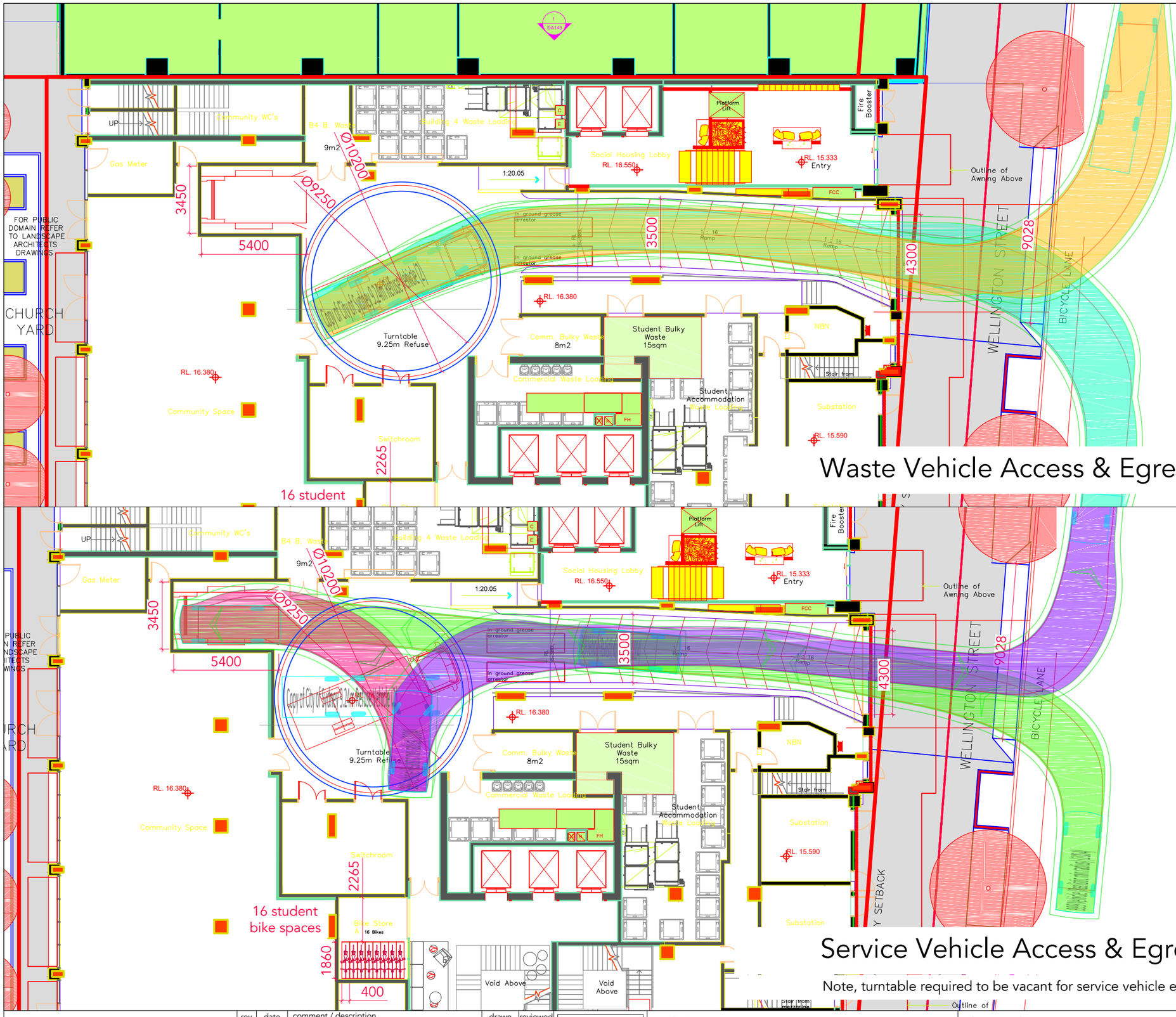
A3



City of Sydney 9.24m Refuse Vehicle

Overall Length	9.240m
Overall Width	2.100m
Overall Body Height	3.800m
Min Body Ground Clearance	0.216m
Track Width	2.000m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	10.500m

Waste Vehicle Access & Egress



Service Vehicle Access & Egress

Note, turntable required to be vacant for service vehicle egress

B99 Vehicle (Realistic min radius) (2004)

Overall Length	5.200m
Overall Width	1.940m
Overall Body Height	1.878m
Min Body Ground Clearance	0.272m
Track Width	1.840m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	6.250m

The turning paths illustrated in this drawing have been prepared using the Autotrack vehicle modelling software in conjunction with AutoCAD. The vehicle model was prepared by Analytico Pty Ltd based upon vehicle data provided by Austroads. While this modelling represents a conservative assessment of the vehicles ability, it is not possible to account for all vehicle types/characteristics or driver ability.

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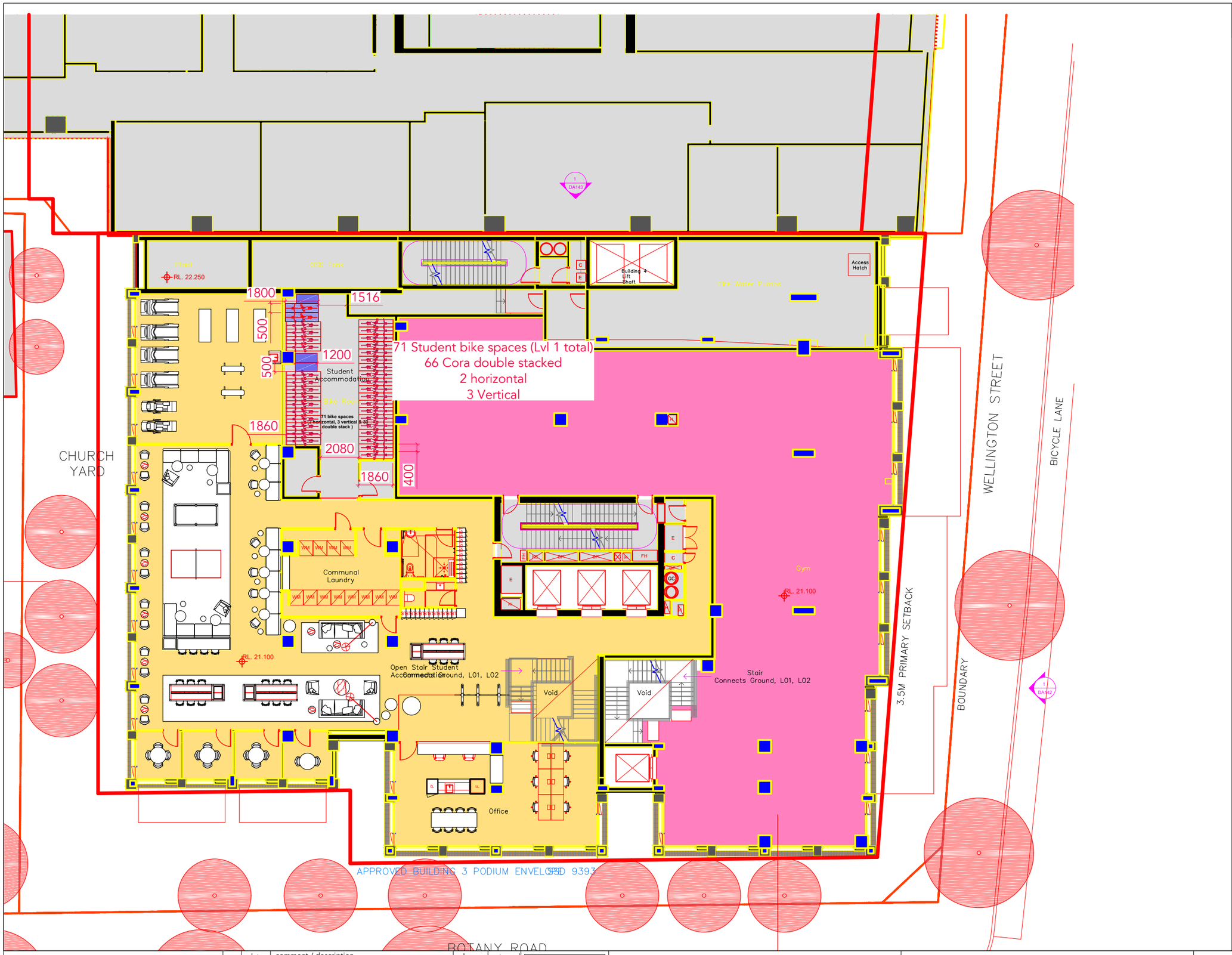
rev	date	comment / description	drawn	reviewed
5	11/02/21	WIP service and bicycle layout Assessment	HL	SW
4	27/01/21	WIP service and bicycle layout Assessment	SW	AM
3	04/12/20	WIP service and bicycle layout Assessment	SW	AM
2	14/08/20	DA Assessment	SW	AM
1	28/07/20	Preliminary Assessment	SW	AM

project
Waterloo Metro
Southern Precinct

drawing title
Building 3
Ground Floor Assessment

client	Mirvac
drawing #	Bld3-001
project #	2789
scale	1:200

rev 5



comments

A3

Single Horizontal Bike Space (500x1800)

Double Stacked Bike Space (400x1860)

Vertical Bike Space (500x1200)

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3	04/12/20	WIP service and bicycle layout Assessment	SW	AM
2	14/08/20	DA Assessment	SW	AM
1	28/07/20	Preliminary Assessment	SW	AM

project
Waterloo Metro
Southern Precinct

drawing title
Building 3
Level 1 Assessment

client	Mirvac
drawing #	Bld3-002
project #	2789
scale	1:200

rev 5

CE BOX

NAL

CHURCH YARD

70 Social Housing bike spaces (total)
58 Cora double stacked
12 Vertical

1 DA142

Building 4 Lift Shaft

70 bikes spaces
(29 Double Stack (58 total) + 12 vertical)

1990
2025
1860
1800
400
1200
400
1860

Access Hatch

Student Accommodation Outdoor Communal Area

Line of Pergola above

Refer to Landscape Architects Drawings

Student Accommodation Communal

RL. 25.100

Open Study Student Accommodation Ground, L01, L02

Void

Void

Stair Gym
Connects Ground, L01, L02

Comms

Commercial

RL. 25.100

WELLINGTON STREET

BICYCLE LANE

3.5M PRIMARY SETBACK

BOUNDARY

1 DA142

APPROVED BUILDING 3 PODIUM ENVELOPE SSD 9393

BOTANY ROAD

comments

A3

Single Horizontal Bike Space (500x1800)

Double Stacked Bike Space (400x1860)

Vertical Bike Space (500x1200)

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3	04/12/20	WIP service and bicycle layout Assessment	SW	AM
2	14/08/20	DA Assessment	SW	AM
1	28/07/20	Preliminary Assessment	SW	AM

project
Waterloo Metro
Southern Precinct

drawing title
Building 3
Level 2 Assessment

client	Mirvac
drawing #	Bld3-003
project #	2789
scale	1:200

rev 5