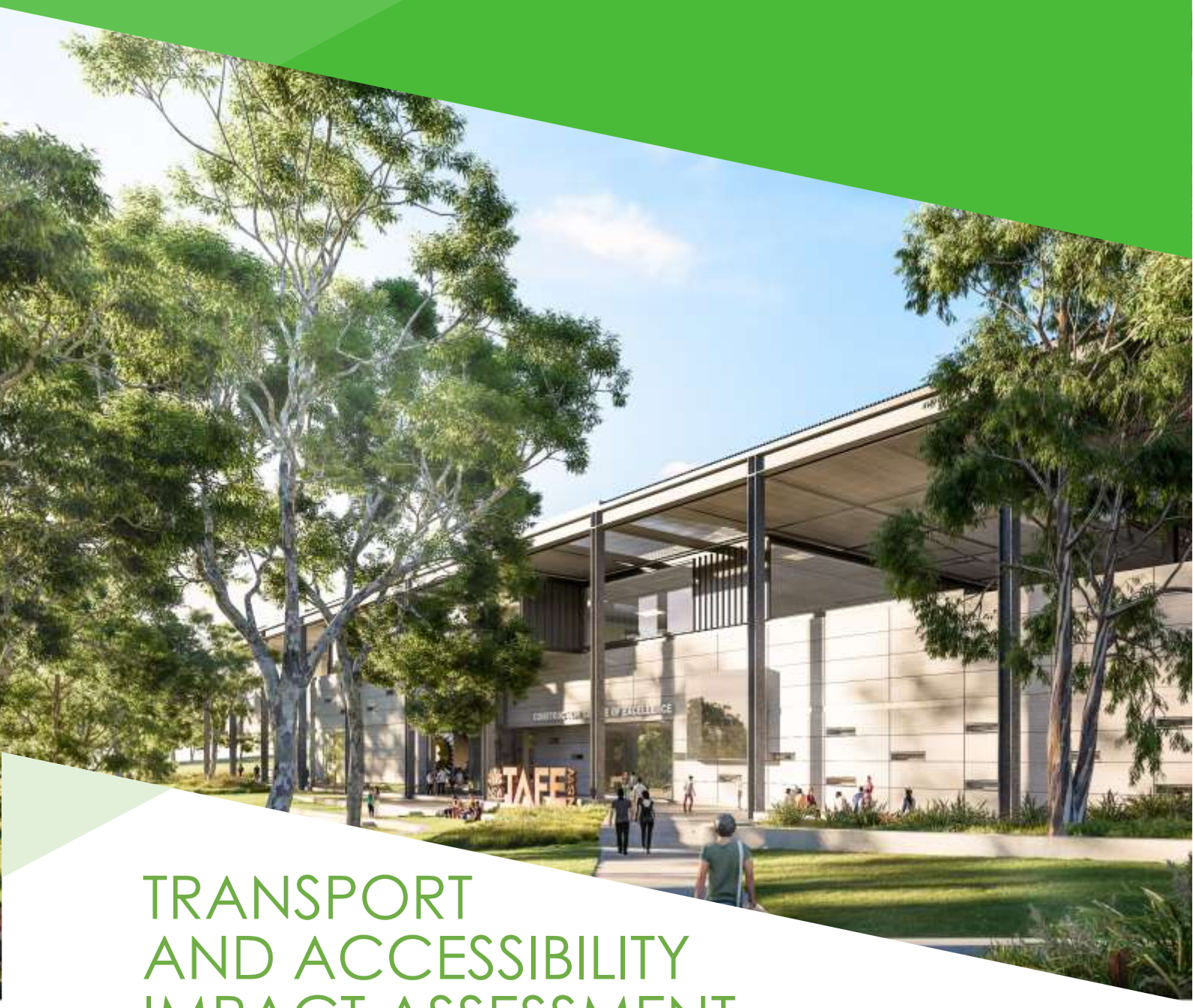


TRANSPORT AND ACCESSIBILITY IMPACT ASSESSMENT

TAFE NSW Construction Centre of Excellence
Nepean Kingswood Campus – 2-44 O'Connell Street, Kingswood

Reference: 20.456r02v08
Date: May 2021

TRAFFIX
TRAFFIC & TRANSPORT PLANNERS

Suite 2.08, 50 Holt St
Surry Hills, NSW 2010

t: (02) 8324 8700
w: www.traffix.com.au

DOCUMENT VERIFICATION

Job Number	20.456			
Project	TAFE NSW Construction Centre of Excellence			
Address	Nepean Kingswood Campus – 2-44 O'Connell Street, Kingswood			
Client	TAFE NSW			
Revision	Date	Prepared By	Checked By	Signed
v08	19/05/2021	Justin Pindar	Vince Doan	

CONTENTS

Appendices

1. RESPONSE TO SUBMISSIONS

1.1 Transport for New South Wales

Green Travel Plan

1. Comments: Green Star Rating

The Green Travel Plan states:

This GTP is subject to review once the targets outlined in the green star rating have been provided. As such, it is recommended that this GTP, TAG and associated targets be revisited at a later stage, once the green star rating document is available for review.

Whereas the EIS states:

The proposed development targets the following: 5 Star Green Star Design & As Built v1.3 rating, considered Australian 'Best Practice'.

Recommendation:

The applicant should be able to determine any required mode shift target changes to achieve the 5-Star rating by referring to the Design & As Built V1.3 released by Green Building Council Australia. If the applicant does not consider this possible, a specific revision date should be provided rather than saying "at a later stage". This revision should be undertaken in consultation with TfNSW.

TRAFFIX Response: Reference should be made to the Green Travel Plan (GTP) which achieves a Green Star Rating of five (5) points. In addition, the EIS has been updated to be consistent with the GTP.

2. Comments:

a. Sustainable Transport Options –

The GTP has not identified existing cycling infrastructure connecting to the site which staff and students currently use in their journey to the site. Promoting these routes will be important in achieving the proposed 2% mode share shift to cycling.

TRAFFIX Response: The GTP now identifies the existing and future cycling infrastructure. Reference should be made to the Sustainable Transport Options - Pedestrian and Bicycle

Facilities (page 5) of the GTP and Strategies and Transport Initiatives -Bicycle Facilities (page 13) of the GTP.

b. Existing Travel Modes –

The GTP has not stated how many responses were received to the interview questionnaire survey that was used to establish the existing travel mode splits. A high response rate would provide an accurate base case scenario.

TRAFFIX Response: The Sustainable Transport Calculator has now been used as the reference travel mode which assumes the travel characteristics for the 'reference project', being for 'education' based in the Kingswood – Werrington SA2 zone and data collected from the 2011 census. This provides consistency with the Green Star Sustainable Transport Calculator as the base case scenario. Nevertheless, the Transport and Accessibility Impact Assessment (Section 4.5 of this report) discuss the interview questionnaire survey results with 291 students and staff participating.

c. Strategies and Transport Initiatives –

The GTP has not provided clear actions with timeframes for how each initiative would be implemented to achieve mode shift targets

TRAFFIX Response: Reference should be made to Table 3 (page 11) of the revised GTP which provides timeframes and the Strategies and Transport Initiatives (page 12) of the GTP.

d. Green Travel Plan Maintenance –

Travel mode targets should not be revised in favour for private car use. Targets should only be revised in favour for the other travel modes including public transport, walking, cycling. Additional actions should be considered by the applicant to ensure mode shift targets are achieved. The applicant should provide Transport for NSW with the name and contact details of the Travel Plan Coordinator once appointed.

TRAFFIX Response: The 'Green Travel Plan Maintenance' (page 14) of the GTP states 'Regular review of the success measures outlined in this plan should be undertaken intermittently to determine whether alternative or supplementary measures are necessary, noting that any revised travel mode targets should favour alternate travel modes (i.e. not private car use).'

e. Summary of the GTP –

The GTP states the long-term targets should be achieved by 2030. It is unclear when the applicant considers the short-term targets should be achieved. If dependant on each stage of construction, indicative milestones could be provided as to ensure mode shift targets are on track to being achieved.

TRAFFIX Response: The 'Proposed Travel Modes' (page 11) of the GTP outlines short-term and long-term targets. It is recommended that a survey of staff and students be conducted annually by the Travel Plan Coordinator to monitor the progress of these targets, noting that these targets are primarily indicative and will require on-going evaluation and fine-tuning.

Recommendation

TfNSW requests the abovementioned information be addressed and the GTP be updated to reflect the outcomes.

TRAFFIX Response: All the above mentioned information has been addressed within the updated GTP. Please refer to the respective sections of the GTP and TIA described above.

Transport Assessment

3. Comment

a) It is noted that the cycle times at Great Western Highway (GWH)/O'Connell & French streets are all over the place, they vary from 120s in the existing to 90s in 2026 to 100s in 2026+development. For major arterial roads like GWH, 120s to 140s cycle time is recommended. The modelling should be updated to reflect a consistent cycle time of 120s.

TRAFFIX Response: SIDRA Intersection 9 modelling has been updated to incorporate a cycle time of 120 seconds – 140 seconds for all signalised intersections. Reference should be made to the intersection modelling outputs presented in **Appendix E.**

b. The existing right turn bay on the western approach is currently at around 80% capacity, once the model is updated to reflect the correct cycle times it is likely that the queue length will exceed the length of the bay. Should the queuing exceed the length of the bay, mitigation measures should be investigated and may be required for this movement.

TRAFFIX Response: Reference should be made to **Section 7.9.1**.

c. From the information presented in the traffic report the number of trips should be about 30% higher than what was concluded in section 6.5, the applicant is to clarify how they arrived at the numbers they present in section 6.5.

TRAFIX Response: The vehicle trips are based on survey data and future staff/student population data provided by TAFE NSW. Reference should be made to **Section 7.1** and **Section 7.5**. Traffic volumes of the vehicle trips are highly conservative as noted within **Section 7.9.1**.

d. Table 6 - The intersection performance of GWH/O'Connell St intersection is worsens to LOS D in the 2030 + Dev scenario (PM Peak). Applicant to propose mitigation measures may be required to improve LOS to an acceptable level. TfNSW advises to have all movements at each approach to have LOS C or better if possible.

TRAFFIX Response: Reference should be made to **Section 7.9** of this report, noting that whilst queuing lengths do exceed the length of right turn bay lengths on individual movements, the overall intersection operates at a level of service D with a practical cycle time of 120 seconds for this intersection under the 2036 + Development scenario. Intersection performance is not measured based on the performance of individual movements for signalized intersections as per Section 4.2.2 of the *RMS Guide to Traffic Generating Developments (2002)* publication. Rather, RMS Guidelines acknowledge that "*The best indicator of the level of service at an intersection is the average delay experienced by vehicles at the intersection. For traffic signals, the average delay over all movements should be taken*". Therefore, the operation of this intersection of GWH/O'Connell Street is considered acceptable and is indicative of a worst-case scenario in any case. Reference should also be made to **Section 7.9.1** for further discussion.

e. It is unclear if the swept paths can be achieved without crossing the centreline of O'Connell St and other internal roads involved. To determine if the swept paths of the largest vehicle are able to be achieved without crossing the centreline the swept path analysis shall include details of lane lines, kerb, gutter and median/centreline.

TRAFFIX Response: Reference should be made to **Section 8.1** of this report and the swept path analysis presented in **Appendix C** showing the largest vehicle requiring access to the subject site does not cross the centreline. However, it should also be noted that a 12.5m

long HRV is permitted to turn left out of the driveway and take up most of the public road in accordance with Figure 3.1 (Note 1) of AS2890.2 (2018).

f. The reports claim to encourage active transport, however there has been no attempt to entice active transport to the site apart from providing additional bicycling parking at the proposed development. Great Western Highway has a shared path this however reduces to a 900mm path along O'Connell with no bicycle facilities at the entrance. A shaded path along O'Connell should be provided to encourage active transport to the site, the verge back of kerb to property line is 3.5m. In addition, it is noted that the footpaths provided on site are inadequate to be used as shared paths.

TRAFFIX Response: Reference should be made to the updated GTP provided separately. TAFE NSW to address item.

g. Connection from the site to the shared path on GWH should be considered along the eastern boundary to the site.

TRAFFIX Response: The connection from the site to the shared path on GWH has been considered and is proposed. Reference should be made to the GTP and the updated Architectural Plans (reduced plans provided in **Appendix B**) which now include shared pathway connection from the building to the GWH.

h. The intersection of GWH/Western Sydney University has not been assessed. Should there be access between the TAFE and University, students can rat run to access the parking closer to the development. In this regard the intersection of GWH/Western Sydney University should be considered in the model.

TRAFFIX Response: It is noted that rat running will not be possible to access the TAFE site as there is no vehicular access between TAFE and University car parks. In addition, WSU provides paid parking whereas TAFE parking is free. As a result, TAFE staff and students would park their vehicles within the TAFE car park with access via O'Connell Street. Therefore, the intersection of GWH / WSU is not considered a critical intersection and not required to be modelled.

Recommendation:

TfNSW requests the abovementioned information be addressed and the TIA be updated to reflect the outcomes.

Construction Traffic Management Plan (CTMP)

4. Comment

a. Section 5.1.2: The truck routes will be using the GWH/Western Sydney University intersection. Modelling of this intersection is required to show the results of the intersection performance on each stage of work.

TRAFFIX Response: SIDRA 9 Intersection modelling has been conducted for the worst-case scenario of construction being bulk excavation noting that there are only minor changes to intersection delays with level of service A. As such, the development construction is considered supportable from a traffic planning perspective with no external improvements to the network required. Reference should be made to Section 6.2 of the updated Preliminary CTPMP provided separately.

b. Appendix C Loading Zone Swept Paths: Traffic Controller is recommended to ensure there is no conflict between construction trucks and vehicles / pedestrians using the carpark.

TRAFFIX Response: Appendix C Loading Zone swept path has been updated to include a traffic controller. It is noted that this is a Preliminary CTPMP and further details of traffic controllers will be provided within the detailed CTPMP and final TCPs.

1.2 Planning, Industry and Environment Response to Submissions

Concerns are raised regarding the traffic including the appropriateness of the traffic model used to inform the Traffic Impact Assessment and of the proposal's impact on the performance of the Great Western Highway (GWH) / O'Connell Street intersection. The Department requires you to address these concerns, including but not limited to the provision of:

- *an updated traffic model to reflect a consistent cycle time of 120s at the GWH / O'Connell and French Street intersection.*

- *detailed mitigation measures should queuing exceed the length of the right turn bay GWH / O'Connell Street, and any mitigation measures required to improve LOS to an acceptable level.*
- *modelling of the GWH / Western Sydney University intersection, demonstrating the results of the intersection performance during each stage of construction work.*

  TRAFFIX Response: SIDRA Intersection 9 modelling has been updated to incorporate a cycle time of 120 seconds – 140 seconds for all signalised intersections as per TfNSW requirements. Reference should be made to the intersection modelling outputs presented in **Appendix E.** Reference should also be made to **Section 7.9.1** of this report in relation to the intersection performance for Great Western Highway, French Street and O'Connell Street in the 2030 + development scenario.

- *additional evidence to demonstrate that the swept paths of construction vehicles can be achieved without crossing the centreline of O'Connell Street and other internal roads.*

  TRAFFIX Response: Construction vehicles are not to access O'Connell Street. Access for construction vehicles will be via the intersection of GWH with WUS access. However, it should also be noted that a HRV is permitted to turn left out of the driveway and take up most of the public road in accordance with Figure 3.1 (Note 1) of AS2890.2 (2018).

The Department also notes Council's concerns that the proposal does not provide sufficient on-site car parking when existing parking rates are applied to the proposal, compounded by TfNSW's comments regarding a lack of adequate information provided within the Green Travel Plan (GTP).

TRAFFIX Response: Updated parking surveys have been conducted over a typical week on each weekday from Monday 19th April 2021 – Friday 23rd April 2021 to understand onsite parking demand during a typical semester over a week. Reference should be made to **Section 6.1** of this report.

Please provide the following:

- *further justification and details regarding the target driver modal split of 70 per cent for the 2030 scenario.*
- *a revised GTP to provide clear actions with timeframes for how each initiative would be implemented to achieve mode shift targets.*
- *consideration of additional actions to ensure the mode shift targets are achieved.*

- *additional information regarding the capacity/usage of the existing north/central campus carpark (west of the pond), and proposed methods of improving connections between the carpark and the proposed building site, if any. Note: this carpark appeared to be somewhat under-utilised during a Department officer visit to the site.*

  TRAFFIX Response: Reference should be made to the Green Travel Plan for discussion regarding driver model split targets, actions and timeframes. Updated parking surveys have been conducted over a typical week. Discussion in relation to parking can be found in **Section 6.1**.

1.3 Council's Response to Submissions

The proposal has been considered having regard to traffic management and car parking considerations and the following aspects are identified for further address:

The proposal currently does not provide sufficient on-site parking to cater for the proposed development when existing car parking demand rates are applied to the proposal. The submitted traffic report states that 84% of students and staff currently drive to the TAFE campus however in suggesting a reduced parking rate, the report assumes that the percentage of students and staff driving to the site will reduce down to 70% by 2030. There does not appear to be a strong basis for this assumption, noting specifically that there is no station proposed to be constructed at this campus or WSU as part of the Metro works. Further clarification and justification is sought from the applicant on the reasoning and rationale for the suggested parking reduction as there does not appear to be sufficient basis for the parking supply proposed. This justification should be based on projected modelling post Metro construction and any other information or modelling associated with similar facilities that has informed the proposed reduced parking rate as now proposed.

TRAFIX Response: Reference should be made to **Section 6.1** of this report. All parking demands are readily accommodated onsite with a safety margin of more than 60 parking spaces in the 2030 development scenario, assuming no changes to parking demand from implementation the proposed Green Travel Plan. The adopted parking strategy and target modal splits are strongly supported and will deliver a sustainable planning outcome that is in the public interest. However, it is considered of importance that the current travel behaviour is not replicated in 2030, to drive a more sustainable planning outcome as a matter of good policy.

The traffic report outlines that key intersections surrounding the development will be reduced to a level of service D which indicates that mitigation measures should be investigated for implementation as part of the development.

TRAFIX Response: Reference should be made to **Section 7.9** of this report, noting that whilst queuing lengths do exceed the length of right turn bay lengths on individual movements, the overall intersection operates at a level of service D with a practical cycle time of 120 seconds for the intersection of GWH/O'Connell Street under the 2036 + Development scenario. Intersection performance is not measured based on the performance of individual movements for signalized intersections as per RMS Guidelines. Rather, *Section 4.2.2* of the *RMS Guide to Traffic Generating Developments (2002) publication* acknowledge that *"The best indicator of the level of service at an intersection is the average delay experienced by vehicles at the intersection. For traffic signals, the average delay over all movements should be taken"*. Therefore, the operation of this intersection of GWH/O'Connell Street is considered acceptable and is indicative of a worst-case scenario in any case. Reference should also be made to **Section 7.9.1** for further discussion.

The provided swept paths in the traffic report appear to show the service vehicle taking up the majority of the width of the circulation roadways and driveway. This is not appropriate, is unsafe and the driveway and circulation roadways should be widened to accommodate passing of the service vehicle and a passenger vehicle.

TRAFFIX Response: Appropriate passing opportunities have been provided within the onsite carpark and TRAFFIX confirms that internal traffic will be managed safely and efficiently in accordance with AS2890.1 (2004) and AS2890.2 (2018). Reference should be made to **Section 8.2** of this report. In addition, a loading dock management plan can be provided at a later stage during construction certificate.

2. INTRODUCTION

TRAFFIX has been commissioned by Cadence Australia Pty Ltd on behalf of TAFE NSW to prepare a Transport and Accessibility Impact Assessment report in relation to the proposed TAFE NSW Construction Centre of Excellence at the Nepean Kingswood campus at 2-44 O'Connell Street, Kingswood. The development will be assessed by the Department of Planning, Industry and Environment for determination.

The student and staff populations are projected to increase over a 7-year period following construction of the proposed development. This report assesses the impacts associated with the expansion of the existing TAFE campus having regard for two forecast population scenarios over time: 2023 and 2030. The development is a State Significant Development (SSD) and therefore is required to respond to the Secretary's Environmental Assessment Requirements (SEARs) as provided by the Department of Planning and Environment.

This report documents the findings of our investigations and should be read in the context of the Statement of Environmental Effects (SEE) prepared separately. Reference should also be made to the SEARs (Application Number SSD-8571481).

The report is structured as follows:

- Section 2: Describes the site and its location
- Section 3: Documents existing traffic conditions
- Section 4: Describes the proposed development
- Section 5: Assesses the parking requirements
- Section 6: Assesses traffic impacts
- Section 7: Discusses access and internal design aspects
- Section 8: Addresses the SEARs
- Section 9: Presents the overall study conclusion

3. LOCATION AND SITE

The subject site is located within the TAFE NSW Nepean Kingswood campus at 2-44 O'Connell Street, Kingswood (Lot 1 in DP866081). More specifically, it is situated along the eastern boundary of the campus, north of 'Building T' and adjacent 'Building BA' of the Western Sydney University (WSU) Werrington South campus.

The site is rectangular in configuration with a total site area of approximately 2.1 hectares. It has a northern boundary to recreational area and a southern boundary to Building T of the TAFE that measure approximately 100 metres. The remaining eastern and western boundaries measure approximately 210 metres to the internal road/Building BA of WSU and recreational area of the TAFE, respectively.

Vehicular access to the wider TAFE site is currently provided via the following vehicular crossings which provide access to two separate carparking areas:

- Gate 1 Access: O'Connell Street (northern access); and
- Gate 2 Access: O'Connell Street (southern access).

Vehicular access to the subject site is proposed via the Gate 2 O'Connell Street access driveway.

A Location Plan is presented in **Figure 1**, with a Site Plan presented in **Figure 2**. Reference should also be made to the photographic record presented in **Appendix A**, which provides an appreciation of the general character of roads and other key attributes in proximity to the site.

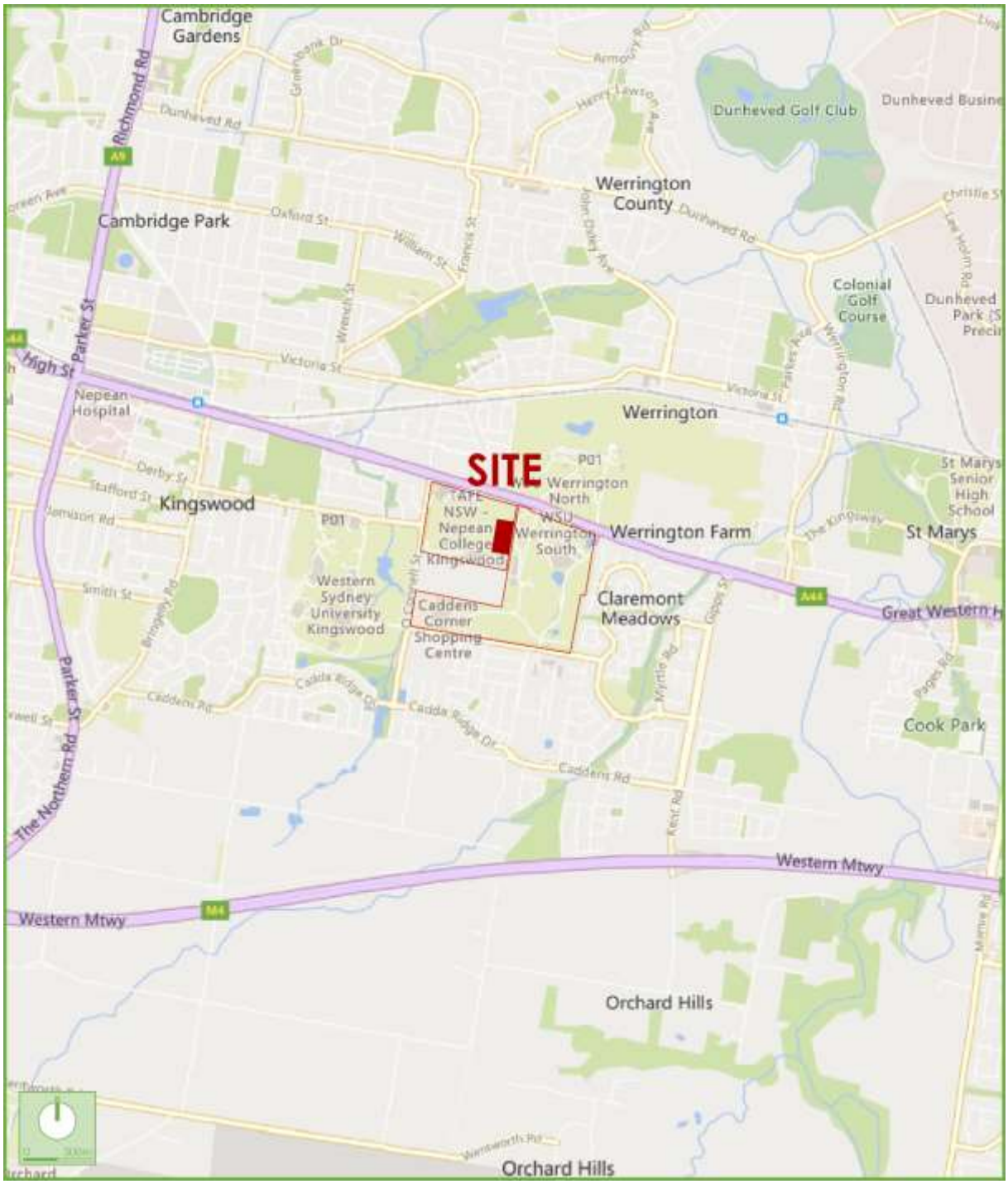


Figure 1: Location Plan

Figure 2: Site Plan

4. EXISTING TRAFFIC CONDITIONS

4.1 Road Network

The road hierarchy in the vicinity of the site is shown in **Figure 3** with the following roads of particular interest:

- Great Western Highway: an RMS highway (HW5) that traverses east-west between Sydney in the east and Bathurst in the west. Within the vicinity of the site, it is generally subject to 80km/h speed zoning (60km/h within proximity of the O'Connell Street intersection) and accommodates 2-3 lanes of traffic in each direction. Great Western Highway does not permit on-street parking and has been identified by the RMS as an approved 26.0m B-Double route.
- Gipps Street: a local road that traverses north-south between the Great Western Highway (HW5) in the north and Kent Road in the south. It is subject to 80km/h speed zoning and accommodates two (2) lanes of traffic in each direction. Gipps Street does not permit on-street parking along both sides of the road.
- O'Connell Street: a local road that traverses north-east between the Great Western Highway (HW5) in the north and Sunflower Drive in the east. It is generally subject to 50-60km/h speed zoning and accommodates a single lane of traffic in each direction. O'Connell Street permits on-street parking along both sides of the road.
- Bringelly Road: a local collector road that traverses north-south between the Great Western Highway (HW5) in the north and The Northern Road / Parker Street in the south. It is subject to 50km/h speed zoning and accommodates a single lane of traffic in each direction within an undivided carriageway. Parallel parking is generally permitted along both kerbside of Bringelly Road.

- Caddens Road: a local collector road that traverses east-west forming a cul-de-sac in the east and connecting to Bringelly Road in the west. It is noted that Caddens Road is not a continuous road and provides sections of road break. It is subject to 50km/h speed zoning and accommodates a single lane of traffic in each direction within an undivided carriageway. On-street parking is generally not permitted west of Ulm Road.
- Kent Road: a local collector road that traverses north-south between Caddens Road in the north and Landsdowne Road in the south. It is subject to 80km/h speed zoning and accommodates two (2) lanes of traffic in each direction within a divided carriageway in the vicinity of its intersection with Caddens Road. On-street parking is not permitted along its length in either direction.

It can be seen from **Figure 3** that the site is conveniently located with respect to the main arterial road network serving the region being the Great Western Highway. As such, traffic can effectively be distributed onto the wider road network, minimising traffic impacts.

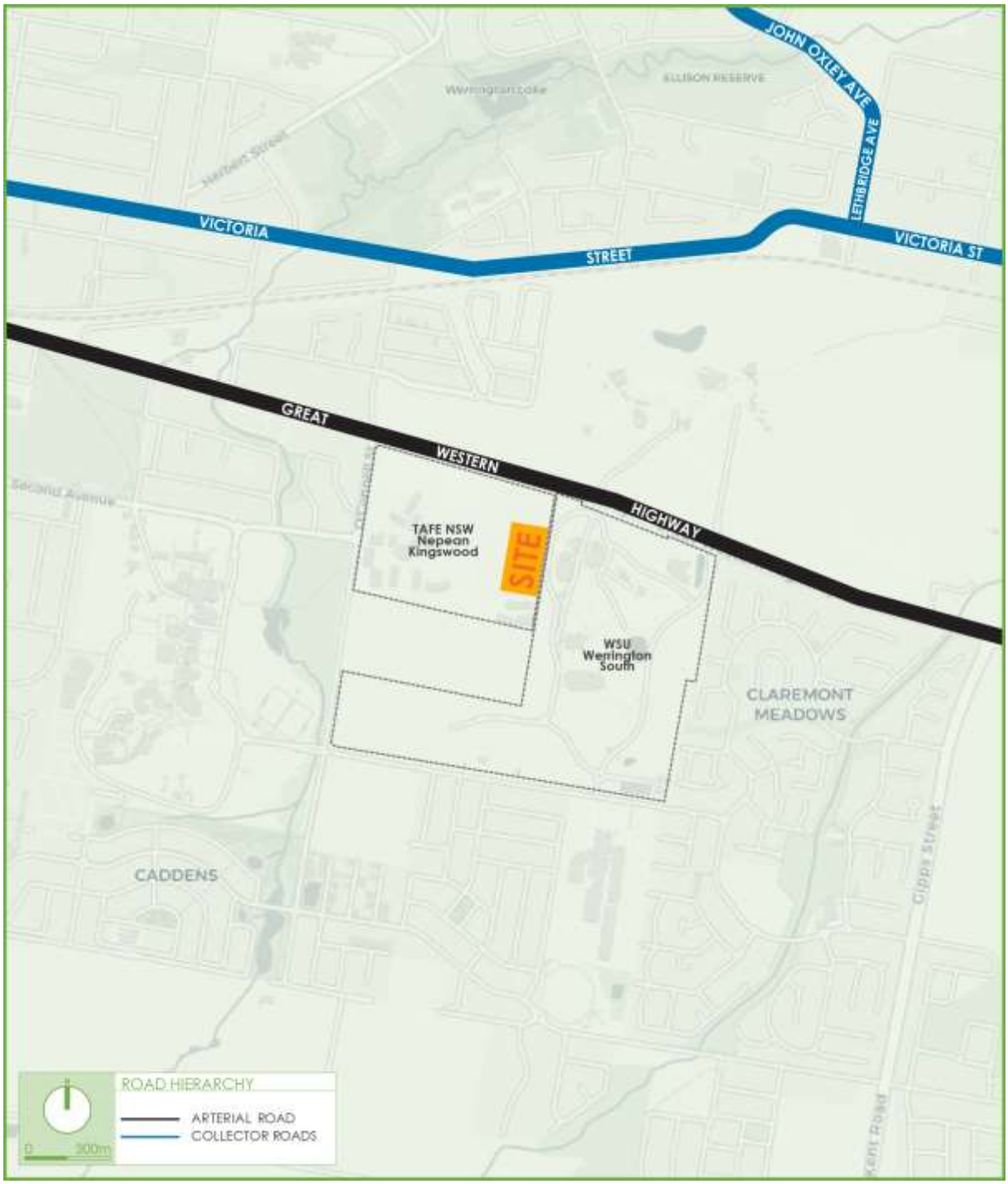


Figure 3: Road Hierarchy

4.2 Key Intersections

The key intersections in the vicinity of the site are shown below and provide an understanding of the existing road geometry and alignment in the locality.

4.2.1 Great Western Highway, O'Connell Street and French Street

Figure 4: Intersection of Great Western Highway, O'Connell Street and French Street

It can be seen from **Figure 4** that the intersection of Great Western Highway, O'Connell Street and French Street is a four-legged signalised intersection, with the east and west legs providing signalised pedestrian crossings. The main attributes of each approach are outlined below.

- Great Western Highway (east-west)
  - The eastern approach provides two (2) through lanes, one (1) through lane from which left turns can be made and one (1) right-turn only lane.
  - The western approach provides two (2) through lanes, one (1) through lane from which left turns can be made and one (1) right-turn only lane.
- O'Connell Street (south)
  - The southern approach provides one (1) through lane from which left turns can be made and one (1) through lane from which right turns can be made.

- French Street (north)
  - The northern approach provides one (1) through lane from which through, left and right turns can be made.

4.2.2 Great Western Highway and Bringelly Road

Figure 5: Intersection of Great Western Highway and Bringelly Road

It can be seen from **Figure 5** that the intersection of Great Western Highway and Bringelly Road is a three-legged signalised T-intersection, with signalised pedestrian crossings provided along all legs. The main attributes of each approach are outlined below.

- Great Western Highway (east-west)
  - The eastern approach provides two (2) through lanes and one (1) through lane from which left turns can be made.
  - The western approach provides three (3) through lanes, and one (1) right turn only lane.
- Bringelly Road (south)
  - The southern approach provides one (1) left turn lane and one (1) right turn lane.

Figure 6: Intersection of Gipps Street, Kent Road and Caddens Road

It can be seen from **Figure 6** that the intersection of Caddens Road, Gipps Street and Kent Road is a four-legged signalised intersection, with signalised pedestrian crossings provided along all legs. The main attributes of each approach are outlined below.

- Caddens Road (east-west)
  - The eastern approach provides one (1) right turn only lane and one (1) shared through lane from which left turns can be made
  - The western approach provides one (1) right turn only lane and one (1) shared through lane from which let turns can be made.
- Kent Road (south)
  - The southern approach provides one (1) through lane, one (1) shared through lane from which left turns can be made and one (1) right turn only lane.
- Kent Road (south)
  - The southern approach provides one (1) through lane, one (1) shared through lane from which left turns can be made and one (1) right turn only lane.

- Gipps Street (north)
  - The northern approach provides one (1) through lane, one (1) shared through lane from which left turns can be made and one (1) right turn only lane.

The assessment of the existing performance of the above key intersections during the critical morning and evening network peaks is discussed in Section 6.

4.3 Public Transport

4.3.1 Bus Services

The subject site is within optimal walking distance (400 metres) of several bus services operating along O'Connell Street and the Great Western Highway. These bus services are presented in **Figure 7**, with the service frequencies during peak periods outlined in **Table 1** below.

Table 1: Bus Routes and Service Frequencies

Bus No.	Route	Service Frequency	
		Weekdays	Saturdays
770	Mount Druitt to Penrith via St Marys	Every 20-30 minutes	Every 60 minutes
775	Mount Druitt to Penrith via Erskine Park	Every 30 minutes	Every 60 minutes
776	Mount Druitt to Penrith via St Clair	Every 20-30 minutes	Every 60 minutes
835	UWS to Prairiewood	Every 30 minutes	-

Furthermore, these above bus services provide regular services to Penrith, St Marys and Mount Druitt railway stations, which provide railway services along the following lines:

- T1 – North Shore and Western Line
- T5 – Cumberland Line
- BML – Blue Mountains Line
- Regional – Western NSW Line

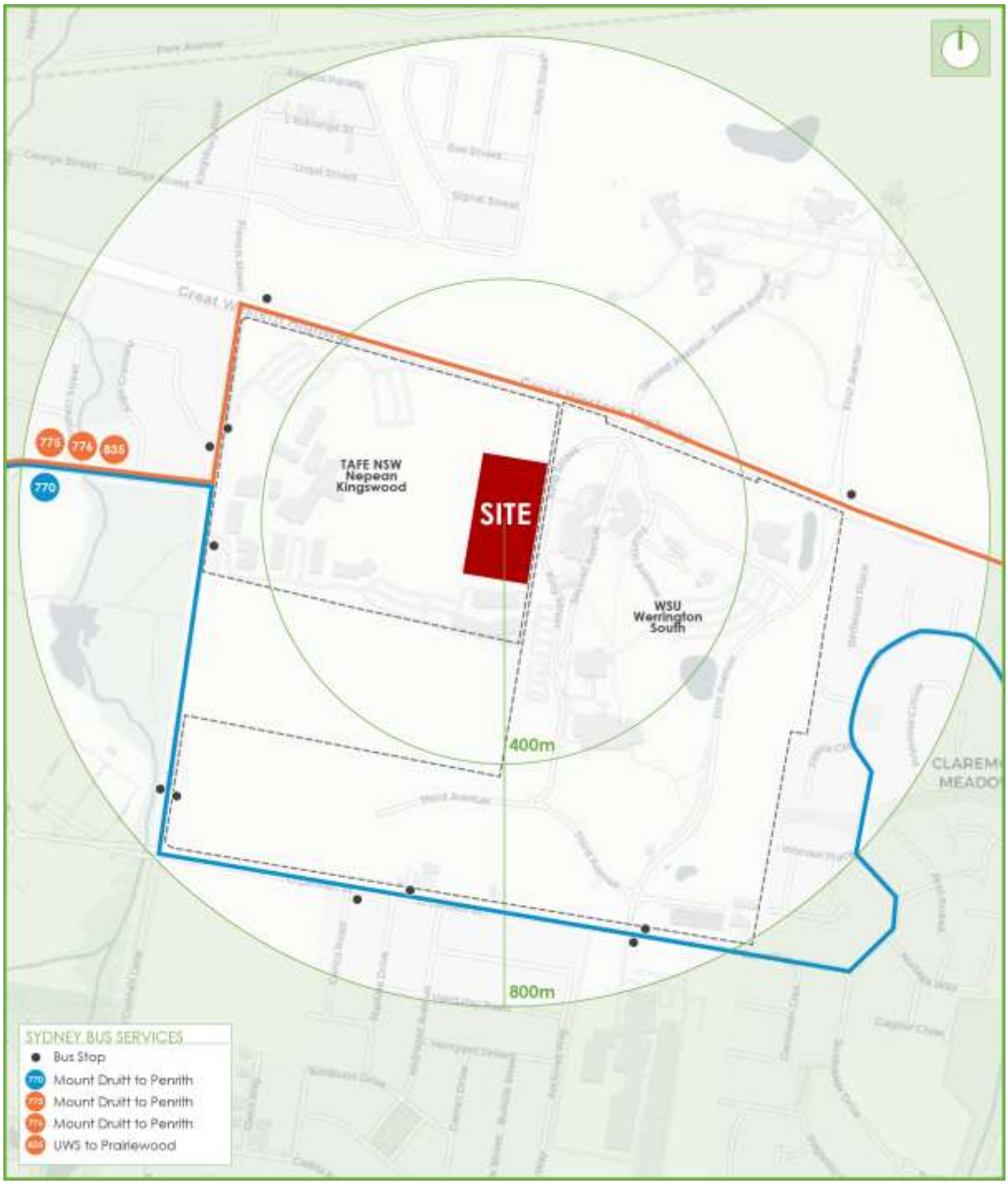


Figure 7: Bus Services

4.3.2 Metro Services

It is likely that St Mary's Train Station will be extended under the South West Rail Link Extension to connect the existing passenger rail line from St Mary's to the Aerotropolis which is now part of the Sydney Metro Greater West – Nancy Bird Walton International Airport project.

In future, students and staff who may live in other suburbs can take advantage of the metro service to get to the site and services will be frequent (approximately every 5-10 minutes, in line with other Sydney Metro projects). This is presented in **Figure 8** below and will significantly alter current modal splits, which are heavily weighted to private car travel.

Figure 8: Metro Services

4.3.3 Shuttle Bus Services

The existing WSU campus provides a private shuttle bus service for existing WSU students and staff between Kingswood Railway Station and the WSU Werrington and Kingswood campus. A proposal is in place to provide a shared shuttle bus service for WSU and TAFE students and staff with regular services between Kingswood Station in the west and the TAFE / WSU in the east. The shuttle bus would pick up and drop off students via the existing internal roadway access via the WSU vehicular access to Great Western Highway. The pick-up and drop off area are to be DDA compliant thereby ensuring ease of access to mobility impaired passengers. It is noted that the estimated time between services is 30 minutes operating from 7:00am to 7:00pm Monday to Friday with the following bus stops:

- Kingswood Station (Great Western Highway, slightly East of the entrance to the Station)
- Kingswood Campus (Kingswood Campus Student Plaza)
- Werrington South Campus (buildings BA, BD)
- Werrington Corporate Park
- Kingswood Campus (Student Residential College, Library and Building F)

The indictive proposed shuttle bus route and internal pick up and drop off for the TAFE students is shown in **Figure 9** below.

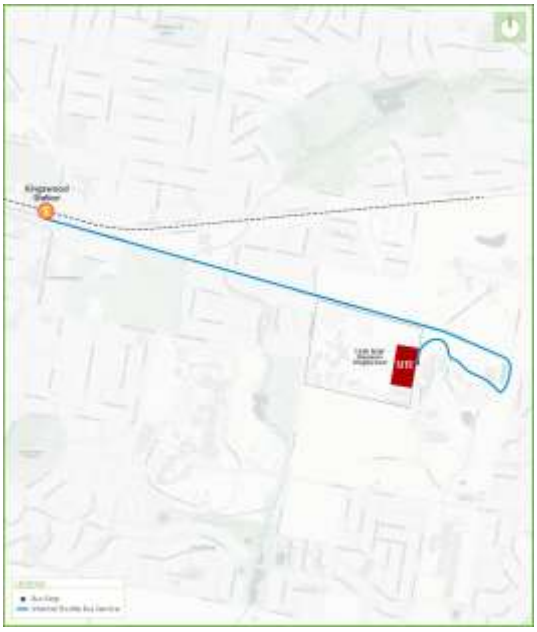


Figure 9: Shuttle Bus Route

4.4 Sustainable Transport

The area surrounding the subject site is well developed with established road and pedestrian footpath networks connecting the site with nearby public transport infrastructure as well as neighbouring residential developments. In addition, the bicycle network in the locality is shown in **Figure 10** below.

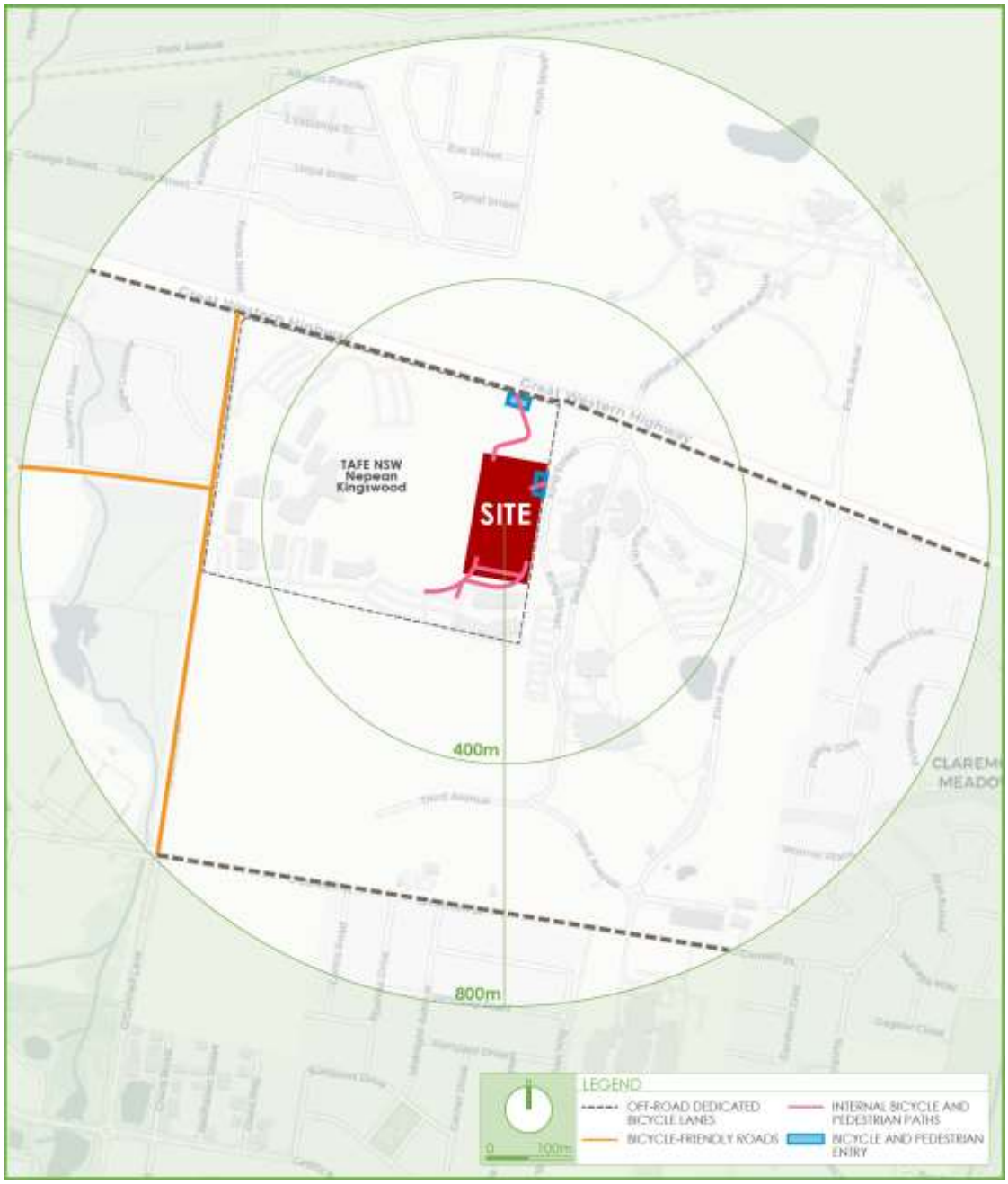


Figure 10: Cycleways

The TAFE proposes to retain the following accesses to the site, comprising:

- 1 x main pedestrian and vehicular access via O'Connell Street (northern access)
- 1 x vehicular access via O'Connell Street (southern access).

Finally, a new shared path is proposed connecting the new Construction Centre of Excellence Building in the eastern sector of the site with the existing TAFE building in the western sector of the site, thereby encouraging more sustainable modes of transport.

4.5 Existing Modal Splits

Existing travel modal splits has been determined based on interview questionnaire survey responses which were distributed to existing staff and students. The results from 291 students and staff participating are summarised in **Table 2** as follows:

Table 3: Existing Travel Modal Splits

Travel Mode	Travel Percentage
Car Driver[1]	84%
Car Passenger[2]	6%
Train	4%
Bus	4%
Bicycle	2%
Walk	0%
Train & Shuttle Bus	0%

1 – Car driver includes motorcyclists.
2 – Includes car passenger dropped off and car passenger's carpooling with other students or staff.

It can be seen from **Table 3** above that the vast majority of staff and students (84%) drove and parked whilst only 10% of arrivals were by other modes of transport (public transport, cycle or walk). It should be noted the above travel modal splits between private vehicles and other travel modal splits were obtained from questionnaire surveys and are slightly different from the reference travel modal splits outlines in the Green Travel Plan which were derived from the Green Star Sustainable Transport Calculator provided to TRAFFIX and cannot be altered. However, it is noted the travel modal splits obtained from the surveys are similar to the reference

travel modal splits provided in the Green Star Sustainable Transport Calculator and are therefore aligned.

5. DESCRIPTION OF PROPOSED DEVELOPMENT

The subject development involves construction of a new Construction Centre of Excellence (CCoE) Building within the northeast corner of the existing TAFE NSW Nepean Kingswood Campus. The development is proposed to be completed by 2023 with student and staff populations projected to grow over a 7-year period. This report focuses on the traffic impacts associated with projected student and staff populations in the following years:

- Existing (2020) 6,000 students enrolments annually
- 2023 an additional 1,750 projected students from CCoE
  Projected TAFE NSW Kingswood Campus annual student population of 7,750
- 2030 an additional 3,500 projected students over existing (2020) from CCoE
  Projected TAFE NSW Kingswood Campus annual student population of 9,500

The above related to student enrolments through the year. However, these enrolments are dispersed throughout the week and daytime activity relating to the number of staff and students on a typical peak weekday between 7.30am - 5.00pm are summarised in **Table 4**.

Table 4: On Site Peak Attendances

Year	Staff	Students	Total
2020	39	998	1037
2023	61	1185	1246
2030	78	1439	1517

It can be seen from Table 4 that at full development, the site will need to accommodate an additional 480 persons daily over the 7-year forecast population growth timeframe. It is important to note that not all of these staff and students will be on site at one time over this period. In addition, the development will incorporate:

- New carparking comprising 16 car parking spaces for students and staff;
- Loading area south of the proposed Construction Centre of Excellence Building;
- New shared path connecting the existing TAFE buildings to the west of the site with the proposed Construction Centre of Excellence Building.

Reference should be made to the plans submitted separately to Council which are presented at reduced scale in **Appendix B**.

6. PARKING REQUIREMENTS

6.1 Car Parking

6.1.1 Council Controls & RMS Guidance

Penrith City Council's Development Control Plan (DCP) and the RMS Guide to Traffic Generating Developments 2002 have been reviewed; however, neither of these guidelines assess the tertiary educational uses proposed by the subject development. it is noted that the Penrith City Council DCP 2014 Section C10 (Transport Access & Parking) states as follows:

"(f)) In the absence of specific requirements relevant to particular developments, the parking requirements in the RTA's "Guide to Traffic Generating Developments" (as updated) and Australian Standard AS 2890.1 and 2 - 2004 should be referred to as a guide. In the absence of all data, the applicant should revert to the use of first principles."

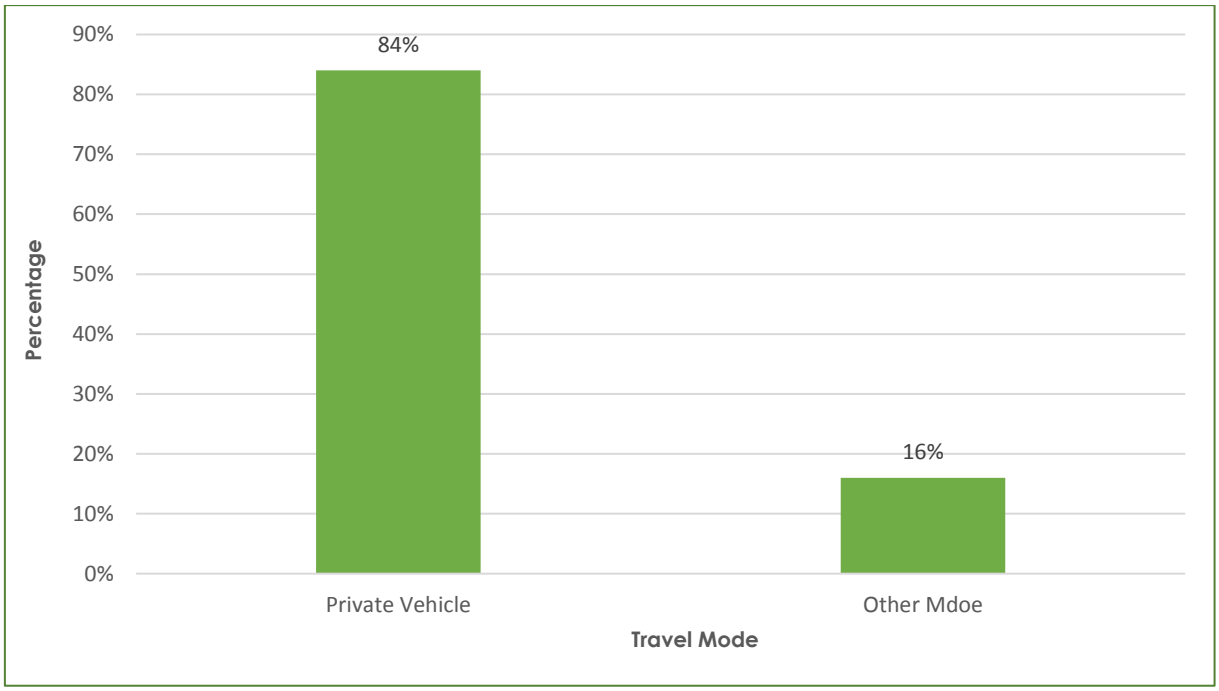
A superior methodology is a 'survey based' assessment and this has been undertaken to determine the future parking demand and corresponding on-site parking requirement associated with the proposed development, which is the preferred methodology based on RMS Guidelines and appropriate where the expansion of an existing facility is proposed.

6.1.2 Survey Based Assessment

Online interview/questionnaire surveys were undertaken of staff and students at the existing TAFE campus, between 27th November and 15th December 2020. These surveys were designed to establish existing modal splits and travel behaviour of staff and students. A total of 291 interview questionnaire surveys were returned, comprising 191 student responses and 100 staff responses.

The results are shown in **Chart 1** below for the combined TAFE population, noting that the results for staff and students were similar.

Chart 1: Student and Staff Modal Choice to and From Campus



It can be seen from **Chart 1** that the following is evident:

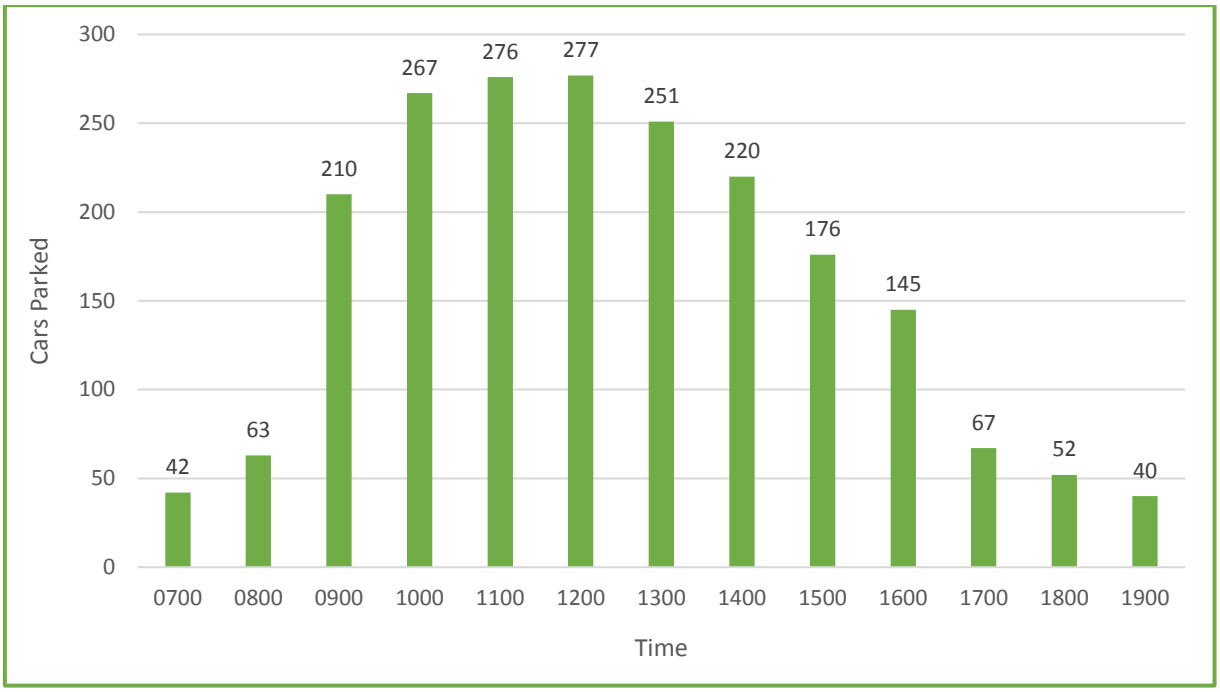
- 84% of students and staff drove and parked within the subject site.
- These drivers arrived prior to 9:30am;
- The balance of 16% of arrivals occurred after 9:30am; and
- 36% of departures occurred prior to 4:00pm, outside the on-street commuter peak.

Therefore, the peak parking demand occurred after 9:30am, was sustained until about 1:00pm and decreased progressively after that time.

6.1.3 2020 On-site Parking Survey

The peak parking demand timeframe (after 9:30am) has been validated by undertaking separate parking surveys of the internal campus carparks. These surveys were undertaken on Thursday 26th November 2020 between 7:00am and 7:00pm. The results are summarised in **Chart 2** below.

Chart 2: Weekday On-Site Parking Occupancy

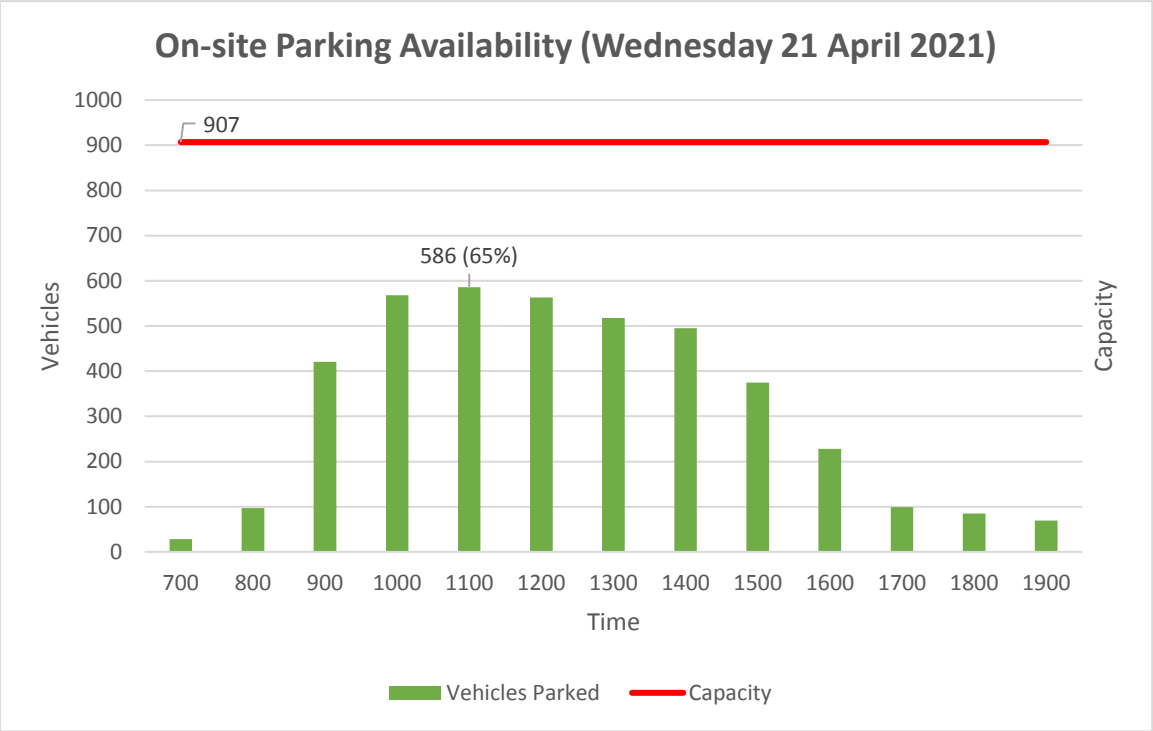


It is evident from **Chart 2** that the parking demand at 9:30am is approximately 238 spaces. This is 86% of the peak demand that occurs at midday, which is very close to the 84% of arrivals prior to 9:30am based on the questionnaire surveys. It is noted that the existing TAFE Nepean Kingswood campus provides a total of 907 car parking spaces. It is emphasised that the above results reflect conditions during COVID restrictions, which therefore reflects a lower attendance level. However, the spread of activity (demand profile) across the day is expected to be similar to that shown in **Chart 2**. Accordingly, additional surveys were conducted in 2021 when the TAFE was fully operational with no COVID restrictions. This is discussed in detailed below.

6.1.4 2021 (Existing) Onsite Parking Demand

Additional on-site parking surveys were conducted over a typical week on each weekday from Monday 19th April 2021 – Friday 23rd April 2021 to understand onsite parking demand during a typical semester over a week. The day with the highest parking demand, (thereby representing a worst-case scenario) was Wednesday 21st April. A summary of the parking demand profile across this day is presented in **Chart 3** below with survey result for the week provided in **Appendix C**.

Chart 3: Weekday On-Site Parking Availability (Wednesday 21st April 2021)



It can be seen from **Chart 3** above that parking demand peaked at 11:00am when 586 out of 907 (65%) parking spaces were occupied, which is equivalent to 1 space per 1.8 daily persons in attendance (1037). Therefore, a surplus of 321 (35%) parking spaces were available at 11:00am when parking demand peaked. This represents a worst-case scenario and the impact of the subject development on available parking provision for the 2023 and 2030 development scenarios is discussed in Sections 6.1.5 and 6.1.6 below.

6.1.5 2023 Development Scenario Parking Demand

The 2023 development scenario is projected to relate to an additional 210 staff and students, from 1037 to 1247. Based on the existing demand profile of 1 space per 1.8 daily persons in attendance (derived above), this would result in a net additional 117 car spaces. This can be readily accommodated by the existing parking surplus of 321 spaces.

Nevertheless, it is highly noteworthy that this assumes no change in current travel behaviour. In addition, the Green Travel Plan accompanying this report, together with other factors, is expected to reduce parking demand and hence deliver a higher parking surplus in the year 2023.

2030 Development Scenario Parking DemandThe 2030 development scenario is projected to relate to an additional 480 staff and students, from 1037 to 1517 over the base case scenario (year 2020). Based on the existing demand profile of 1 space per 1.8 daily persons in attendance (derived previously), this would result in a net additional 267 spaces. This can be readily accommodated by the existing parking surplus of 321 spaces with 54 spare spaces.

Nevertheless, it is highly noteworthy that this assumes no change in current travel behaviour. The Green Travel Plan accompanying this report, together with other factors, is expected to reduce travel behaviour and parking demand and hence deliver a higher parking surplus in the year 2030.

In addition, the development proposes to construct an additional 16 spaces, which will increase the parking supply from 907 spaces to 923 spaces. This is more than the expected peak demand of 857 spaces (267 + 586) in the 2030 development scenario and will provide a safety margin.

In summary, all parking demands are readily accommodated onsite with a safety margin of more than 60 parking spaces in the 2030 development scenario, assuming no changes to parking demand from implementation the proposed Green Travel Plan, prepared separately. The adopted parking strategy and target modal splits are strongly supported and will deliver a sustainable planning outcome that is in the public interest. However, it is considered of importance that the current travel behaviour is not replicated in 2030, to drive a more sustainable planning outcome as a matter of good policy.

6.2 Accessible Parking

The proposed development will provide an additional accessible parking space within the new carpark adjacent to the new Construction Centre of Excellence Building.

6.3 Bicycle Parking

The Penrith City Council DCP defers to the Planning Guidelines for Walking and Cycling' (NSW Government 2004) to determine minimum bicycle parking requirements. The Planning Guidelines provide the following bicycle parking rates for tertiary education establishments, universities and TAFE's:

- Staff: 3-5% of staff,

- Students: 5-10% of fulltime students.
- Visitors: 5-10% of staff.

At this stage, the number of fulltime student enrolments is unknown. However, application of the above bicycle parking rates to the maximum number of students and staff onsite at any one time for the 2030 development scenario (441 additional students and 39 additional staff) results in the requirement for approximately 26-48 bicycle spaces (2 x staff spaces, 22-44 student spaces and 2 visitor spaces).

Application of the long-term bicycle travel mode target for staff and students (4.7%) to the 2030 development scenario staff and student population increase results in a requirement for 23 bicycle parking spaces.

Therefore, provision of 26 bicycle parking spaces is considered adequate to satisfy Council's DCP requirement and long-term bicycle travel mode targets for staff and students. In response, a minimum of 26 bicycle parking spaces and end of trip facilities are to be provided on the lower ground floor. These future bicycle facilities are to be detailed at CC Stage. However, it is envisaged that additional bicycle parking spaces could be provided in response to demand throughout the lifecycle of the subject development, as required.

6.4 Shuttle Bus

The development proposes to utilise WSU existing shuttle bus services to Kingswood Railway Station. A shuttle bus stop is proposed via the USW internal road network which runs adjacent (to the east) of the subject development. This is discussed in more detail in the Green Travel Plan prepared separately.

6.5 Refuse Collection and Servicing

The proposed loading bay to the south of the proposed Construction Centre of Excellence building can accommodate vehicles up to a 12.5m heavy rigid vehicle (HRV) and will readily accommodate any standard waste collection vehicle. Reference should be made to the swept path analysis provided in **Appendix D.**

6.6 Emergency Vehicle Access

The proposed internal road network and loading bay to the south of the proposed Construction Centre of Excellence building can readily accommodate all emergency service vehicles, thereby ensuring all emergency vehicles are able to access the site when required.

6.7 Pick up and Drop Off Arrangements

Questionnaire survey results demonstrated that only 6% of staff and students were car passengers which includes car passenger dropped off and car passenger's carpooling with other staff and students. For a conservative assessment, say all 6% were dropped off /picked up and application of this modal split was applied to the 2030 development scenario, approximately 29 staff and students would be dropped off and picked up. Importantly, pick ups and drop offs will be spread throughout the day and it is envisaged that all pickup/drop arrivals can be accommodated safely within an available parking space or within the circulation aisle of the proposed carpark, accordingly. This arrangement is considered supportable.

7. TRAFFIC AND TRANSPORT IMPACTS

7.1 Assumptions from Surveys

For consistency across the assessed intersections the following assumptions were made based on the travel mode surveys and intersection surveys:

- The network peak hour used for this assessment was based on the combined peak hourly traffic volume at all assessed intersections. This was determined as 7:45am to 8:45am in the morning (AM) peak and 4:45pm to 5:45pm in the evening (PM) peak.
- The travel mode survey of the students was used to determine the percentage of students arriving/departing during the peak periods. As the question for arrivals and departures was based on 30-minute intervals, the two highest percentages of the three overlapping intervals were summed to determine the percentage of vehicles in the peak period. During the AM peak 54% vehicles arrived or departed during the peak hour and 28% during the PM peak hour.

7.2 Data Analysis

Due to uncertainty regarding the reliability of traffic volumes during the time intersection surveys were undertaken due to potential COVID-19 impacts, it was necessary to compare traffic data from 2019 (without COVID-19 impacts) with 2020 traffic data (with COVID-19 impacts) during both morning and afternoon peak periods. TRAFFIX received SCATS data from TfNSW for the intersection of Great Western Highway and O'Connell Street for the following dates:

- Tuesday 26th November 2019
- Tuesday 24th November 2020

SCATS data revealed there was a slight increase in traffic volumes at the intersection of Great Western Highway and O'Connell Street from 2019 to 2020 during peak morning (7:45am-8:45am) and afternoon (4:45pm-5:45pm) times as summarised below:

- Morning peak hour: + 103 vehicles
- Afternoon peak hour: +75 vehicles.

As a result, existing traffic volumes were not required to be factored to account for COVID-19 impacts. TRAFFIX consulted with TfNSW to confirm the validity of the above methodology and reference should be made to **Appendix E** in this regard.

7.3 Existing Site Generation

The subject site currently accommodates the existing TAFE development. Accordingly, TRAFFIX has undertaken a site inspection on Thursday 3rd December 2020 between 8:30am to 9:30am and 4:30pm to 5:30pm noting the following traffic generations:

- 235 vehicle trips per hour in the morning peak period (189 in, 46 out); and
- 107 vehicle trips per hour in the afternoon peak period (35 in, 72 out).

It should be noted that this traffic generation of the existing development is captured within the existing survey data and traffic modelling.

7.4 Growth Rates

A growth rate of 2% per annum compounding has been assumed for the background traffic in the 2026 and 2030 scenarios. This is considered a conservative 'worst-case' scenario for the following reasons:

- The traffic counting station on the Great Western Highway has shown the traffic volumes decreasing each year since 2017. Therefore, the 2% background growth is considered unlikely to occur in the foreseeable future.
- A cumulative assessment of the development potential of the Quarter Precinct Masterplan and Western Sydney University Redevelopment Plan is not considered feasible due to a lack of publicly available information to assess these developments. However, the 2% growth rate is considered more than sufficient to account for the development potential of these developments with current background traffic in decline.

The SEARs requests 2031 and 2036 scenarios to be assessed however as the development will be fully operational by 2030 this is considered sufficient to determine the impact of the proposed development. Any assessment of years beyond will be assessing the background growth rather than the development based on a conservative growth rate, which is not considered necessary for a development of this size or scale.

7.5 Development Trip Generation

The impacts of the proposed development on the external road network have been assessed having regard for the projected student and staff population data provided by TAFE in conjunction with the interview questionnaire survey results based on the existing staff and student population. These relate as close as possible to the Year Scenarios 2026, 2031 and 2036 as required under the SEARS.

Based on the travel mode survey results in **Table 3** from Section 4.5, 84% of students/staff currently drive to the existing development. However, the arrival and departure of students/staff does not occur within a single hour as shown in **Chart 4** and **Chart 5**. The network peak periods (discussed within Section 7.1) sees 54% of vehicles arrive/depart in the morning network peak hour and 28% of vehicles arrive/depart in the afternoon network peak hour. This data has been used for the future year scenarios.

Chart 4: Morning Peak Distribution

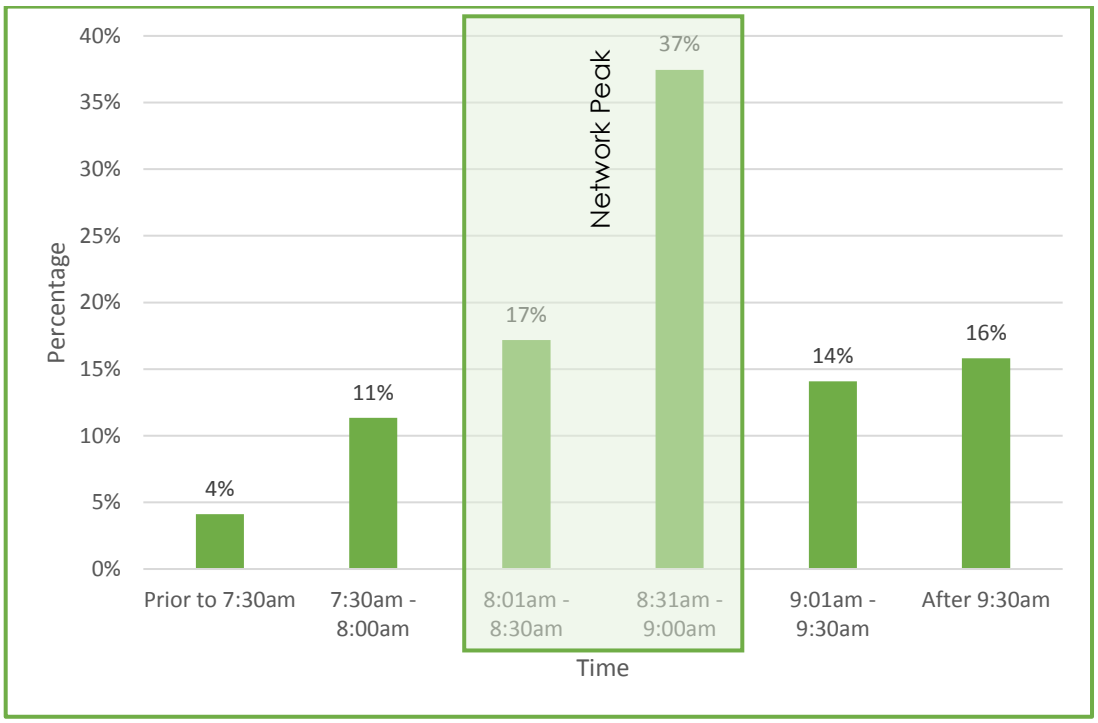
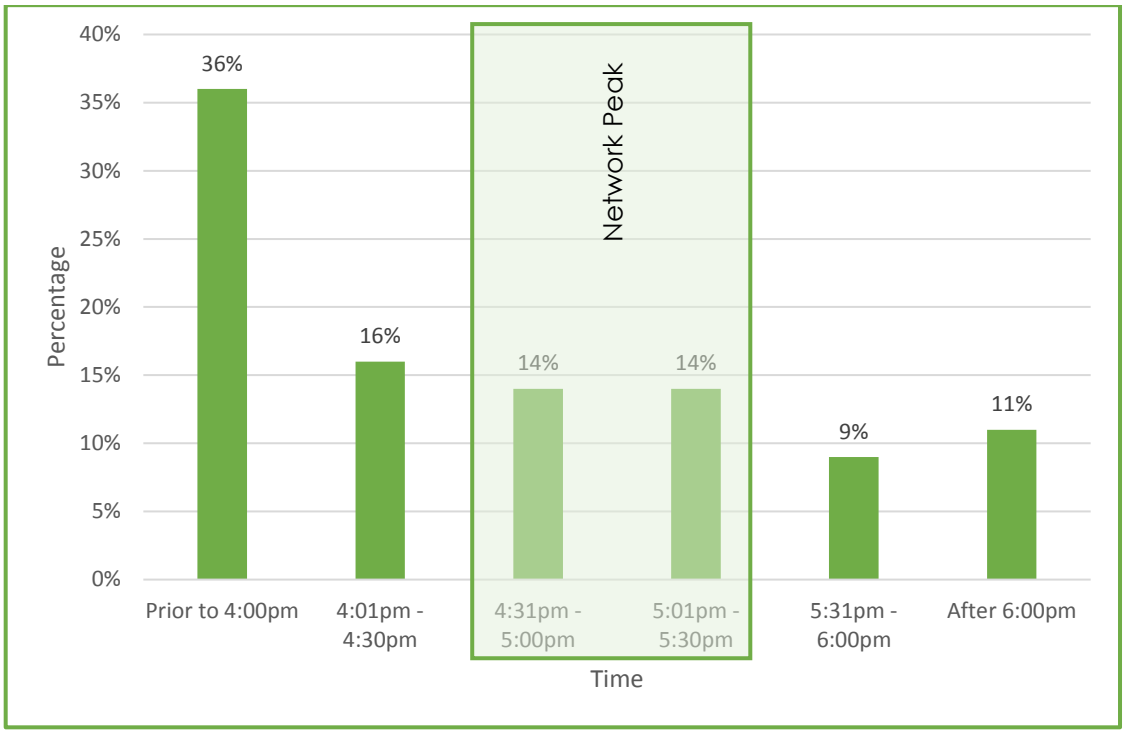


Chart 5: Afternoon/Evening Distribution



7.5.1 2026 Development Scenario

Student and staff population data provided by TAFE demonstrates that 209 additional students and staff per day are projected to attend campus in the 2023 development scenario which will also be relevant to the 2026 scenario as indicated by SEARS.

This equates to:

- +96 vehicle trips (77 arrivals and 19 departures) during the morning network peak hour period (7:45am-8:45am), and:
- +49 vehicle trips (15 arrivals and 34 departures) during the afternoon network peak hour period (4:45pm-5:45pm).

7.5.2 2030 Development Scenario

Student and staff population data provided by TAFE demonstrates that 480 additional students and staff per day are projected to attend campus in the 2030 development scenario.

This equates to:

- +218 vehicle trips (174 arrivals and 44 departures) during the morning network peak hour period (7:45am-8:45am), and:
- +113 vehicle trips (33 arrivals and 80 departures) during the afternoon network peak hour period (4:45pm-5:45pm).

7.5.3 2036 Development Scenario

Based on the building population projections provided by TAFE NSW, it is forecasted that the development will reach its capacity by 2030. As such, no additional trips relating to the subject development will be added after 2030. Therefore, any increase in trips will be the result of background traffic growth not attributed to the subject development.

7.6 Assessed Network

In order to determine the impact of these additional trips on the surrounding road network, the below critical intersections have been assessed based on the SEARs, noting that there are no other intersections considered of interest:

- Great Western Highway / French Street / O'Connell Street
- Great Western Highway / Bringelly Road
- Caddens Road / Gipps Street

Impacts to the above key intersections as a result of the proposed development are discussed below.

7.7 Traffic Distributions

The distribution of the traffic generation has been based the travel mode survey where students/staff identified the suburb they live. The route to and from their suburb was allocated to the following routes listed in **Table 5**. The table includes the route, suburbs allocated to the route and percentage of students/staff.

Table 5: Traffic Distributions

Route	Suburbs	Percentage
Great Western Highway East via O'Connell	Emerton, Hebersham, Mount Druitt, St Clair, St Marys,	6.1%
Great Western Highway West via O'Connell	Cambridge Park, Castlereagh, Cranebrook, East Kurrajong, Ebenezer, Glossodia, Grose Vale, Kurrajong Hills, Londonderry, Mount Riverview, North Richmond, Penrith, Werrington, Werrington County, Werrington Downs, Wilberforce, Windsor	22.1%
Second Avenue via O'Connell	Kingswood	6.1%
The Northern Road via Bringelly Road, Caddens Road, Cadda Ridge Road and O'Connell Street	Baulkham Hills, Blacktown, Burwood, Casula, Claremont Meadows, Doonside, Girraween, Greenacre, Greenwich, Kellyville, Marayong, Middleton Grange, Mount Annan, Mount Vernon, Northmead Padstow, Parramatta, Pendle Hill, Plumpton Quakers Hill, Riverstone, Schofields, Seven Hills, Springwood, Stanhope Gardens, The Ponds, Wentworthville, Wilmot	28.3%
M4 East via Gipps Road, Bringelly Road, Caddens Road, Cadda Ridge Road and O'Connell Street	Belimbla Park, Blaxland, Camden, Emu Heights, Emu Plains, Faulconbridge, Glenbrook, Glenmore Park, Hazelbrook, Katoomba, Lapstone, Lawson, Leonay, Linden, Narellan Vale, Oran Park, Silverdale, South Penrith, Wallacia, Warrimoo, Wentworth Falls, Winmalee, Woodford	37.4%

The above distributions have been used to create the following distribution diagrams in **Figure 11 and Figure 12**, which were then inputted into the SIDRA Intersection modelling to determine the impact of the traffic on the surrounding road network.

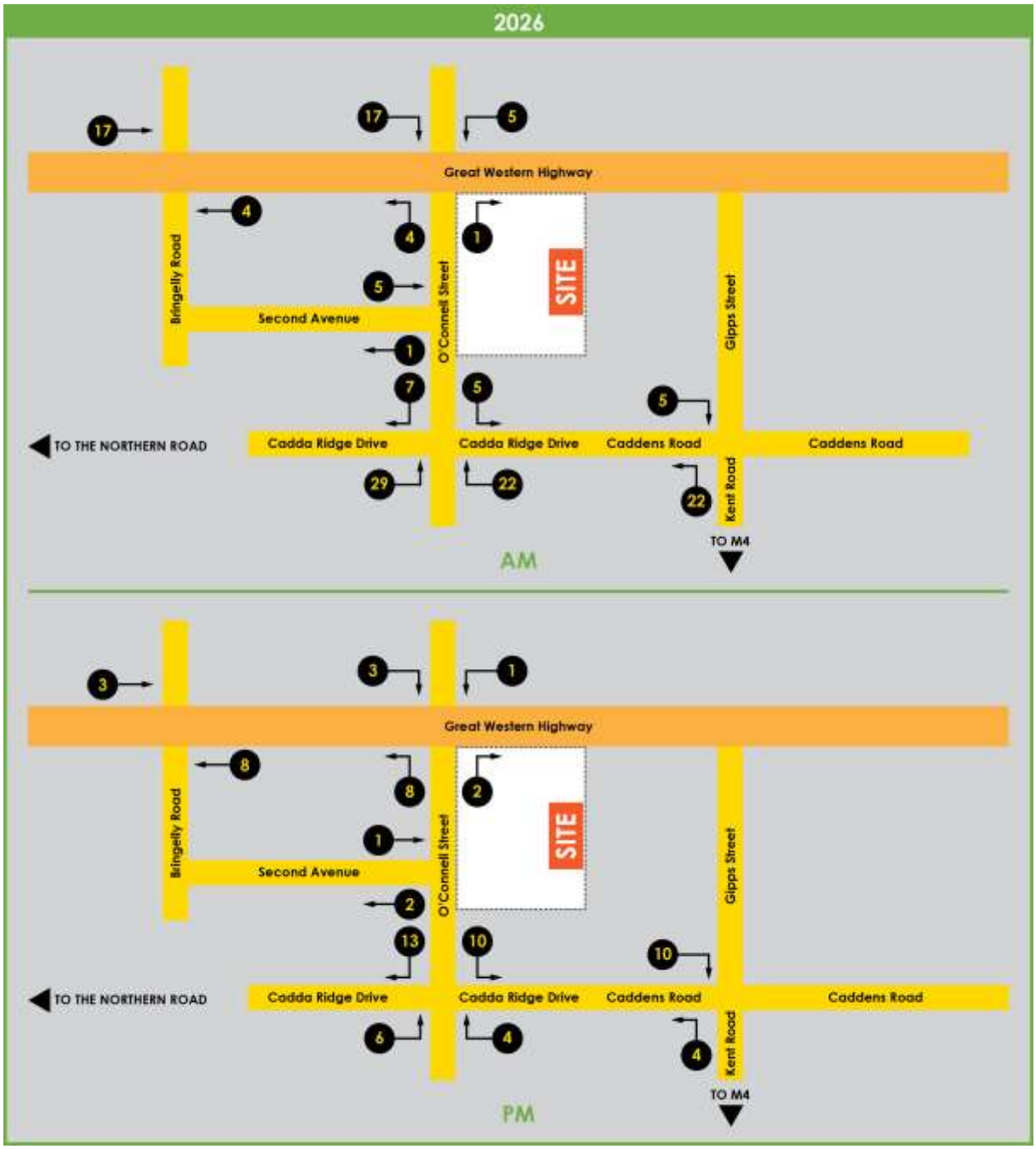


Figure 11: 2026 Trip Distribution

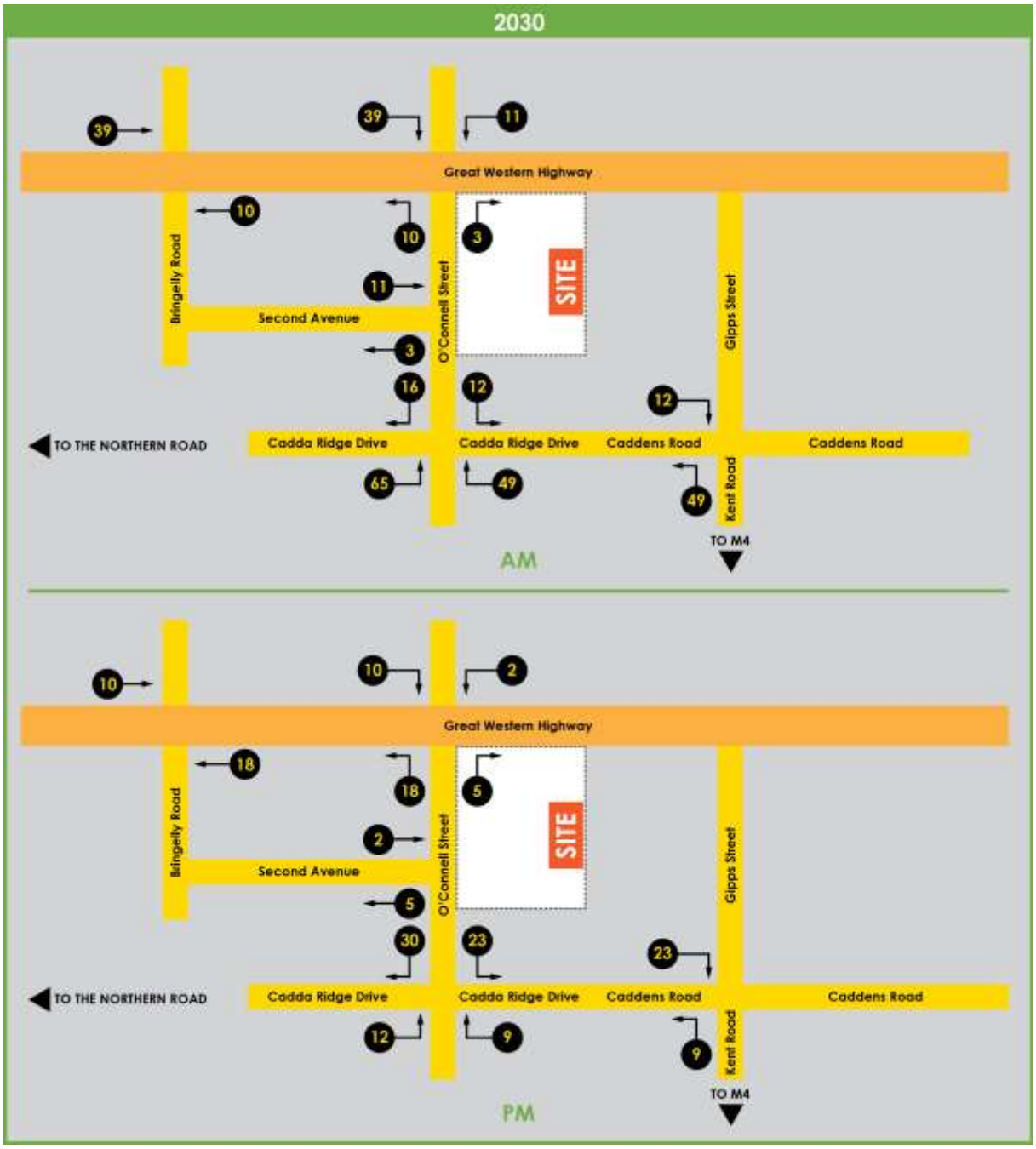


Figure 12: 2030 Trip Distribution

7.8 Modelling Methodology

In order to assess the potential traffic impacts of the proposed development, the following modelling was undertaken:

- Existing 2020;
- Future 2026 growth only;
- Future 2026 + Development;
- Future 2030 growth only;
- Future 2030 + Development.

Traffic surveys were undertaken of the intersections mentioned above, which are considered to be most critical in relation to the site and are the required intersection to be assessed in accordance with SEAR's. These counts were undertaken on Tuesday 17th November and Thursday 19th November 2020 between 7:30am-9:30am and 4:00am-6:00pm. The traffic volumes in these surveys formed the base case volumes for software modelling undertaken to assess intersection performance characteristics under existing traffic conditions. The SIDRA Intersection 9 model produces a range of outputs, the most useful of which are the Degree of Saturation (DoS) and Average Vehicle Delay per vehicle (AVD). The AVD is in turn related to a level of service (LoS) criteria. These performance measures can be interpreted using the following explanations as summarised in **Table 6** below:

DoS the DoS is a measure of the operational performance of individual intersections. As both queue length and delay increase rapidly as DoS approaches 1, it is usual to attempt to keep DoS to less than 0.9. When DoS exceeds 0.9 residual queues can be anticipated, as occurs at many major intersections throughout the metropolitan area during peak periods. In this regard, a practical limit at 1.1 can be assumed. For intersections controlled by roundabout or give way/stop control, satisfactory intersection operation is generally indicated by a DoS of 0.8 or less.

AVD the AVD for individual intersections provides a measure of the operational performance of an intersection. In general, levels of acceptability of AVD for individual intersections depend on the time of day (motorists generally accept higher delays during peak commuter periods) and the road system being modelled (motorists are more likely to accept longer delays on side streets than on the main road system).

LoS this is a comparative measure which provides an indication of the operating performance of an intersection.

Table 6: Intersection Performance Indicators (RMS)

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabout
A	Less than 14	Good operation
B	15 to 28	Good with acceptable delays and spare capacity
C	29 to 42	Satisfactory
D	43 to 56	Operating near capacity
E	57 to 70	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode
F	More than 70	Unsatisfactory and requires additional capacity

7.9 Network Performance

The traffic impacts arising from the proposed development during the morning and afternoon peak periods in the existing and future scenarios have been assessed by loading the distributed traffic volumes into the SIDRA Intersection model. The results of this software modelling for the base case, future and base case plus development traffic is summarised in **Table 7**, **Table 8** and **Table 9** below. The detailed outputs are provided in **Appendix F**.

7.9.1 Intersection of Great Western Highway, French Street and O'Connell Street

Table 7: Base and Proposed Intersection Performance for Great Western Highway, French Street and O'Connell Street

Intersection	Control	Period	Scenario	Degree of Saturation (DoS)	Average Delay	Level of Service
Great Western Highway / French Street / O'Connell Street	Signal	AM	2020 Base	0.725	23.5	B
			2026	0.913	24.5	B
			2026+ Dev	0.923	26.7	B
			2030	0.985	33.8	C
			2030 + Dev	1.052	44.4	D
		PM	2020 Base	0.737	25.7	B
			2026	0.828	28.9	C
			2026+ Dev	0.830	29.1	C

Intersection	Control	Period	Scenario	Degree of Saturation (DoS)	Average Delay	Level of Service
			2030	0.902	36.2	C
			2030 + Dev	0.915	42.2	C

It can be seen from **Table 7** above that GWH/French Street/O'Connell Street operates at a level of service (LoS) D with an average delay of 44.4 seconds in the 2030 + development scenario during the peak morning period (worst case scenario) and is operating near capacity with an increase of 10.6 seconds in delay from the 2030 scenario. In addition, the 95th percentile queue length of 81.9m for the right turn bay on the western approach extends 10 metres beyond the current lane. However, this is considered acceptable for the following reasons:

- The model has assumed the current travel modes for the trip distributions including the 84% of students/staff driving to TAFE. However, the Green Travel Plan has established a car driver target of 69.3% by 2030 through the use of a number of strategies to encourage alterative transport modes. Therefore, the model is overestimating the traffic generation of the development in 2030 as the reduction in the number of car drivers has not been taken into account. It is emphasised that the model split changes will apply to the entire campus population, current and future, resulting in significant traffic demand suppression.
- The 95th percentile is the maximum queue length and as such unlikely to be occurring frequently.
- The model has assumed a 2% growth rate along the Great Western Highway, however volumes along the Great Western Highway has declined over the past few years since 2017 in accordance with daily traffic count volumes obtained from TfNSW Traffic Volume Viewer Station ID 7123-PR located on the Great Western Highway, and therefore the model is a conservative assessment of the future intersection performance.
- The intersection with an average delay of 44.4 seconds during the 2030 + development scenario is only marginally within the LoS D range of 43 to 56 seconds.

As such, for the above reasons, the future intersection performance is considered acceptable and likely to operate at a LoS C (being satisfactory). In addition, it is unlikely that the right turn bay on GWH would exceed the length of the bay.

7.9.2 Intersection of Great Western Highway/Bringelly Road

Table 8: Base and Proposed Intersection Performance for Great Western Highway/Bringelly Road

Intersection	Control	Period	Scenario	Degree of Saturation (DoS)	Average Delay	Level of Service
Great Western Highway / Bringelly Road	Signal	AM	2020 Base	0.674	23.7	B
			2026	0.760	25.0	B
			2026 + Dev	0.749	33.1	B
			2030	0.826	26.9	B
			2030 + Dev	0.826	27.0	B
		PM	2020 Base	0.652	24.7	B
			2026	0.739	26.0	B
			2026 + Dev	0.759	26.3	B
			2030	0.829	29.1	C
			2030 + Dev	0.858	30.6	C

As **Table 8** shows, the intersection of Great Western Highway and Bringelly Road operates at a LoS C and an average delay of 30.6 seconds in the 2030 + development scenario during the peak evening period. This is a 1.5 second increase of the expected 2030 during the evening peak and therefore the impact proposed development has minimal impact upon this intersection.

7.9.3 Intersection of Caddens Road / Gipps Road / Kent Road

Table 9: Base and Proposed Intersection Performance for Caddens Road / Gipps Road / Kent Road

Intersection	Control	Period	Scenario	Degree of Saturation (DoS)	Average Delay	Level of Service
Caddens Road / Gipps Street / Kent Road	Signal	AM	2020 Base	0.748	31.7	C
			2026	0.798	34.2	C
			2026 + Dev	0.812	34.8	C
			2030	0.859	41.3	C
			2030 + Dev	0.888	45.3	D
		PM	2020 Base	0.691	31.4	C
			2026	0.756	33.1	C
			2026 + Dev	0.770	33.8	C
			2030	0.822	36.1	C
			2030 + Dev	0.849	39.1	C

It is evident from **Table 9** that the intersection of Caddens Road / Gipps Road / Kent Road operates at a LoS D with an average delay of 45.3 seconds in the 2030 + development scenario during the peak morning period and is operating near capacity however considered acceptable with an increase of 4.0 second increase in delay from the 2030 scenario.

7.9.4 Summary

Therefore, all future traffic impacts resulting from the proposed development are considered manageable and no external road upgrades or improvements are considered necessary at any of the key intersections analysed under future scenarios as required under SEARs. This result is a consequence of the adopted parking strategy and target modal splits aimed at delivering a sustainable planning outcome that is in the public interest.

8. ACCESS AND INTERNAL DESIGN ASPECTS

8.1 Site Vehicular Access

No changes are proposed to the O'Connell Street Gate 1 access driveway as a result of the subject development.

The O'Connell Street Gate 2 access driveway will provide vehicular access to the proposed development with an additional 16 car parking spaces. AS 2890.1 requires access driveway widths to be designed in accordance with the number of car parking spaces effectively served by that access. As a result, the addition of 16 spaces is considered minor and therefore, the existing vehicular access is satisfactory. It is noted however minor works to remove the median is proposed to accommodate service vehicles up to a 12.5m long heavy rigid vehicle accessing the site. This is considered acceptable as service vehicles will only access the site out of operating hours and schedule times only. In addition, it is proposed that the roadway near the vehicular access within the development is to be widened slightly to accommodate a passing opportunity in the unlikely event that a truck and a car is required to pass.

In summary, the vehicular accesses for the TAFE will operate satisfactory and is designed in accordance with AS 2890.1 and AS 2890.2. Reference should be made to the swept path analysis presented in **Appendix D**.

8.2 Internal Design

The internal car park complies with the requirements of AS 2890.1 (2004), AS2890.2 (2002), AS 2890.3 (2015) and AS 2890.6 (2009), and the following characteristics are noteworthy:

8.2.1 Parking Modules

- All car parking spaces are to be designed in accordance with a User Class 2. These spaces are provided with a minimum space length of 5.4m, a minimum width of 2.5m and a minimum aisle width of 5.8m.
- All spaces located adjacent to obstructions of greater than 150mm in height are to be provided with an additional width of 300mm.
- Dead-end aisles are to be provided with the required 1.0m aisle extension in accordance with Figure 2.3 of AS2890.1 (2004) and turning bays when exceeding six spaces.

- All accessible parking spaces are to be designed in accordance with AS2890.6 (2009), being 2.4m wide, 5.4m long and situated immediately adjacent to a dedicated shared area or the circulating aisle.

8.2.2 Bicycle Parking

- All bicycle parking facilities are to be provided on the ground floor for ease of access. All bicycle parking facilities are to be designed in accordance with the minimum requirements of AS2890.3 (2015) and this can be dealt with during CC Stage.

8.2.3 Service Area Design

- The internal design of the service area is to be undertaken in accordance with the requirements of AS2890.2 for the maximum length vehicle permissible on-site being a 12.5m long HRV.

8.2.4 Wayfinding, Signage & Line Marking

- Internal vehicle movements, pedestrians and cyclists are to be managed safety and efficiently within the subject site in accordance with AS2890, Austroads Guidelines and standard traffic engineering principles. Reference should be made to the signage and wayfinding plan presented in **Appendix G** which provides a guide, to be finalised at Construction Certification Stage.

8.3 Summary

In summary, the internal configuration of the car park has been designed in accordance with AS2890.1 (2004), AS2890.2 (2002), AS 2890.3 (2015) and AS2890.6 (2009). It is however envisaged that a condition of consent would be imposed requiring compliance with these standards and as such any minor amendments considered necessary (if any) can be dealt with prior to the release of a Construction Certificate.

9. SUMMARY OF RESPONSES TO SEARS

A response to each relevant requirement of the Secretary's Environmental Assessment Requirements (SEARs) is provided below, including references to sections of this report where applicable. Reference should also be made to the full copy of the SEARs provided in **Appendix H** and the below matters relate specifically to Item 7:

7. Transport and Accessibility

Include a transport and accessibility impact assessment, which details, but not limited to the following:

Accurate details of the current daily and peak hour vehicle, existing and future public transport networks and pedestrian and cycle movement provided on the road network located adjacent to the proposed development;

- **TRAFFIX Response:**

Reference should be made to Section 4 which provides an overview of the existing pedestrian and cycle infrastructure available within the vicinity of the subject site, including linkages to pedestrian and cycle infrastructure within the proposed development. Section 7.3 provides an overview of existing traffic volumes on the external road network within the vicinity of the subject site.

Details of estimated total daily and peak hour trips generated by the proposal, including vehicle, public transport, pedestrian and bicycle trips based on surveys of the existing TAFE NSW Nepean Kingswood Campus facilities and similar education facilities within the local area;

- **TRAFFIX Response:**

Reference should be made to Section 7 for future trips generated by the subject development and impacts to the surrounding external road network.

Cumulative impacts of all trips generated by the development and the existing TAFE NSW Nepean Kingswood Campus, as well as the development potential identified in the Quarter Precinct Master Plan and Western Sydney University Redevelopment Plan;

) **TRAFFIX Response:**

Reference should be made to Section 7.4

Existing car parking capacity and utilisation on streets within a 400 metre radius from the site on a typical weekday covering at least one hour before and after the proposed hours of operation (including night classes);

) **TRAFFIX Response:**

All parking is accommodated onsite and no reliance on on-street parking is proposed. Therefore, there will be no impact to existing on-street parking availability within the vicinity of the site. Reference should be made to Section 6 with weekday on-site parking survey shown in Chart 2 and Chart 3.

The adequacy of existing public transport or any future public transport infrastructure and services within the vicinity of the site, pedestrian and bicycle networks and associated infrastructure to meet the likely future demand of the proposed development;

) **TRAFFIX Response:**

Reference should be made to Section 4 which provides an assessment of the existing and future public transport infrastructure and services within the vicinity of the subject site.

Measures to integrate the development with the existing/future public transport network.

) **TRAFFIX Response:**

Reference should be made to Section 4.

Impact of trips generated by the development on the area-wide network, with consideration of the cumulative impacts of the development on the surrounding roads and intersections in the context of any other approved planning proposals and developments in the precinct and surrounds, should be considered. Including the impact of nearby intersections and the need/associated funding for upgrading or road improvement works, if required;

) **TRAFFIX Response:**

Impacts to surrounding road networks as a result of the proposed development are considered negligible with no improvements or upgrades to existing surrounding road

infrastructure considered necessary. Reference should be made to Section 7 for a detailed analysis. In addition, a conservative growth rate of 2% per annum compounding has been assumed for the background traffic to account for future growth as discussed in Section 7.4.

An assessment of the forecast impacts on traffic volume generated on road safety and capacity of road network including consideration of cumulative impacts at key intersections using SIDRA or similar traffic model as prescribed by Transport for New South Wales (TfNSW). The traffic modelling should consider the scenarios of year 2026, 2031, 2036 and the year until the facility ceases operation. These should include, but not be limited to:

- ***Great Western Highway/O'Connell Street/French Street***
- ***Great Western Highway/Bringelly Road***
- ***Gipps Street (Werrington Arterial)/Caddens Road***

) **TRAFFIX Response:**

Reference should be made to Section 7.4 with modelling results provided in Section 7.9.

The identification of infrastructure required to ameliorate any impacts on traffic efficiency and road safety impacts associated with the proposed development, including details on improvements required to affected intersections, additional bus routes along bus capable roads (i.e. minimum 3.5 m wide travel lanes), additional bus stops or bus bays;

) **TRAFFIX Response:**

No infrastructure upgrades are considered necessary. References should be made to Section 7.9.

Details of travel demand management measures to minimise the impact on general traffic and bus operations, including details of a location-specific sustainable travel plan (Green Travel Plan and specific Workplace travel plan) and the provision of facilities to increase the non-car mode share for travel to and from the site;

) **TRAFFIX Response:**

Reference should be made to the Green Travel Plan prepared separately by TRAFFIX.

The proposed walking and cycling access arrangements and connections to public transport services;

- **TRAFFIX Response:**

  Reference should be made to Section 4.

The design of the proposed cycle and pedestrian entry connecting to the Great Western Highway shared path should ensure that there are clear sight lines between the cyclists from the development and the faster moving cyclists on the Great Western Highway;

- **TRAFFIX Response:**

  Cyclist and pedestrian access is provided using existing (approved) vehicular and pedestrian access locations via O'Connell Street. In addition, a cycle and pedestrian entry connecting to the GWH shared path is proposed.

The proposed access arrangements, including car and bus pick-up/drop-off facilities, and measures to mitigate any associated traffic impacts and impacts on public transport, pedestrian and bicycle networks, including pedestrian crossings and refuges and speed control devices and zones;

- **TRAFFIX Response:**

  Reference should be made to the reduced plans presented in **Appendix B.**

Proposed bicycle parking provision, including end of trip facilities, in secure, convenient, accessible areas close to main entries incorporating lighting and passive surveillance;

- **TRAFFIX Response:**

  All bicycle parking demands are able to be readily accommodated onsite. Reference should be made to Section 6.3.

Details of vehicle circulation, proposed number of on-site car parking spaces for staff, students and visitors and corresponding compliance with appropriate parking codes and justification for the level of car parking provided on-site;

- **TRAFFIX Response:**

  Reference should be made to the internal design aspects discussed in Section 8 and the parking assessment presented in Section 6.

Any short term reduction of existing car spaces for staff, students and visitors due to the proposed construction works (if any), and the proposed location, operational and functional characteristics of the re-allocated staff, students and visitors car parking (if applicable);

- **TRAFFIX Response:**

  Not applicable.

Details of the proposed site access and the parking provisions associated with the proposed development including compliance with the requirements of the relevant Australian Standards (i.e. turn paths, sight distance requirements, aisle widths, etc.);

- **TRAFFIX Response:**

  Reference should be made to the internal design aspects discussed in Section 8.

An assessment of the cumulative on-street parking impacts of cars and bus pick-up/drop-off, staff parking and any other parking demands associated with the development and provide any associated recommendations to ameliorate any such impacts;

- **TRAFFIX Response:**

  Not applicable. All parking drop off and pick up requirements are to be accommodated without reliance on the public road network.

An assessment of road and pedestrian safety adjacent to the proposed development and the details of required road safety measures and personal safety in line with CPTED;

- **TRAFFIX Response:**

  Not applicable.

Emergency vehicle access, service vehicle access, delivery and loading arrangements and estimated service vehicle movements (including vehicle type and the likely arrival and departure times);

) **TRAFFIX Response:**

Refer to Section 6.6: Emergency vehicle access is provided throughout the subject site.

The preparation of a preliminary Construction Traffic and Pedestrian Management Plan to demonstrate the proposed management of the impact in relation to construction traffic addressing the following:

- ***Assessment of cumulative impacts associated with other construction activities (if any);***
- ***An assessment of road safety at key intersections and locations subject to heavy vehicle construction traffic movements and high pedestrian activity;***
- ***Details of construction program detailing the anticipated construction duration and highlighting significant and milestone stages and events during the construction process;***
- ***Details of anticipated peak hour and daily construction vehicle movements to and from the site;***
- ***Details of on-site car parking and access arrangements of construction vehicles, construction workers to and from the site, emergency vehicles and service vehicles; and***
- ***Details of temporary cycling and pedestrian access during construction.***

) **TRAFFIX Response:**

Reference should be made to the Preliminary CTPMP Report, prepared separately by TRAFFIX.

Alternate methods for gaining the most accurate traffic analysis data may be agreed with TfNSW, if required.

) **TRAFFIX Response:**

Reference should be made to Section 7.2.

10. CONCLUSIONS

In summary:

- The State Significant Development (SSD) application to which this report relates, seeks approval for the expansion of the existing TAFE Nepean Kingswood Campus located at 2-44 O'Connell Street, Kingswood. The expansion includes the construction of a new building known as the NSW Construction Centre of Excellence facility located in the eastern sector of the overall TAFE campus.
- TAFE NSW seeks approval to expand the existing campus to accommodate 1,750 additional students per semester by 2023 and an additional 3,500 students per semester by 2030 (over and above the existing 3,000 students per semester.
- The assessment relies upon enrolment data provided by TAFE, which has provided the context for this assessment.
- There are presently a total of 907 spaces within the existing campus, demonstrating that existing peak parking demands are readily accommodated on-site, with a surplus of 321 spaces. This demand profile is not expected to continue into the future with opportunities to change modal splits and spread on-site activity across the day.

  The 2023 development scenario is projected to relate to an additional maximum of 210 staff and students onsite at any one time, from 1037 to 1247. Based on the existing demand profile of 1 space per 1.8 daily persons in attendance, this would result in a net additional 117 car spaces. This can be readily accommodated by the existing parking surplus of 321 spaces in addition to the future 16 additional spaces proposed.

  The 2030 development scenario would result in a net additional 267 car spaces (over existing 2020). This can be readily accommodated by the existing parking surplus of 321 spaces in addition to the future 16 additional spaces proposed.

  However, a reduced parking demand profile will result due to the factors discussed in Section 6.1.6, including the provision of a shared shuttle service with UWS to Kingswood Railway Station, so that adoption of a 'target' car driver modal split of 69.3% (17.3% reduction from existing in accordance with the GTP) for the entire campus is considered achievable. The adopted parking strategy and target modal splits are strongly supported and will deliver a sustainable planning outcome that is in the public interest. This may be

contrasted with a 'no intervention' approach where current travel behaviour remains unchanged in 2030, failing to drive a sustainable planning outcome as a matter of good policy; and wasting Government resources.

- The subject development proposes to construct an additional 16 spaces, which will increase the parking supply from 907 spaces to 923 spaces. This is more than the expected demand of 900 spaces and will provide a buffer of more than 60 spaces.
- TfNSW has requested that the assessment consider peak traffic conditions in 2026, 2031 and 2036. This has however been undertaken for 2020, 2026 and 2030, at which time the development is fully populated. That is, any increase in trips after 2030 will be the result of background traffic growth only with no development impacts beyond 2030 when the development is fully populated. There is no nexus between the development and increased network traffic beyond 2030.
- A growth rate of 2% per annum compounding has been assumed for the background traffic in the 2026 and 2030 scenarios. This is considered a conservative 'worst-case' scenario for the reasons discussed in Section 7.4.
- The Future Years Scenarios have been examined under 'Base Case' (without development) and 'Future' (base case year + development) for each year, in order to compare the relative impact of the proposed development with conditions that will occur in any event, absent the development. The assessment has taken account of growth in background traffic.. It is emphasised that the modal split changes will apply to the entire campus population, current and future, resulting in significant traffic demand suppression, which is sound policy.
- The 2026 Development Scenario equates to a net additional 96 vehicle trips (77 arrivals and 19 departures) during the morning network weekday peak (7:45am-8:45am), and 49 vehicle trips (15 arrivals and 34 departures) during the weekday afternoon network peak (4:45pm-5:45pm). These can be readily accommodated on the road network.
- The 2030 Development Scenario equates to a net additional 218 vehicle trips (174 arrivals and 44 departures) during the morning network peak hour period (7:45am-8:45am), and 113 vehicle trips (34 arrivals and 79 departures) during the afternoon network peak hour period (4:45pm-5:45pm). These increases can be similarly accommodated.
- Specifically, all intersections operate with a Level of Service D or better under all future scenarios, even based on a conservative 2% background traffic growth rate. Therefore, all

future traffic impacts resulting from the proposed development are considered manageable and no external road upgrades are considered necessary at any of the key intersections analysed under future scenarios identified in the SEARs.

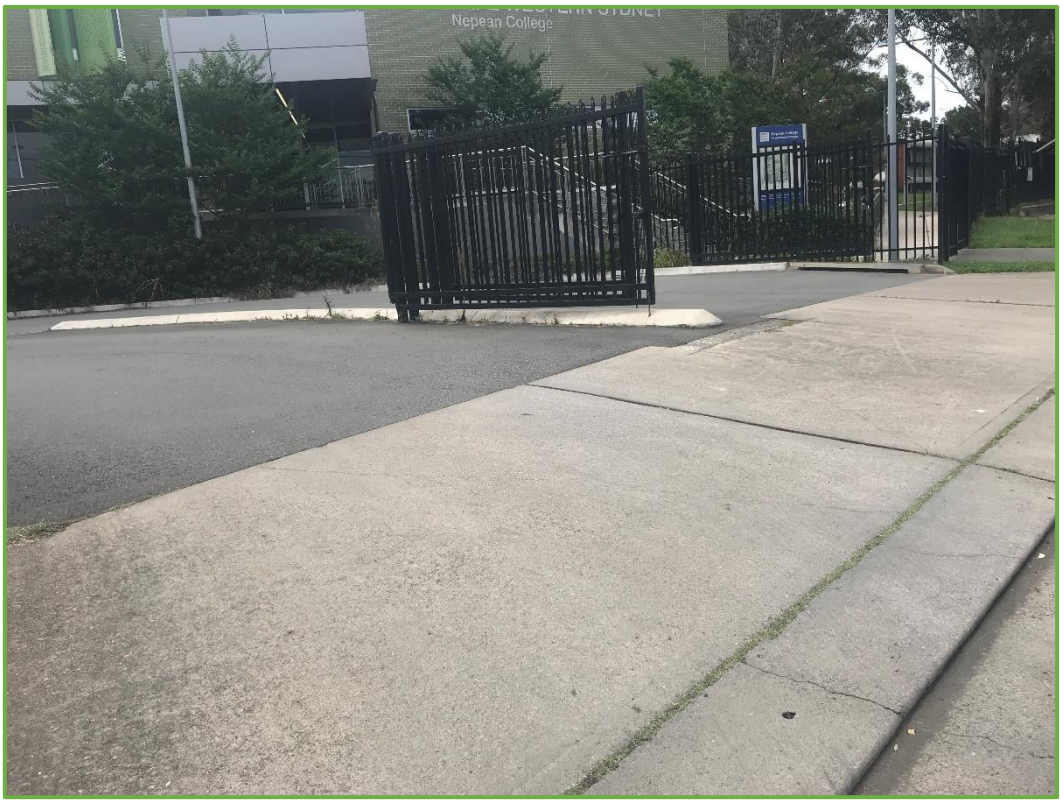
- The design of accesses and parking areas will be appropriately located and have been assessed to comply with AS2890.1 (2004), AS2890.2 (2002) and AS2890.6 (2009).
- Each individual SEAR's requirement has been addressed as summarised in Section 9.
- The application is supported by a Draft Green Travel Plan in response to SEAR's requirements.
- The application is supported by a Preliminary Construction Traffic Management Plan prepared separately in response to SEAR's requirements.

This Transport and Accessibility Impact Assessment therefore demonstrates that the subject application is supportable on transport planning grounds. TRAFFIX anticipates an ongoing involvement during the development approval process.

.

APPENDIX A

Photographic Record



View looking southwest at the access driveway of Gate 1

View looking northeast at the access driveway of Gate 1

View looking west at the pedestrian refuge island outside of Gate 1

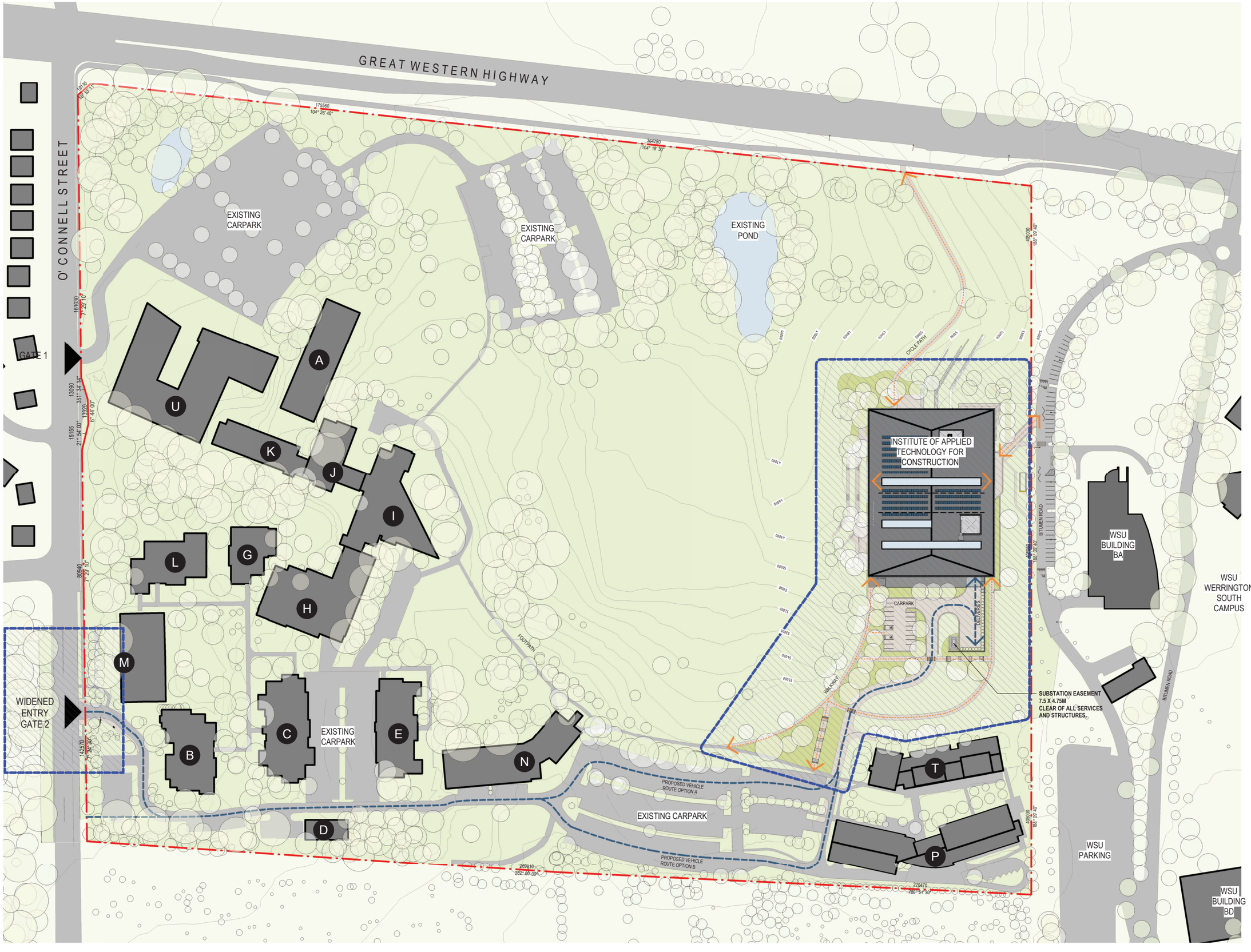
View looking south at the access driveway of Gate 2

View looking north at the access driveway of Gate 2

View looking west at the pedestrian refuge island near Gate 2

APPENDIX B

Reduced Plans



LEGEND

- EXISTING PEDESTRIAN ACCESS
- EXISTING VEHICULAR ACCESS
- BOUNDARY LINE
- A EXISTING BUILDING NAME
- PROPOSED VEHICULAR ROUTE CARPARK RECONFIGURATION
- PROPOSED PEDESTRIAN PATH
- EXTENT OF SSD SCOPE
- PROPOSED CONSTRUCTION HUB
- PROPOSED ROADS WALKWAYS AND RECONFIGURED CARPARK
- EXISTING ROADS, WALKWAYS AND CARPARKS

GRAY PUKSAND

Contractors to use Architectural drawings for set out.
Contractors to check & verify all Dimensions on Site prior to Construction/Fabrication.
Figured Dimensions take precedence over Scaled Dimensions.
Any Discrepancies should be immediatley referred to the Architect.
All work to comply with N.C.C. Statutory Authorities & Relevant Australian Standards.

NSW Nominated Architects Scott Moylan 7147 Craig Saltmarsh 6569

REV	DESCRIPTION	DATE
A	Test of Adequacy Submission	10-02-21
B	Issued for SSDA	04-03-21
C	Issued for SSDA	11-03-21
D	Issued for SSDA	12-05-21

PROJECT NO	220090
DRAWN	PW
CHECKED	SS
APPROVED	BH

Insitute of Applied Technology for Construction
12-44 O'Connell St, Kingswood
NSW 2747

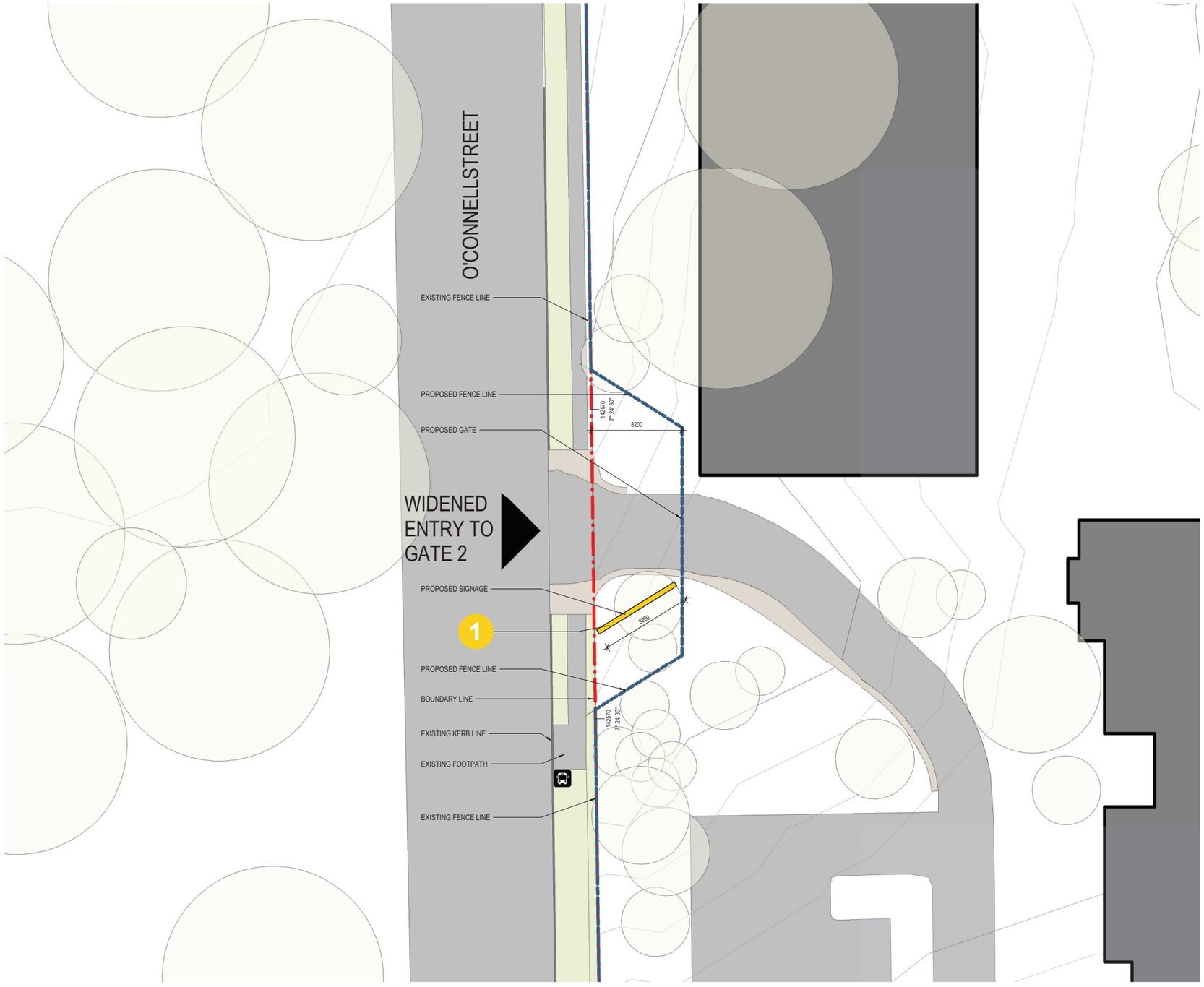
SSDA

SITE PLAN - PROPOSED

DWG # **DA0103** REV **D**

SCALE @ A1 As indicated

12/05/2021 9:47:05 AM BIM 360://Kingswood TAFE/220090_TAFE NSW WSOH_Site_C21.rvt



1 DA0103 SITE PLAN - PROPOSED - SSDA - PROPOSED ENTRY

SCALE 1 : 200

LEGEND

- EXISTING PEDESTRIAN ACCESS
- EXISTING VEHICULAR ACCESS
- BOUNDARY LINE
- A — EXISTING BUILDING NAME
- PROPOSED VEHICULAR ROUTE CARPARK RECONFIGURATION
- PROPOSED PEDESTRIAN PATH
- EXTENT OF SSD SCOPE
- PROPOSED CONSTRUCTION HUB
- PROPOSED ROADS WALKWAYS AND RECONFIGURED CARPARK
- EXISTING ROADS, WALKWAYS AND CARPARKS
- 1 — SIGN TYPE 1

GRAY PUKSAND

REV	DESCRIPTION	DATE
P1	Issued for Information	04-03-21

PROJECT NO	**220090**
DRAWN	**Author**
CHECKED	**Checker**
APPROVED	**Approver**

TAFE NSW Construction Centre of Excellence
12-44 O'connell St, Kingswood
NSW 2747

PROPOSED ENTRY

DWG # **DA0110** REV **P1**

SCALE @ A1 As indicated

APPENDIX C

2021 Weekly Survey Results

R.O.A.R. DATA
Reliable, Original & Authentic Results
Ph. Mob.0418-239019

Client	: Traffix
Job No / Name	: 7515 KINGSWOOD Parking Surveys 2
Day/Date	: Mon 19th to Fri 23rd April 2021

R.O.A.R. DATA
Reliable, Original & Authentic Results
Ph. Mob.0418-239019

Client : Traffix
Job No / Name : 7515 KINGSWOOD Parking Surveys 2
Day/Date : Monday 19th April 2021

Zone	On Street	Cap	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900
A	O'Connell St East / Side	23	4	2	6	4	3	4	3	4	4	5	5	2	1
B	O'Connell St East / Side	10	0	0	0	0	0	0	0	0	0	0	0	0	0
C	O'Connell St West / Side	18	1	1	4	3	3	2	2	3	3	2	3	1	1
D	O'Connell St West / Side	12	4	2	2	4	4	3	3	1	2	1	2	3	5
Total of Vehicles Parked		**63**	**9**	**5**	**12**	**11**	**10**	**9**	**8**	**8**	**9**	**8**	**10**	**6**	**7**
Number of Vacant Spaces			54	58	51	52	53	54	55	55	54	55	53	57	56
% of Capacity Used			**14.3%**	**7.9%**	**19.0%**	**17.5%**	**15.9%**	**14.3%**	**12.7%**	**12.7%**	**14.3%**	**12.7%**	**15.9%**	**9.5%**	**11.1%**

Area	Car Parks	Cap	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900
1	North Eastern	180	0	2	15	18	19	20	15	15	14	7	4	2	0
2	North Western	313	2	35	244	266	264	273	256	223	169	77	41	23	20
3	Southern	414	31	41	178	236	235	235	236	219	167	139	59	62	55
Total of Vehicles Parked		**907**	**33**	**78**	**437**	**520**	**518**	**528**	**507**	**457**	**350**	**223**	**104**	**87**	**75**
Number of Vacant Spaces			874	829	470	387	389	379	400	450	557	684	803	820	832
% of Capacity Used			**3.6%**	**8.6%**	**48.2%**	**57.3%**	**57.1%**	**58.2%**	**55.9%**	**50.4%**	**38.6%**	**24.6%**	**11.5%**	**9.6%**	**8.3%**

R.O.A.R. DATA
Reliable, Original & Authentic Results
Ph. Mob.0418-239019

Client : Traffix
Job No / Name : 7515 KINGSWOOD Parking Surveys 2
Day/Date : Tuesday 20th April 2021

Zone	On Street	Cap	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900
A	O'Connell St East / Side	23	1	1	3	4	4	4	3	2	2	2	0	0	0
B	O'Connell St East / Side	10	0	0	0	0	0	0	0	0	0	0	1	1	0
C	O'Connell St West / Side	18	1	1	4	9	10	9	9	7	5	3	2	1	1
D	O'Connell St West / Side	12	4	2	3	2	1	1	0	1	1	2	3	1	1
Total of Vehicles Parked		**63**	**6**	**4**	**10**	**15**	**15**	**14**	**12**	**10**	**8**	**7**	**6**	**3**	**2**
Number of Vacant Spaces			57	59	53	48	48	49	51	53	55	56	57	60	61
% of Capacity Used			**9.5%**	**6.3%**	**15.9%**	**23.8%**	**23.8%**	**22.2%**	**19.0%**	**15.9%**	**12.7%**	**11.1%**	**9.5%**	**4.8%**	**3.2%**

Area	Car Parks	Cap	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900
1	North Eastern	180	0	3	19	22	22	21	19	18	17	9	6	0	0
2	North Western	313	2	28	226	244	253	254	251	227	167	90	45	14	3
3	Southern	414	32	70	180	282	287	290	276	266	231	172	68	81	73
Total of Vehicles Parked		**907**	**34**	**101**	**425**	**548**	**562**	**565**	**546**	**511**	**415**	**271**	**119**	**95**	**76**
Number of Vacant Spaces			873	806	482	359	345	342	361	396	492	636	788	812	831
% of Capacity Used			**3.7%**	**11.1%**	**46.9%**	**60.4%**	**62.0%**	**62.3%**	**60.2%**	**56.3%**	**45.8%**	**29.9%**	**13.1%**	**10.5%**	**8.4%**

R.O.A.R. DATA
Reliable, Original & Authentic Results
Ph. Mob.0418-239019

Client : Traffix
Job No / Name : 7515 KINGSWOOD Parking Surveys 2
Day/Date : Wednesday 21st April 2021

Zone	On Street	Cap	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900
A	O'Connell St East / Side	23	2	2	5	6	4	2	0	0	0	0	0	0	0
B	O'Connell St East / Side	10	1	0	0	0	0	0	0	0	0	0	0	0	0
C	O'Connell St West / Side	18	1	1	4	8	10	8	8	5	2	2	1	1	1
D	O'Connell St West / Side	12	4	2	1	1	1	2	2	2	1	0	1	1	2
Total of Vehicles Parked		**63**	**8**	**5**	**10**	**15**	**15**	**12**	**10**	**7**	**3**	**2**	**2**	**2**	**3**
Number of Vacant Spaces			55	58	53	48	48	51	53	56	60	61	61	61	60
% of Capacity Used			**12.7%**	**7.9%**	**15.9%**	**23.8%**	**23.8%**	**19.0%**	**15.9%**	**11.1%**	**4.8%**	**3.2%**	**3.2%**	**3.2%**	**4.8%**

Area	Car Parks	Cap	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900
1	North Eastern	180	0	5	37	40	40	38	29	29	28	11	3	2	0
2	North Western	313	0	24	219	267	282	274	249	239	168	86	41	28	19
3	Southern	414	28	68	165	261	249	251	240	227	179	131	55	55	50
Total of Vehicles Parked		**907**	**28**	**97**	**421**	**568**	**571**	**563**	**518**	**495**	**375**	**228**	**99**	**85**	**69**
Number of Vacant Spaces			879	810	486	339	336	344	389	412	532	679	808	822	838
% of Capacity Used			**3.1%**	**10.7%**	**46.4%**	**62.6%**	**63.0%**	**62.1%**	**57.1%**	**54.6%**	**41.3%**	**25.1%**	**10.9%**	**9.4%**	**7.6%**

R.O.A.R. DATA
Reliable, Original & Authentic Results
Ph. Mob.0418-239019

Client : Traffix
Job No / Name : 7515 KINGSWOOD Parking Surveys 2
Day/Date : Thursday 22nd April 2021

Zone	On Street	Cap	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900
A	O'Connell St East / Side	23	0	0	3	3	3	1	0	0	0	1	1	0	0
B	O'Connell St East / Side	10	1	0	0	0	0	0	0	0	0	0	0	0	0
C	O'Connell St West / Side	18	1	1	2	2	2	2	1	2	2	1	0	0	0
D	O'Connell St West / Side	12	2	4	3	3	0	1	2	1	1	0	0	1	1
Total of Vehicles Parked		**63**	**4**	**5**	**8**	**8**	**5**	**4**	**3**	**3**	**3**	**2**	**1**	**1**	**1**
Number of Vacant Spaces			59	58	55	55	58	59	60	60	60	61	62	62	62
% of Capacity Used			**6.3%**	**7.9%**	**12.7%**	**12.7%**	**7.9%**	**6.3%**	**4.8%**	**4.8%**	**4.8%**	**3.2%**	**1.6%**	**1.6%**	**1.6%**

Area	Car Parks	Cap	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900
1	North Eastern	180	0	1	23	27	29	27	25	21	19	8	5	1	0
2	North Western	313	3	11	188	206	204	213	193	158	113	41	23	3	1
3	Southern	414	32	54	151	243	248	246	210	194	140	110	50	86	80
Total of Vehicles Parked		**907**	**35**	**66**	**362**	**476**	**481**	**486**	**428**	**373**	**272**	**159**	**78**	**90**	**81**
Number of Vacant Spaces			872	841	545	431	426	421	479	534	635	748	829	817	826
% of Capacity Used			**3.9%**	**7.3%**	**39.9%**	**52.5%**	**53.0%**	**53.6%**	**47.2%**	**41.1%**	**30.0%**	**17.5%**	**8.6%**	**9.9%**	**8.9%**

R.O.A.R. DATA
Reliable, Original & Authentic Results
Ph. Mob.0418-239019

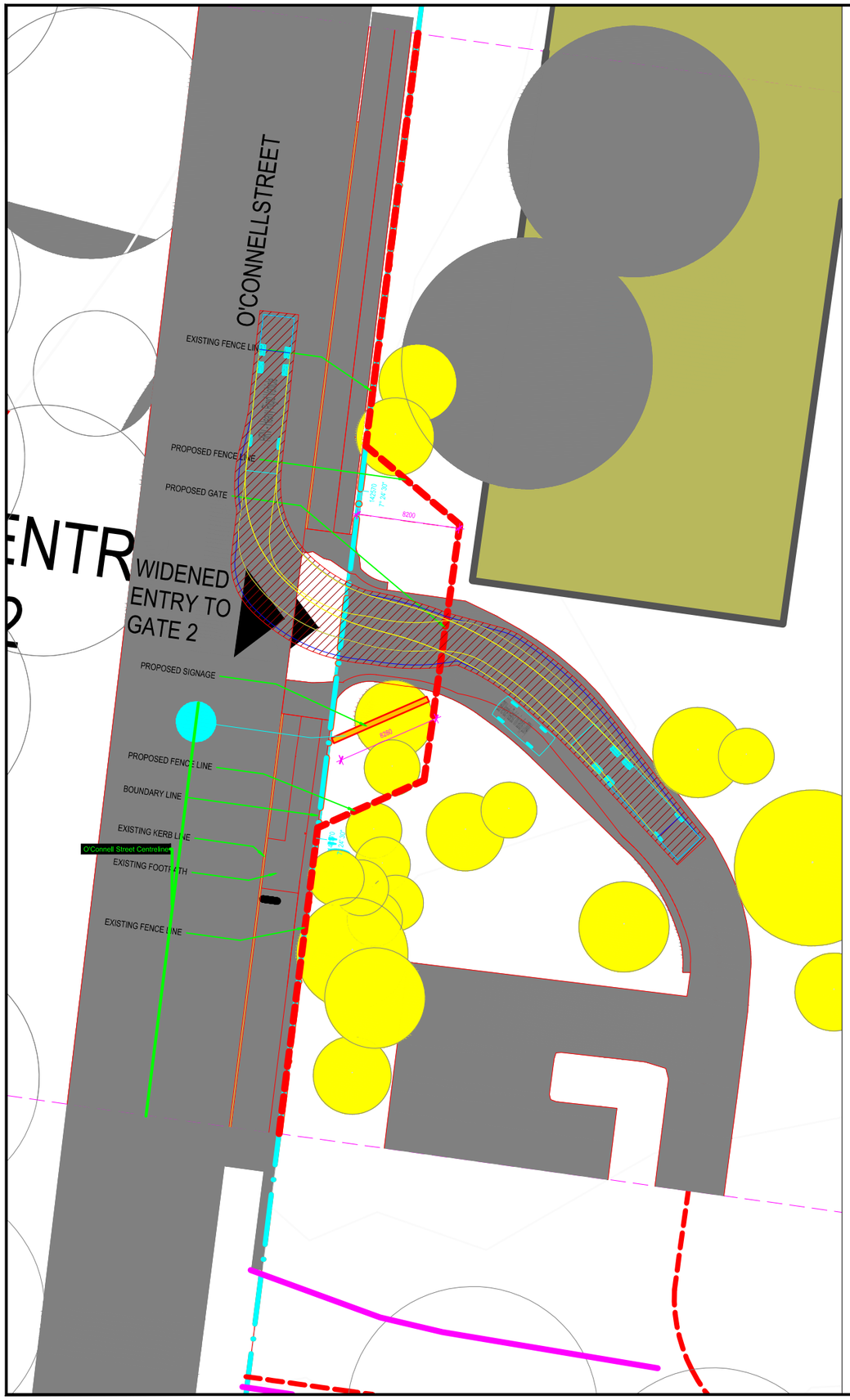
Client : Traffix
Job No / Name : 7515 KINGSWOOD Parking Surveys 2
Day/Date : Friday 23rd April 2021

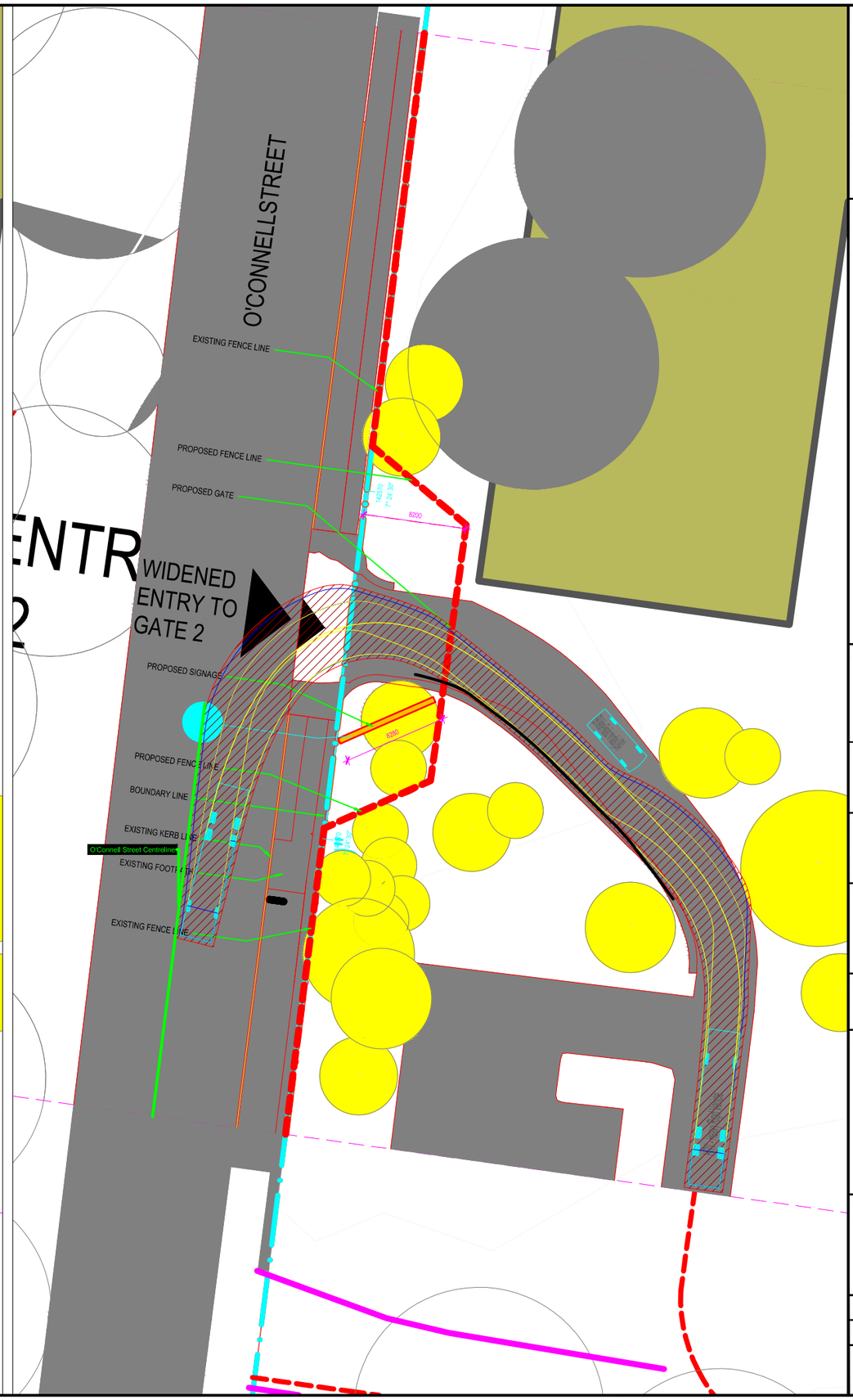
Zone	On Street	Cap	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900
A	O'Connell St East / Side	23	0	0	1	0	0	0	0	0	0	0	0	1	0
B	O'Connell St East / Side	10	0	0	0	0	0	0	0	0	0	0	0	0	0
C	O'Connell St West / Side	18	1	1	1	1	1	1	1	2	2	1	1	1	1
D	O'Connell St West / Side	12	2	2	2	3	4	4	3	2	2	2	1	1	1
Total of Vehicles Parked		**63**	**3**	**3**	**4**	**4**	**5**	**5**	**4**	**4**	**4**	**3**	**2**	**3**	**2**
Number of Vacant Spaces			60	60	59	59	58	58	59	59	59	60	61	60	61
% of Capacity Used			**4.8%**	**4.8%**	**6.3%**	**6.3%**	**7.9%**	**7.9%**	**6.3%**	**6.3%**	**6.3%**	**4.8%**	**3.2%**	**4.8%**	**3.2%**

Area	Car Parks	Cap	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900
1	North Eastern	180	0	0	7	9	10	7	8	9	8	5	2	0	0
2	North Western	313	2	18	170	181	184	180	173	158	113	35	12	1	1
3	Southern	414	27	41	77	119	121	114	103	113	68	50	11	5	1
Total of Vehicles Parked		**907**	**29**	**59**	**254**	**309**	**315**	**301**	**284**	**280**	**189**	**90**	**25**	**6**	**2**
Number of Vacant Spaces			878	848	653	598	592	606	623	627	718	817	882	901	905
% of Capacity Used			**3.2%**	**6.5%**	**28.0%**	**34.1%**	**34.7%**	**33.2%**	**31.3%**	**30.9%**	**20.8%**	**9.9%**	**2.8%**	**0.7%**	**0.2%**

APPENDIX D

Swept Path Analysis





Notes:

This drawing is prepared for information purposes only. It is not to be used for construction.

TRAFFIX is responsible for vehicle swept path diagrams and/or drawing mark-ups only. Base drawing prepared by others.

Vehicle swept path diagrams prepared using computer generated turning path software and associated CAD drawing platforms. Vehicle data based upon relevant Australian Standards (*AS/NZS 2890.1:2004 Parking facilities - Off-street car parking*, and/or *AS2890.2:2002 Parking facilities - Off-street commercial vehicle facilities*). These standards embody a degree of tolerance, however the vehicle characteristics in these standards represent a suitable design vehicle and do not account for all variations in vehicle dimensions / specifications and/or driver ability or behaviour.

Rev.	Revision Note	By.	Date
A	Initial Swept Paths Analysis	JP	21-01-21
B	Swept Paths Analysis	JP	08-02-21
C	Revised Swept Paths Analysis	VD	01-03-21
D	Revised Swept Paths Analysis	JP	05-03-21

Swept Path Legend

- Wheel Path
- Vehicle Body Envelope
- Clearance Envelope (300mm)

Architect

Client
Cadence Australia Pty Ltd
Level 1, 10 Mallett Street
Camperdown 2050

Scale / Plan Orientation

0 4 8 12 16m
1:400 @ A3

Project Description
TAFE NSW
2-44 O'Connell Street, Kingswood, NSW, 2747

Drawing Prepared By

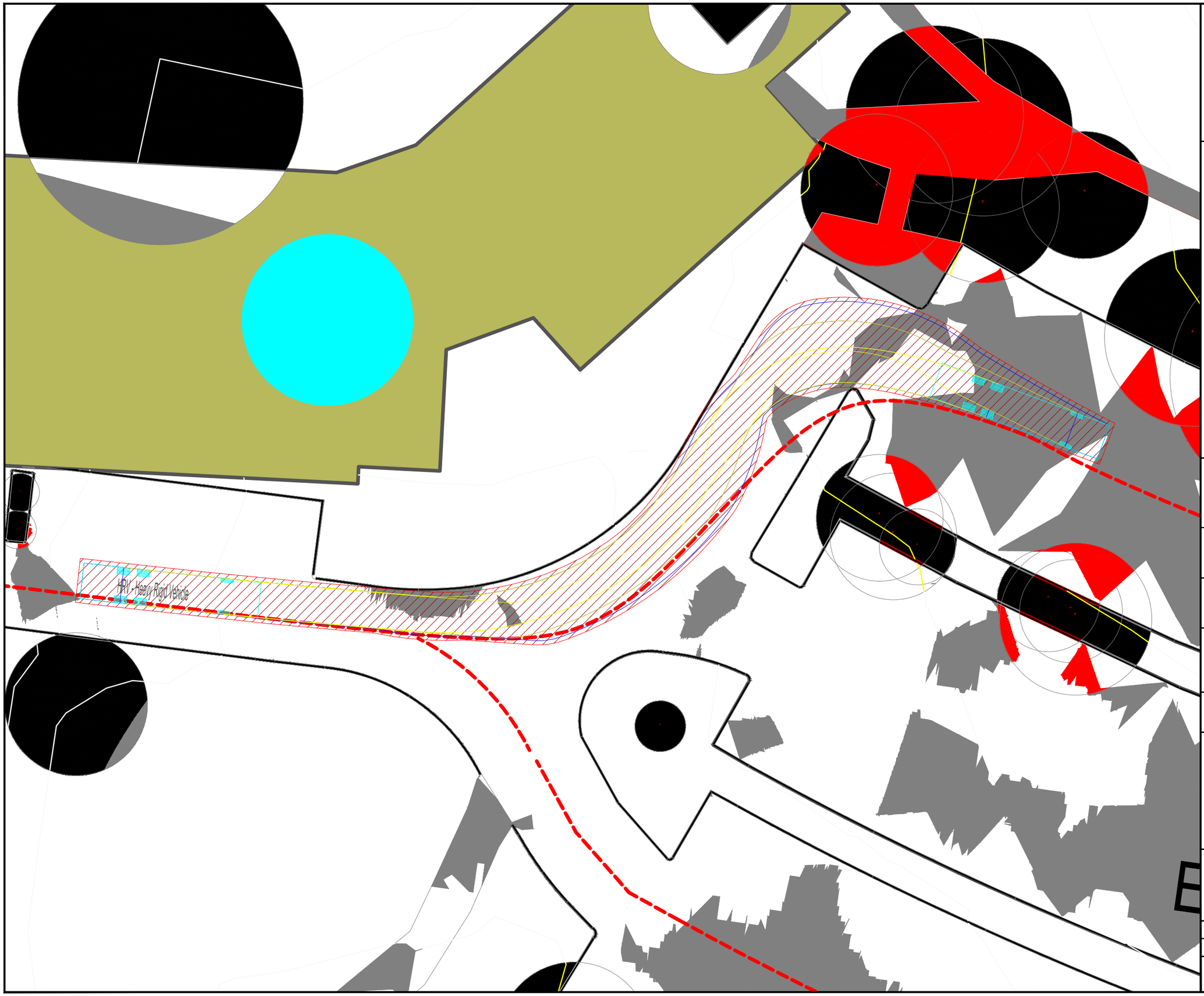
TRAFFIX
TRAFFIC & TRANSPORT PLANNERS
Suite 2.08, 50 Holt Street
Surry Hills, NSW 2010
PO Box 1124
Strawberry Hills, NSW 2012
t: +61 2 8324 8700
f: +61 2 9830 4481
w: www.traffix.com.au

Drawing Title
O'Connell Street Access Driveway
Swept Path Analysis
12.5m HRV - Site Access & Passing Opportunity
Left: Entry Manoeuvre
Right: Exit Manoeuvre

Drawn:	Checked:	Date:
JP	VD	08-02-21

20.456d02v06 TRAFFIX [210205 Plans] Design Review SITE + ACCESS.dwg

Project No.	Drawing Phase	Drawing No.	Rev.
20.456	DA	TX.10	A



Notes:

This drawing is prepared for information purposes only. It is not to be used for construction.

TRAFFIX is responsible for vehicle swept path diagrams and/or drawing mark-ups only. Base drawing prepared by others.

Vehicle swept path diagrams prepared using computer generated turning path software and associated CAD drawing platforms. Vehicle data based upon relevant Australian Standards (*AS/NZS 2890.1:2004 Parking facilities - Off-street car parking*, and/or *AS2890.2:2002 Parking facilities - Off-street commercial vehicle facilities*). These standards embody a degree of tolerance, however the vehicle characteristics in these standards represent a suitable design vehicle and do not account for all variations in vehicle dimensions / specifications and/or driver ability or behaviour.

Rev.	Revision Note	By.	Date
A	Swept Paths Analysis	JP	01-03-21
B	Revised Swept Paths Analysis	JP	05-03-21

Swept Path Legend

- Wheel Path
- Vehicle Body Envelope
- Clearance Envelope (300mm)

Architect

Client
Cadence Australia Pty Ltd
Level 1, 10 Mallett Street
Camperdown 2050

Scale / Plan Orientation

0 2.5 5 7.5 10m
1:250 @ A3

Project Description
TAFE NSW
2-44 O'Connell Street, Kingswood, NSW, 2747

Drawing Prepared By

TRAFFIX
TRAFFIC & TRANSPORT PLANNERS

Suite 2.08, 50 Holt Street
Surry Hills, NSW 2010
PO Box 1124
Strawberry Hills, NSW 2012

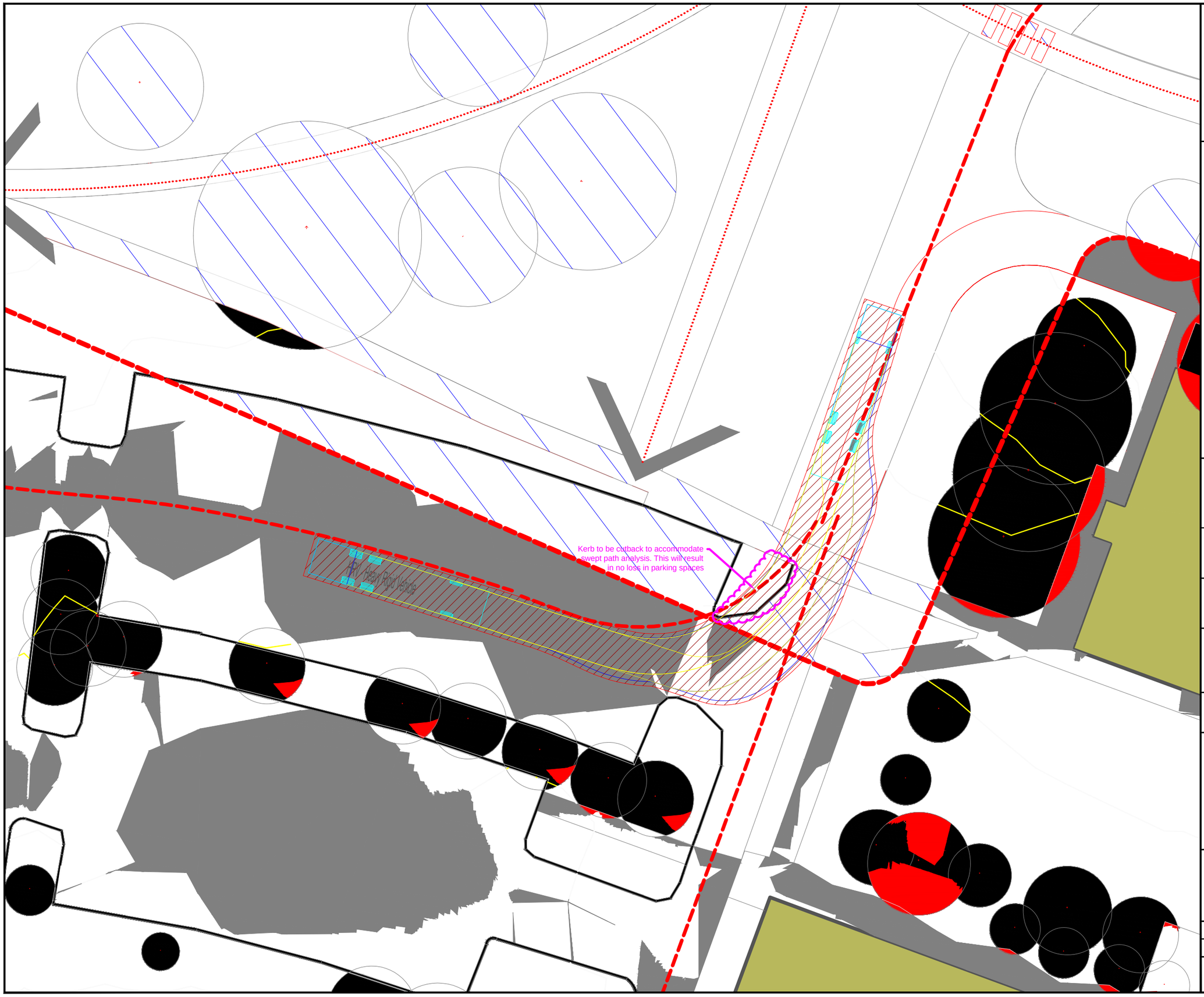
t: +61 2 8324 8700
f: +61 2 9830 4481
w: www.traffix.com.au

Drawing Title
Proposed Site Plan
Entry - 12.5m Heavy Rigid Vehicle
Swept Path Analysis

Drawn:	Checked:	Date:
JP	VD	01-03-21

20.456d02v06 TRAFFIX [210205 Plans] Design Review SITE + ACCESS.dwg

Project No.	Drawing Phase	Drawing No.	Rev.
20.456	DA	TX.11	A



Notes:

This drawing is prepared for information purposes only. It is not to be used for construction.

TRAFFIX is responsible for vehicle swept path diagrams and/or drawing mark-ups only. Base drawing prepared by others.

Vehicle swept path diagrams prepared using computer generated turning path software and associated CAD drawing platforms. Vehicle data based upon relevant Australian Standards (*AS/NZS 2890.1:2004 Parking facilities - Off-street car parking*, and/or *AS2890.2:2002 Parking facilities - Off-street commercial vehicle facilities*). These standards embody a degree of tolerance, however the vehicle characteristics in these standards represent a suitable design vehicle and do not account for all variations in vehicle dimensions / specifications and/or driver ability or behaviour.

Rev.	Revision Note	By.	Date
A	Swept Paths Analysis	JP	01-03-21
B	Revised Swept Paths Analysis	JP	05-03-21

Swept Path Legend

- Wheel Path
- Vehicle Body Envelope
- Clearance Envelope (300mm)

Architect

Client
Cadence Australia Pty Ltd
Level 1, 10 Mallett Street
Camperdown 2050

Scale / Plan Orientation

0 2.5 5 7.5 10m
1:250 @ A3

Project Description
TAFE NSW
2-44 O'Connell Street, Kingswood, NSW, 2747

Drawing Prepared By

TRAFFIX
TRAFFIC & TRANSPORT PLANNERS

Suite 2.08, 50 Holt Street
Surry Hills, NSW 2010
PO Box 1124
Strawberry Hills, NSW 2012

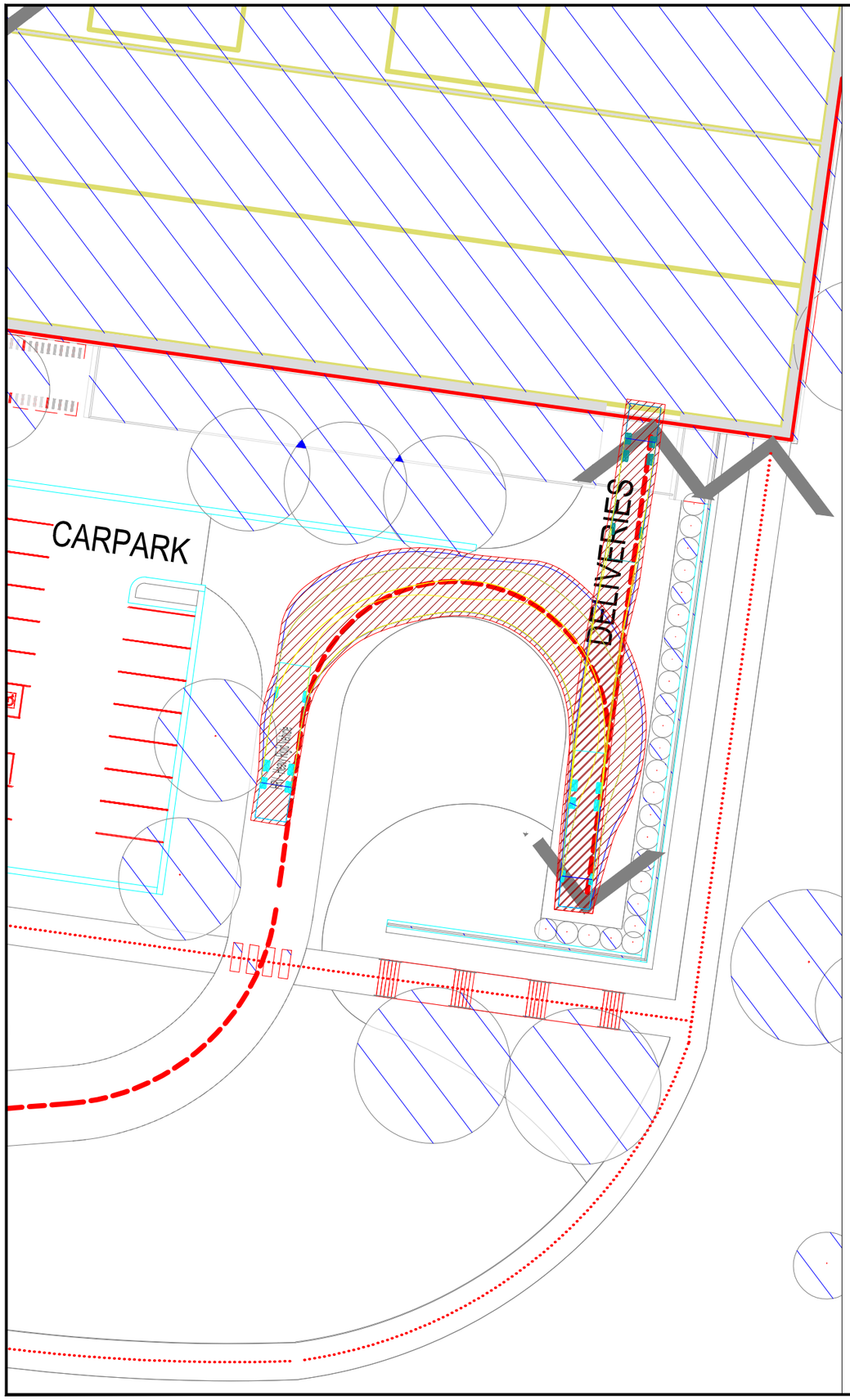
t: +61 2 8324 8700
f: +61 2 9830 4481
w: www.traffix.com.au

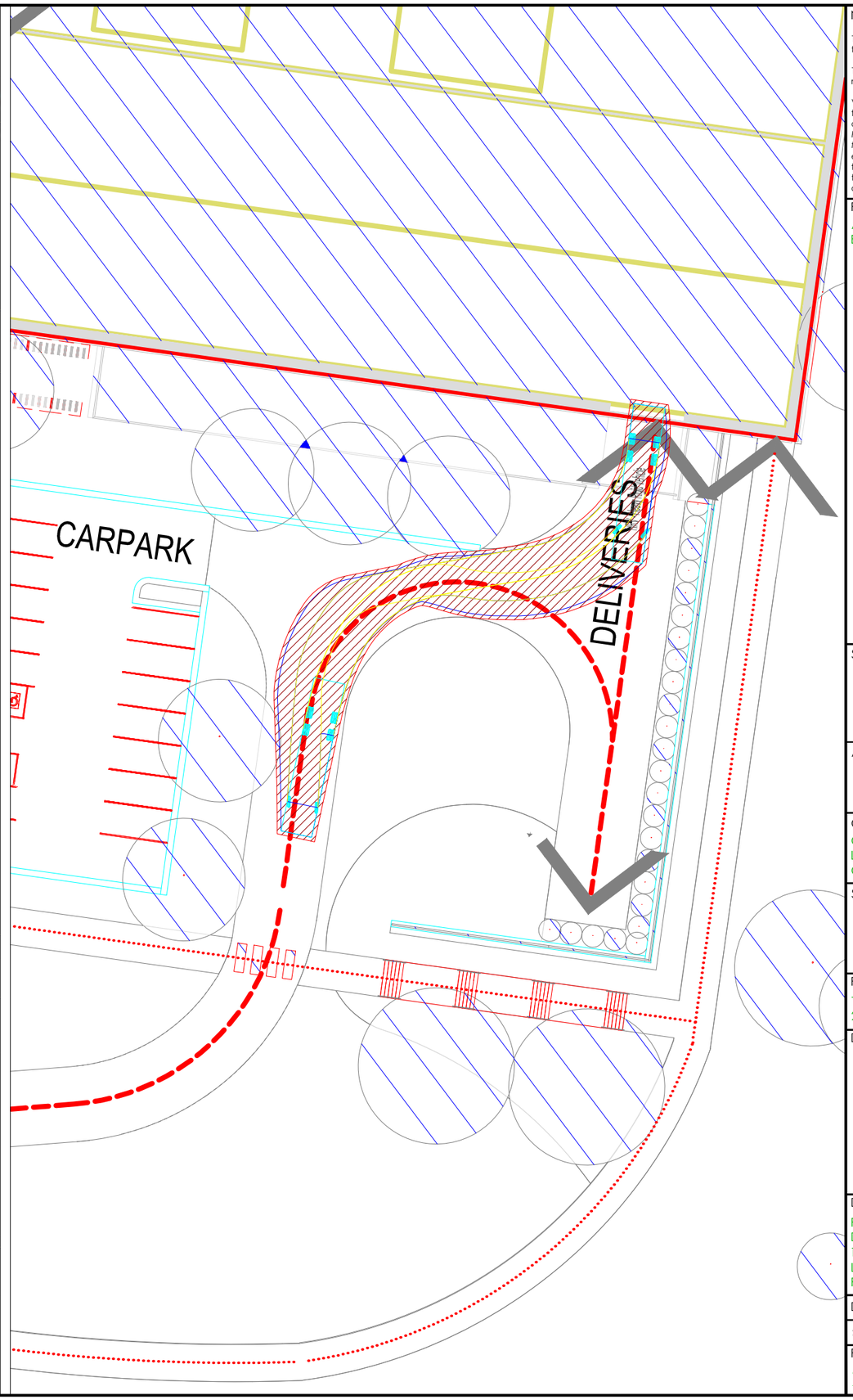
Drawing Title
Survey Plan
Entry - Top Car Park
12.5m Heavy Rigid Vehicle
Swept Path Analysis

Drawn:	Checked:	Date:
JP	VD	01-03-21

20.456d02v06 TRAFFIX [210205 Plans] Design Review SITE + ACCESS.dwg

Project No.	Drawing Phase	Drawing No.	Rev.
20.456	DA	TX.12	A





Notes:

This drawing is prepared for information purposes only. It is not to be used for construction.

TRAFFIX is responsible for vehicle swept path diagrams and/or drawing mark-ups only. Base drawing prepared by others.

Vehicle swept path diagrams prepared using computer generated turning path software and associated CAD drawing platforms. Vehicle data based upon relevant Australian Standards (*AS/NZS 2890.1:2004 Parking facilities - Off-street car parking*, and/or *AS2890.2:2002 Parking facilities - Off-street commercial vehicle facilities*). These standards embody a degree of tolerance, however the vehicle characteristics in these standards represent a suitable design vehicle and do not account for all variations in vehicle dimensions / specifications and/or driver ability or behaviour.

Rev.	Revision Note	By.	Date
A	Swept Paths Analysis	JP	01-03-21
B	Revised Swept Paths Analysis	JP	05-03-21

Swept Path Legend

- Wheel Path
- Vehicle Body Envelope
- Clearance Envelope (300mm)

Architect

Client
Cadence Australia Pty Ltd
Level 1, 10 Mallett Street
Camperdown 2050

Scale / Plan Orientation

0 4 8 12 16m
1:400 @ A3

Project Description
TAFE NSW
2-44 O'Connell Street, Kingswood, NSW, 2747

Drawing Prepared By

TRAFFIX
TRAFFIC & TRANSPORT PLANNERS

Suite 2.08, 50 Holt Street
Surry Hills, NSW 2010
PO Box 1124
Strawberry Hills, NSW 2012

t: +61 2 8324 8700
f: +61 2 9830 4481
w: www.traffix.com.au

Drawing Title
Proposed Site Plan
Delivery Bay
12.5m Heavy Rigid Vehicle - Swept Path Analysis
Left: Reverse Entry Manoeuvre
Right: Forward Exit Manoeuvre

Drawn:	Checked:	Date:
JP	VD	01-03-21

20.456d02v06 TRAFFIX [210205 Plans] Design Review SITE + ACCESS.dwg

Project No.	Drawing Phase	Drawing No.	Rev.
20.456	DA	TX.13	A

Notes:

This drawing is prepared for information purposes only. It is not to be used for construction.

TRAFFIX is responsible for vehicle swept path diagrams and/or drawing mark-ups only. Base drawing prepared by others.

Vehicle swept path diagrams prepared using computer generated turning path software and associated CAD drawing platforms. Vehicle data based upon relevant Australian Standards (*AS/NZS 2890.1:2004 Parking facilities - Off-street car parking*, and/or *AS2890.2:2002 Parking facilities - Off-street commercial vehicle facilities*). These standards embody a degree of tolerance, however the vehicle characteristics in these standards represent a suitable design vehicle and do not account for all variations in vehicle dimensions / specifications and/or driver ability or behaviour.

Rev.	Revision Note	By.	Date
A	Swept Paths Analysis	JP	01-03-21
B	Revised Swept Paths Analysis	JP	05-03-21

Swept Path Legend

- Wheel Path
- Vehicle Body Envelope
- Clearance Envelope (300mm)

Architect

Client

Cadence Australia Pty Ltd
Level 1, 10 Mallett Street
Camperdown 2050

Scale / Plan Orientation

0 2.5 5 7.5 10m

1:250 @ A3

Project Description

TAFE NSW
2-44 O'Connell Street, Kingswood, NSW, 2747

Drawing Prepared By

TRAFFIX
TRAFFIC & TRANSPORT PLANNERS

Suite 2.08, 50 Holt Street
Surry Hills, NSW 2010
PO Box 1124
Strawberry Hills, NSW 2012

t: +61 2 8324 8700
f: +61 2 9830 4481
w: www.traffix.com.au

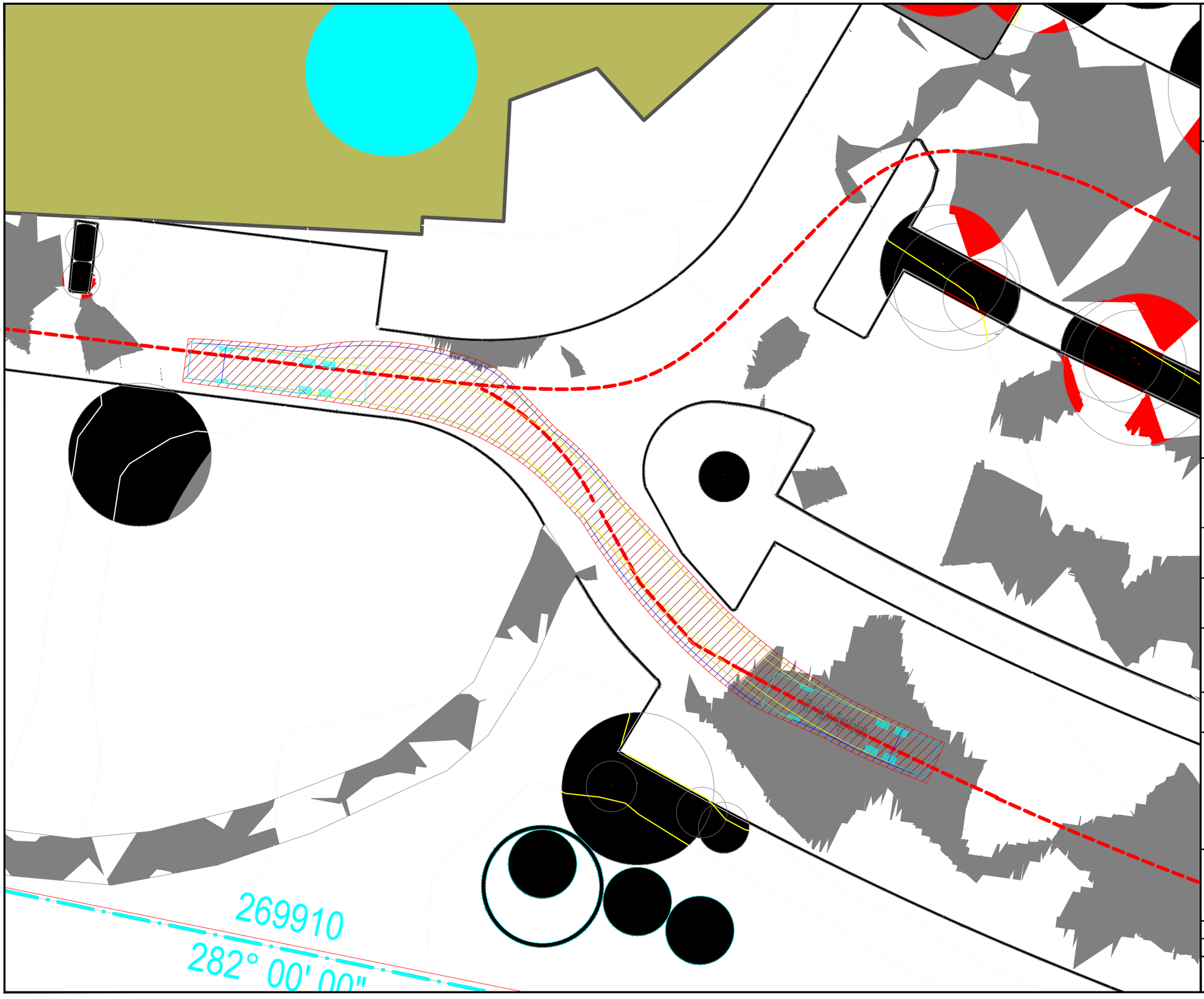
Drawing Title

Survey Plan
Exit - Bottom Car Park
12.5m Heavy Rigid Vehicle
Swept Path Analysis

Drawn:	Checked:	Date:
JP	VD	01-03-21

20.456d02v06 TRAFFIX [210205 Plans] Design Review SITE + ACCESS.dwg

Project No.	Drawing Phase	Drawing No.	Rev.
20.456	DA	TX.14	A



Notes:

This drawing is prepared for information purposes only. It is not to be used for construction.

TRAFFIX is responsible for vehicle swept path diagrams and/or drawing mark-ups only. Base drawing prepared by others.

Vehicle swept path diagrams prepared using computer generated turning path software and associated CAD drawing platforms. Vehicle data based upon relevant Australian Standards (*AS/NZS 2890.1:2004 Parking facilities - Off-street car parking*, and/or *AS2890.2:2002 Parking facilities - Off-street commercial vehicle facilities*). These standards embody a degree of tolerance, however the vehicle characteristics in these standards represent a suitable design vehicle and do not account for all variations in vehicle dimensions / specifications and/or driver ability or behaviour.

Rev.	Revision Note	By.	Date
A	Swept Paths Analysis	JP	01-03-21
B	Swept Paths Analysis	JP	05-03-21

Swept Path Legend

- Wheel Path
- Vehicle Body Envelope
- Clearance Envelope (300mm)

Architect

Client
Cadence Australia Pty Ltd
Level 1, 10 Mallett Street
Camperdown 2050

Scale / Plan Orientation

0 2.5 5 7.5 10m
1:250 @ A3

Project Description
TAFE NSW
2-44 O'Connell Street, Kingswood, NSW, 2747

Drawing Prepared By

TRAFFIX
TRAFFIC & TRANSPORT PLANNERS

Suite 2.08, 50 Holt Street
Surry Hills, NSW 2010
PO Box 1124
Strawberry Hills, NSW 2012

t: +61 2 8324 8700
f: +61 2 9830 4481
w: www.traffix.com.au

Drawing Title
Survey Plan
Carpark Exit - 12.5m Heavy Rigid Vehicle
Swept Path Analysis

Drawn:	Checked:	Date:
JP	VD	01-03-21

20.456d02v06 TRAFFIX [210205 Plans] Design Review SITE + ACCESS.dwg

Project No.	Drawing Phase	Drawing No.	Rev.
20.456	DA	TX.15	A

APPENDIX E

TfNSW Correspondence

Vince Doan

Subject: FW: [20.456] TAFE NSW Nepean Kingswood: 2-44 O'Connell Street, Kingswood

From: Vince Doan
Sent: Friday, 4 December 2020 4:37 PM
To: Laura Van putten
Cc: Justin Pindar
Subject: RE: [20.456] TAFE NSW Nepean Kingswood: 2-44 O'Connell Street, Kingswood

Hi Laura,

Thank you for the chat on Thursday (26/11/2020). We have now requested and received SCATS data. As discussed, the following will be our modelling methodology:

- Compare the intersection volume from this year and last year
- If last year volumes were greater than this year, we will use the SCATS data and the turning counts will be based on this years turning counts percentage on each approach
- If this year surveys are greater, we will use the surveys.

Please let me know if you have any other comments however, I do assume that is this the general approach for traffic modelling during this period (COVID-19).

Regards,

Vince Doan
Executive Engineer

TRAFFIX

From: Laura Van putten
Sent: Wednesday, 25 November 2020 9:44 AM
To: Vince Doan
Subject: RE: [20.456] TAFE NSW Nepean Kingswood: 2-44 O'Connell Street, Kingswood

Hi Vince

Happy to discuss – I will be available to chat in the morning tomorrow please feel free to contact me my details are below.

If for whatever reason I may be away from the phone just flick me a quick email and I will call you back.

Kind regards,

Laura van Putten

From: Vince Doan
Sent: Wednesday, 25 November 2020 8:27 AM
To: Laura Van putten
Cc: Development Sydney; Justin Pindar
Subject: RE: [20.456] TAFE NSW Nepean Kingswood: 2-44 O'Connell Street, Kingswood

Hi Laura,

Will you be free Thursday before 3pm or Friday (anytime) to have a quick chat either via the phone or teams?

Just wanted to have a quick discussion about the methodology of the proposal.

Regards,

Vince Doan
Executive Engineer

TRAFFIX

From: Sharon Verhoeven **On Behalf Of** Development Sydney
Sent: Friday, 20 November 2020 12:40 PM
To: Vince Doan
Cc: Laura Van putten
Subject: RE: [20.456] TAFE NSW Nepean Kingswood: 2-44 O'Connell Street, Kingswood

Hi Vince

It will be Laura Van Putten looking after this referral.

Kind regards
Sharon

From: Vince Doan
Sent: Friday, 20 November 2020 12:18 PM
To: Development Sydney
Cc: Justin Pindar
Subject: RE: [20.456] TAFE NSW Nepean Kingswood: 2-44 O'Connell Street, Kingswood
Importance: High

Hi,

Yet to receive anything. Could you please advise who is the best contact?

Regards,

Vince Doan
Executive Engineer

TRAFFIX

From: Vince Doan
Sent: Wednesday, 11 November 2020 4:33 PM
To: Development Sydney
Cc: Justin Pindar
Subject: [20.456] TAFE NSW Nepean Kingswood: 2-44 O'Connell Street, Kingswood

To whom it may concern,

We have been engaged by TAFE NSW as the traffic engineers for works on the TAFE Nepean Kingswood Campus. The proposal is an SSD (SSD-8571481 attached).

Could you please advise who is the best contact moving forward? In addition, I would like to arrange a quick telephone chat sometime next week to just discuss the methodology.

Please contact me should you have any queries.

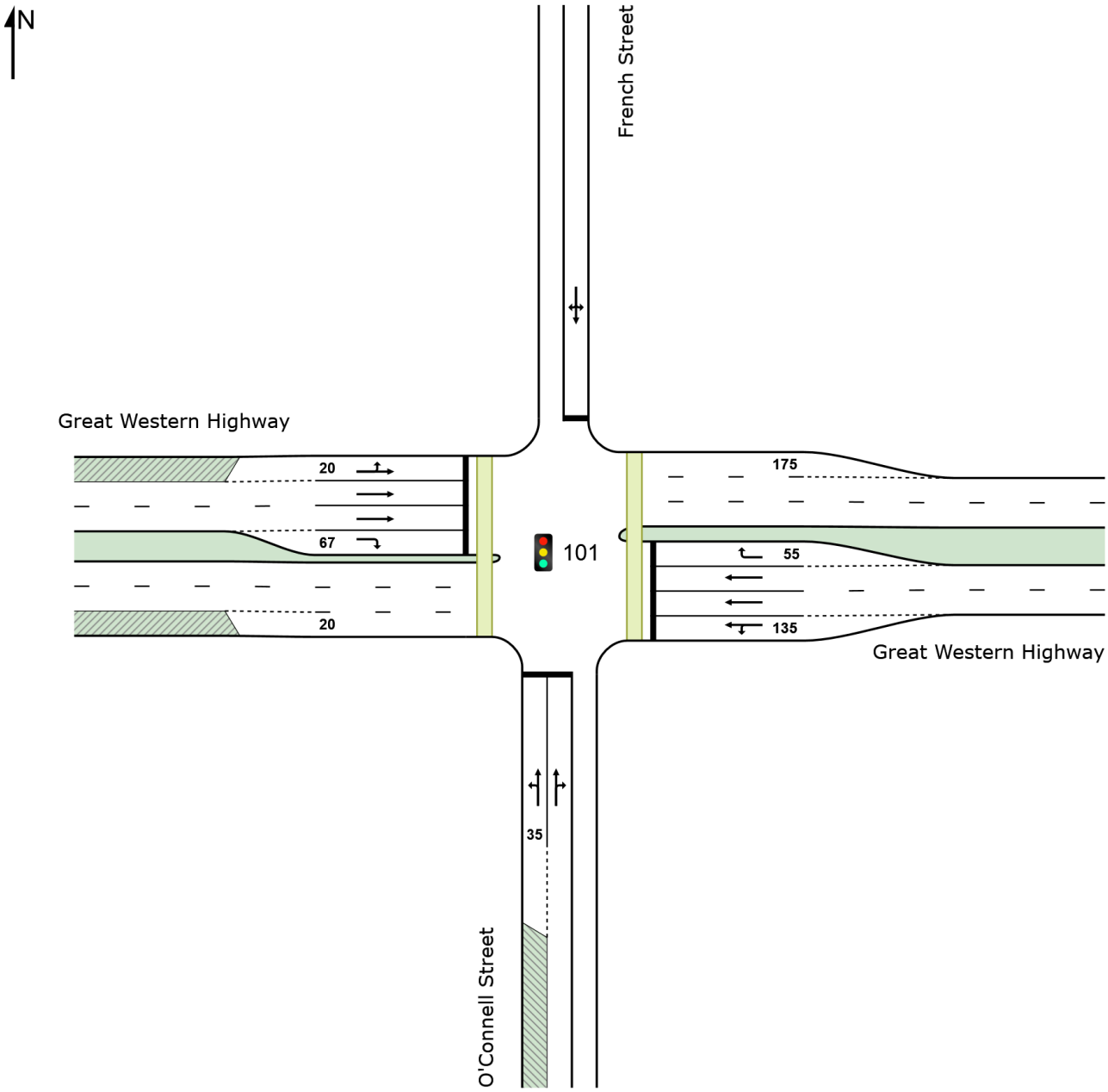
Regards,

Vince Doan
Executive Engineer

TRAFFIX

APPENDIX F-1

SIDRA Modelling Outputs
Great Western Highway, French Street and O'Connell Street


N
French Street
Great Western Highway
20
67
20
101
175
55
135
Great Western Highway
35
O'Connell Street

USER REPORT FOR SITE

All Movement Classes

Project: 20.456m01v03 TRAFFIX

Template: Movement Summaries

Site: 101 [Great Western Highway x O'Connell Street x French Street Existing AM (Site Folder: Exisitng (2020))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: TCS
Reference Phase: Phase A
Input Phase Sequence: A, B*, C*, D, E, E1*, E2*
Output Phase Sequence: A, D, E
(* Variable Phase)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: O'Connell Street														
1	L2	44	1	46	2.3	0.130	44.0	LOS D	2.6	18.6	0.81	0.71	0.81	30.4
2	T1	11	0	12	0.0	0.130	37.5	LOS C	2.6	18.6	0.81	0.71	0.81	29.1
3	R2	169	9	178	5.3	* 0.725	58.3	LOS E	10.4	76.2	0.99	0.87	1.09	25.8
Approach		224	10	236	4.5	0.725	54.5	LOS D	10.4	76.2	0.95	0.83	1.02	26.7
East: Great Western Highway														
4	L2	204	10	215	4.9	0.211	19.1	LOS B	6.1	44.3	0.52	0.72	0.52	40.3
5	T1	1458	45	1535	3.1	* 0.718	20.0	LOS B	32.7	234.9	0.78	0.72	0.78	45.2
6	R2	23	0	24	0.0	0.174	63.8	LOS E	1.4	9.7	0.97	0.71	0.97	27.8
Approach		1685	55	1774	3.3	0.718	20.5	LOS B	32.7	234.9	0.76	0.72	0.76	44.3
North: French Street														
7	L2	49	0	52	0.0	0.438	50.9	LOS D	7.4	51.6	0.92	0.79	0.92	31.1
8	T1	24	0	25	0.0	0.438	45.3	LOS D	7.4	51.6	0.92	0.79	0.92	26.9
9	R2	62	0	65	0.0	0.438	49.9	LOS D	7.4	51.6	0.92	0.79	0.92	31.2
Approach		135	0	142	0.0	0.438	49.4	LOS D	7.4	51.6	0.92	0.79	0.92	30.4
West: Great Western Highway														
10	L2	8	0	8	0.0	0.558	20.1	LOS B	10.7	77.0	0.57	0.50	0.57	44.4
11	T1	1254	43	1320	3.4	0.598	16.1	LOS B	20.5	147.4	0.62	0.55	0.62	47.6
12	R2	90	7	95	7.8	* 0.718	69.2	LOS E	5.9	43.8	1.00	0.84	1.16	23.7
Approach		1352	50	1423	3.7	0.718	19.6	LOS B	20.5	147.4	0.64	0.57	0.65	45.2
All Vehicles		3396	115	3575	3.4	0.725	23.5	LOS B	32.7	234.9	0.73	0.67	0.74	42.3

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

* Critical Movement (Signal Timing)

Site: 301 [Great Western Highway x O'Connell Street x French Street 2026 AM (Site Folder: Future - 2026)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.
Design Life Analysis (Final Year): Results for 6 years

Timings based on settings in the Site Phasing & Timing dialog (Demand & Sensitivity Analysis overrides)
Phase Times determined by the program
Phase Sequence: TCS
Reference Phase: Phase A
Input Phase Sequence: A, B*, C*, D, E, E1*, E2*
Output Phase Sequence: A, D, E, E2*
(* Variable Phase)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	INPUT VOLUMES HV] veh/h	DEMAND FLOWS [Total veh/h	DEMAND FLOWS HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	95% BACK OF QUEUE Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: O'Connell Street														
1	L2	44	1	52	2.3	0.152	45.5	LOS D	3.0	21.4	0.82	0.72	0.82	30.0
2	T1	11	0	13	0.0	0.152	38.5	LOS C	3.0	21.4	0.82	0.72	0.82	28.8
3	R2	169	9	200	5.3	* 0.913	76.8	LOS F[11]	14.0	102.8	1.00	1.06	1.45	22.1
Approach		224	10	266	4.5	0.913	68.8	LOS E[11]	14.0	102.8	0.96	0.98	1.30	23.6
East: Great Western Highway														
4	L2	204	10	242	4.9	0.234	18.8	LOS B	6.8	49.8	0.52	0.72	0.52	40.5
5	T1	1458	45	1728	3.1	* 0.817	21.1	LOS B	39.7	284.9	0.84	0.78	0.84	44.5
6	R2	23	0	27	0.0	0.294	68.7	LOS E[11]	1.6	11.5	1.00	0.71	1.00	26.8
Approach		1685	55	1997	3.3	0.817	21.5	LOS B	39.7	284.9	0.81	0.77	0.81	43.7
North: French Street														
7	L2	49	0	58	0.0	0.520	53.0	LOS D	8.5	59.8	0.94	0.80	0.94	30.6
8	T1	24	0	28	0.0	0.520	47.1	LOS D	8.5	59.8	0.94	0.80	0.94	26.5
9	R2	62	0	73	0.0	0.520	51.7	LOS D	8.5	59.8	0.94	0.80	0.94	30.7
Approach		135	0	160	0.0	0.520	51.3	LOS D	8.5	59.8	0.94	0.80	0.94	30.0
West: Great Western Highway														
10	L2	8	0	9	0.0	0.601	18.3	LOS B	11.2	80.8	0.54	0.48	0.54	45.4
11	T1	1254	43	1487	3.4	0.643	14.4	LOS A	22.8	164.4	0.60	0.53	0.60	48.7
12	R2	90	7	107	7.8	* 0.808	72.0	LOS F[11]	6.8	50.9	1.00	0.91	1.29	23.1
Approach		1352	50	1603	3.7	0.808	18.3	LOS B	22.8	164.4	0.63	0.56	0.64	46.0
All Vehicles		3396	115	4026	3.4	0.913	24.5	LOS B	39.7	284.9	0.75	0.70	0.78	41.9

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

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.
* Critical Movement (Signal Timing)

Site: 501 [Great Western Highway x O'Connell Street x French Street 2026+DEV AM (Site Folder: Future - 2026 + DEV)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.
Design Life Analysis (Final Year): Results for 6 years

Timings based on settings in the Site Phasing & Timing dialog (Demand & Sensitivity Analysis overrides)
Phase Times determined by the program
Phase Sequence: TCS
Reference Phase: Phase A
Input Phase Sequence: A, B*, C*, D, E, E1*, E2*
Output Phase Sequence: A, D, E
(* Variable Phase)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: O'Connell Street														
1	L2	48	1	56	2.1	0.168	46.6	LOS D	3.2	23.1	0.84	0.72	0.84	29.7
2	T1	11	0	13	0.0	0.168	39.6	LOS C	3.2	23.1	0.84	0.72	0.84	28.5
3	R2	170	9	201	5.3	* 0.923	79.1	LOS F[11]	14.4	105.1	1.00	1.08	1.48	21.7
Approach		229	10	271	4.4	0.923	70.4	LOS E[11]	14.4	105.1	0.96	0.99	1.32	23.3
East: Great Western Highway														
4	L2	209	10	247	4.8	0.243	19.4	LOS B	7.1	52.0	0.54	0.73	0.54	40.2
5	T1	1458	45	1728	3.1	* 0.831	23.2	LOS B	41.6	298.9	0.86	0.80	0.87	43.4
6	R2	23	0	27	0.0	0.176	62.6	LOS E[11]	1.5	10.8	0.96	0.72	0.96	28.1
Approach		1690	55	2003	3.3	0.831	23.3	LOS B	41.6	298.9	0.82	0.79	0.83	42.8
North: French Street														
7	L2	49	0	58	0.0	0.524	53.1	LOS D	8.6	59.9	0.94	0.80	0.94	30.6
8	T1	24	0	28	0.0	0.524	47.2	LOS D	8.6	59.9	0.94	0.80	0.94	26.5
9	R2	62	0	73	0.0	0.524	51.7	LOS D	8.6	59.9	0.94	0.80	0.94	30.7
Approach		135	0	160	0.0	0.524	51.4	LOS D	8.6	59.9	0.94	0.80	0.94	30.0
West: Great Western Highway														
10	L2	8	0	9	0.0	0.645	20.5	LOS B	12.0	86.3	0.58	0.51	0.58	44.2
11	T1	1254	43	1487	3.4	0.691	16.9	LOS B	24.8	178.5	0.65	0.58	0.65	47.1
12	R2	107	7	125	6.7	* 0.843	73.0	LOS F[11]	8.1	59.8	1.00	0.94	1.33	23.0
Approach		1369	50	1621	3.7	0.843	21.2	LOS B	24.8	178.5	0.68	0.61	0.70	44.3
All Vehicles		3423	115	4054	3.4	0.923	26.7	LOS B	41.6	298.9	0.78	0.73	0.82	40.8

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

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.
* Critical Movement (Signal Timing)

Site: 701 [Great Western Highway x O'Connell Street x French Street 2030 AM (Site Folder: Future - 2030)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 130 seconds (Site Practical Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.
Design Life Analysis (Final Year): Results for 10 years

Timings based on settings in the Site Phasing & Timing dialog (Demand & Sensitivity Analysis overrides)
Phase Times determined by the program
Phase Sequence: TCS
Reference Phase: Phase A
Input Phase Sequence: A, B*, C*, D, E, E1*, E2*
Output Phase Sequence: A, D, E
(* Variable Phase)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: O'Connell Street														
1	L2	44	1	56	2.3	0.160	48.4	LOS D	3.5	24.9	0.82	0.72	0.82	29.2
2	T1	11	0	14	0.0	0.160	41.2	LOS C	3.5	24.9	0.82	0.72	0.82	28.0
3	R2	169	9	217	5.3	* 0.985	106.5	LOS F[11]	19.0	139.3	1.00	1.17	1.65	18.0
Approach		224	10	287	4.5	0.985	91.9	LOS F[11]	19.0	139.3	0.96	1.06	1.45	19.8
East: Great Western Highway														
4	L2	204	10	262	4.9	0.253	20.0	LOS B	8.1	58.7	0.53	0.73	0.53	39.8
5	T1	1458	45	1871	3.1	* 0.903	34.9	LOS C	60.0	430.8	0.90	0.91	1.00	38.1
6	R2	23	0	30	0.0	0.207	68.4	LOS E[11]	1.8	12.7	0.97	0.72	0.97	26.9
Approach		1685	55	2162	3.3	0.903	33.5	LOS C	60.0	430.8	0.86	0.89	0.94	38.1
North: French Street														
7	L2	49	0	63	0.0	0.542	57.2	LOS E[11]	10.0	70.2	0.95	0.81	0.95	29.6
8	T1	24	0	31	0.0	0.542	51.1	LOS D	10.0	70.2	0.95	0.81	0.95	25.5
9	R2	62	0	80	0.0	0.542	55.6	LOS D	10.0	70.2	0.95	0.81	0.95	29.7
Approach		135	0	173	0.0	0.542	55.4	LOS D	10.0	70.2	0.95	0.81	0.95	29.0
West: Great Western Highway														
10	L2	8	0	10	0.0	0.691	21.1	LOS B	13.3	95.8	0.58	0.51	0.58	43.9
11	T1	1254	43	1609	3.4	0.740	18.2	LOS B	30.7	220.9	0.66	0.59	0.66	46.4
12	R2	90	7	115	7.8	* 0.853	79.3	LOS F[11]	8.1	60.7	1.00	0.94	1.35	21.8
Approach		1352	50	1735	3.7	0.853	22.2	LOS B	30.7	220.9	0.68	0.62	0.71	43.8
All Vehicles		3396	115	4358	3.4	0.985	33.8	LOS C	60.0	430.8	0.80	0.79	0.88	37.7

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

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.
* Critical Movement (Signal Timing)

Site: 901 [Great Western Highway x O'Connell Street x French Street 2030+DEV AM (Site Folder: Future - 2030 +DEV)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 130 seconds (Site User-Given Cycle Time)
Design Life Analysis (Final Year): Results for 10 years

Timings based on settings in the Site Phasing & Timing dialog (Demand & Sensitivity Analysis overrides)
Phase Times determined by the program
Phase Sequence: TCS - Existing
Reference Phase: Phase A
Input Phase Sequence: A, D, E
Output Phase Sequence: A, D, E

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: O'Connell Street														
1	L2	54	1	67	1.9	0.177	47.9	LOS D	4.0	28.4	0.82	0.73	0.82	29.5
2	T1	11	0	14	0.0	0.177	40.6	LOS C	4.0	28.4	0.82	0.73	0.82	28.2
3	R2	172	9	220	5.2	* 1.052	145.4	LOS F[11]	23.1	169.0	1.00	1.30	1.92	14.2
Approach		237	10	301	4.3	1.052	118.8	LOS F[11]	23.1	169.0	0.95	1.15	1.62	16.5
East: Great Western Highway														
4	L2	215	10	273	4.7	0.275	21.7	LOS B	8.9	65.1	0.56	0.74	0.56	38.9
5	T1	1458	45	1871	3.1	* 0.947	51.7	LOS D	72.2	519.1	0.95	1.05	1.17	32.4
6	R2	23	0	30	0.0	0.159	64.5	LOS E[11]	1.8	12.3	0.95	0.72	0.95	27.7
Approach		1696	55	2174	3.2	0.947	48.1	LOS D	72.2	519.1	0.90	1.01	1.09	32.9
North: French Street														
7	L2	49	0	63	0.0	0.569	56.9	LOS E[11]	10.5	73.3	0.95	0.81	0.95	29.8
8	T1	31	0	38	0.0	0.569	50.7	LOS D	10.5	73.3	0.95	0.81	0.95	25.9
9	R2	62	0	80	0.0	0.569	55.2	LOS D	10.5	73.3	0.95	0.81	0.95	29.9
Approach		142	0	181	0.0	0.569	54.8	LOS D	10.5	73.3	0.95	0.81	0.95	29.1
West: Great Western Highway														
10	L2	8	0	10	0.0	0.736	23.3	LOS B	14.3	103.1	0.61	0.54	0.61	42.7
11	T1	1254	43	1609	3.4	0.788	21.0	LOS B	31.6	228.0	0.69	0.63	0.71	44.8
12	R2	129	7	157	5.7	* 0.877	79.3	LOS F[11]	11.1	81.9	1.00	0.96	1.35	22.0
Approach		1391	50	1776	3.6	0.877	26.2	LOS B	31.6	228.0	0.72	0.66	0.76	41.7
All Vehicles		3466	115	4431	3.3	1.052	44.4	LOS D	72.2	519.1	0.84	0.87	0.99	33.8

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

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.
* Critical Movement (Signal Timing)

Site: 201 [Great Western Highway x O'Connell Street x French Street Existing PM (Site Folder: Exisitng (2020))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: TCS
Reference Phase: Phase A
Input Phase Sequence: A, B*, C*, D, E, E1*, E2*
Output Phase Sequence: A, D, E
(* Variable Phase)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: O'Connell Street														
1	L2	55	4	58	7.3	0.144	40.6	LOS C	3.1	22.9	0.78	0.71	0.78	31.3
2	T1	17	0	18	0.0	0.722	37.8	LOS C	12.0	86.9	0.83	0.75	0.84	28.9
3	R2	198	8	208	4.0	* 0.722	53.3	LOS D	12.0	86.9	0.97	0.87	1.04	27.0
Approach		270	12	284	4.4	0.722	49.8	LOS D	12.0	86.9	0.92	0.83	0.98	27.9
East: Great Western Highway														
4	L2	216	9	227	4.2	0.236	21.4	LOS B	7.0	50.6	0.57	0.73	0.57	39.0
5	T1	1220	25	1284	2.0	0.655	20.8	LOS B	27.8	198.2	0.76	0.68	0.76	44.7
6	R2	73	0	77	0.0	0.552	66.4	LOS E	4.6	32.1	1.00	0.77	1.01	27.3
Approach		1509	34	1588	2.3	0.655	23.1	LOS B	27.8	198.2	0.74	0.70	0.74	42.6
North: French Street														
7	L2	40	1	42	2.5	0.338	46.8	LOS D	6.0	42.5	0.87	0.77	0.87	32.2
8	T1	18	0	19	0.0	0.338	40.9	LOS C	6.0	42.5	0.87	0.77	0.87	28.0
9	R2	58	1	61	1.7	0.338	45.5	LOS D	6.0	42.5	0.87	0.77	0.87	32.3
Approach		116	2	122	1.7	0.338	45.2	LOS D	6.0	42.5	0.87	0.77	0.87	31.7
West: Great Western Highway														
10	L2	19	1	20	5.3	0.688	22.9	LOS B	12.9	91.4	0.62	0.55	0.62	42.8
11	T1	1441	24	1517	1.7	* 0.737	19.9	LOS B	29.0	205.9	0.71	0.63	0.71	45.4
12	R2	85	4	89	4.7	* 0.664	68.0	LOS E	5.5	39.8	1.00	0.82	1.10	23.9
Approach		1545	29	1626	1.9	0.737	22.5	LOS B	29.0	205.9	0.72	0.64	0.73	43.6
All Vehicles		3440	77	3621	2.2	0.737	25.7	LOS B	29.0	205.9	0.75	0.68	0.76	41.2

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

* Critical Movement (Signal Timing)

Site: 401 [Great Western Highway x O'Connell Street x French Street 2026 PM (Site Folder: Future - 2026)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.
Design Life Analysis (Final Year): Results for 6 years

Timings based on settings in the Site Phasing & Timing dialog (Demand & Sensitivity Analysis overrides)
Phase Times determined by the program
Phase Sequence: TCS
Reference Phase: Phase A
Input Phase Sequence: A, B*, C*, D, E, E1*, E2*
Output Phase Sequence: A, D, E, E2*
(* Variable Phase)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: O'Connell Street														
1	L2	55	4	65	7.3	0.161	40.3	LOS C	3.5	26.1	0.78	0.71	0.78	31.5
2	T1	17	0	20	0.0	0.807	37.2	LOS C	14.3	103.9	0.82	0.75	0.85	29.1
3	R2	198	8	235	4.0	* 0.807	57.6	LOS E[11]	14.3	103.9	0.98	0.93	1.16	26.0
Approach		270	12	320	4.4	0.807	52.8	LOS D	14.3	103.9	0.93	0.88	1.06	27.1
East: Great Western Highway														
4	L2	216	9	256	4.2	0.270	22.3	LOS B	8.2	59.2	0.59	0.74	0.59	38.6
5	T1	1220	25	1446	2.0	0.754	23.1	LOS B	33.9	241.2	0.82	0.75	0.82	43.5
6	R2	73	0	87	0.0	* 0.799	73.1	LOS F[11]	5.6	38.9	1.00	0.89	1.29	26.0
Approach		1509	34	1789	2.3	0.799	25.4	LOS B	33.9	241.2	0.80	0.76	0.81	41.5
North: French Street														
7	L2	40	1	47	2.5	0.370	47.5	LOS D	6.8	48.2	0.88	0.77	0.88	32.1
8	T1	18	0	21	0.0	0.370	41.3	LOS C	6.8	48.2	0.88	0.77	0.88	28.0
9	R2	58	1	69	1.7	0.370	45.8	LOS D	6.8	48.2	0.88	0.77	0.88	32.2
Approach		116	2	138	1.7	0.370	45.7	LOS D	6.8	48.2	0.88	0.77	0.88	31.6
West: Great Western Highway														
10	L2	19	1	23	5.3	0.773	26.1	LOS B	15.5	109.9	0.63	0.60	0.68	41.3
11	T1	1441	24	1708	1.7	* 0.828	24.3	LOS B	36.8	261.3	0.74	0.71	0.79	43.0
12	R2	85	4	101	4.7	0.748	69.8	LOS E[11]	6.3	45.8	1.00	0.86	1.19	23.6
Approach		1545	29	1831	1.9	0.828	26.8	LOS B	36.8	261.3	0.75	0.72	0.81	41.5
All Vehicles		3440	77	4078	2.2	0.828	28.9	LOS C	36.8	261.3	0.79	0.75	0.84	39.7

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

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.
* Critical Movement (Signal Timing)

Site: 601 [Great Western Highway x O'Connell Street x French Street 2026+DEV PM (Site Folder: Future - 2026 + DEV)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.
Design Life Analysis (Final Year): Results for 6 years

Timings based on settings in the Site Phasing & Timing dialog (Demand & Sensitivity Analysis overrides)
Phase Times determined by the program
Phase Sequence: TCS
Reference Phase: Phase A
Input Phase Sequence: A, B*, C*, D, E, E1*, E2*
Output Phase Sequence: A, D, E, E2*
(* Variable Phase)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: O'Connell Street														
1	L2	63	4	74	6.4	0.166	39.8	LOS C	3.7	27.4	0.77	0.72	0.77	31.8
2	T1	17	0	20	0.0	0.830	40.2	LOS C	15.0	108.7	0.84	0.79	0.91	28.2
3	R2	200	8	237	4.0	* 0.830	59.7	LOS E[11]	15.0	108.7	0.99	0.95	1.20	25.5
Approach		280	12	331	4.3	0.830	54.1	LOS D	15.0	108.7	0.93	0.89	1.09	26.8
East: Great Western Highway														
4	L2	217	9	257	4.1	0.271	22.3	LOS B	8.2	59.5	0.59	0.74	0.59	38.6
5	T1	1220	25	1446	2.0	0.753	23.1	LOS B	33.9	241.5	0.82	0.75	0.82	43.5
6	R2	73	0	87	0.0	* 0.799	73.1	LOS F[11]	5.6	38.9	1.00	0.89	1.29	26.0
Approach		1510	34	1790	2.3	0.799	25.4	LOS B	33.9	241.5	0.80	0.76	0.81	41.5
North: French Street														
7	L2	41	1	48	2.4	0.374	47.6	LOS D	6.8	48.6	0.88	0.77	0.88	32.1
8	T1	18	0	21	0.0	0.374	41.3	LOS C	6.8	48.6	0.88	0.77	0.88	28.0
9	R2	58	1	69	1.7	0.374	45.9	LOS D	6.8	48.6	0.88	0.77	0.88	32.2
Approach		117	2	139	1.7	0.374	45.8	LOS D	6.8	48.6	0.88	0.77	0.88	31.6
West: Great Western Highway														
10	L2	19	1	23	5.3	0.774	26.2	LOS B	15.6	111.0	0.63	0.60	0.68	41.2
11	T1	1441	24	1708	1.7	* 0.829	24.4	LOS B	36.8	261.5	0.74	0.71	0.79	43.0
12	R2	88	4	104	4.6	0.770	70.4	LOS E[11]	6.5	47.5	1.00	0.88	1.22	23.5
Approach		1548	29	1835	1.9	0.829	27.0	LOS B	36.8	261.5	0.75	0.72	0.82	41.4
All Vehicles		3455	77	4094	2.2	0.830	29.1	LOS C	36.8	261.5	0.79	0.75	0.84	39.6

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

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.
* Critical Movement (Signal Timing)

Site: 801 [Great Western Highway x O'Connell Street x French Street 2030 PM (Site Folder: Future - 2030)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 140 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.
Design Life Analysis (Final Year): Results for 10 years

Timings based on settings in the Site Phasing & Timing dialog (Demand & Sensitivity Analysis overrides)
Phase Times determined by the program
Phase Sequence: TCS
Reference Phase: Phase A
Input Phase Sequence: A, B*, C*, D, E, E1*, E2*
Output Phase Sequence: A, D, E, E2*
(* Variable Phase)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	INPUT VOLUMES HV] veh/h	DEMAND FLOWS [Total veh/h	DEMAND FLOWS HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	95% BACK OF QUEUE Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: O'Connell Street														
1	L2	55	4	71	7.3	0.180	46.8	LOS D	4.7	34.3	0.79	0.72	0.79	29.5
2	T1	17	0	22	0.0	*0.902	41.4	LOS C	20.0	144.7	0.80	0.73	0.81	28.0
3	R2	198	8	254	4.0	0.902	78.9	LOS F[11]	20.0	144.7	1.00	1.02	1.33	21.7
Approach		270	12	346	4.4	0.902	70.0	LOS E[11]	20.0	144.7	0.95	0.94	1.19	23.3
East: Great Western Highway														
4	L2	216	9	277	4.2	0.283	23.8	LOS B	10.0	72.6	0.58	0.74	0.58	37.8
5	T1	1220	25	1565	2.0	0.820	26.1	LOS B	40.7	289.7	0.84	0.77	0.84	42.0
6	R2	73	0	94	0.0	*0.883	88.3	LOS F[11]	7.2	50.5	1.00	0.95	1.42	23.5
Approach		1509	34	1936	2.3	0.883	28.8	LOS C	40.7	289.7	0.81	0.77	0.83	39.9
North: French Street														
7	L2	40	1	51	2.5	0.396	53.9	LOS D	8.5	60.5	0.88	0.78	0.88	30.5
8	T1	18	0	23	0.0	0.396	47.3	LOS D	8.5	60.5	0.88	0.78	0.88	26.4
9	R2	58	1	74	1.7	0.396	51.9	LOS D	8.5	60.5	0.88	0.78	0.88	30.6
Approach		116	2	149	1.7	0.396	51.9	LOS D	8.5	60.5	0.88	0.78	0.88	30.0
West: Great Western Highway														
10	L2	19	1	24	5.3	0.827	33.2	LOS C	19.6	139.4	0.61	0.63	0.71	38.2
11	T1	1441	24	1849	1.7	*0.886	33.6	LOS C	51.8	368.1	0.76	0.76	0.85	38.8
12	R2	85	4	109	4.7	0.850	84.5	LOS F[11]	8.2	59.7	1.00	0.93	1.33	21.0
Approach		1545	29	1982	1.9	0.886	36.4	LOS C	51.8	368.1	0.77	0.77	0.88	37.4
All Vehicles		3440	77	4414	2.2	0.902	36.2	LOS C	51.8	368.1	0.80	0.79	0.88	36.7

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

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.
* Critical Movement (Signal Timing)

Site: 1001 [Great Western Highway x O'Connell Street x French Street 2030+DEV PM (Site Folder: Future - 2030 +DEV)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 140 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.
Design Life Analysis (Final Year): Results for 10 years

Timings based on settings in the Site Phasing & Timing dialog (Demand & Sensitivity Analysis overrides)
Phase Times determined by the program
Phase Sequence: TCS
Reference Phase: Phase A
Input Phase Sequence: A, B*, C*, D, E, E1*, E2*
Output Phase Sequence: A, D, E, E2*
(* Variable Phase)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	INPUT VOLUMES HV] veh/h	DEMAND FLOWS [Total veh/h	DEMAND FLOWS HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	95% BACK OF QUEUE Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: O'Connell Street														
1	L2	73	4	90	5.7	0.181	42.6	LOS D	5.0	36.4	0.75	0.72	0.75	31.0
2	T1	17	0	22	0.0	* 0.905	49.5	LOS D	21.0	151.6	0.84	0.83	0.96	25.9
3	R2	203	8	259	4.0	0.905	78.6	LOS F[11]	21.0	151.6	0.99	1.03	1.33	21.8
Approach		293	12	371	4.2	0.905	68.2	LOS E[11]	21.0	151.6	0.93	0.94	1.17	23.7
East: Great Western Highway														
4	L2	218	9	279	4.1	0.297	25.6	LOS B	10.6	76.7	0.61	0.75	0.61	36.9
5	T1	1220	25	1565	2.0	0.859	32.8	LOS C	45.6	324.8	0.87	0.83	0.92	39.0
6	R2	73	0	94	0.0	* 0.883	88.3	LOS F[11]	7.2	50.5	1.00	0.95	1.42	23.5
Approach		1511	34	1938	2.3	0.883	34.4	LOS C	45.6	324.8	0.84	0.83	0.90	37.5
North: French Street														
7	L2	40	1	51	2.5	0.383	52.1	LOS D	8.4	59.8	0.87	0.78	0.87	31.0
8	T1	19	0	24	0.0	0.383	45.6	LOS D	8.4	59.8	0.87	0.78	0.87	26.9
9	R2	58	1	74	1.7	0.383	50.1	LOS D	8.4	59.8	0.87	0.78	0.87	31.1
Approach		117	2	150	1.7	0.383	50.1	LOS D	8.4	59.8	0.87	0.78	0.87	30.4
West: Great Western Highway														
10	L2	19	1	24	5.3	0.854	38.9	LOS C	22.0	156.3	0.64	0.68	0.78	36.0
11	T1	1441	24	1849	1.7	* 0.915	41.8	LOS C	57.5	408.1	0.78	0.83	0.93	35.7
12	R2	95	4	120	4.3	0.845	83.4	LOS F[11]	8.9	64.9	1.00	0.92	1.30	21.2
Approach		1555	29	1993	1.9	0.915	44.3	LOS D	57.5	408.1	0.79	0.83	0.95	34.6
All Vehicles		3476	77	4452	2.2	0.915	42.2	LOS C	57.5	408.1	0.83	0.84	0.94	34.5

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

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.
* Critical Movement (Signal Timing)

APPENDIX F-2

SIDRA Modelling Outputs
Great Western Highway/Bringelly Road

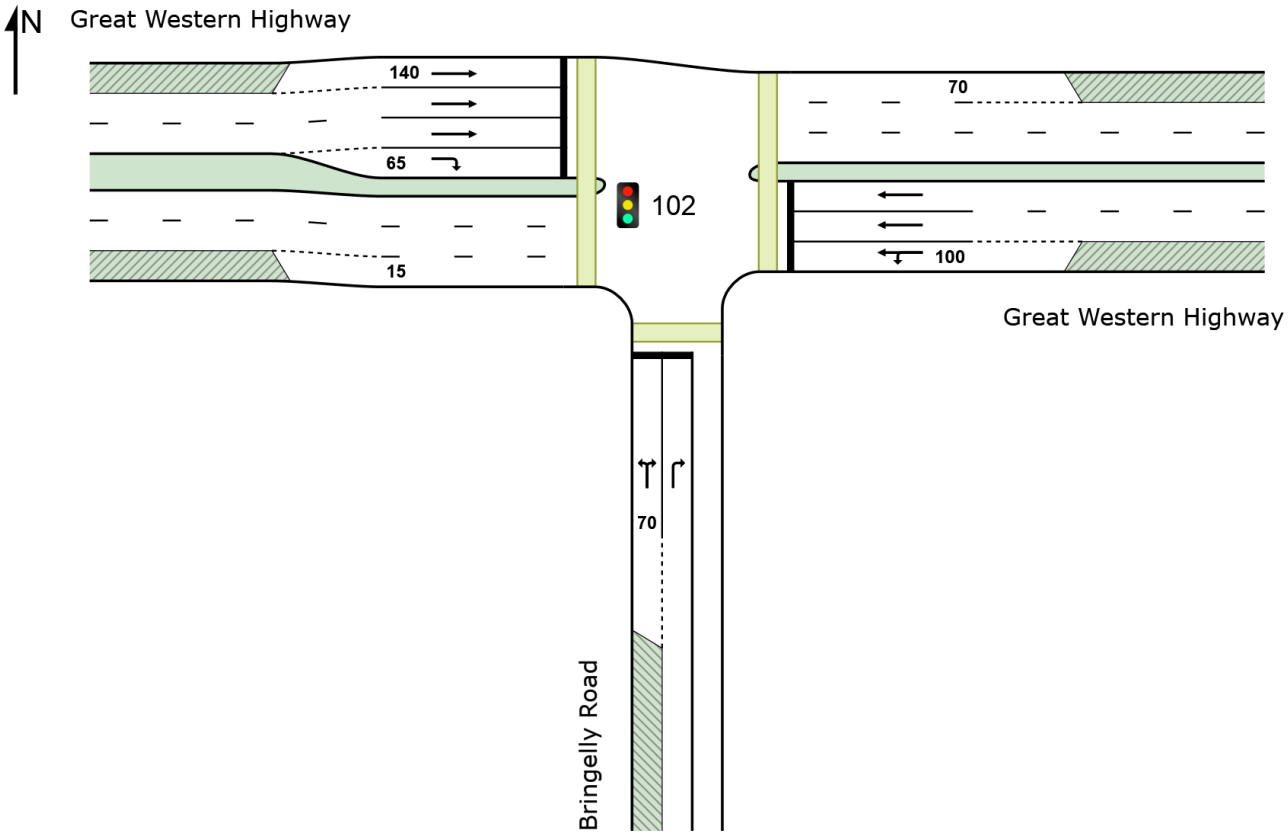
Site: 102 [Great Western Highway x Bringelly Road Exsting AM (Site Folder: Exisitng (2020))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Site: 102 [Great Western Highway x Bringelly Road Exsting AM (Site Folder: Exisitng (2020))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site Optimum Cycle Time - Minimum Delay)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Bringelly Road														
1	L2	177	10	186	5.6	0.661	52.5	LOS D	14.6	106.1	0.96	0.84	0.96	31.8
3	R2	299	9	315	3.0	*0.661	53.8	LOS D	14.6	106.1	0.98	0.83	0.98	26.0
Approach		476	19	501	4.0	0.661	53.3	LOS D	14.6	106.1	0.97	0.83	0.97	28.3
East: Great Western Highway														
4	L2	167	4	176	2.4	0.199	24.3	LOS B	5.8	41.3	0.61	0.73	0.61	37.0
5	T1	1163	40	1224	3.4	*0.674	25.1	LOS B	27.6	198.6	0.82	0.74	0.82	45.4
Approach		1330	44	1400	3.3	0.674	25.0	LOS B	27.6	198.6	0.79	0.74	0.79	44.7
West: Great Western Highway														
11	T1	1151	47	1212	4.1	0.375	7.3	LOS A	11.5	83.2	0.42	0.37	0.42	55.0
12	R2	185	10	195	5.4	*0.459	40.6	LOS C	9.8	71.6	0.91	0.92	0.91	35.1
Approach		1336	57	1406	4.3	0.459	11.9	LOS A	11.5	83.2	0.48	0.45	0.48	51.8
All Vehicles		3142	120	3307	3.8	0.674	23.7	LOS B	27.6	198.6	0.69	0.63	0.69	44.8

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

* Critical Movement (Signal Timing)

Site: 302 [Great Western Highway x Bringelly Road 2026 AM (Site Folder: Future - 2026)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Design Life Analysis (Final Year): Results for 6 years

Timings based on settings in the Site Phasing & Timing dialog (Demand & Sensitivity Analysis overrides)
Phase Times determined by the program
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Bringelly Road														
1	L2	177	10	210	5.6	0.744	55.5	LOS D	17.2	125.6	0.99	0.87	1.04	31.0
3	R2	299	9	354	3.0	* 0.744	56.5	LOS E[11]	17.2	125.6	1.00	0.87	1.06	25.3
Approach		476	19	564	4.0	0.744	56.1	LOS D	17.2	125.6	0.99	0.87	1.05	27.6
East: Great Western Highway														
4	L2	167	4	198	2.4	0.221	24.0	LOS B	6.5	46.4	0.61	0.74	0.61	37.2
5	T1	1163	40	1379	3.4	* 0.760	25.9	LOS B	33.5	241.7	0.86	0.78	0.86	45.1
Approach		1330	44	1577	3.3	0.760	25.6	LOS B	33.5	241.7	0.83	0.78	0.83	44.4
West: Great Western Highway														
11	T1	1151	47	1364	4.1	0.423	7.7	LOS A	13.6	98.3	0.43	0.39	0.43	54.8
12	R2	185	10	219	5.4	* 0.563	48.7	LOS D	11.3	83.0	0.95	0.98	0.95	32.5
Approach		1336	57	1584	4.3	0.563	13.4	LOS A	13.6	98.3	0.50	0.47	0.50	51.0
All Vehicles		3142	120	3725	3.8	0.760	25.0	LOS B	33.5	241.7	0.72	0.66	0.73	44.2

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

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.
* Critical Movement (Signal Timing)

Site: 502 [Great Western Highway x Bringelly Road 2026+DEV AM (Site Folder: Future - 2026 + DEV)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Design Life Analysis (Final Year): Results for 6 years

Timings based on settings in the Site Phasing & Timing dialog (Demand & Sensitivity Analysis overrides)
Phase Times determined by the program
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	INPUT VOLUMES HV] veh/h	DEMAND FLOWS [Total veh/h	DEMAND FLOWS HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	95% BACK OF QUEUE Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Bringelly Road														
1	L2	177	10	210	5.6	0.744	55.5	LOS D	17.2	125.6	0.99	0.87	1.04	31.0
3	R2	299	9	354	3.0	* 0.744	56.5	LOS E[11]	17.2	125.6	1.00	0.87	1.06	25.3
Approach		476	19	564	4.0	0.744	56.2	LOS D	17.2	125.6	0.99	0.87	1.05	27.6
East: Great Western Highway														
4	L2	167	4	198	2.4	0.217	23.4	LOS B	6.4	45.6	0.60	0.74	0.60	37.6
5	T1	1167	40	1383	3.4	* 0.749	25.1	LOS B	33.1	238.2	0.85	0.77	0.85	45.4
Approach		1334	44	1581	3.3	0.749	24.8	LOS B	33.1	238.2	0.82	0.77	0.82	44.8
West: Great Western Highway														
11	T1	1168	47	1382	4.0	0.428	7.7	LOS A	13.8	100.1	0.44	0.39	0.44	54.8
12	R2	185	10	219	5.4	* 0.583	49.0	LOS D	11.4	83.8	0.96	0.98	0.96	32.4
Approach		1353	57	1602	4.2	0.583	13.4	LOS A	13.8	100.1	0.51	0.47	0.51	51.0
All Vehicles		3163	120	3747	3.8	0.749	24.7	LOS B	33.1	238.2	0.71	0.66	0.72	44.4

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

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.
* Critical Movement (Signal Timing)

Site: 702 [Great Western Highway x Bringelly Road 2030 AM (Site Folder: Future - 2030)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Design Life Analysis (Final Year): Results for 10 years

Timings based on settings in the Site Phasing & Timing dialog (Demand & Sensitivity Analysis overrides)
Phase Times determined by the program
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Bringelly Road														
1	L2	177	10	227	5.6	0.826	60.5	LOS E[11]	19.5	141.9	1.00	0.92	1.15	29.8
3	R2	299	9	384	3.0	* 0.826	61.3	LOS E[11]	19.5	141.9	1.00	0.92	1.17	24.1
Approach		476	19	611	4.0	0.826	61.0	LOS E[11]	19.5	141.9	1.00	0.92	1.16	26.4
East: Great Western Highway														
4	L2	167	4	214	2.4	0.235	23.6	LOS B	7.0	49.9	0.60	0.74	0.60	37.4
5	T1	1163	40	1492	3.4	* 0.819	28.0	LOS B	39.2	282.3	0.89	0.83	0.91	44.2
Approach		1330	44	1707	3.3	0.819	27.4	LOS B	39.2	282.3	0.85	0.82	0.87	43.6
West: Great Western Highway														
11	T1	1151	47	1477	4.1	0.458	8.0	LOS A	15.2	110.3	0.45	0.40	0.45	54.6
12	R2	185	10	237	5.4	* 0.652	53.5	LOS D	12.5	91.8	0.97	1.00	0.97	31.2
Approach		1336	57	1714	4.3	0.652	14.3	LOS A	15.2	110.3	0.52	0.49	0.52	50.5
All Vehicles		3142	120	4032	3.8	0.826	26.9	LOS B	39.2	282.3	0.73	0.69	0.77	43.4

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

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.
* Critical Movement (Signal Timing)

Site: 902 [Great Western Highway x Bringelly Road 2030+DEV AM (Site Folder: Future - 2030 +DEV)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Design Life Analysis (Final Year): Results for 10 years

Timings based on settings in the Site Phasing & Timing dialog (Demand & Sensitivity Analysis overrides)
Phase Times determined by the program
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Bringelly Road														
1	L2	177	10	227	5.6	0.826	60.5	LOS E[11]	19.5	141.9	1.00	0.92	1.15	29.8
3	R2	299	9	384	3.0	* 0.826	61.2	LOS E[11]	19.5	141.9	1.00	0.92	1.17	24.1
Approach		476	19	611	4.0	0.826	61.0	LOS E[11]	19.5	141.9	1.00	0.92	1.16	26.4
East: Great Western Highway														
4	L2	167	4	214	2.4	0.235	23.6	LOS B	7.0	49.9	0.60	0.74	0.60	37.4
5	T1	1173	40	1503	3.4	* 0.825	28.6	LOS C	40.0	288.2	0.89	0.84	0.92	43.9
Approach		1340	44	1717	3.3	0.825	28.0	LOS B	40.0	288.2	0.86	0.83	0.88	43.4
West: Great Western Highway														
11	T1	1190	47	1518	4.0	0.480	8.1	LOS A	16.4	118.4	0.45	0.41	0.45	54.6
12	R2	185	10	237	5.4	* 0.654	53.8	LOS D	12.5	91.8	0.98	1.00	0.98	31.1
Approach		1375	57	1755	4.2	0.654	14.3	LOS A	16.4	118.4	0.52	0.49	0.52	50.5
All Vehicles		3191	120	4083	3.8	0.826	27.0	LOS B	40.0	288.2	0.74	0.70	0.77	43.3

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

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.
* Critical Movement (Signal Timing)

Site: 202 [Great Western Highway x Bringelly Road Exsting PM (Site Folder: Exisitng (2020))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site Optimum Cycle Time - Minimum Delay)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Bringelly Road														
1	L2	165	5	174	3.0	0.639	49.8	LOS D	15.7	111.9	0.95	0.84	0.95	32.6
3	R2	379	6	399	1.6	*0.639	50.0	LOS D	15.7	111.9	0.95	0.84	0.95	27.0
Approach		544	11	573	2.0	0.639	49.9	LOS D	15.7	111.9	0.95	0.84	0.95	28.9
East: Great Western Highway														
4	L2	197	1	207	0.5	0.240	25.9	LOS B	7.2	50.5	0.64	0.75	0.64	36.3
5	T1	1098	30	1156	2.7	*0.652	26.0	LOS B	25.9	185.4	0.82	0.74	0.82	45.0
Approach		1295	31	1363	2.4	0.652	26.0	LOS B	25.9	185.4	0.79	0.74	0.79	44.1
West: Great Western Highway														
11	T1	1181	22	1243	1.9	0.404	9.6	LOS A	13.5	96.3	0.48	0.42	0.48	53.6
12	R2	166	3	175	1.8	*0.442	40.1	LOS C	9.0	63.8	0.92	0.88	0.92	35.4
Approach		1347	25	1418	1.9	0.442	13.4	LOS A	13.5	96.3	0.53	0.48	0.53	51.1
All Vehicles		3186	67	3354	2.1	0.652	24.7	LOS B	25.9	185.4	0.71	0.65	0.71	44.2

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

* Critical Movement (Signal Timing)

Site: 402 [Great Western Highway x Bringelly Road 2026 PM (Site Folder: Future - 2026)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Design Life Analysis (Final Year): Results for 6 years

Timings based on settings in the Site Phasing & Timing dialog (Demand & Sensitivity Analysis overrides)
Phase Times determined by the program
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Bringelly Road														
1	L2	165	5	196	3.0	0.730	52.0	LOS D	18.1	129.3	0.97	0.86	1.00	32.0
3	R2	379	6	449	1.6	* 0.730	52.1	LOS D	18.1	129.3	0.98	0.86	1.01	26.4
Approach		544	11	645	2.0	0.730	52.1	LOS D	18.1	129.3	0.98	0.86	1.01	28.3
East: Great Western Highway														
4	L2	197	1	234	0.5	0.266	25.6	LOS B	8.1	56.9	0.64	0.75	0.64	36.4
5	T1	1098	30	1302	2.7	* 0.739	26.7	LOS B	31.5	225.8	0.86	0.78	0.86	44.7
Approach		1295	31	1535	2.4	0.739	26.5	LOS B	31.5	225.8	0.83	0.77	0.83	43.8
West: Great Western Highway														
11	T1	1181	22	1400	1.9	0.454	10.1	LOS A	16.0	113.8	0.50	0.45	0.50	53.4
12	R2	166	3	197	1.8	* 0.551	49.2	LOS D	10.4	73.9	0.96	0.96	0.96	32.5
Approach		1347	25	1597	1.9	0.551	14.9	LOS B	16.0	113.8	0.55	0.51	0.55	50.2
All Vehicles		3186	67	3777	2.1	0.739	26.0	LOS B	31.5	225.8	0.74	0.68	0.74	43.6

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

* Critical Movement (Signal Timing)

Site: 602 [Great Western Highway x Bringelly Road 2026+DEV PM (Site Folder: Future - 2026 + DEV)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Design Life Analysis (Final Year): Results for 6 years

Timings based on settings in the Site Phasing & Timing dialog (Demand & Sensitivity Analysis overrides)
Phase Times determined by the program
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Bringelly Road														
1	L2	165	5	196	3.0	0.728	51.9	LOS D	18.1	129.5	0.97	0.86	1.00	32.0
3	R2	379	6	449	1.6	* 0.728	52.1	LOS D	18.1	129.5	0.98	0.86	1.01	26.5
Approach		544	11	645	2.0	0.728	52.0	LOS D	18.1	129.5	0.97	0.86	1.01	28.3
East: Great Western Highway														
4	L2	197	1	234	0.5	0.270	26.3	LOS B	8.2	57.8	0.65	0.75	0.65	36.1
5	T1	1106	30	1310	2.7	* 0.759	27.7	LOS B	32.5	232.9	0.88	0.79	0.88	44.3
Approach		1303	31	1544	2.4	0.759	27.5	LOS B	32.5	232.9	0.84	0.78	0.84	43.4
West: Great Western Highway														
11	T1	1184	22	1403	1.9	0.455	10.1	LOS A	16.1	114.2	0.50	0.45	0.50	53.4
12	R2	166	3	197	1.8	* 0.534	49.3	LOS D	10.3	73.3	0.95	0.95	0.95	32.4
Approach		1350	25	1600	1.9	0.534	14.9	LOS B	16.1	114.2	0.55	0.51	0.55	50.2
All Vehicles		3197	67	3788	2.1	0.759	26.3	LOS B	32.5	232.9	0.74	0.68	0.75	43.4

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

* Critical Movement (Signal Timing)

Site: 802 [Great Western Highway x Bringelly Road 2030 PM (Site Folder: Future - 2030)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Design Life Analysis (Final Year): Results for 10 years

Timings based on settings in the Site Phasing & Timing dialog (Demand & Sensitivity Analysis overrides)
Phase Times determined by the program
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Bringelly Road														
1	L2	165	5	212	3.0	0.821	55.4	LOS D	19.2	137.0	0.95	0.90	1.09	31.1
3	R2	379	6	486	1.6	* 0.821	56.4	LOS D	21.8	155.0	0.99	0.91	1.12	25.3
Approach		544	11	698	2.0	0.821	56.1	LOS D	21.8	155.0	0.98	0.91	1.11	27.2
East: Great Western Highway														
4	L2	197	1	253	0.5	0.293	26.5	LOS B	9.0	63.4	0.66	0.76	0.66	36.0
5	T1	1098	30	1409	2.7	* 0.829	31.9	LOS C	39.1	279.9	0.91	0.86	0.96	42.6
Approach		1295	31	1662	2.4	0.829	31.1	LOS C	39.1	279.9	0.87	0.85	0.91	41.9
West: Great Western Highway														
11	T1	1181	22	1515	1.9	0.498	11.0	LOS A	18.4	131.1	0.53	0.48	0.53	52.9
12	R2	166	3	213	1.8	* 0.624	54.6	LOS D	11.4	81.1	0.98	0.98	0.98	31.0
Approach		1347	25	1728	1.9	0.624	16.3	LOS B	18.4	131.1	0.58	0.54	0.58	49.5
All Vehicles		3186	67	4088	2.1	0.829	29.1	LOS C	39.1	279.9	0.77	0.73	0.81	42.2

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

* Critical Movement (Signal Timing)

Site: 1002 [Great Western Highway x Bringelly Road 2030+DEV PM (Site Folder: Future - 2030 +DEV)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Design Life Analysis (Final Year): Results for 10 years

Timings based on settings in the Site Phasing & Timing dialog (Demand & Sensitivity Analysis overrides)
Phase Times determined by the program
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Bringelly Road														
1	L2	165	5	212	3.0	0.816	56.3	LOS D	21.2	151.8	0.98	0.91	1.10	30.9
3	R2	379	6	486	1.6	* 0.816	55.9	LOS D	21.2	151.8	0.99	0.91	1.12	25.4
Approach		544	11	698	2.0	0.816	56.0	LOS D	21.2	151.8	0.98	0.91	1.11	27.3
East: Great Western Highway														
4	L2	197	1	253	0.5	0.298	27.2	LOS B	9.2	64.4	0.67	0.76	0.67	35.6
5	T1	1116	30	1428	2.7	* 0.858	36.2	LOS C	42.6	305.1	0.94	0.91	1.02	41.0
Approach		1313	31	1681	2.4	0.858	34.8	LOS C	42.6	305.1	0.90	0.89	0.96	40.5
West: Great Western Highway														
11	T1	1191	22	1526	1.8	0.502	11.0	LOS A	18.6	132.4	0.53	0.48	0.53	52.8
12	R2	166	3	213	1.8	* 0.604	54.7	LOS D	11.3	80.4	0.97	0.98	0.97	30.9
Approach		1357	25	1739	1.8	0.604	16.4	LOS B	18.6	132.4	0.58	0.54	0.58	49.5
All Vehicles		3214	67	4118	2.1	0.858	30.6	LOS C	42.6	305.1	0.78	0.75	0.83	41.6

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

* Critical Movement (Signal Timing)

APPENDIX F-3

SIDRA Modelling Outputs
Caddens Road / Gipps Road / Kent Road

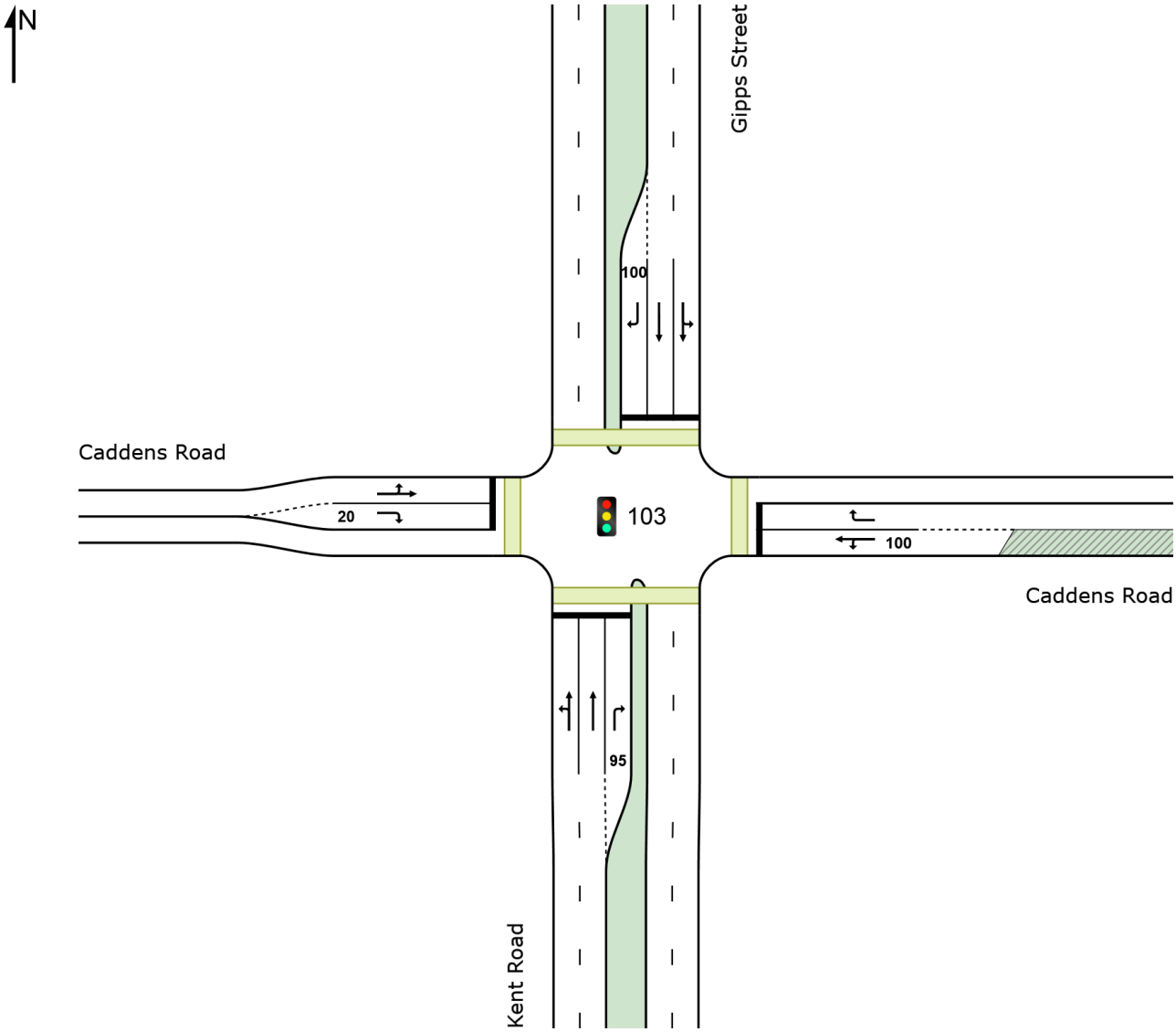
Site: 103 [Caddens Road x Gipps Street x Kent Road Existing AM (Site Folder: Exisitng (2020))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: TCS
Reference Phase: Phase A
Input Phase Sequence: A, B*, C*, D, E, E1*, E2*
Output Phase Sequence: A, D, E
(* Variable Phase)

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Site: 103 [Caddens Road x Gipps Street x Kent Road Existing AM (Site Folder: Exisitng (2020))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: TCS
Reference Phase: Phase A
Input Phase Sequence: A, B*, C*, D, E, E1*, E2*
Output Phase Sequence: A, D, E
(* Variable Phase)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Kent Road														
1	L2	194	4	204	2.1	0.748	36.2	LOS C	30.2	219.8	0.89	0.83	0.89	43.4
2	T1	991	59	1043	6.0	*0.748	29.1	LOS C	30.2	219.8	0.89	0.81	0.89	47.2
3	R2	20	0	21	0.0	0.170	66.5	LOS E	1.2	8.5	0.98	0.71	0.98	30.0
Approach		1205	63	1268	5.2	0.748	30.8	LOS C	30.2	219.8	0.89	0.81	0.89	46.0
East: Caddens Road														
4	L2	61	0	64	0.0	0.143	31.6	LOS C	3.7	26.7	0.70	0.67	0.70	40.5
5	T1	31	2	33	6.5	0.143	27.0	LOS B	3.7	26.7	0.70	0.67	0.70	38.0
6	R2	68	3	72	4.4	0.202	40.2	LOS C	3.2	23.4	0.80	0.74	0.80	32.8
Approach		160	5	168	3.1	0.202	34.3	LOS C	3.7	26.7	0.74	0.70	0.74	36.7
North: Gipps Street														
7	L2	28	1	29	3.6	0.542	32.6	LOS C	19.4	141.0	0.78	0.70	0.78	40.1
8	T1	849	37	894	4.4	0.542	25.6	LOS B	19.5	141.5	0.78	0.69	0.78	50.1
9	R2	77	2	81	2.6	*0.667	70.5	LOS E	5.0	35.7	1.00	0.80	1.11	26.9
Approach		954	40	1004	4.2	0.667	29.4	LOS C	19.5	141.5	0.80	0.70	0.81	46.7
West: Caddens Road														
10	L2	137	3	144	2.2	0.323	30.1	LOS C	6.1	43.9	0.69	0.73	0.69	39.7
11	T1	18	1	19	5.6	0.323	25.7	LOS B	6.1	43.9	0.69	0.73	0.69	37.9
12	R2	212	8	223	3.8	*0.728	46.7	LOS D	11.6	84.1	0.89	0.85	0.97	36.1
Approach		367	12	386	3.3	0.728	39.5	LOS C	11.6	84.1	0.81	0.80	0.85	37.3
All Vehicles		2686	120	2827	4.5	0.748	31.7	LOS C	30.2	219.8	0.84	0.77	0.85	44.1

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

* Critical Movement (Signal Timing)

Site: 303 [Caddens Road x Gipps Street x Kent Road 2026 AM (Site Folder: Future - 2026)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.
Design Life Analysis (Final Year): Results for 6 years

Timings based on settings in the Site Phasing & Timing dialog (Demand & Sensitivity Analysis overrides)
Phase Times determined by the program
Phase Sequence: TCS
Reference Phase: Phase A
Input Phase Sequence: A, B*, C*, D, E, E1*, E2*
Output Phase Sequence: A, B*, D, E, E2*
(* Variable Phase)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Kent Road														
1	L2	194	4	230	2.1	0.798	36.0	LOS C	35.1	255.3	0.91	0.85	0.92	39.1
2	T1	991	59	1175	6.0	*0.798	28.9	LOS C	35.1	255.3	0.91	0.84	0.92	42.4
3	R2	20	0	24	0.0	0.128	35.4	LOS C	0.7	5.2	0.94	0.70	0.94	35.2
Approach		1205	63	1428	5.2	0.798	30.1	LOS C	35.1	255.3	0.91	0.84	0.92	41.6
East: Caddens Road														
4	L2	61	0	72	0.0	0.160	31.1	LOS C	4.2	29.9	0.70	0.67	0.70	36.4
5	T1	31	2	37	6.5	0.160	26.5	LOS B	4.2	29.9	0.70	0.67	0.70	38.2
6	R2	68	3	81	4.4	0.263	44.9	LOS D	3.9	28.2	0.85	0.76	0.85	31.3
Approach		160	5	190	3.1	0.263	36.1	LOS C	4.2	29.9	0.76	0.71	0.76	34.4
North: Gipps Street														
7	L2	28	1	33	3.6	0.723	40.2	LOS C	26.5	192.1	0.91	0.82	0.91	36.6
8	T1	849	37	1006	4.4	0.723	32.8	LOS C	26.5	192.1	0.90	0.80	0.90	40.4
9	R2	77	2	91	2.6	*0.751	72.2	LOS F[11]	5.7	41.0	1.00	0.84	1.21	26.6
Approach		954	40	1131	4.2	0.751	36.2	LOS C	26.5	192.1	0.91	0.80	0.93	38.4
West: Caddens Road														
10	L2	137	3	162	2.2	0.442	32.6	LOS C	7.3	52.3	0.73	0.75	0.73	38.5
11	T1	18	1	21	5.6	0.442	28.2	LOS B	7.3	52.3	0.73	0.75	0.73	36.9
12	R2	212	8	251	3.8	*0.779	48.7	LOS D	13.6	97.9	0.89	0.87	1.02	31.4
Approach		367	12	435	3.3	0.779	41.7	LOS C	13.6	97.9	0.82	0.82	0.90	34.1
All Vehicles		2686	120	3184	4.5	0.798	34.2	LOS C	35.1	255.3	0.89	0.82	0.91	38.6

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

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.
* Critical Movement (Signal Timing)

Site: 503 [Caddens Road x Gipps Street x Kent Road 2026+DEV AM (Site Folder: Future - 2026 + DEV)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.
Design Life Analysis (Final Year): Results for 6 years

Timings based on settings in the Site Phasing & Timing dialog (Demand & Sensitivity Analysis overrides)
Phase Times determined by the program
Phase Sequence: TCS
Reference Phase: Phase A
Input Phase Sequence: A, B*, C*, D, E, E1*, E2*
Output Phase Sequence: A, B*, D, E, E2*
(* Variable Phase)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Kent Road														
1	L2	216	4	253	1.9	0.812	37.0	LOS C	36.5	265.5	0.92	0.87	0.94	38.4
2	T1	991	59	1175	6.0	* 0.812	30.0	LOS C	36.5	265.5	0.92	0.86	0.94	41.6
3	R2	20	0	24	0.0	0.128	35.4	LOS C	0.7	5.2	0.94	0.70	0.94	35.2
Approach		1227	63	1452	5.1	0.812	31.3	LOS C	36.5	265.5	0.92	0.86	0.94	40.8
East: Caddens Road														
4	L2	61	0	72	0.0	0.160	31.1	LOS C	4.2	29.9	0.70	0.67	0.70	36.4
5	T1	31	2	37	6.5	0.160	26.5	LOS B	4.2	29.9	0.70	0.67	0.70	38.2
6	R2	68	3	81	4.4	0.263	44.9	LOS D	3.9	28.2	0.85	0.76	0.85	31.3
Approach		160	5	190	3.1	0.263	36.1	LOS C	4.2	29.9	0.76	0.71	0.76	34.4
North: Gipps Street														
7	L2	28	1	33	3.6	0.722	40.2	LOS C	26.4	191.9	0.91	0.81	0.91	36.6
8	T1	849	37	1006	4.4	0.722	32.8	LOS C	26.4	191.9	0.90	0.80	0.90	40.4
9	R2	77	2	91	2.6	* 0.751	72.2	LOS F[11]	5.7	41.0	1.00	0.84	1.21	26.6
Approach		954	40	1131	4.2	0.751	36.2	LOS C	26.4	191.9	0.91	0.80	0.93	38.4
West: Caddens Road														
10	L2	137	3	162	2.2	0.446	32.6	LOS C	7.3	52.3	0.73	0.75	0.73	38.5
11	T1	18	1	21	5.6	0.446	28.2	LOS B	7.3	52.3	0.73	0.75	0.73	36.9
12	R2	217	8	257	3.7	* 0.793	49.9	LOS D	14.1	101.7	0.90	0.88	1.05	31.0
Approach		372	12	440	3.2	0.793	42.5	LOS C	14.1	101.7	0.83	0.83	0.91	33.8
All Vehicles		2713	120	3212	4.4	0.812	34.8	LOS C	36.5	265.5	0.89	0.83	0.92	38.3

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

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.
* Critical Movement (Signal Timing)

Site: 703 [Caddens Road x Gipps Street x Kent Road 2030 AM (Site Folder: Future - 2030)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 140 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.
Design Life Analysis (Final Year): Results for 10 years

Timings based on settings in the Site Phasing & Timing dialog (Demand & Sensitivity Analysis overrides)
Phase Times determined by the program
Phase Sequence: TCS
Reference Phase: Phase A
Input Phase Sequence: A, B*, C*, D, E, E1*, E2*
Output Phase Sequence: A, B*, D, E, E2*
(* Variable Phase)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Kent Road														
1	L2	194	4	249	2.1	0.859	45.4	LOS D	48.4	352.6	0.96	0.92	1.00	35.0
2	T1	991	59	1272	6.0	* 0.859	38.2	LOS C	48.4	352.6	0.95	0.91	1.00	37.0
3	R2	20	0	26	0.0	0.161	41.3	LOS C	0.9	6.6	0.96	0.71	0.96	33.0
Approach		1205	63	1546	5.2	0.859	39.4	LOS C	48.4	352.6	0.95	0.91	1.00	36.5
East: Caddens Road														
4	L2	61	0	78	0.0	0.167	34.4	LOS C	5.2	37.1	0.69	0.68	0.69	35.0
5	T1	31	2	40	6.5	0.167	29.9	LOS C	5.2	37.1	0.69	0.68	0.69	36.9
6	R2	68	3	87	4.4	0.278	49.9	LOS D	4.8	35.0	0.84	0.76	0.84	29.9
Approach		160	5	205	3.1	0.278	40.1	LOS C	5.2	37.1	0.76	0.71	0.76	33.0
North: Gipps Street														
7	L2	28	1	36	3.6	0.750	44.1	LOS D	33.8	245.0	0.92	0.83	0.92	35.1
8	T1	849	37	1089	4.4	0.750	36.4	LOS C	33.8	245.0	0.90	0.81	0.90	38.3
9	R2	77	2	99	2.6	* 0.843	86.1	LOS F[11]	7.4	53.1	1.00	0.88	1.33	23.8
Approach		954	40	1224	4.2	0.843	40.6	LOS C	33.8	245.0	0.91	0.81	0.93	36.1
West: Caddens Road														
10	L2	137	3	176	2.2	0.530	35.6	LOS C	9.0	64.6	0.72	0.75	0.72	37.2
11	T1	18	1	23	5.6	0.530	31.2	LOS C	9.0	64.6	0.72	0.75	0.72	35.8
12	R2	212	8	272	3.8	* 0.846	60.9	LOS E[11]	18.2	131.4	0.90	0.91	1.10	28.0
Approach		367	12	471	3.3	0.846	50.0	LOS D	18.2	131.4	0.82	0.84	0.94	31.3
All Vehicles		2686	120	3447	4.5	0.859	41.3	LOS C	48.4	352.6	0.91	0.85	0.95	35.2

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

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.
* Critical Movement (Signal Timing)

Site: 903 [Caddens Road x Gipps Street x Kent Road 2030+DEV AM (Site Folder: Future - 2030 +DEV)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 140 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.
Design Life Analysis (Final Year): Results for 10 years

Timings based on settings in the Site Phasing & Timing dialog (Demand & Sensitivity Analysis overrides)
Phase Times determined by the program
Phase Sequence: TCS
Reference Phase: Phase A
Input Phase Sequence: A, B*, C*, D, E, E1*, E2*
Output Phase Sequence: A, B*, D, E
(* Variable Phase)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Kent Road														
1	L2	243	4	301	1.7	0.888	50.3	LOS D	53.8	390.6	0.98	0.96	1.07	32.9
2	T1	991	59	1272	6.0	* 0.888	43.3	LOS D	53.8	390.6	0.97	0.96	1.06	34.5
3	R2	20	0	26	0.0	0.129	39.3	LOS C	0.9	6.4	0.94	0.71	0.94	33.7
Approach		1254	63	1598	5.1	0.888	44.5	LOS D	53.8	390.6	0.97	0.95	1.06	34.1
East: Caddens Road														
4	L2	61	0	78	0.0	0.167	34.4	LOS C	5.2	37.1	0.69	0.67	0.69	35.0
5	T1	31	2	40	6.5	0.167	29.9	LOS C	5.2	37.1	0.69	0.67	0.69	36.9
6	R2	68	3	87	4.4	0.278	49.9	LOS D	4.8	35.0	0.84	0.76	0.84	29.9
Approach		160	5	205	3.1	0.278	40.1	LOS C	5.2	37.1	0.76	0.71	0.76	33.0
North: Gipps Street														
7	L2	28	1	36	3.6	0.790	47.2	LOS D	35.1	254.7	0.95	0.86	0.95	33.9
8	T1	849	37	1089	4.4	0.790	39.8	LOS C	35.1	254.7	0.93	0.84	0.94	36.6
9	R2	77	2	99	2.6	* 0.843	86.1	LOS F[11]	7.4	53.1	1.00	0.88	1.33	23.8
Approach		954	40	1224	4.2	0.843	43.7	LOS D	35.1	254.7	0.94	0.84	0.97	34.7
West: Caddens Road														
10	L2	137	3	176	2.2	0.543	35.6	LOS C	9.0	64.6	0.72	0.75	0.72	37.2
11	T1	18	1	23	5.6	0.543	31.2	LOS C	9.0	64.6	0.72	0.75	0.72	35.8
12	R2	224	8	285	3.6	* 0.879	66.8	LOS E[11]	20.2	145.6	0.91	0.94	1.17	26.5
Approach		379	12	484	3.2	0.879	53.8	LOS D	20.2	145.6	0.83	0.86	0.98	30.2
All Vehicles		2747	120	3511	4.4	0.888	45.3	LOS D	53.8	390.6	0.93	0.89	1.00	33.6

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

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.
* Critical Movement (Signal Timing)

Site: 203 [Caddens Road x Gipps Street x Kent Road Existing PM (Site Folder: Exisitng (2020))]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: TCS
Reference Phase: Phase A
Input Phase Sequence: A, B*, C*, D, E, E1*, E2*
Output Phase Sequence: A, D, E
(* Variable Phase)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Kent Road														
1	L2	230	8	242	3.5	0.687	33.8	LOS C	27.3	196.3	0.85	0.80	0.85	44.3
2	T1	897	25	944	2.8	*0.687	26.4	LOS B	27.3	196.3	0.84	0.76	0.84	48.9
3	R2	48	0	51	0.0	0.297	63.8	LOS E	2.9	20.1	0.97	0.75	0.97	30.6
Approach		1175	33	1237	2.8	0.687	29.4	LOS C	27.3	196.3	0.84	0.77	0.84	46.6
East: Caddens Road														
4	L2	38	1	40	2.6	0.095	33.9	LOS C	2.3	16.6	0.72	0.67	0.72	39.1
5	T1	16	2	17	12.5	0.095	29.3	LOS C	2.3	16.6	0.72	0.67	0.72	37.0
6	R2	59	3	62	5.1	0.176	42.1	LOS C	2.8	20.8	0.81	0.74	0.81	32.1
Approach		113	6	119	5.3	0.176	37.5	LOS C	2.8	20.8	0.77	0.70	0.77	35.1
North: Gipps Street														
7	L2	82	2	86	2.4	0.593	32.1	LOS C	22.6	160.7	0.79	0.73	0.79	40.0
8	T1	927	17	976	1.8	0.593	25.1	LOS B	22.8	161.9	0.79	0.72	0.79	50.2
9	R2	111	1	117	0.9	*0.691	67.7	LOS E	7.1	49.8	1.00	0.82	1.10	27.6
Approach		1120	20	1179	1.8	0.691	29.8	LOS C	22.8	161.9	0.81	0.73	0.82	45.8
West: Caddens Road														
10	L2	63	0	66	0.0	0.144	34.7	LOS C	3.6	25.6	0.73	0.71	0.73	38.1
11	T1	22	2	23	9.1	0.144	30.3	LOS C	3.6	25.6	0.73	0.71	0.73	36.4
12	R2	209	2	220	1.0	*0.672	47.0	LOS D	11.4	80.2	0.91	0.83	0.93	36.3
Approach		294	4	309	1.4	0.672	43.1	LOS D	11.4	80.2	0.86	0.80	0.87	36.6
All Vehicles		2702	63	2844	2.3	0.691	31.4	LOS C	27.3	196.3	0.83	0.75	0.84	44.3

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

* Critical Movement (Signal Timing)

Site: 403 [Caddens Road x Gipps Street x Kent Road 2026 PM (Site Folder: Future - 2026)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.
Design Life Analysis (Final Year): Results for 6 years

Timings based on settings in the Site Phasing & Timing dialog (Demand & Sensitivity Analysis overrides)
Phase Times determined by the program
Phase Sequence: TCS
Reference Phase: Phase A
Input Phase Sequence: A, B*, C*, D, E, E1*, E2*
Output Phase Sequence: A, B*, D, E, E2*
(* Variable Phase)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Kent Road														
1	L2	230	8	273	3.5	0.747	33.7	LOS C	31.7	227.9	0.87	0.83	0.87	40.0
2	T1	897	25	1063	2.8	0.747	26.3	LOS B	31.7	227.9	0.86	0.79	0.86	44.2
3	R2	48	0	57	0.0	*0.306	37.0	LOS C	2.0	13.8	0.96	0.74	0.96	34.5
Approach		1175	33	1393	2.8	0.747	28.2	LOS B	31.7	227.9	0.87	0.79	0.87	42.6
East: Caddens Road														
4	L2	38	1	45	2.6	0.105	32.6	LOS C	2.5	18.3	0.71	0.66	0.71	35.4
5	T1	16	2	19	12.5	0.105	28.0	LOS B	2.5	18.3	0.71	0.66	0.71	37.5
6	R2	59	3	70	5.1	0.224	45.3	LOS D	3.4	24.6	0.85	0.75	0.85	31.2
Approach		113	6	134	5.3	0.224	38.5	LOS C	3.4	24.6	0.78	0.71	0.78	33.4
North: Gipps Street														
7	L2	82	2	97	2.4	0.756	37.6	LOS C	30.6	218.0	0.91	0.83	0.91	37.4
8	T1	927	17	1099	1.8	*0.756	29.9	LOS C	30.6	218.0	0.89	0.80	0.89	42.1
9	R2	111	1	132	0.9	0.713	67.2	LOS E[11]	8.0	56.1	1.00	0.83	1.11	27.7
Approach		1120	20	1328	1.8	0.756	34.1	LOS C	30.6	218.0	0.90	0.80	0.91	39.3
West: Caddens Road														
10	L2	63	0	75	0.0	0.175	37.2	LOS C	4.2	30.3	0.76	0.73	0.76	37.0
11	T1	22	2	26	9.1	0.175	32.9	LOS C	4.2	30.3	0.76	0.73	0.76	35.5
12	R2	209	2	248	1.0	*0.752	50.8	LOS D	13.6	95.9	0.93	0.87	1.03	30.9
Approach		294	4	349	1.4	0.752	46.6	LOS D	13.6	95.9	0.88	0.83	0.95	32.4
All Vehicles		2702	63	3203	2.3	0.756	33.1	LOS C	31.7	227.9	0.88	0.80	0.89	39.3

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

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.
* Critical Movement (Signal Timing)

Site: 603 [Caddens Road x Gipps Street x Kent Road 2026+DEV AM (Site Folder: Future - 2026 + DEV)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.
Design Life Analysis (Final Year): Results for 6 years

Timings based on settings in the Site Phasing & Timing dialog (Demand & Sensitivity Analysis overrides)
Phase Times determined by the program
Phase Sequence: TCS
Reference Phase: Phase A
Input Phase Sequence: A, B*, C*, D, E, E1*, E2*
Output Phase Sequence: A, B*, D, E, E2*
(* Variable Phase)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Kent Road														
1	L2	234	8	277	3.4	0.763	34.6	LOS C	32.4	232.6	0.89	0.84	0.89	39.5
2	T1	897	25	1063	2.8	0.763	27.2	LOS B	32.4	232.6	0.87	0.80	0.87	43.5
3	R2	48	0	57	0.0	* 0.306	36.8	LOS C	1.9	13.6	0.96	0.74	0.96	34.6
Approach		1179	33	1397	2.8	0.763	29.1	LOS C	32.4	232.6	0.88	0.81	0.88	42.1
East: Caddens Road														
4	L2	38	1	45	2.6	0.102	31.8	LOS C	2.5	18.1	0.70	0.66	0.70	35.7
5	T1	16	2	19	12.5	0.102	27.3	LOS B	2.5	18.1	0.70	0.66	0.70	37.8
6	R2	59	3	70	5.1	0.217	44.3	LOS D	3.3	24.3	0.84	0.75	0.84	31.5
Approach		113	6	134	5.3	0.217	37.7	LOS C	3.3	24.3	0.77	0.71	0.77	33.6
North: Gipps Street														
7	L2	82	2	97	2.4	0.770	38.5	LOS C	31.1	220.9	0.92	0.84	0.92	37.1
8	T1	927	17	1099	1.8	* 0.770	31.0	LOS C	31.1	220.9	0.90	0.81	0.90	41.3
9	R2	111	1	132	0.9	0.713	67.2	LOS E[11]	8.0	56.1	1.00	0.83	1.11	27.7
Approach		1120	20	1328	1.8	0.770	35.1	LOS C	31.1	220.9	0.91	0.82	0.93	38.8
West: Caddens Road														
10	L2	63	0	75	0.0	0.171	36.4	LOS C	4.2	29.9	0.75	0.72	0.75	37.3
11	T1	22	2	26	9.1	0.171	32.1	LOS C	4.2	29.9	0.75	0.72	0.75	35.7
12	R2	219	2	258	0.9	* 0.759	50.5	LOS D	14.2	100.0	0.93	0.87	1.03	31.0
Approach		304	4	359	1.3	0.759	46.2	LOS D	14.2	100.0	0.88	0.83	0.95	32.5
All Vehicles		2716	63	3218	2.3	0.770	33.8	LOS C	32.4	232.6	0.89	0.81	0.90	38.8

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

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.
* Critical Movement (Signal Timing)

Site: 803 [Caddens Road x Gipps Street x Kent Road 2030 PM (Site Folder: Future - 2030)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.
Design Life Analysis (Final Year): Results for 10 years

Timings based on settings in the Site Phasing & Timing dialog (Demand & Sensitivity Analysis overrides)
Phase Times determined by the program
Phase Sequence: TCS
Reference Phase: Phase A
Input Phase Sequence: A, B*, C*, D, E, E1*, E2*
Output Phase Sequence: A, B*, D, E, E2*
(* Variable Phase)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Kent Road														
1	L2	230	8	295	3.5	0.809	36.1	LOS C	36.7	264.0	0.92	0.87	0.93	38.8
2	T1	897	25	1151	2.8	0.809	28.7	LOS C	36.7	264.0	0.90	0.84	0.92	42.5
3	R2	48	0	62	0.0	* 0.332	37.1	LOS C	2.1	15.0	0.97	0.75	0.97	34.5
Approach		1175	33	1508	2.8	0.809	30.5	LOS C	36.7	264.0	0.91	0.84	0.92	41.2
East: Caddens Road														
4	L2	38	1	49	2.6	0.114	32.7	LOS C	2.7	19.9	0.71	0.67	0.71	35.4
5	T1	16	2	21	12.5	0.114	28.1	LOS B	2.7	19.9	0.71	0.67	0.71	37.5
6	R2	59	3	76	5.1	0.248	46.4	LOS D	3.7	27.0	0.86	0.76	0.86	30.8
Approach		113	6	145	5.3	0.248	39.2	LOS C	3.7	27.0	0.79	0.71	0.79	33.1
North: Gipps Street														
7	L2	82	2	105	2.4	0.818	41.2	LOS C	36.0	255.9	0.95	0.89	0.98	36.0
8	T1	927	17	1189	1.8	* 0.818	33.8	LOS C	36.0	255.9	0.92	0.86	0.96	39.6
9	R2	111	1	142	0.9	0.772	68.9	LOS E[11]	8.8	62.1	1.00	0.86	1.18	27.3
Approach		1120	20	1437	1.8	0.818	37.8	LOS C	36.0	255.9	0.93	0.86	0.99	37.4
West: Caddens Road														
10	L2	63	0	81	0.0	0.190	37.4	LOS C	4.6	32.9	0.77	0.73	0.77	36.9
11	T1	22	2	28	9.1	0.190	33.1	LOS C	4.6	32.9	0.77	0.73	0.77	35.4
12	R2	209	2	268	1.0	* 0.822	56.1	LOS D	15.8	111.6	0.95	0.91	1.14	29.4
Approach		294	4	377	1.4	0.822	50.4	LOS D	15.8	111.6	0.90	0.86	1.03	31.2
All Vehicles		2702	63	3467	2.3	0.822	36.1	LOS C	36.7	264.0	0.91	0.85	0.96	37.7

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

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.
* Critical Movement (Signal Timing)

Site: 1003 [Caddens Road x Gipps Street x Kent Road 2030+DEV PM (Site Folder: Future - 2030 +DEV)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.
Design Life Analysis (Final Year): Results for 10 years

Timings based on settings in the Site Phasing & Timing dialog (Demand & Sensitivity Analysis overrides)
Phase Times determined by the program
Phase Sequence: TCS
Reference Phase: Phase A
Input Phase Sequence: A, B*, C*, D, E, E1*, E2*
Output Phase Sequence: A, B*, D, E, E2*
(* Variable Phase)

Vehicle Movement Performance

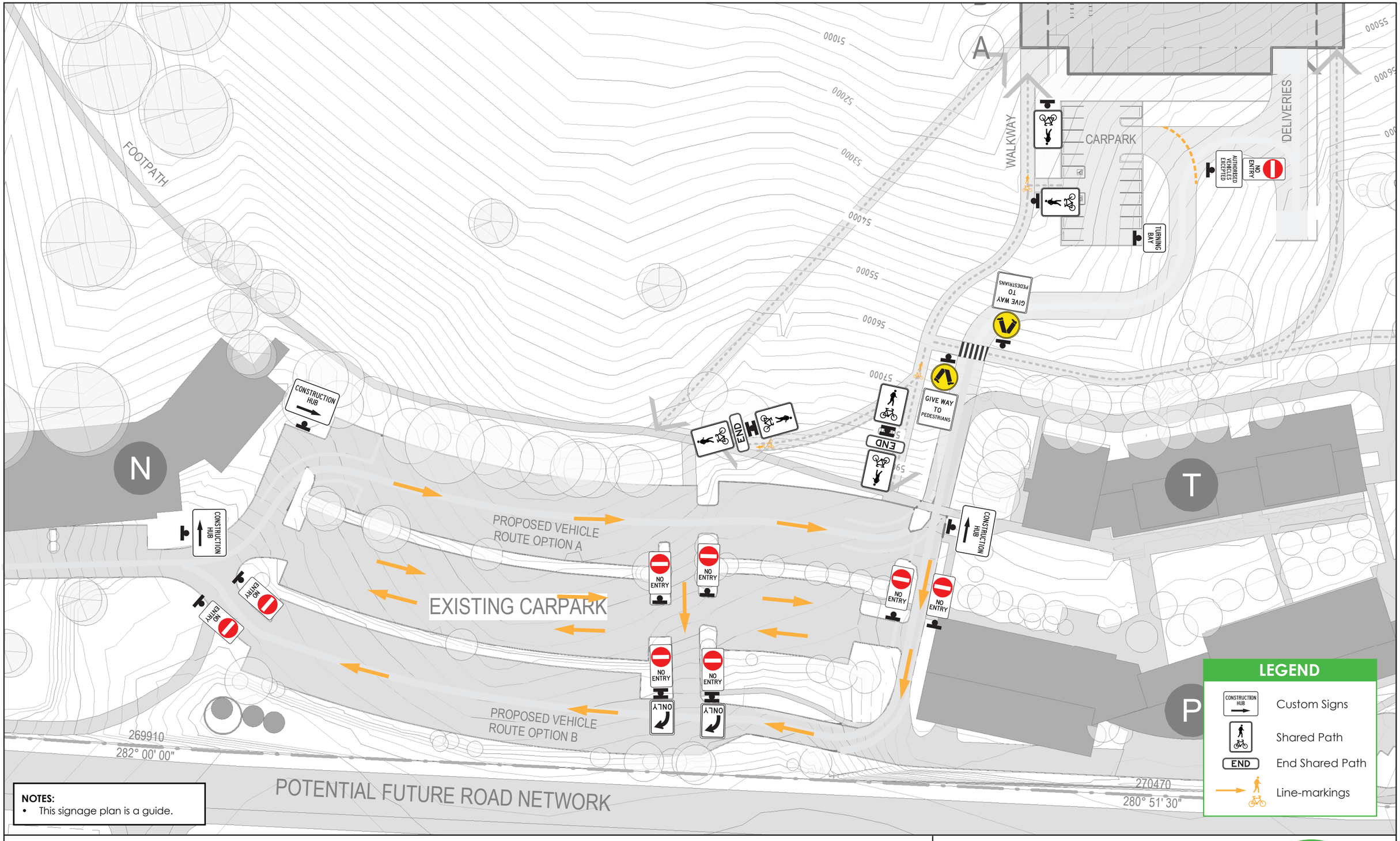
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Kent Road														
1	L2	239	8	305	3.4	0.828	38.6	LOS C	38.7	278.0	0.94	0.89	0.97	37.6
2	T1	897	25	1151	2.8	0.828	31.3	LOS C	38.7	278.0	0.92	0.87	0.96	40.8
3	R2	48	0	62	0.0	* 0.332	36.8	LOS C	2.1	14.6	0.97	0.75	0.97	34.6
Approach		1184	33	1517	2.8	0.828	33.0	LOS C	38.7	278.0	0.92	0.87	0.96	39.7
East: Caddens Road														
4	L2	38	1	49	2.6	0.108	31.2	LOS C	2.6	19.4	0.69	0.66	0.69	36.0
5	T1	16	2	21	12.5	0.108	26.6	LOS B	2.6	19.4	0.69	0.66	0.69	38.0
6	R2	59	3	76	5.1	0.232	44.5	LOS D	3.6	26.4	0.84	0.75	0.84	31.4
Approach		113	6	145	5.3	0.232	37.5	LOS C	3.6	26.4	0.77	0.71	0.77	33.7
North: Gipps Street														
7	L2	82	2	105	2.4	0.849	45.9	LOS D	38.5	273.7	0.97	0.94	1.05	34.1
8	T1	927	17	1189	1.8	* 0.849	38.6	LOS C	38.5	273.7	0.95	0.91	1.03	37.0
9	R2	111	1	142	0.9	0.842	73.2	LOS F[11]	9.2	64.7	1.00	0.90	1.31	26.4
Approach		1120	20	1437	1.8	0.849	42.6	LOS D	38.5	273.7	0.96	0.91	1.06	35.1
West: Caddens Road														
10	L2	63	0	81	0.0	0.180	35.8	LOS C	4.5	32.1	0.75	0.73	0.75	37.6
11	T1	22	2	28	9.1	0.180	31.5	LOS C	4.5	32.1	0.75	0.73	0.75	36.0
12	R2	232	2	292	0.9	* 0.840	56.7	LOS E[11]	17.5	123.7	0.95	0.93	1.16	29.1
Approach		317	4	401	1.3	0.840	50.7	LOS D	17.5	123.7	0.90	0.87	1.04	31.0
All Vehicles		2734	63	3501	2.3	0.849	39.1	LOS C	38.7	278.0	0.93	0.88	1.00	36.2

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

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.
* Critical Movement (Signal Timing)

APPENDIX G

Wayfinding, Signage & Line Marking Plan



NOTES:
- This signage plan is a guide.

Signage and Line-marking Plan

Project:	TAFE NSW Nepean Kingswood	**Date:**	05.03.2021
Project Number:	20.456	**Prepared By:**	Justin Pindar
Client:	Cadence Australia Pty Ltd	**Approved By:**	Vince Doan

TRAFFIC & TRANSPORT PLANNERS

Suite 2.08
50 Holt Street
Surry Hills NSW 2010

(02) 8324 8700
info@traffix.com.au

TRAFFIX

APPENDIX H

SEAR's Requirements

Planning Secretary's Environmental Assessment Requirements

Section 4.12(8) of the *Environmental Planning and Assessment Act 1979*
Schedule 2 of the Environmental Planning and Assessment Regulation 2000

Application Number	SSD-8571481
Proposal Name	TAFE NSW Western Sydney Construction Hub
Location	TAFE NSW Nepean Kingswood campus, 2-44 O'Connell Street, Kingswood
Applicant	TAFE NSW
Date of Issue	DRAFT
General Requirements	The Environmental Impact Statement (EIS) must be prepared in accordance with and meet the minimum requirements of clauses 6 and 7 of Schedule 2 the Environmental Planning and Assessment Regulation 2000 (the Regulation). Notwithstanding the key issues specified below, the EIS must include an environmental risk assessment to identify the potential environmental impacts associated with the development. Where relevant, the assessment of the key issues below, and any other significant issues identified in the risk assessment, must include: · adequate baseline data · consideration of potential cumulative impacts due to other development in the vicinity (completed, underway or proposed) · measures to avoid, minimise and if necessary, offset the predicted impacts, including detailed contingency plans for managing any significant risks to the environment. The EIS must be accompanied by a report from a qualified quantity surveyor providing: · a detailed calculation of the capital investment value (CIV) (as defined in clause 3 of the Regulation) of the proposal, including details of all assumptions and components from which the CIV calculation is derived · an estimate of the jobs that will be created by the future development during the construction and operational phases of the development · certification that the information provided is accurate at the date of preparation.
Key Issues	The EIS must address the following specific matters: **1. Statutory and Strategic Context** Address the statutory provisions contained in all relevant environmental planning instruments, including: · *Biodiversity Conservation Act 2016;* · State Environmental Planning Policy (State & Regional Development) 2011; · State Environmental Planning Policy (Infrastructure 2007); · State Environmental Planning Policy (Educational Establishments and Child Care Facilities) 2017; · State Environmental Planning Policy No. 64 – Advertising and Signage; · State Environmental Planning Policy No.55 – Remediation of Land; · Draft State Environmental Planning Policy (Environment); and · Penrith Local Environmental Plan 2010 *Permissibility*

Detail the nature and extent of any prohibitions that apply to the development.

Development Standards
Identify compliance with the development standards applying to the site and provide justification for any contravention of the development standards.

Provisions
Adequately demonstrate and document in the EIS how each of the provisions in the listed instruments are addressed, including reference to necessary technical documents.

2. Policies
Address the relevant planning provisions, goals and strategic planning objectives in the following:

- NSW State Priorities;
- The Greater Sydney Regional Plan, A Metropolis of three cities
- Future Transport Strategy 2056 and supporting plans;
- State Infrastructure Strategy 2018 – 2038 Building the Momentum;
- Sydney's Cycling Future 2013;
- Sydney's Walking Future 2013;
- Sydney's Bus Future 2013;
- Crime Prevention Through Environmental Design (CPTED) Principles
- Better Placed: An integrated design policy for the built environment of New South Wales (Government Architect NSW (GANSW), 2017);
- Healthy Urban Development Checklist (NSW Health, 2009);
- Draft Greener Places Design Guide;
- Western Sydney District Plan; and
- Penrith Development Control Plan 2014.

3. Operation

- Provide details of the existing and proposed operations, including staff and student numbers, and hours of operation.
- Provide a detailed justification of suitability of the site to accommodate the proposal.

4. Built Form and Urban Design

- Address the height, density, bulk and scale, setbacks and interface of the proposal in relation to the surrounding development, topography, streetscape and any public open spaces.
- Address design quality and built form, with specific consideration of the overall site layout, streetscape, open spaces, façade, rooftop, massing, setbacks, building articulation, materials and colours.
- Provide details of any digital signage boards, including size, location and finishes.
- Detail how services, including but not limited to waste management, loading zones, and mechanical plant are integrated into the design of the development.
- Provide detailed site and context analysis to justify the proposed site planning and design approach including massing options and preferred strategy for future development.
- Provide a detailed site-wide landscape strategy, including consideration of integration with built form, security, shade, topography and existing vegetation.
- Provide a visual impact assessment that identifies any potential impacts on the surrounding built environment and landscape including views to and from the site and any adjoining heritage items.
- Address CPTED Principles.
- Provide details of integration with the wider campus site and the adjoining

Western Sydney University site (if relevant), including contextual integration and spatial arrangements, vehicle and pedestrian connections, landscaping, and consideration of significant view corridors & preservation of significant views and features, where relevant.

5. Environmental Amenity

- Assess amenity impacts on the surrounding locality, including solar access, visual privacy, visual amenity, overshadowing, wind impacts and acoustic impacts. A high level of environmental amenity for any surrounding residential land uses must be demonstrated.
- Conduct a view analysis to the site from key vantage points and streetscape locations (photomontages or perspectives should be provided showing the building and likely future development).
- Include a lighting strategy and measures to reduce spill into the surrounding sensitive receivers.

6. Staging

Provide details regarding the staging of the proposed development (if any).

7. Transport and Accessibility

Include a transport and accessibility impact assessment, which details, but not limited to the following:

- accurate details of the current daily and peak hour vehicle, existing and future public transport networks and pedestrian and cycle movement provided on the road network located adjacent to the proposed development;
- details of estimated total daily and peak hour trips generated by the proposal, including vehicle, public transport, pedestrian and bicycle trips based on surveys of the existing TAFE NSW Nepean Kingswood Campus facilities and similar education facilities within the local area;
- cumulative impacts of all trips generated by the development and the existing TAFE NSW Nepean Kingswood Campus, as well as the development potential identified in the Quarter Precinct Master Plan and Western Sydney University Redevelopment Plan;
- existing car parking capacity and utilisation on streets within a 400 metre radius from the site on a typical weekday covering at least one hour before and after the proposed hours of operation (including night classes);
- the adequacy of existing public transport or any future public transport infrastructure and services within the vicinity of the site, pedestrian and bicycle networks and associated infrastructure to meet the likely future demand of the proposed development;
- measures to integrate the development with the existing/future public transport network;
- impact of trips generated by the development on the area-wide network, with consideration of the cumulative impacts of the development on the surrounding roads and intersections in the context of any other approved planning proposals and developments in the precinct and surrounds, should be considered. Including the impact of nearby intersections and the need/associated funding for upgrading or road improvement works, if required;
- an assessment of the forecast impacts on traffic volume generated on road safety and capacity of road network including consideration of cumulative impacts at key intersections using SIDRA or similar traffic model as prescribed by Transport for New South Wales (TfNSW). The traffic modelling should consider the scenarios of year 2026, 2031, 2036 and the year until the facility ceases operation. These should include, but not be limited to:
  - Great Western Highway/O'Connell Street/French Street
  - Great Western Highway/Bringelly Road

- o Gipps Street (Werrington Arterial)/Caddens Road;
- the identification of infrastructure required to ameliorate any impacts on traffic efficiency and road safety impacts associated with the proposed development, including details on improvements required to affected intersections, additional bus routes along bus capable roads (i.e. minimum 3.5 m wide travel lanes), additional bus stops or bus bays;
- details of travel demand management measures to minimise the impact on general traffic and bus operations, including details of a location-specific sustainable travel plan (Green Travel Plan and specific Workplace travel plan) and the provision of facilities to increase the non-car mode share for travel to and from the site;
- the proposed walking and cycling access arrangements and connections to public transport services;
- the design of the proposed cycle and pedestrian entry connecting to the Great Western Highway shared path should ensure that there are clear sight lines between the cyclists from the development and the faster moving cyclists on the Great Western Highway;
- the proposed access arrangements, including car and bus pick-up/drop-off facilities, and measures to mitigate any associated traffic impacts and impacts on public transport, pedestrian and bicycle networks, including pedestrian crossings and refuges and speed control devices and zones;
- proposed bicycle parking provision, including end of trip facilities, in secure, convenient, accessible areas close to main entries incorporating lighting and passive surveillance;
- details of vehicle circulation, proposed number of on-site car parking spaces for staff, students and visitors and corresponding compliance with appropriate parking codes and justification for the level of car parking provided on-site;
- any short term reduction of existing car spaces for staff, students and visitors due to the proposed construction works (if any), and the proposed location, operational and functional characteristics of the re-allocated staff, students and visitors car parking (if applicable);
- details of the proposed site access and the parking provisions associated with the proposed development including compliance with the requirements of the relevant Australian Standards (i.e. turn paths, sight distance requirements, aisle widths, etc.);
- an assessment of the cumulative on-street parking impacts of cars and bus pick-up/drop-off, staff parking and any other parking demands associated with the development and provide any associated recommendations to ameliorate any such impacts;
- an assessment of road and pedestrian safety adjacent to the proposed development and the details of required road safety measures and personal safety in line with CPTED;
- emergency vehicle access, service vehicle access, delivery and loading arrangements and estimated service vehicle movements (including vehicle type and the likely arrival and departure times);
- the preparation of a preliminary Construction Traffic and Pedestrian Management Plan to demonstrate the proposed management of the impact in relation to construction traffic addressing the following:
  - o assessment of cumulative impacts associated with other construction activities (if any);
  - o an assessment of road safety at key intersections and locations subject to heavy vehicle construction traffic movements and high pedestrian activity;
  - o details of construction program detailing the anticipated construction duration and highlighting significant and milestone stages and events during the construction process;
  - o details of anticipated peak hour and daily construction vehicle movements to

and from the site;
- details of on-site car parking and access arrangements of construction vehicles, construction workers to and from the site, emergency vehicles and service vehicles; and
- details of temporary cycling and pedestrian access during construction.

· Alternate methods for gaining the most accurate traffic analysis data may be agreed with TfNSW, if required.

Relevant Policies and Guidelines:

· Guide to Traffic Generating Developments (Roads and Maritime Services, 2002)
· EIS Guidelines - Road and Related Facilities (Department of Urban Affairs and Planning (DUAP), 1996)
· Cycling Aspects of Austroads Guides
· NSW Planning Guidelines for Walking and Cycling (Department of Infrastructure, Planning and Natural Resources (DIPNR), 2004)
· Austroads Guide to Traffic Management Part 12: Traffic Impacts of Development
· Standards Australia AS2890.1 (Off-Street car parking)
· Standards Australia AS2890.2 (Parking Facilities Off-street commercial vehicle facilities)
· Standards Australia AS2890.3 (Bicycle Parking Facilities)
· Standards Australia AS2890.5 (On-street parking)
· Standards Australia AS2890.6 (Off-street parking for people with disabilities)
· Werrington Enterprise Living + Learning Precinct Strategy
· Penrith Health & Education Precinct Strategic Vision

8. Ecologically Sustainable Development (ESD)

· Detail how ESD principles (as defined in clause 7(4) of Schedule 2 of the Regulation) will be incorporated in the design and ongoing operation phases of the development;
· Include a framework for how the future development will be designed to consider and reflect national best practice sustainable building principles to improve environmental performance and reduce ecological impact. This should be based on a materiality assessment and include waste reduction design measures, future proofing, use of sustainable and low-carbon materials, energy and water efficient design (including water sensitive urban design) and technology and use of renewable energy;
· Include preliminary consideration of building performance and mitigation of climate change, including consideration of Green Star Performance;
· Include an assessment against an accredited ESD rating system or an equivalent program of ESD performance. This should include a minimum rating scheme target level; and
· Provide a statement regarding how the design of the future development is responsive to the CSIRO projected impacts of climate change, specifically:
  - hotter days and more frequent heatwave events
  - extended drought periods
  - more extreme rainfall events
  - gustier wind conditions
  - how these will inform landscape design, material selection and social equity aspects (respite/shelter areas).

Relevant Policies and Guidelines:

· NSW and ACT Government Regional Climate Modelling (NARCliM) climate change projections.

9. Heritage

· Provide a statement of significance and an assessment of the impact on the

heritage significance of the heritage items on the site in accordance with the guidelines in the NSW Heritage Manual (Heritage Office and DUAP, 1996); and
- Address any archaeological potential and significance on the site and the impacts the development may have on this significance.

10. Aboriginal Heritage
- Identify and describe the Aboriginal cultural heritage values that exist across the site and document these in an Aboriginal Cultural Heritage Assessment Report (ACHAR). This may include the need for surface survey and test excavation;
- Identify and address the Aboriginal cultural heritage values in accordance with the Guide to investigating, assessing and reporting on Aboriginal Cultural Heritage in NSW (Office of Environment and Heritage (OEH), 2011) and Code of Practice for Archaeological Investigations of Aboriginal Objects in NSW (OEH, 2010), and in consultation with Heritage NSW;
- Document consultation with Aboriginal people in accordance with Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 (Department of Environment, Climate Change and Water) (DECCW). The significance of cultural heritage values of Aboriginal people who have a cultural association with the land are to be documented in the ACHAR;
- Identify, assess and document all impacts on the Aboriginal cultural heritage values in the ACHAR;
- Demonstrate attempts to avoid any impact upon cultural heritage values and identify any conservation outcomes. Where impacts are unavoidable, the ACHAR and EIS must outline measures proposed to mitigate impacts. Any objects recorded as part of the assessment must be documented and notified to Heritage NSW and the Environment, Energy and Science Group of the Department of Planning, Industry and Environment; and
- Outline procedures to be followed if Aboriginal objects are found at any stage of the life of the project to formulate appropriate measures to manage unforeseen impacts.

11. Social Impacts
- Include an assessment of the social consequences of the building's relative location and decanting activities if proposed.

12. Noise and Vibration
- Identify and provide a quantitative assessment of the main noise and vibration generating sources during demolition, site preparation, bulk excavation, construction. Outline measures to minimise and mitigate the potential noise impacts on surrounding occupiers of land.
- Identify and assess operational noise, including consideration of any public-address system, workshop activities, mechanical services (e.g. air conditioning plant), use of site facilities for events, and any out of hours community use of facilities, and outline measures to minimise and mitigate the potential noise impacts on surrounding occupiers of land.

Relevant Policies and Guidelines:
- NSW Noise Policy for Industry 2017 (NSW Environment Protection Authority (EPA)
- Interim Construction Noise Guideline (Department of Environment and Climate Change, 2009)
- Assessing Vibration: A Technical Guideline 2006 (Department of Environment and Conservation, 2006)
- Development Near Rail Corridors and Busy Roads - Interim Guideline (Department of Planning, 2008)
- NSW Road Noise Policy (DECCW, 2011)

- Australian Standard 2363:1999 Acoustics - Measurement of noise from helicopter operations.

13. Contamination

- Assess and quantify any soil and groundwater contamination and demonstrate that the site is suitable for the proposed use in accordance with SEPP 55.

Relevant Policies and Guidelines:

- Managing Land Contamination: Planning Guidelines - SEPP 55 Remediation of Land (DUAP, 1998)
- Sampling Design Guidelines (EPA, 1995)
- Consultants reporting on contaminated land: Contaminated Land Guidelines (EPA, 2020)
- National Environment Protection (Assessment of Site Contamination) Measure (National Environment Protection Council, as amended 2013)

14. Utilities

- Prepare an Infrastructure Management Plan in consultation with relevant agencies, detailing information on the existing capacity and any augmentation and easement requirements of the development for the provision of utilities including staging of infrastructure;
- Detail impacts of any existing infrastructure assets of utility stakeholders from demolition/construction and any proposed mitigation/protection measures; and
- Prepare an Integrated Water Management Plan detailing any proposed alternative water supplies, proposed end uses of potable and non-potable water, and water sensitive urban design.

15. Water Quality

- Demonstrate that all practical measures to avoid or minimise water pollution and protect human health and the environment from harm are investigated and implemented; and
- Identify sensitive receiving environments and develop a strategy to avoid or minimise impacts on these environments.

Relevant Policies and Guidelines:

- ANZECC Guidelines and Water Quality Objectives in NSW (DEC, 2006)
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG, 2018)
- Approved Methods for the Sampling and Analysis of Water Pollutants in NSW (DECC, 2008)
- Managing Urban Stormwater, Soils and Construction Volume 1 (Landcom 2004) and Volume 2 (A. Installation of Services; B. Waste Landfills; C. Unsealed Roads; D. Main Roads; E. Mines and Quarries) (DECC, 2008)
- NSW Water Quality and River Flow Objectives at http://www.environment.nsw.gov.au/ieo/index.htm

16. Water-related Infrastructure Requirements

- Determine service demands following servicing investigations and demonstrate that satisfactory arrangements for drinking water, wastewater, and if required, recycled water services have been made.
- Obtain endorsement and/or approval from Sydney Water to ensure that the proposed development does not adversely impact on any existing water, wastewater or stormwater main, or any other Sydney Water asset, including any easement of property.

17. Integrated Water Cycle Management

· Detail any sustainability initiatives that will minimise/reduce the demand for drinking water, including any alternative water supply and end uses of drinking and non-drinking water that may be proposed, and demonstrate water sensitive urban design (principles are used), and any water conservation measures that are likely to be proposed.

18. Stormwater Management

· Detail any steps/measures to be taken to protect existing stormwater assets, such as avoiding over and/or adjacent to stormwater assets and building bridges over stormwater assets, if required. Outline measures to minimise or eliminate flooding, degradation of water quality, and avoid adverse impacts on any heritage items, and create pipeline easements where required.

· Detail how the design of the proposal would ensure that post-development stormwater flows match pre-development flows. Provide, where applicable, a preliminary stormwater management plan for the development that:
  - is prepared by a suitably qualified person in consultation with Council and any other relevant drainage authority;
  - details of proposed drainage design for the site including on-site detention facilities, water quality measures and the nominated discharge point;
  - demonstrates compliance with Council or other drainage authority requirements; and
  - stormwater plans detailing the proposed methods of drainage without impacting on the downstream properties.

Relevant Policies and Guidelines:

· Guidelines for developments adjoining land managed by the Office of Environment and Heritage (OEH, 2013).

· Stormwater Drainage Specification for Building Developments (Penrith City Council, 2018)

· Water Sensitive Urban Design Policy (Penrith City Council, 2013) and Technical Guidelines (Penrith City Council, 2015).

19. Contributions

· Address Council's 'Section 7.11 Werrington Enterprise Living and Learning (WELL) Precinct Development Contributions Plan' and/or details of any Voluntary Planning Agreement which may be required to be amended because of the proposed development.

20. Drainage

· Detail measures to minimise operational water quality impacts on surface waters and groundwater.

Relevant Policies and Guidelines:

· Guidelines for developments adjoining land managed by the Office of Environment and Heritage (OEH, 2013).

21. Flooding

· Identify flood risk on-site (detailing the most recent flood studies for the project area) and consideration of any relevant provisions of the NSW Floodplain Development Manual (DIPNR, 2005) and Council flood studies, including the potential effects of climate change, sea level rise and an increase in rainfall intensity. If there is a material flood risk, include design solutions for mitigation.

22. Bushfire

· Prepare a Bush Fire Assessment Report that addresses the requirements for Special Fire Protection Purpose as detailed in Planning for Bush Fire Protection

	2019 (NSW RFS) (PBP-2019). The report must address the extent to which the proposed development conforms with or deviates from the specifications set out in PBP-2019, including a classification of the vegetation on and surrounding the development (out to a distance of 140 metres from the boundaries of the site). · Address the bush fire risk posed by existing grassland surrounds or areas subject to revegetation and demonstrate that the asset protections zones can comply with Table A1.12.1 of PBP-2019. **23. Biodiversity Assessment** · Provide a Biodiversity Development Assessment Report (BDAR) that assesses the biodiversity impacts of the proposed development in accordance with the requirements of the Biodiversity Conservation Act 2016, Biodiversity Conservation Regulation 2017 and Biodiversity Assessment Method, except where a BDAR waiver has been issued in relation to the development or the development is located on biodiversity certified land. · Where a BDAR is not required because a BDAR waiver has been issued in relation to the development, provide: - a copy of the BDAR waiver and demonstrate that the proposed development is consistent with that covered in the BDAR waiver; and - an assessment of flora and fauna impacts where significant vegetation or flora and fauna values would be affected by the proposed development. **24. Water and Soils** · Provide: o an assessment of potential impacts on surface and groundwater (quality and quantity), soil, related infrastructure and watercourse(s) where relevant; o details of measures and procedures to minimise and manage the generation and off-site transmission of sediment, dust and fine particles; and o an assessment of salinity and acid sulphate soil impacts, including a Salinity Management Plan and/or Acid Sulphate Soils Management Plan, where relevant. ***Relevant Policies and Guidelines:*** · Managing Urban Stormwater - Soils & Construction Volume 1 2004 (Landcom) · Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (EPA) · Guidelines for development adjoining land managed by the Office of Environment and Heritage (OEH, 2013) **25. Waste** Identify, quantify and classify the likely waste streams to be generated during construction and operation and describe the measures to be implemented to manage, reuse, recycle and safely dispose of this waste. Identify appropriate servicing arrangements (including but not limited to, waste management, loading zones, mechanical plant) for the site. ***Relevant Policies and Guidelines:*** · Waste Classification Guidelines (EPA, 2014) **26. Construction Hours** o Identify proposed construction hours and provide details of the instances where it is expected that works will be required to be carried out outside the standard construction hours.
Plans and Documents	The EIS must include all relevant plans, architectural drawings, diagrams and relevant documentation required under Schedule 1 of the Regulation. Provide these

as part of the EIS rather than as separate documents.

In addition, the EIS must include the following:

- A section 10.7(2) and (5) Planning Certificates (previously Section 149(2) and (5) Planning Certificate)
- Architectural drawings showing key dimensions, RLs, scale bar and north point, including:
  - plans, sections and elevation of the proposal at no less than 1:200;
  - illustrated materials schedule including physical or digital samples board with correct proportional representation of materials, nominated colours and finishes;
  - details of proposed signage, including size, location and finishes;
  - detailed annotated wall sections at 1:20 scale that demonstrate typical cladding, window and floor details, including materials and general construction quality;
  - site plans and operations statement;
- Site Survey Plan, showing existing levels, location and height of existing and adjacent structures / buildings and site boundaries;
- Site Analysis and Context Plans, including:
  - site and context plans that demonstrate principles for future development and expansion, built form character and open space network;
  - precinct scale plan showing relationship of the proposal to any proposed development on surrounding land;
  - active transport linkages with existing, proposed and potential footpaths and bicycle paths and public transport links; and
  - site and context plans that demonstrate principles for future network, active transport linkages with existing, proposed and potential footpaths and bicycle paths and public transport links.
- Sediment and Erosion Control Plan;
- Shadow Diagrams;
- View analysis, photomontages and architectural renders, including from those from public vantage points;
- Landscape architectural drawings showing key dimensions, RLs, scale bar and north point, including:
  - integrated landscape plans at appropriate scale, with detail of new and retained planting, shade structures, materials and finishes;
  - plan identifying significant trees, trees to be removed and trees to be retained or transplanted;
- Design report to demonstrate how design quality will be achieved in accordance with the above Key Issues including:
  - architectural design statement;
  - diagrams, structure plan, illustrations and drawings to clarify the design intent of the proposal;
  - detailed site and context analysis;
  - analysis of options considered to justify the proposed site planning and design approach;
  - visual impact assessment identifying potential impacts on the surrounding built environment and adjoining heritage items;
  - summary of feedback provided by GANSW and NSW State Design Review Panel (SDRP) and responses to this advice;
  - summary report of consultation with the community and response to any feedback provided; and
  - how Aboriginal culture and heritage has been considered and incorporated into the design;
- Geotechnical and Structural Report;
- Accessibility Report;

	· Arborist Report; · Salinity Investigation Report (where required); · Noise and Vibration Assessment; · Contamination Assessment; · Acid Sulphate Soils Management Plan (where required); and · Schedule of materials and finishes.
Consultation	During the preparation of the EIS, you must consult with the relevant local, State or Commonwealth Government authorities, service providers, community groups, special interest groups, including local Aboriginal land councils and registered Aboriginal stakeholders, and affected landowners. In particular, you must consult with: · Penrith City Council; · Government Architect NSW (through the NSW SDRP process) (GANSW); · Transport for NSW (TfNSW); · Transport for NSW (Roads and Maritime Services) (TfNSW RMS). Consultation with GANSW, TfNSW and TfNSW (RMS) should commence as soon as practicable to agree the scope of investigation. The EIS must outline and describe the consultation process undertaken and the issues raised, and identify where the design of the development has been amended in response to these issues. Where amendments have not been made to address an issue, a short explanation must be provided.
Further consultation after two years	If you do not lodge a development application and EIS for the development within two years of the issue date of these SEARs, you must consult further with the Planning Secretary in relation to the preparation of the EIS.
References	The assessment of the key issues listed above must consider relevant guidelines, policies, and plans as identified.