WSU Bankstown Campus Proposal

Peer Review of Transport and Traffic

Prepared for:

Canterbury-Bankstown City Council

13 September 2019

The Transport Planning Partnership

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Executive Summary

On behalf of Canterbury-Bankstown Council (Council), The Transport Planning Partnership (TTPP) has undertaken an independent peer review of the Transport and Accessibility Plan (TMAP) prepared in support of a planning proposal for the Western Sydney University (WSU) Bankstown Campus.

The overall purpose of the TMAP peer review is to advise Council of the following:

- the appropriateness of the methodology and assumptions utilised in the TMAP;
- the implications of the TMAP findings to the surrounding area;
- are the targets for travel demand and mode share as set out in the TMAP realistic and can they be achieved with the measures prescribed in the TMAP;
- if not, what further analysis or measures are required to enable Council to provide an appropriately informed assessment of the planning proposal for the purpose of Gateway approval.

Overall, it is considered that the TMAP prepared for the WSU Bankstown Campus represents a sound and generally adequate response to the transport planning aspects of the WSU planning proposal. The TMAP reflects and is consistent with the aims and objectives of the various regional and local transport policies which seek to encourage and facilitate greater use of sustainable travel modes.

However, a number of deficiencies have been identified that would need to be addressed to ensure a robust assessment of the proposed development. These key areas can be summarised to be:

- Traffic modelling and road network operation
  - Additional traffic modelling is required to fully appreciate the implications of the planning proposal on the surrounding road network.
  - Calibration of models to observed traffic conditions is required to reflect actual conditions (i.e. vehicle queuing).
  - Future scenario modelling required to determine implication of proposal in say +5 or +10 years' time. Currently only existing plus development scenarios have been considered.
- Measures to achieve transport mode share targets
  - Existing mode share for travel to Bankstown is heavily weighted to private motor vehicle.
  - The mode share target of 5 per cent private car (as driver) for travel to / from the WSU Bankstown campus are aggressive and will require a significant change in travel behaviour.

- Further consideration of measures to ensure that the TMAP mode share target are realistic is required. This will need to include both on-site and off-site measures.

With regard to mode share targets, TTPP is of the opinion that the 5 per cent mode share to "car as driver" is an appropriate target to be set as it will, if achieved, deliver town centre amenity benefits. However, it is TTPP's opinion that the achievement of the 'aggressive' mode share target cannot be achieved simply by the implementation of on site (WSU Campus) measures.

For example, the provision of limited and restricted on-site parking for the WSU Campus is supported. However, this alone is not considered enough to change driver behaviour to the extent proposed. Off-site changes to on street / off street parking facilities will be required to discourage the dispersal of parking demand off campus to the surrounding network.

As such it is recommended that WSU needs to be part of the planning, solution and contributions for off Campus works and measures. To date this is not considered in the TMAP.

1 Introduction

The Transport Planning Partnership (TTPP) has been engaged by Canterbury-Bankstown Council (Council) to undertake an independent transport and parking review of the Transport Management and Accessibility Plan (TMAP) prepared by Arup (17 July 2019) as part of the WSU Bankstown Campus planning proposal to guide Council's assessment of the application. Council's assessment will be reported to the Local Planning Panel to decide whether the proposal will proceed to Gateway.

1.1 Project Background

The site of the proposed WSU Bankstown campus is located at 74 Rickard Road and 375 Chapel Road, as shown in Figure 1.1.

Figure 1.1: Site Location

The planning proposal seeks to provide a 19-storey University Campus comprising:

- formal academic spaces and informal learning spaces
- workplace spaces for faculty staff

- basement carpark consisting of 3 loading spaces (1 medium waste vehicle and 2 courier vans), 94 car spaces and 32 bicycle spaces.

The project will facilitate the relocation of teaching, research and staff facilities currently located at the WSU Bankstown Campus at Milperra. The WSU Bankstown Campus is expected to service around 2,000 students to accommodate a maximum of 3,400 students (based on information submitted by Urbis on 27 August, 2019) and 650 University / Education space staff, at any one time; allowing for varying lecture times, external meetings, sick leave and holiday leave.

1.2 Project Objectives

TTPP has prepared this peer review to advise the appropriateness of the methodology and assumptions made by Arup in the Transport Management and Accessibility Plan (TMAP) (17 July 2019). TTPP has undertaken the peer review of the TMAP in the context of the following documents:

- Current Bankstown LEP / DCP controls
- Council's Complete Streets project
- State Design Review Panel comments (12 March 2019)
- Arup's Traffic and Parking Report (20 December 2018)
- Arup's Transport Management and Accessibility Plan (17 July 2019)
- Arup's SIDRA models including:
  - Existing conditions
  - Future traffic conditions – including the full development of the site and traffic growth.

1.3 Site Inspection

On Monday 8 July 2019, TTPP undertook a site inspection during the afternoon between 11:30am and 12:30pm to observe existing transport conditions surrounding the site.

It is noted that this site visit was carried out during the school holidays. Nevertheless, some key observations identified during this site visit are as follows:

- Rickard Road westbound queues on approach to Chapel Road were observed to occasionally extend beyond the existing driveway to the Library for a short period of time, as shown below. This means that it may be difficult for vehicles to exit the driveway onto Rickard Road when queues extend past the driveway during peak periods (which may be worse on a typical day).

Figure 1.2: Rickard Road Queues

- The existing parking restrictions within the existing library car park are restricted to 4P restrictions between 8:30am and 6:00pm Monday to Friday. Parking demand was observed to be high, with limited spare parking capacity. It is expected that staff/students at the proposed WSU site would park within the library car park.

Figure 1.3: 4P Library Parking Restrictions

- The site benefits from good pedestrian links to/from Bankstown station. There are also four bicycle rails, accommodating eight spaces, provided within the vicinity of the site on Chapel Road, as well as near Bankstown Station.

Figure 1.4: Existing Bike Rails and Pedestrian Network

- The existing site is currently occupied by 43 car parking spaces, which are restricted to 2P parking restrictions. The Appian Way also provides 26 public car parking spaces and 20 Council staff car parking spaces (information provided by Council). These car parking spaces were observed to be in very high demand with limited space parking supply. It is noted that these car parking spaces will be removed as a result of the planning proposal thereby reducing the supply of publicly accessible spaces within the Bankstown town centre by some 69 spaces.

Figure 1.5: The Appian Way

2 Peer Review Findings of TMAP

This section outlines the findings of the peer review in relation to the transport assessment undertaken by Arup for the planning proposal. TTPP also provides recommendations to address the identified deficiencies to enable a more comprehensive and accurate assessment of the planning proposal.

2.1 Bankstown Demographics

Section 2.5 Travel Characteristics

- Year 2016 Census data presented in Figure 15 of the TMAP indicates that 83 per cent of trips made by people employed within the selected Bankstown destination zone are car-based (77 per cent as car driver and 6 per cent as car passenger trips). Public transport only accounts for 14 per cent of trips, with the remaining four per cent by walking.

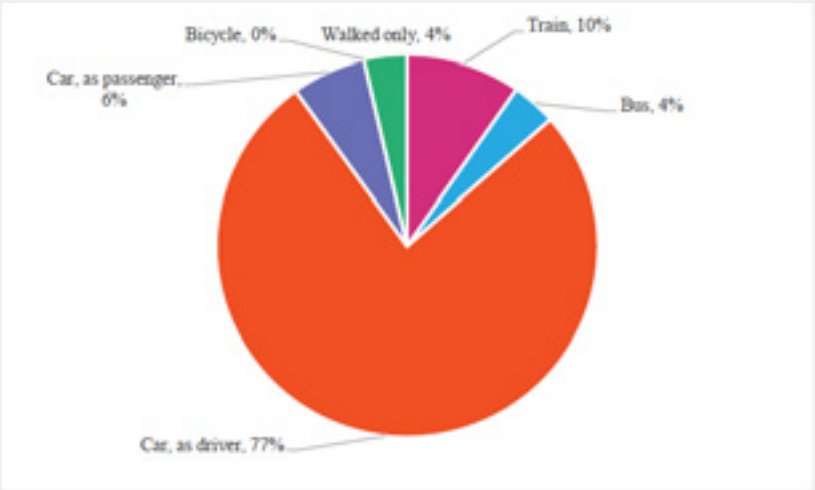


Figure 15 Existing travel to work mode share (DZN 115710002)

- The above data indicates that the Bankstown area is very reliant on car usage, even though the area is serviced by good public transport services, including rail and bus services from Bankstown Station.
- The Sydney Metro between Bankstown and the City will operate from Year 2024 at a peak frequency of 15 trains per hour in both directions (1 every 4 minutes). On this basis, it is expected that there would be some modal shift to train/metro once the Sydney Metro is operational.

2.2 Trip Generation Estimate

Section 5 Traffic Assessment

- Figure 34 of the TMAP indicates that staff at the proposed new Bankstown WSU campus are expected to commute from the following areas based on Year 2016 Census data:

- Bankstown – 60 per cent
- Canterbury – 10 per cent
- Liverpool – 10 per cent
- Merrylands-Guildford – 5 per cent
- Hurstville – 5 per cent
- Other – 10 per cent

- Given that the above locations are based on existing staff working within the Bankstown catchment area (i.e. Census data), TTPP recommends that existing staff travel surveys at the existing WSU Milperra campus be undertaken to understand where staff currently reside and travel to/from the WSU campus.
- The TMAP mode share target for staff by car is 15 per cent. This is 62 per cent less than existing car driver trips based on Year 2016 Census data in the Bankstown destination zone. On this basis, this car driver mode share target for staff is not considered realistic, unless measures are put in place on-site and off-site to disincentive car travel to the site, as well as wide Bankstown area.
- The traffic generation estimates associated with the proposed WSU site has been estimated based on the mode share targets outlined in Table 6. Arup notes that travel surveys will be undertaken once the campus is operational to allow for an accurate baseline mode split to be established.

Table 6 Mode share targets

Mode	University / Education space staff	Students
Walk	10%	15%
Cycle	5%	5%
Car Driver	15%	5%
Car Passenger (incl.drop-off)	3%	5%
Bus	30%	33%
Train/Metro	32%	32%
Other	5%	5%
Total	**100%**	**100%**

- It is recommended that the mode share target for "other" mode share be further clarified as part of the assessment.
- Based on TTPP in-house data collected at various tertiary education facilities such as at UTS, ACU, Meadowbank TAFE (refer to Section 3 for further details), car trips from similar tertiary educational facilities can range from 11 to 75 per cent for staff, and from 5 and 40 per cent for students. The lower percentage of car driver modes are associated with the existing UTS campus, which is located within close proximity to Central Station. UTS is centrally located within the Sydney CBD with limited car parking within the immediate vicinity of the site. Paid car parking is also made available in public car parking areas, but this is generally expensive such that driving to the Sydney CBD is not affordable by car, particularly for students. Therefore, UTS is not considered the best comparison with the proposed WSU Bankstown site.

- The traffic generation estimates using the mode share targets may not be a good representation of future conditions. It is therefore recommended that travel surveys be undertaken to gauge how existing staff and students at the WSU Milperra site currently travel to the site, where they live and whether they will change their mode of travel from car to public transport if the site were to be relocated near Bankstown Station. This would allow for a better benchmark to assess the mode share targets for both staff and students. It is expected that there would be a modal shift away from car with the relocation of the campus due to its proximity to Bankstown Station.
- The estimated overall travel demand (person trips) generated throughout the day is outlined in Table 7. This indicates that it is estimated that a total of 2,001 students would be on-site between 11am and 12pm.

Table 7 BCC person trip arrival and departures

Time	Arrivals			Departures			Accumulation *(students only)*
	Staff	Students	Total	Staff	Students	Total	*Total*
Before 7	19	14	**33**	0	0	**0**	*14*
7-8	111	110	**221**	0	0	**0**	*125*
8-9 (AM Peak)	317	828	**1145**	0	18	**18**	*935*
9-10	162	576	**737**	1	16	**17**	*1494*
10-11	22	393	**415**	0	23	**23**	*1864*
11-12	3	197	**200**	0	60	**60**	*2001*
12-13	2	116	**118**	2	92	**95**	*2025*
13-14	2	89	**91**	3	143	**146**	*1970*
14-15	2	52	**54**	13	183	**195**	*1839*
15-16	1	49	**49**	37	225	**262**	*1663*
16-17	1	31	**32**	176	400	**575**	*1294*
17-18 (PM Peak)	1	48	**49**	294	519	**812**	*823*
18-19	0	12	**12**	92	451	**543**	*384*
After 19	4	5	**9**	29	390	**419**	*0*

- Table 8 indicates that the proposal is estimated to generate a total of 89 car driver trips and 51 car passenger (including drop off) trips during the busiest peak hour between 8am and 9am. There will also be a total of 735 persons catching public transport (bus and train/metro) during the busiest peak hour between 8am and 9am.
- During the PM peak between 5pm and 6pm, there would be a total of 70 car driver trips and 35 car passenger (including drop off) trips, with a total of 519 persons catching public transport during the PM peak.

Table 8 Peak hour trips

Mode	Arrivals			Departures		
	Staff	Students	Total	Staff	Students	Total
Walk	32	124	**156**	29	78	**107**
Cycle	16	41	**57**	15	26	**41**
Car Driver	48	41	**89**	44	26	**70**
Car Passenger (incl.drop-off)	10	41	**51**	9	26	**35**
Bus	95	273	**368**	88	171	**259**
Train/Metro	101	265	**367**	94	166	**260**
Other	16	41	**57**	15	26	**41**
Total	**317**	**828**	**1145**	**294**	**519**	**812**

- Table 9 estimates the vehicular trip generation associated with the BCC car park (94 spaces) will be 53vph in the AM Peak and 49vph in the PM Peak.

Table 9 BCC car park vehicular trip generation

	AM Peak		PM Peak	
	In	Out	In	Out
Vehicle trips	48	5	5	44
Total	**53**		**49**	

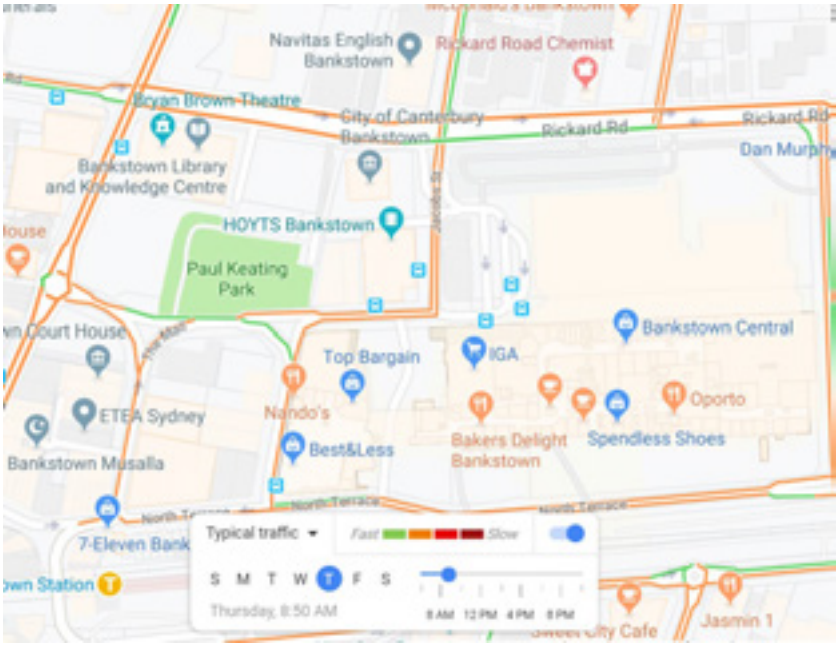
- The proposed The Appian Way drop off activity is estimated to generate 51 car drop off's in the AM peak (8am-9am) and 35 drop off's in the PM peak (5pm-6pm). Vehicles will access the drop off area from Rickard Road (turning left into the site) and exit via Civic Drive onto Jacobs Street.
- The Appian Way will function as a shared zone. The site criteria for shared zones in TfNSW's policy guideline outlines that a shared zone should have no more than 100 vehicles per hour and no more than 1,000 vehicles per day. Based on the estimated person trips outlined in Table 7, it is expected that there would be up to 51 car drop off trips during the busiest hour between 8am and 9am; or approximately 147 car drop offs during the day. This level of traffic is acceptable for a shared zone.

2.3 Road Network Assessment

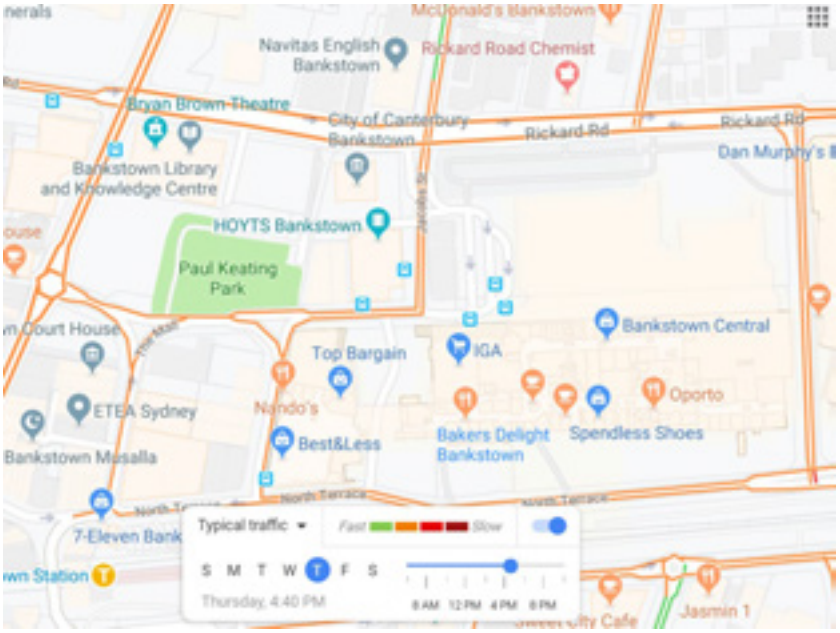
Section 2.6 Traffic Volumes and Section 5.5.4 Traffic Modelling

- Traffic surveys were undertaken at the two key immediate intersections on Wednesday 5 September 2018 between 7am and 10am and between 3pm and 7pm, as follows:
  - Rickard Road / Chapel Road
  - Rickard Road / Jacobs Street
- Traffic modelling was undertaken using SIDRA 8 modelling software at the above two intersections to assess existing conditions and future traffic conditions (including the full development of the site and traffic growth). A future background growth of 2.5 per cent on Rickard Road in the AM peak has been adopted in the traffic assessment based on future mid-block traffic volumes from the draft Bankstown Complete Streets project.

- Based on the modelling outputs, only Year 2018 has been assessed (i.e. no future year scenario). It is recommended that a +5 or +10-year future case scenario be assessed with and without the proposed development.
- The modelling outputs indicate that the average queue on Rickard Road on approach to Chapel Road is 2-3 vehicles in the AM peak and 5-8 vehicles in the PM peak.
- No queue length data is provided. It is recommended that queue length data is collected to assess the validity of the traffic models.
- Analysis of google congestion maps indicate that speeds along Rickard Road are not "free flowing" but with some congestion during the AM and PM peak periods. This data is generally interpreted as traffic queues for practitioners in the absence of queue length data. The orange line denotes that travel speeds are less than the posted speed limit, such that queues are interpreted as half the length of the orange line. Therefore, this suggests that the queue lengths modelled do not match the google congestion map data. See below.



Typical Thursday AM at 8:50am



Typical Thursday PM at 4:40pm

- The traffic distribution and assignment of traffic assumes that the majority (80 per cent) of traffic accessing the car park will arrive via Stacey Street and Rickard Road, with the remainder arriving from Jacobs Street and Rickard Road, as shown in Figure 37. Traffic leaving the site has been assumed to be evenly distributed north, west and south at the Rickard Road-Chapel Road intersection.

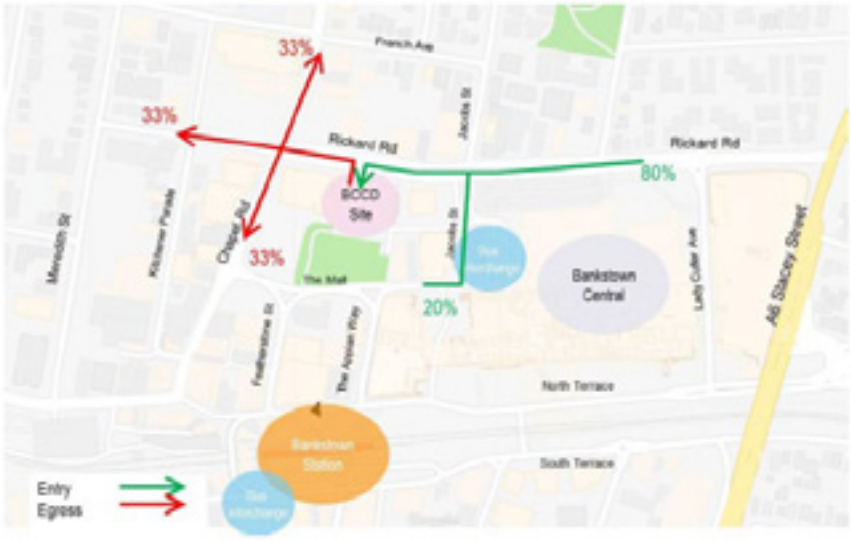


Figure 37 Car park access and egress routes and distribution

- The traffic distribution and assignment of traffic assumes that all drop-off traffic will arrive from Rickard Road (i.e. westbound through at the intersection with Jacob Street), whereas 50 per cent of vehicles will exit the site eastbound and 50 per cent of vehicles will exit the site westbound on Rickard Road, as shown in Figure 38.

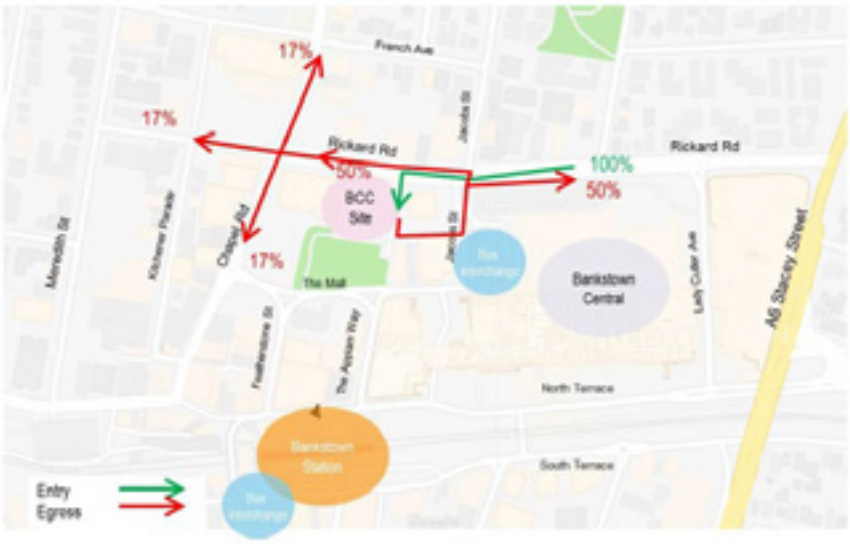


Figure 38 Set-down access and egress routes and distribution

- It is expected that the proposed development would generate some additional traffic onto surrounding intersections, including the following:
  - Chapel Road-The Mall (roundabout)
  - Rickard Road-Kitchener Parade (signalised intersection)
  - French Avenue-Chapel Road (signalised intersection)
  - Rickard Road-Sir Joseph Banks Street (signalised intersection)
  - The Mall-Jacobs Street (priority intersection).

  No traffic surveys or modelling has been undertaken at the above intersections. The above intersections are circled red, with the surveyed intersections shown in black in the following figure. It is noted that the intersection impacts at the Rickard Road-Jacobs Street intersection could potentially be exacerbated as a result of motorists (egress) wishing to turn back onto Stacey Street, as shown in orange dashed line below.

- Traffic associated with the proposed development is expected to be diluted due to it being distributed to different turning movements and across a number of local intersections. Therefore, any intersection modelling at the above additional intersections is unlikely to register any noticeable traffic impacts based on the anticipated development traffic generated by the proposed development. However, it is recommended that the impacts of the above intersections be assessed and justified accordingly to support the proposed development.

2.4 SIDRA Traffic Models

TTPP has reviewed the SIDRA traffic models provided by Council on 9 July 2019 (SIDRA Ref: WSU Bankstown Network Model). The SIDRA traffic models were based on the traffic surveys undertaken by Arup on Wednesday 5 September 2018 between 7am and 10am and between 3pm and 7pm. A summary of TTPP's comments is provided in Table 2.1.

The severity is rated as follows:

- **major** – requires immediate resolution
- **moderate** – requires clarification/justification or correction
- **minor** – should be addressed although may have minor impacts to the results

Table 2.1: SIDRA Model Comments

No.	Comment	Will correction affect the operation of the intersection?	Severity (Major, Medium, Minor)
	Intersection Level		
1	The right turn bay from Rickard Road (east leg) into Jacobs Street (north leg) in the SIDRA model is shorter than the existing. The existing right-turn lane is approximately 70m in length. This right-turn lane has been modelled as 35m.	Yes – but minimal impacts	Major
2	The left turn from Jacobs Street (south leg) into Rickard Road (west leg) in the westbound direction is a give way slip lane. This give way slip lane has been coded as a signalised left turn in the SIDRA model.	Yes – but minimal impacts	Major
3	The peak flow period of 60 minutes has been modelled while the maximum peak flow period is 30 minutes. Peak flow period should reflect the intersection count data and any variation should be justified and documented based on RMS modelling guidelines.	Yes	Major
4	The speed limit on the south approach to the Chapel Road/Rickard Road intersection is 40km/h, while the SIDRA model shows it is coded as 60 km/h.	Unlikely	Major
5	The speed limit of Jacobs Street is incorrect. The speed limit on Jacobs Street is 50km/h and 40 km/h on the north and south approach to the Rickard Road/Jacobs Street intersection respectively.	Unlikely	Major
6	The modelled traffic signals at the intersection of Rickard Road/Chapel Road do not replicate the existing signal phasing configuration (i.e. missing filtered right-turn in the modelled B phase) and phasing sequence.	Yes	Major

No.	Comment	Will correction affect the operation of the intersection?	Severity (Major, Medium, Minor)
	Intersection Level		
7	The modelled traffic signals at the intersection of Rickard Road/Jacobs Street do not replicate the existing signals phasing configuration (i.e. B phase and C phase has been modelled as a split phase, but the traffic control signal plan indicates that these movements run under D phase, which is not a split phase) and phasing sequence.	Yes	Major
8	Pedestrian protection (i.e. 5-7 seconds delay for vehicles turning left) has not been modelled which results in an overestimation of intersection capacity.	Yes	Medium
9	The SIDRA default pedestrian walking speed of 1.3m/s has been used. Pedestrian walking speed should be adjusted to 1.2 m/s based on RMS modelling guidelines.	Unlikely	Medium
10	The default peak flow factor has been changed from 95% to 100%. Any variation should be justified.	Likely – but minimal impacts	Minor
11	The default pedestrian volume of 50 pedestrians/hour has been used for these intersections. It is expected that the actual pedestrian volumes may be higher due to the shopping centre and community services in the vicinity of the study area.	Unlikely	Minor
	Network Level		
1	The timing option for modelling the existing condition should be set as "user given phase time" while it is modelled as "Practical Cycle Time" which is not acceptable.	Yes	Major
2	Modelled AM and PM peak signals phasing configuration is the same as in SCATS but cycle and phases times are different due to adopting "practical cycle time" instead of "user given phase time".	Yes	Major
3	50 seconds cycle time is not the actual cycle time for these intersections during peak periods.	Yes	Major
4	The network peak flow period is set up as 30 minutes while peak flow period is set up as 60 minutes at intersection level which are not consistent.	Yes	Major
5	The proposed WSU Bankstown Campus is located between the two modelled intersections. The model has not included the two existing driveways (i.e. The Appian Way and Library driveway). Motorists entering and exiting Rickard Road will negatively impact traffic movements along Rickard Road. It is recommended that access to the site and The Appian Way access is included in the traffic modelling assessment.	Yes	Medium
6	There is a high midblock flow difference during both AM peak period. In the AM, the midblock flow difference between the two intersection is up to 147 vehicles/hour, while in the PM the difference is up to 12 vehicles/hour under the existing base case.	Yes	Medium
7	The number of lane changes are too high for this small network which results in unrealistic delay calculation	Yes	Medium
8	The modelled queue length is not consistent with the typical queuing condition estimated by Google Maps on the ground during peak periods.	Yes	Medium
9	The modelling results are not a good estimation of the current traffic condition on the ground estimated by Google Maps.	Yes	Medium

In summary, the SIDRA traffic models should be updated and/or justified accordingly. The above changes may affect the traffic modelling results and should be updated and documented accordingly for Council review.

2.5 Sustainable Transport Assessment

- A total of 32 bicycle parking spaces would be provided in the basement, as well as up to 100 spaces within the public domain of the site. It is unclear where the 100 spaces within the public domain of the site will be located. The 32 bicycle parking spaces are proposed to be allocated for staff only, with the other 100 spaces anticipated to be used by staff or students. The DCP does not contain any specific bicycle parking rates for educational tertiary establishments.
- The NSW Planning for Walking and Cycling guideline recommends bicycle parking be provided at a rate of 3-5 per cent, plus 5-10% for full time students for long-term bicycle parking and 5-10 per cent of staff for short-term bicycle parking. On the basis of 650 staff and 2,000 students, this would equate to a total bicycle parking provision of 153-298 spaces (i.e. 120-233 short-term spaces and 33-65 long-term spaces).
- It is unclear from Arup's TMAP whether any end-of-trip facilities will be provided within the site. End of trip facilities such as showers, change rooms and lockers should be provided.
- The provision of 32 on-site bicycle parking spaces, plus 100 spaces within the public domain of the site do not satisfy the recommended bicycle parking rates for tertiary establishments in accordance with the NSW Planning for Walking and Cycling guideline. It is therefore recommended that an area be allocated within the site to provide additional bicycle parking.
- The proposed pedestrian access to the campus is considered acceptable, with key pedestrian access points to the site shown in Figure 27 along the north, east and south portions of the site.

Figure 27 Pedestrian access points

- Access to the staff bicycle parking area in the basement (32 spaces) will be provided via the driveway or lifts. The ramp grades are not outlined on the architectural plans, but it is understood that the driveway has been designed to accommodate vehicles up to and including an 8.8m medium rigid vehicle. For an 8.8m medium rigid vehicle, a maximum ramp grade of 1:6.5 (15.4%) is permitted under AS2890.2:2002. Generally, longitudinal gradients on paths for cycling should be as flat as possible.

Figure 28 Proposed staff bike parking

- TTPP notes that many private waste collection contractors use vehicles similar to that of an 8.8m medium rigid vehicle. There are also smaller waste collection service providers such as Vikings that use smaller vehicles, equivalent to a B99 vehicle (i.e. 99th percentile vehicle). In recognition of this, TTPP expects that designing for vehicles up to and including an 8.8m medium rigid vehicle is satisfactory. It would however be subject to

the servicing requirements of the university. This will need to be clarified as part of the future development application for the site.

- Section 6.1 indicates that a comprehensive Green Travel Plan will be prepared for the campus. A number of key measures have been included in the report to support sustainable transport initiatives, including:
  - The appointment of a travel plan co-ordinator to promote the uptake of public transport, walking and cycling by staff and students travelling to and from BCC;
  - Limited provision of on-site parking;
  - The provision of high-quality and secure bike parking and end of trip facilities; and
  - Undertaking travel surveys.
- It is recommended that a green travel plan be required as part of any development consent for the approval, requiring ongoing travel surveys post-occupation to monitor the mode share targets. It may be the case that any future development of the site (e.g. any enrolment capacity increases) is not to progress until the mode share targets have been met for the site. This consent condition has been applied to other universities such as ACU Strathfield campus, that being:
  - *"Any future application must demonstrate that the mode share targets within the Green Travel Plan can be consistently complied with"* – [2014] NSWLEC 1238
- It is however recommended that a Green Travel Plan be prepared as part of the SSDA submission, with travel surveys undertaken at the existing WSU Milperra campus as a benchmark to justify the mode share targets of the site, with consideration to where staff and students currently travel to/from the existing campus and expected mode shifts due to the new location of the site.

2.6 Parking Assessment

- Council's DCP does not contain any specific car parking rates for tertiary educational establishments.
- The proposal will provide 94 car parking spaces, including four DDA compliant car parking spaces across two basement levels. No parking will be provided for students. Arup notes that this level of car parking provision is similar to the arrangement at the WSU Parramatta City Campus, where 80 parking spaces are provided. Arup notes that the proposal has similar features to the development, including GFA, staff and student population and proximity to public transport.
- Information provided by Council via WSU indicates that there are currently approximately 6,369 enrolled students at the Parramatta City Campus (as of 2018). It is however unclear what the existing staff levels are at the Parramatta City Campus.

- Notwithstanding this, based on the information provided, car parking is currently provided at the Parramatta City Campus at a rate of approximately 1 space for every 80 enrolled students.
- Based upon a total of 10,000 enrolled students, this could equate to a total car parking requirement of 125 spaces based on the existing car parking provision at the Parramatta City Campus.
- The provision of no on-site student car parking is considered acceptable for the proposed development based on the site's proximity to public transport services.
- Analysis of car parking provisions at other tertiary educational establishments indicate that limited car parking is often provided on-site, which is consistent with the proposed development. It is however recommended that the provision of car sharing facilities be investigated on-site to reduce single-occupancy car trips.
- Based on 650 on-site university / education staff, the provision of 94 spaces means that 14.5 per cent of staff would be able to drive and park at the campus. This is consistent with the staff mode share targets indicated in Table 6. However, as outlined above, TTPP expects that more staff will drive to the school based on 2016 Census data, which indicates that 77 per cent of employees currently travel to the Bankstown area by car.
- Recent information provided by Council suggests that the car parking is being reduced from 94 to 84 car parking spaces. Based on the proposed staff levels of 650 staff on-site at any one time, this means that 13 per cent of staff could drive and park on-site. This is less than the proposed staff mode share target for car driver.
- TTPP is however of the view that the provision of limited car parking is a key measure to manage car parking and travel demand and therefore, this car parking provision is considered reasonable. It is however expected that the proposal would increase the car parking demand in the area, which is already generally near or at capacity.
- It is therefore recommended that the Applicant apply to contribute towards Council's Planning Agreements Policy (via a planning agreement) to address this car parking shortfall. This would enable Council to use the funds to construct public car spaces within the Bankstown CBD. This is further discussed in Section 2.8.
- Changes to car parking restrictions or arrangements, e.g. implementing time restricted paid on-street car parking and ticketed systems within public car parks, may need to be investigated to balance the needs of the community and commuter car parking. An example of this would be the existing library 4P parking restrictions, which is located directly opposite the site. Based on information provided by Council, ticketed and timed car parking restrictions are currently being implemented across the CBD.

2.7 Loading Facilities

Section 4.5 Loading and Servicing

- A loading dock is proposed within the basement to allow for one 8.8m long medium rigid vehicle/waste vehicle and two courier vans. Further clarification on the anticipated servicing demand and frequency of the proposal, including the type of service vehicles expected, is required as part of any future development application for the site to further assess the adequacy of the loading dock.
- TTPP notes that other educational facilities generally design for a 12.5m heavy rigid vehicles (such as at UTS, ACU, Meadowbank TAFE). Therefore, further clarification is required to justify the proposed loading dock provisions. However, it is not unreasonable to restrict service vehicles to an 8.8m medium rigid vehicle or smaller, subject to the provision of management measures (e.g. signage, line marking or a loading dock management plan).
- Swept path analysis undertaken by Arup indicates that an 8.8m long medium rigid vehicle will occupy the full width of the driveway to enter and exit the loading bay, see below. It is however unclear how frequent these movements are expected to occur, but reference to AS2890.2:2002 states that *"the full width of the access driveway may be used for both entering and leaving the site"* for the occasional service (i.e. less than once per day).

- A loading dock management plan is recommended for the proposed development to ensure all deliveries to the site are appropriately managed throughout the day. The loading dock management plan will need to include measures that specify that deliveries to the site are to be undertaken only during an allocated time slot and booked in advance with the loading dock manager. The loading dock management plan should be prepared in consultation with Council and be conditioned as part of any development approval.

- Section 4.5 indicates that a potential loading zone for two small rigid vehicles could be provided on Rickard Road by repurposing the redundant segment of the deceleration lane.
- Rickard Road is currently restricted with No Parking restrictions on the south side of the road. It is therefore expected that drop-off/pick-up activities associated with the proposed WSU Bankstown Campus may be undertaken within the existing No Parking zones on Rickard Road, which may not be desirable from a traffic capacity perspective (i.e. drop-off/pick-up activities within the kerbside lane will reduce the overall lane capacity on Rickard Road).

Existing No Parking Restrictions on Rickard Road (outside the proposed WSU Bankstown site)

- It is therefore is recommended that the existing No Parking restrictions on Rickard Road along the site frontage be removed and replaced with No Stopping restrictions so no drop off/pick up activities occur on the Rickard Road site frontage.
- The existing deceleration lane is also restricted with No Parking restrictions, which is occasionally used for drop-off/pick-up activities, as shown below.

Existing Deceleration Lane on Rickard Road – Van dropping off patrons

- It is unclear how often the existing No Parking zone is used for drop-off/pick-up activities within the deceleration lane, but the provision of a loading zone for two small rigid vehicles will mean that existing drop-off/pick-up activities will not be able to continue occur along this zone. All drop offs may need to be undertaken within The Appian Way, which may not be the desired route choice for most vehicles as vehicles will need to circulate onto Jacobs Street before getting back onto Rickard Road. It is therefore recommended that all loading and unloading activities associated with the site be undertaken on-site within the loading dock.

2.8 Other Issues

- The existing WSU campus at Milperra provides student-discounted car parking, as well as car parking for staff such that existing staff and student behaviours and attitudes would likely prefer to travel by car, as opposed to using sustainable transport measures. Extensive education and consultation should be undertaken to facilitate a modal shift away from car.
- Arup notes that the WSU Bankstown Campus is expected to service around 2,000 students, 650 University / Education space staff at any one time between 8am and 10pm, allowing for varying lecture times, external meetings, sick leave and holiday leave (based on information provided in the Planning Proposal Report prepared by Urbis dated 18 December 2018, page 41). Council should therefore consider implementing a condition of consent to restrict on-site student activity to up to 2,000 students at any one time between 8am and 10pm. Any special events where more than 2,000 students are expected should be also be considered as part of the transport assessment (e.g. during Open Days).
- The following car parking provisions are currently provided (information provided by Council):
  - Civic Tower: 433 car spaces, comprising:
    - Tenants (including Council staff): 303 spaces
    - Public: 130 spaces
  - BLAKC (Library) – 71 spaces
  - Surface car park (WSU site) – 43 spaces
  - Appian Way:
    - Public = 26 spaces
    - Council staff = 20 spaces
- The WSU Site and Appian Way car parking spaces (89 spaces) will be removed as part of the planning proposal. Existing on-site observations indicate that the car parking demand in these areas is very high, with limited available parking capacity. Demand will increase the pressure and demand on remaining spaces.

- According to the Draft Bankstown Complete Streets Plan, *"when WSU develops existing parking either to be retained on–site or relocated to another car park"* (page 133). As the 89 spaces are not proposed to be retained on the site, the loss of the car parking spaces is an infrastructure deficiency. On this basis, the parking shortfall of 89 spaces is considered an infrastructure deficiency.
- It is therefore recommended that the Applicant apply to contribute towards Council's Planning Agreements Policy (via a planning agreement) to address this car parking shortfall. This would enable Council to use the funds to construct public car spaces within the Bankstown CBD.
- The Bankstown Central Shopping Centre is introducing timed parking restrictions (3-hour free parking and payment thereafter) on their site for some 3,200 car parking spaces. It is expected that this would result in increased car parking demand within the local road network.
- The anticipated future changes to car parking in the area are expected to reduce the overall car parking supply in the area.
- One of the key issues identified in Council's Complete Streets study is that *"large amount of un-regulated and free parking encourages more driving and congestion, and all-day commuter parking doesn't benefit businesses"*. A key opportunity identified from this study is to use smart parking technology and introduce more time limits to cater for shoppers and visitors, rather than commuters. This is considered desirable from a sustainable transport perspective to manage car parking demand as the convenience of driving in the area is reduced (i.e. driving becomes unaffordable).

2.9 Summary of Peer Review Findings of TMAP

TTPP has undertaken an independent peer review of the transport assessment undertaken by Arup for the proposed development on behalf of Council. A number of deficiencies have been identified that would need to be addressed to enable a robust assessment to be undertaken. On this basis, the following recommendations are made:

- Travel surveys be undertaken at the existing WSU Milperra Campus to understand existing staff travel behaviours, including where staff currently live and whether they would change their mode of travel from car to public transport if the site were to be relocated near Bankstown Station. This would allow for a better benchmark to assess the mode share targets for staff.
- The traffic generation assessment should be reassessed based on the updated mode share targets based on the above travel surveys.
- The traffic model only assessed Year 2018. The traffic modelling should consider a +5 or +10-year future case scenario with and without the proposed development.
- The traffic modelling did not consider the impacts of the existing two driveways off Rickard Road. It is recommended that access to the site and The Appian Way access is included in the traffic modelling assessment.

- No queue length data has been collected to calibrate the traffic models. It is recommended that queue length data be collected during AM and PM peak periods to assess the validity of the traffic models.
- The traffic modelling assessment should consider a wider study area to assess the wider traffic implications arising from the proposed development.
- The bicycle parking spaces do not satisfy the recommended bicycle parking rates outlined in the NSW Planning for Walking and Cycling guideline. It is therefore recommended that the proposed bicycle parking be reassessed, or an area be allocated within the site to provide additional parking, if required at a future stage (e.g. an outcome from future travel surveys as part of the green travel plan).
- A green travel plan should be required as part of any development consent for the proposed development, including a requirement to undertake regular travel surveys post-occupation to monitor the mode share targets. It may be the case that any future development of the site (e.g. any enrolment capacity increases) is not to progress until the mode share targets have been met for the site.
- The provision of car sharing facilities should be investigated on-site to reduce single-occupancy car trips.
- A loading dock management plan is required as part of any development consent for the proposed development to ensure all deliveries to the site are appropriately managed throughout the day.
- The parking restrictions on Rickard Road (i.e. existing No Parking restrictions) be reassessed to manage the overall efficiency of the traffic road network following the completion of the proposed development – i.e. to ensure drop-off/pick-up activities do not occur on Rickard Road.
- The provision of limited and restricted on-site car parking for the proposal is supported and is considered desirable to manage car use. This is also considered consistent with the future strategic vision of the Bankstown area. However, on-site and off-site changes to parking facilities will be required to discourage the dispersal of parking demand off campus to the surrounding road network.

3 Stage 2 – Assessment of Planning Proposal

This section of the report summaries TTPP's Stage 2 findings in accordance with Council's project requirements.

Item 2.1 – Review the documentation submitted as part of the planning proposal application.

See above peer review comments – refer to Section 2.9.

Item 2.2 – Identify the origin of staff, students and visitors to the university campus based on current trends

The origin of staff, students and visitors to the university campus would be dependent on the education facilities and courses proposed on-site. Generally, staff and students come from an array of different locations to university campuses.

Based on travel surveys undertaken at UTS, staff and students were found to originate from all over NSW and some outside of NSW. Approximately 30 per cent of staff and students were found to travel more than an hour to campus, whereas 45 per cent of staff and students travelled between 30 and 60 minutes. The existing student and staff modal splits for car is 11 and 5 per cent respectively.

Similarly, travel surveys undertaken at the Meadowbank TAFE Campus indicate that the majority of students travel between 5 and 10km, while the majority of staff travel more than 15km. Whilst the site is located directly adjacent to the Meadowbank Station, 75 per cent of staff and 40 per cent of students travel by car.

However, Arup notes that the existing catchment of students attending the existing WSU Milperra campus live within 2 and 5km of the future campus, commuting from Bankstown, Greenacre, Punchbowl, Yagoona and Condell Park. The target modal split for staff and students at the WSU site is 15 and 5 per cent car driver respectively, which closely aligns with the existing UTS mode splits. It is however noted that the existing UTS campus is not considered the best comparison with the WSU Bankstown site at the moment as driving to the Bankstown area is considered more attractive than driving to UTS due to the current availability of car parking. Changes to the Bankstown area will be needed to achieve a similar UTS car driver percentage.

The existing UTS campus is centrally located near Central Station and therefore, is more accessible by public transport compared to the proposed Bankstown WSU campus. On this basis, it is recommended that travel surveys be undertaken at the existing WSU Milperra campus in order to obtain a benchmark to assess whether the target modal splits are reasonable for the site, particularly for staff as existing teaching facilities are proposed to be relocated to the new site.

Item 2.3 – Quantify the anticipated transport demands by all users of the university campus (i.e. staff, students, commercial tenants and visitors).

The anticipated transport demands for the proposed WSU campus are expected to depend on the following factors:

- proximity of the university to a railway station
- proximity of the university to major CBDs
- number of parking spaces provided
- availability of on-street parking within the vicinity of the university
- origin of staff and students at the university campus.

TTPP has conducted studies on universities both within close proximity of a railway station (less than 1km) and further away. The following table has been extracted from a report undertaken by TTPP for the University of Technology Sydney (UTS). UTS is located approximately 950m (walking distance) away from the closest railway station (Central Station) and provides no parking for students (although very limited spaces are reserved for students with disabilities).

Table 3.1: UTS Student and Staff Mode Share

Mode	2018 Online Questionnaire	
	Staff	Students
Car	10.5%	4.5%
Rail	47.8%	61.6%
Bus	22.7%	21.5%
Walk	10.7%	10.0%
Cycle	5.8%	1.6%
Other	2.4% [1]	0.9%
Total	**100%**	**100%**

[1] "Other" modes for Staff includes usage of multiple transport modes incl. public transport, taxi, uber, bicycle, walking, car

The data presented in Table 3.1 indicates that public transport is the most popular travel mode with 71% of staff and 83% of students travelling to the university via public transport in 2018. Staff choose car and walking as the next popular mode of transport with 10.5% driving or carpooling and 11% walking. Comparatively, 4.5% of students travel by car and 10% walk.

It can be inferred that the proximity of the university to public transport combined with the lack of parking provided (as well as the universities proximity to the CBD) influence staff and student modal splits to the university.

The following data represents the modal splits for students at ACU (Strathfield). It should be noted that the closest railway station to the university is Strathfield Station, located approximately 2km away (about a 25-minute walk), therefore it is expected that car usage would contribute a larger proportion of trips to the university, than if it were situated closer to a railway station.

Table 3.2: ACU Modal Split

Mode	Mode Share (April 2016)	Mode Share (August 2016)
Public Transport	34.8%(*)	39.5%
Car Driver	52.6%	45.1%
Car Passenger	10.3%	13.5%
Motorbike / Scooter	0%	0%
Bicycle	0.6%	0.9%
Walk	1.7%	1.0%
Total	**100%**	**100%**

(*) This figure includes both public transport and the ACU Shuttle Bus

As such, it can be seen from the table above that private car usage contributes approximately half of all trips to/from the university among both surveyed dates.

As the proposed Western Sydney University is situated some 450m (walking distance) from the Bankstown Railway Line with frequent services, it is expected that many students would opt to make public transport their primary mode of transportation to the university. It should also be noted that the Bankstown Line is to be upgraded to metro standards in the near future (2024), with more frequent services and shorter travel times.

A similar tertiary education facility in terms of its proximity to public transport services would be the Meadowbank TAFE site, which is located directly adjacent to the Meadowbank Station. A summary of existing mode splits for staff and students at Meadowbank TAFE is shown in Table 3.3.

Table 3.3: Meadowbank TAFE Student and Staff Mode Share

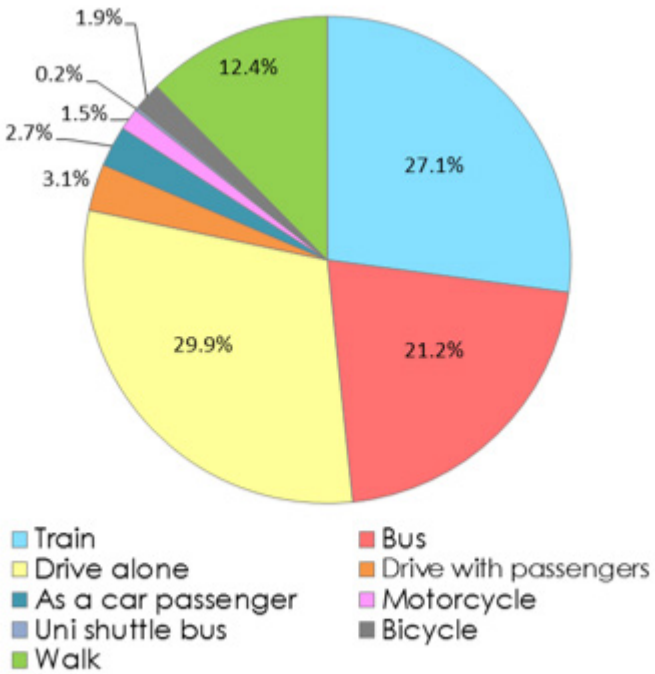
Mode	Existing Mode Splits	
	Staff	Students
Car Driver	75%	40%
Car Passenger	1%	1%
Dropped Off	0%	3%
Bus*	0%	4%
Train*	19%	42%
Ferry	0%	1%
Motorcycle	1%	1%
Cycle	1%	0%
Walk	3%	8%
Total	**100%**	**100%**

* Trips made by 'Bus then Train' have been included in 'Train' trips. Similarly, trips made by 'Train then Bus' have been included in 'Bus' trips.

The above indicates that 75 per cent of staff and 40 per cent of students travel to the site as a car driver. This represents a very high car driver rate for staff even though the site is located directly adjacent to public transport facilities (i.e. Meadowbank Station). Comparably, 2016 Census data indicates that 43 per cent of employees in the Meadowbank-Melrose Park area travel by car. It is however noted that Meadowbank TAFE currently provides 585 car parking spaces on-site for staff and students.

Similarly, the existing Macquarie University Campus is located within 200m from Macquarie University Station. This campus is much bigger than the proposed WSU campus and caters for some 48,000 enrolled students. Nevertheless, travel surveys undertaken in 2014 indicate that 30 per cent of staff and students drive to the campus alone, as shown in Figure 3.1. This campus currently provides approximately 4,500 parking spaces on campus available to staff, students and visitors.

Figure 3.1: Overall Transport Mode Split (2014)



On this basis, a car driver mode target of 15 per cent is considered a bit low for staff when compared to the other universities and TAFE sites and the existing high car usage in the Bankstown area based on existing 2016 Census data.

It is noted that a modal shift of between 3 and 5 per cent is typically considered to be a significant achievement (based on knowledge of local and internal GTPs, and as stated by experts in Land Environment Court proceedings). However, noting the public transport and pedestrian/cycle improvements in the Bankstown area, it is anticipated that a greater modal shift can be achieved in the coming years.

Further, based on the limited car parking availability in the area, it is not expected that students will be able to park within the vicinity of the proposed WSU Bankstown site such that students would ultimately be discouraged from driving to the site and therefore choose more sustainable modes of travel to/from the site, such as public transport.

Item 2.4 – Quantify the anticipated off–street parking demands by all users of the university campus.

Based on the mode share targets of the site, it is expected that 15 per cent of staff and 5 per cent of students would travel to the site as a car driver. Assuming there will be 600 staff and 2,000 students on-site at any one time (based on information provided in Arup's report), this would equate to a car parking demand of 90 staff and 100 student car parking spaces (i.e. a total of 190 car parking spaces). This does not include the car parking demand generated by any visitors at the site

Generally, most universities provide a level of visitor car parking, which are managed by the university campus through a booking system. It may be the case that the planning proposal consider the provision of some visitor car parking spaces (e.g. 1-2 spaces).

Section 5.9.2 suggests that the student car parking demand of 100 spaces would be accommodated in the Bankstown CBD. It is however noted that the existing car parking demand in the area is already very high, with limited spare parking capacity available throughout the day. In addition to this, all parking spaces are generally restricted, and 89 spaces would be removed due to the planning proposal (i.e. WSU site and The Appian Way).

It is therefore important to promote sustainable transport and provide high quality pedestrian and bicycle cycleways and public transport connections to discourage car use to/from the site. Council's Complete Streets project is expected to improve existing pedestrian and cycleways in the Bankstown area. It is therefore recommended that the Applicant consider entering an agreement with Council to contribute to the proposed off-site works, as part of Council's Complete Streets projects, to ensure a well-established network is created to/from the proposed WSU Bankstown Campus.

A comprehensive green travel plan should also be prepared and submitted to Council to outline the proposed measures to manage car parking and encourage sustainable transport to/from the site, as opposed to car use.

Item 2.5 – Identify examples of university campuses' parking provisions near railway stations (national) which may assist to guide Council's assessment of the application.

A summary of some university parking provisions is provided in Table 3.4.

Table 3.4: University Parking Provision Examples

University	Closest Railway Station	Distance from Railway Station	Parking Provisions (Students)	Parking Provisions (Staff)	Number of Students enrolled at Campus
University of Newcastle – Sydney Campus	Martin Place Station	85m	0	Not specified	939
Western Sydney University – Sydney Campus	Museum Station	120m	Not specified but limited parking	Not specified, staff required to contact	-

University	Closest Railway Station	Distance from Railway Station	Parking Provisions (Students)	Parking Provisions (Staff)	Number of Students enrolled at Campus
				University to organise parking arrangements	
WSU – Sydney Olympic Park Campus	Sydney Olympic Park	150m	0	Not specified, staff required to contact University to organise parking arrangements	-
Macquarie University	Macquarie University Station (Metro)	200m	4,500 for staff, students and visitors		48,000
University of Wollongong – South Western Sydney Campus	Liverpool Station	290m	Not specified but very likely to be 0	Not specified	-
Southern Cross University – Sydney Campus	Central Station	<400m	0	Not specified	-
University of New England – Parramatta Campus	Parramatta Station	400m	Not specified but very likely to be 0	Not Specified	-
University of Western Sydney – Parramatta, 169 Macquarie Street Campus	Parramatta Station	<550m	0	80, staff required to contact University to organise parking arrangements	-
University of Sydney	Redfern Station	700m	~2,380, includes students, staff, visitors and service vehicle spaces		-
Australian Catholic University – North Sydney Campus	North Sydney Station	700m	0 but very limited facilities provided for students with disabilities	Not specified but very limited	-
Western Sydney University – Liverpool Campus	Liverpool Station	700m	58	Not specified, staff required to contact University to organise parking arrangements	-
University of Wollongong – Southern Sydney Campus	Loftus Station	700m	Hundreds of spaces but number not specified	Not specified	-
University of Newcastle	Warabrook Station	750m	Thousands of spaces, with free parking as well	Not specified but plentiful	26,652
University of Western Sydney – Parramatta South Campus	Rydalmere Station	<850m	~800	-	-
University of Technology Sydney	Central Station	900m	0 but very limited facilities for students with disabilities	Not specified but very limited	39,074

University	Closest Railway Station	Distance from Railway Station	Parking Provisions (Students)	Parking Provisions (Staff)	Number of Students enrolled at Campus
Western Sydney University – Bankstown Campus (Proposed)	Bankstown Station	450m	0	~90	Expected to be around 10,000

Based on the above, it is clear that the most universities do not provide any on-site car parking for students, particularly those located within close proximity to public transport services. The exception to this is at Macquarie University, which is located within close proximity to Macquarie University Station and provides some 4,500 car parking spaces.

On this basis, TTPP considers the provision of no on-site car parking for students acceptable, particularly based on the site's proximity to public transport services.

Arup's mode share targets for staff and students at the site are outlined in Table 3.5.

Table 3.5: Arup Mode Share Targets

Mode	University / Education Staff	Students
Walk	10%	15%
Cycle	5%	5%
Car Driver	15%	5%
Car Passenger (incl. drop-off)	3%	5%
Bus	30%	33%
Train/Metro	32%	32%
Other	5%	5%
Total	**100%**	**100%**

Arup's report notes that there would be up to 650 staff on-site at any one time. On this basis, a total of 98 car parking spaces would be required to satisfy the 15 per cent car driver mode share target of the site. It is also recommended that an additional 1-2 car parking spaces be provided for visitor use (99-100 spaces in total).

TTPP understands that 84 car parking spaces are currently proposed on the site (reduced from 94 spaces). This represents a shortfall of 14 staff car parking spaces. In recognition of this, TTPP recommends that car share spaces be provided in lieu of staff car parking spaces to encourage carpooling and car share to/from the site. It is expected that one car share could be provided in lieu of say three to 12 car parking spaces.

However, it is expected that these car share facilities would be shared with the public, which may not be desirable from a security perspective for the site. On this basis, the Proponent could also consider installing off-site car share locations, subject to consultation with Council and relevant car share operations (e.g. GoGet).

Notwithstanding this, to address the parking shortfall, it is recommended that the Applicant apply to contribute towards Council's Planning Agreements Policy (via a planning agreement). This would enable Council to use the funds to construct public car spaces within the Bankstown CBD. This option would address the parking shortfalls on-site, rather than the option to provide car share facilities on-site, which may not be desirable for the reasons explained above.

4 Stage 3 – Preliminary Findings

This section of the report summaries TTPP's Stage 3 findings in accordance with Council's project requirements.

Item 3.1 Prepare a set of principles to guide the transport and parking requirements, taking into consideration the Region and District Plans' actions to transform the Bankstown CBD into a strategic centre / health and education precinct.

A summary actions/aims of key policy framework documents and how the site is aligned with these aims is provided in Table 4.1.

Table 4.1: Summary of Key Policy Direction

Key Aims/Objectives/Goals	The Planning Proposal
Greater Sydney Region Plan	
The key premise of the Greater Sydney Region Plan is to establish three cities where most residents live within 30 minutes of their jobs, education and health facilities, services and great places. Bankstown forms part of the Eastern Harbour City (with some parts of Bankstown located within the Central River City). The Eastern Harbour City has significant rail projects underway to increase its global competitiveness, boost business-to-business connections and attract skilled workers with faster commuting times. The Harbour CBD will extend its capabilities with an emerging Innovation Corridor on its western edge comprising universities, a major teaching hospital, international innovation companies and fast-growing start-ups. Key directions for the area include: 1. **Infrastructure and collaboration** – further collaboration to address planning complexities and identify ways to support growth at the Australian Nuclear Science and Technology Organisation innovation precinct and the Bankstown Airport and Milperra industrial area. 2. **Liveability** – growth in the area will bring urban renewal with increased infrastructure and services, open spaces and public spaces. Sympathetic infill development will focus on improved local connections. 3. **Productivity** – investments in transport and services, job growth and business activity to support innovation and global competitiveness. 4. **Sustainability** – improve access to foreshores, waterways and the coasts for recreational, tourism, cultural events and water-based transport.	The planning proposal is considered consistent with the Greater Sydney Region Plan by introducing educational facilities (i.e. the WSU Bankstown university campus) in the Bankstown CBD. The proposal would be supported by future infrastructure and services, including the future Sydney Metro between Sydenham and Bankstown.
South District Plan	
The South District Plan is part of the Eastern Harbour City. Its vision will be achieved by:	The planning proposal is considered consistent with the South District Plan by introducing educational facilities (i.e. the WSU Bankstown university campus) in the

Key Aims/Objectives/Goals	The Planning Proposal
• *Supporting the growth of the ANSTO innovation precinct, health and education precincts, Bankstown Airport-Milperra industrial area and the District's strategic centres* • *Retaining industrial and urban services land and freight routes* • *Optimising on the District's locational advantage of being close to Sydney Airport, Port Botany, the Illawarra and Port Kembla* • *Building on the District's connections to Parramatta, and in the longer term to Liverpool and Western Sydney Airport* • *Sustaining vibrant public places, walking and cycling, and cultural, artistic and tourism assets* • *Matching growth and infrastructure, including social infrastructure* • *Protecting and enhancing natural assets including waterways and beaches, bushland and scenic and cultural landscapes* • *Providing innovation in providing recreational and open spaces, and increased urban tree canopy* • *Transitioning to a low-carbon, high efficiency District through precinct-scale initiatives.* Some key relevant action plans are outlined below.	Bankstown CBD. The proposal would be supported by future infrastructure and services, including the future Sydney Metro between Sydenham and Bankstown.
Action 6. Maximise the utility of existing infrastructure assets and consider strategies to influence behaviour changes to reduce the demand for new infrastructure, including supporting the development of adaptive and flexible regulations to allow decentralised utilities.	The planning proposal site benefits from its proximity to good public transport services and a well-established pedestrian network. On this basis, it is recommended that a Green Travel Plan be prepared and submitted to Council to outline proposed measures to manage car parking and influence travel behaviours by encouraging sustainable transport to/from the site.
Action 10b. Deliver healthy, safe and inclusive places for people of all ages and abilities that support active, resilient and socially connected communities by prioritising opportunities for people to walk, cycle and use public transport.	The planning proposal delivers healthy, safe and inclusive places for staff and students at the proposed WSU campus. The planning proposal site is centrally located within the Bankstown CBD area, surrounded by good library and park facilities and public transport services.
Action 19a, b & d. In Collaboration Areas, Planned Precincts and planning for centres, investigate opportunities for precinct-based provision of adaptable car parking and infrastructure in lieu of private provision of car parking, ensure parking availability takes into account the level of access by public transport and incorporate facilities to encourage the use of car-sharing, electric and hybrid vehicles including car charging stations.	It is recommended that a Green Travel Plan be prepared and submitted to Council to outline proposed measures to manage car parking and influence travel behaviours by encouraging sustainable transport to/from the site, including to encourage the use of car-sharing, electric and hybrid vehicles.
Action 50a. Prioritise infrastructure investments, particularly those focused on access to the transport network, which enhance walkability within two kilometres of a metropolitan or strategic centre or 10 minutes walking distance of a local centre.	The planning proposal site benefits from its proximity to good public transport services and a well-established pedestrian network. The planning proposal is considered consistent with the South District Plan by introducing educational facilities (i.e. the WSU Bankstown university campus) in the Bankstown CBD. The proposal would be supported by future infrastructure and services, including the future Sydney Metro between Sydenham and Bankstown.

Key Aims/Objectives/Goals	The Planning Proposal
Prioritising parking spaces for car sharing and carpooling can support more efficient use of road space and help reduce emissions.	It is recommended that a Green Travel Plan be prepared and submitted to Council to outline proposed measures to manage car parking and influence travel behaviours by encouraging sustainable transport to/from the site, including to maximise car sharing and carpooling to the site.
Bankstown CBD Local Area Plan	
The Local Area Plan sets out the vision for the Bankstown CBD to ensure adequate land, infrastructure, facilities and open space are available. The site is located within the Northern CBD Core. This precinct is highlight accessible to the railway station and bus interchange. The Plan outlines that the Bankstown CBD will require more dwellings, jobs and infrastructure to meet the needs of the growing Bankstown population.	The planning proposal is considered consistent with the Bankstown CBD Local Area Plan by introducing educational facilities (i.e. the WSU Bankstown university campus) in the Bankstown CBD. The proposal would be supported by future infrastructure and services, including the future Sydney Metro between Sydenham and Bankstown.
Bankstown Complete Streets	
Connect regional links, provide additional end of trip facilities at the new Metro station as well as the future Western Sydney University students.	The planning proposal is considered consistent with the Bankstown Complete Streets by introducing educational facilities (i.e. the WSU Bankstown campus) in the Bankstown CBD. The proposal would be supported by future infrastructure and services, including the future Sydney Metro between Sydenham and Bankstown.
Use Smart Parking technology to use existing parking spaces more efficiently and introduce time limits to cater for shoppers and visitors rather than commuters.	The proposed changes to parking in the Bankstown CBD area are expected to influence future travel behaviours to/from the area by making parking less attractive and more costly for commuter trips, including staff and students from the proposed WSU Bankstown campus.

In summary, the following sets of principles to guide the transport and parking requirements of the planning proposal should be adopted:

- minimising the provision of car parking to promote more sustainable modes of transport; this would also be expected to reduce the anticipated traffic being generated by the site
- improving pedestrian and cycle links to/from the site, as well as connections within the site, should be considered to maximise walking and cycle trips
- providing a green travel plan to outline travel demand management strategies to manage car use and reduce car trips to/from the site, particularly single-occupancy trips, and to maximise car sharing and carpooling to the site
- participating and contributing in local area plans to ensure offsite works and/or measures assist achieve the proposed mode share targets for the site, such as the provision of time restricted on-street car parking and future pedestrian and cycle network improvements within the immediate vicinity of the site.

Item 3.2 Based on the principles, summarise the preliminary findings in relation to:

a) *Quantify the impacts the anticipated demands will have on existing infrastructure including (but not limited to) the adequacy and capacity of the existing local road, public transport, cycle and footpath networks within the vicinity of the site. Council recently completed traffic modelling as part of the Bankstown Complete Streets project.*

<u>Local Road</u>

Vehicle access to the site will be restricted to left in and left out via the existing driveway on Rickard Road. Rickard Road provides good connectivity to the wider road network, with good access to Stacey Street and Hume Highway.

The existing and proposed future local road network is shown in Figure 4.1 and Figure 4.2 respectively.

Figure 4.1: Existing Road Network

Source: Council Draft Complete Streets, Item 06 Complete Street Masterplan dated April 2019, Existing (Page 108)

Figure 4.2: Future Proposed Road Network

Source: Council Draft Complete Streets, Item 06 Complete Street Masterplan dated April 2019, Proposed (Page 109)

The proposed traffic network changes are shown in Figure 4.3. In addition to this, new signal upgrades are proposed at the Rickard Road-Chapel Street and Rickard Road-Jacobs Street signalised intersections as part of the Bankstown Complete Street projects to support Ring Road and bus movements.

Figure 4.3: Proposed Traffic Network Changes

Source: Council Draft Complete Streets, Item 06 Complete Street Masterplan dated April 2019, Future Traffic Network Changes (Page 129)

As indicated in Section 2.9, additional traffic analysis will need to be undertaken to enable a robust assessment to be undertaken. This additional traffic analysis will need to be undertaken prior to determine whether the existing and proposed future local road network is acceptable to serve the proposal.

<u>Public Transport</u>

Bankstown is well connected to its neighbouring suburbs by frequent bus services. The following bus services run between and/or through Greenacre, Punchbowl, Yagoona, Condell Park and Bankstown via Padstow, Revesby and Panania (which are the anticipated catchment areas for students):

- 905 – Fairfield to Bankstown
- 907 – Parramatta to Bankstown
- 925 – East Hills to Lidcombe via Bankstown
- 939 – Greenacre to Bankstown
- 940 – Hurstville to Bankstown via Riverwood
- 941 – Hurstville to Bankstown via Greenacre
- 944 – Mortdale to Bankstown via Peakhurst Heights

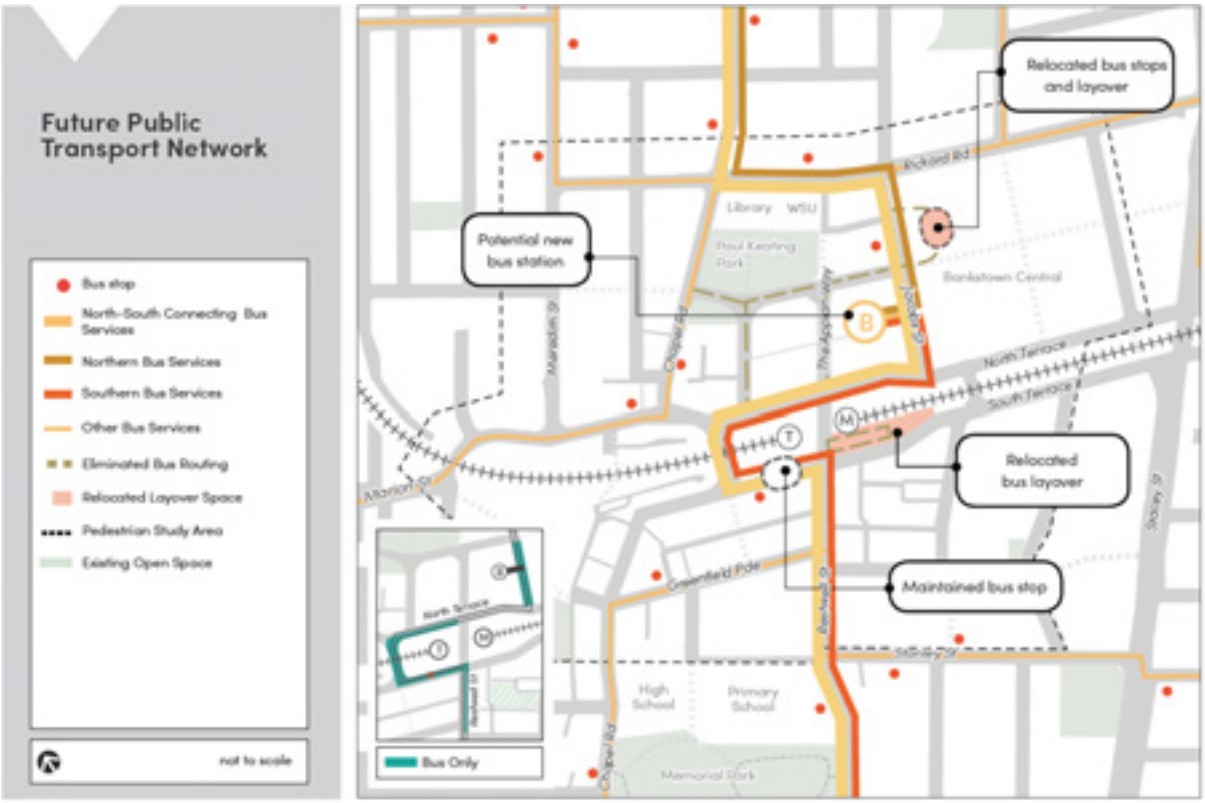
- 945 – Mortdale to Bankstown via Hurstville
- 946 – Roselands to Bankstown via Lakemba & Greenacre
- M90 – Liverpool to Burwood (most common bus service used to commute to the existing WSU Milperra campus, also runs through the Bankstown Interchange).

Future metro services will operate ever four minutes during peak periods, with each metro train having a capacity for 1,100 passengers. In addition to this, train services will continue to operate regularly during peak times between Lidcombe and Liverpool.

On this basis, existing and future public transport is considered acceptable to serve the proposal.

The future public transport network is shown in Figure 4.4.

Figure 4.4: Future Proposed Public Transport Network



Source: Council Draft Complete Streets, Item 06 Complete Street Masterplan dated April 2019, Future Public Transport Network (Page 125)

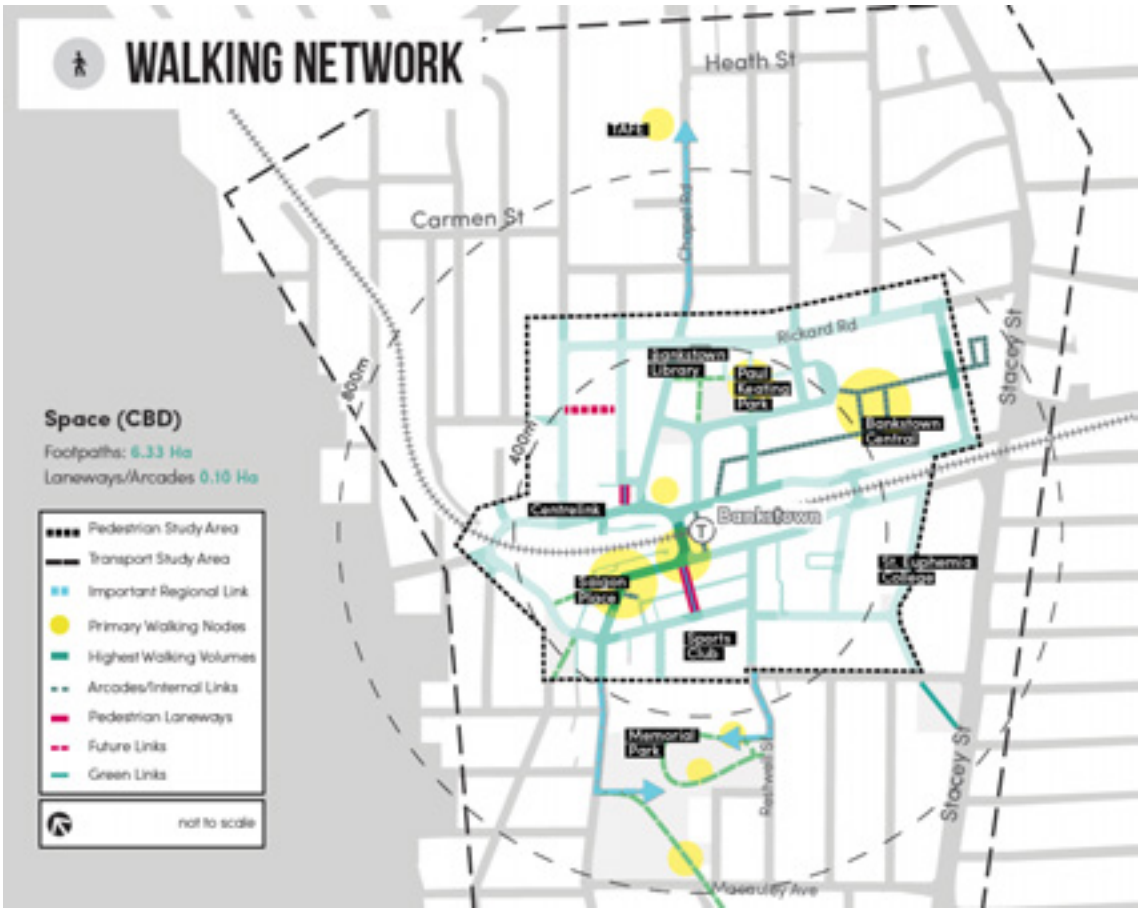
Cycle and Footpath Networks

The existing pedestrian network is exceptional within the immediate vicinity of the site and provides good pedestrian connectivity to/from key attractions in the area (e.g. Bankstown Station and Bankstown Central). Students walking to Bankstown Central will however need to travel to the centre via the car park.

As part of the Bankstown Complete Streets project, The Appian Way is proposed to be transformed with new pedestrian and cyclist links between the proposed WSU Bankstown campus and railway station.

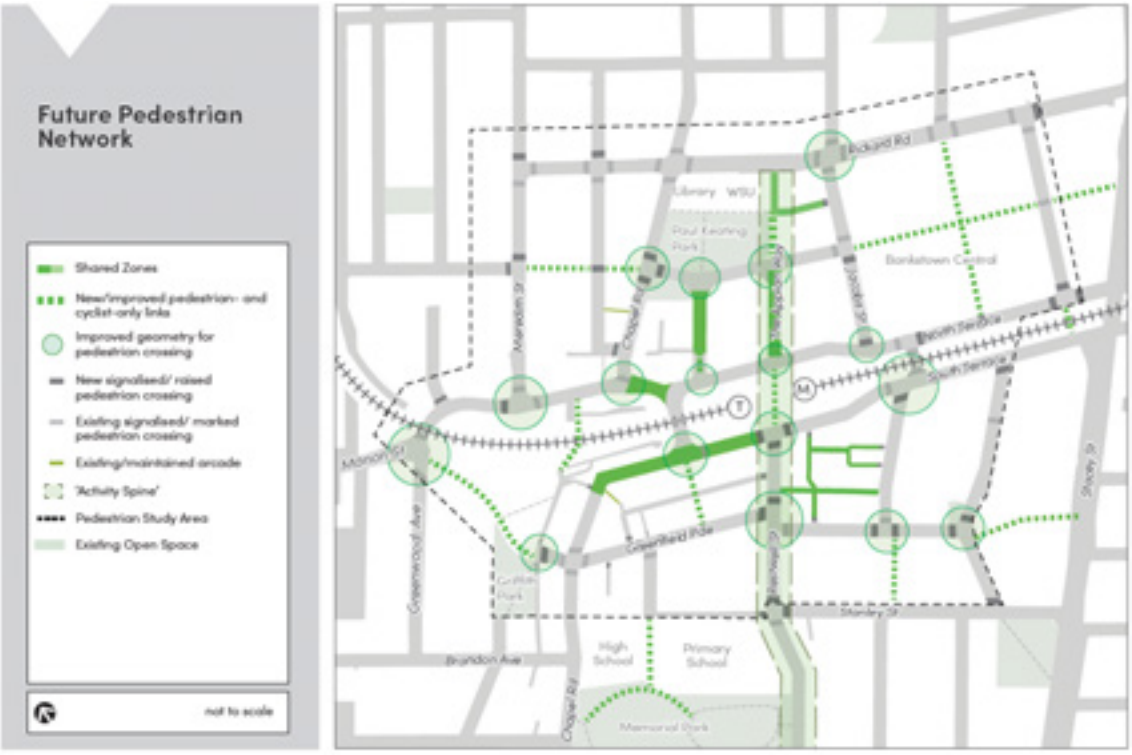
The existing and proposed future pedestrian network is shown in Figure 4.5 and Figure 4.6 respectively,

Figure 4.5: Existing Walking Network



Source: Council Draft Complete Streets Appendix A Transport and Place Analysis dated June 2018, Walking Network (Page 53)

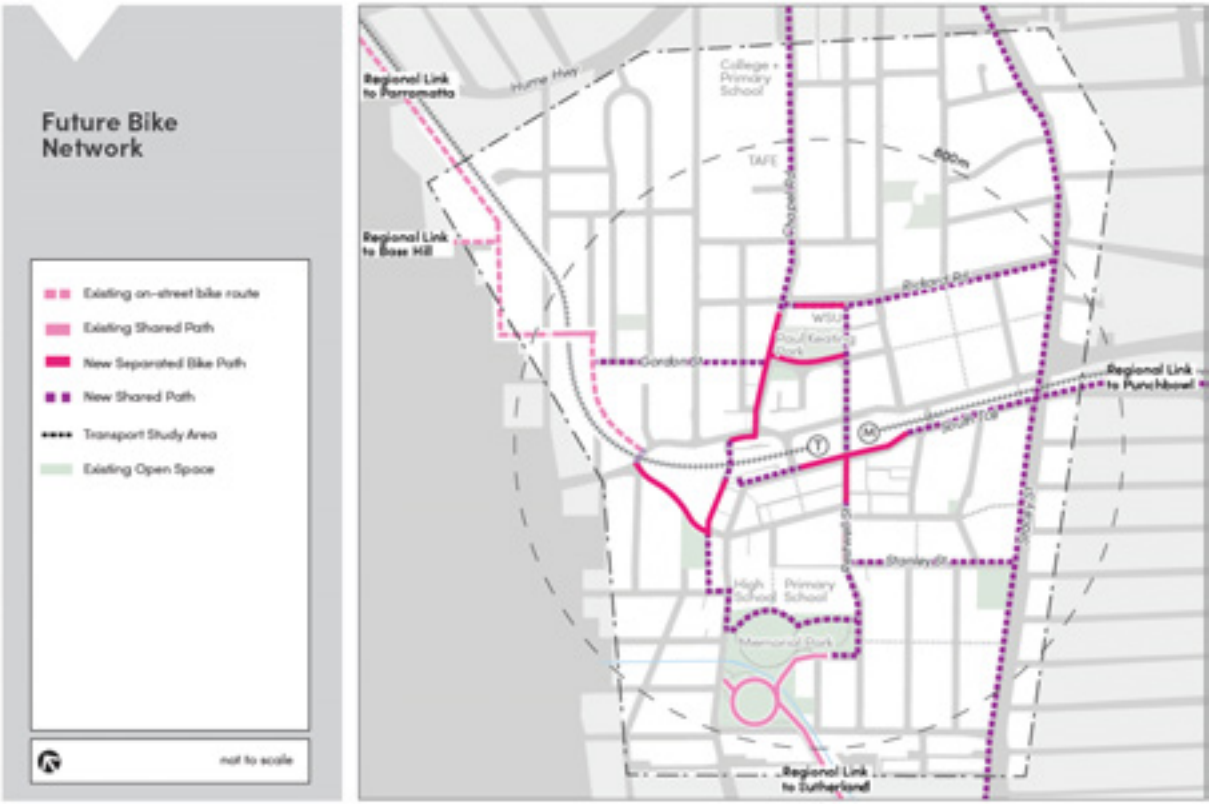
Figure 4.6: Future Pedestrian Network (Bankstown Complete Streets Project)



Source: Council Draft Complete Streets, Item 06 Complete Street Masterplan dated April 2019, Future Pedestrian Network (Page 111)

Similarly, new cycle links are proposed as part of the Bankstown Complete Streets project to connect missing cycle links in the regional system to facilitate green grid connections through the Bankstown CBD, including good cycle connections to/from the proposed WSU Bankstown campus. The future cycle network is shown in Figure 4.7.

Figure 4.7: Future Cycle Network (Bankstown Complete Streets Project)



Source: Council Draft Complete Streets, Item 06 Complete Street Masterplan dated April 2019, Future Bike Network (Page 121)

TTPP is of the view that the proposed future local pedestrian and cycle network within the immediate vicinity of the site is acceptable to adequately serve the proposal, subject to the proposed off-site works to promote sustainable transport and provide high quality pedestrian and bicycle cycleways and public transport connections.

Anticipated Future Demand

The Arup study provides the following mode share targets, outlined in Table 4.2.

Table 4.2: Arup Mode Share Targets

Mode	University / Education Staff	Students
Walk	10%	15%
Cycle	5%	5%
Car Driver	15%	5%
Car Passenger (incl. drop-off)	3%	5%
Bus	30%	33%
Train/Metro	32%	32%
Other	5%	5%
Total	**100%**	**100%**

The above mode share targets may be reasonable as a long-term mode share target for the site. It is expected that staff modes by car would initially be higher than the mode share target based upon existing travel behaviour in the local area from Census data. However, it is not unreasonable to expect a mode shift away from car following the completion of future public transport and network upgrades in the area (i.e. Sydney Metro and Bankstown Complete Streets projects).

On this basis, based on the future mode share targets of the planning proposal, the anticipated demand on the surrounding network generated by the proposal is shown in Table 4.3.

Table 4.3: Anticipated Total Demand on Network

Mode	University / Education Staff (650)	Students (2,000)	Total
Walk	65	300	365
Cycle	32	100	132
Car Driver	97	100	197
Car Passenger (incl. drop-off)	20	100	120
Bus	195	660	855
Train/Metro	208	640	848
Other	33	100	133
Total	**650**	**2,000**	**2,650**

The above anticipated demand on the network would generally be distributed throughout the day, with the majority of staff trips occurring during typical AM (8am-9am) and PM (5pm-6pm) peak periods.

Analysis undertaken by Arup indicates that no bus capacity issues were noted in the AM peak period, with most services having 'many seats available'. During the PM peak, only the M91 service (towards Parramatta) had 'standing room only', with all other services having 'many seats' or 'few seats' available. In recognition of this and the anticipated additional public transport services following the completion of the Sydney Metro, TTPP expects that the planning proposal could be appropriately accommodated in the surrounding road network, subject to the additional traffic analysis outlined in Section 2.9.

<u>Bankstown Complete Streets project – traffic modelling</u>

b) *Identify supporting traffic, transport and public domain infrastructure improvements, which the proposal may need to provide to manage the likely effects of the proposal. Public domain improvements must align with the Bankstown Complete Streets project.*

The proposed public domain improvements suggested in the Bankstown Complete Streets project will provide improved connectivity to/from the proposed WSU Bankstown campus.

c) *Identification of any other transport or parking issues which may assist Council's assessment of the planning proposal application*

One of the key issues with the planning proposal would be the management of car parking, particularly as limited staff car parking and no student car parking will be provided on-site. On this basis, TTPP recommends the provision of a green travel plan.

5 Conclusion

TTPP has undertaken an independent peer review of the transport assessment undertaken by Arup for the proposed development on behalf of Council.

Stage 2 and Peer Review Findings

A number of deficiencies of the TMAP have been identified that would need to be addressed to enable a robust assessment to be undertaken. On this basis, the following recommendations are made:

- Travel surveys be undertaken at the existing WSU Milperra Campus to understand existing staff travel behaviours, including where staff currently live and whether they would change their mode of travel from car to public transport if the site were to be relocated near Bankstown Station. This would allow for a better benchmark to assess the mode share targets for staff.
- The traffic generation assessment should be reassessed based on the updated mode share targets based on the above travel surveys.
- The traffic model only assessed Year 2018. The traffic modelling should consider a +5 or +10-year future case scenario with and without the proposed development.
- The traffic modelling did not consider the impacts of the existing two driveways off Rickard Road. It is recommended that access to the site and The Appian Way access is included in the traffic modelling assessment.
- No queue length data has been collected to calibrate the traffic models. It is recommended that queue length data be collected during AM and PM peak periods to assess the validity of the traffic models.
- The traffic modelling assessment should consider a wider study area to assess the wider traffic implications arising from the proposed development.
- The bicycle parking spaces do not satisfy the recommended bicycle parking rates outlined in the NSW Planning for Walking and Cycling guideline. It is therefore recommended that the proposed bicycle parking be reassessed, or an area be allocated within the site to provide additional parking.
- A green travel plan should be required as part of any development consent for the proposed development, including a requirement to undertake regular travel surveys post-occupation to monitor the mode share targets. It may be the case that any future development of the site (e.g. any enrolment capacity increases) is not to progress until the mode share targets have been met for the site.
- The provision of car sharing facilities should be investigated on-site to reduce single-occupancy car trips.

- A loading dock management plan is required as part of any development consent for the proposed development to ensure all deliveries to the site are appropriately managed throughout the day.
- The parking restrictions on Rickard Road (i.e. existing No Parking restrictions) be reassessed to manage the overall efficiency of the traffic road network following the completion of the proposed development – i.e. to ensure drop-off/pick-up activities do not occur on Rickard Road during peak periods.
- The provision of limited and restricted on-site car parking for the proposal is supported and is considered desirable to manage car use. This is also considered consistent with the future strategic vision of the Bankstown area. However, on-site and off-site changes to parking facilities will be required to discourage the dispersal of parking demand off campus to the surrounding road network.

Stage 2 Summary

Arup's mode share targets for staff and students at the site are outlined in Table 5.1.

Table 5.1: Arup Mode Share Targets

Mode	University / Education Staff	Students
Walk	10%	15%
Cycle	5%	5%
Car Driver	15%	5%
Car Passenger (incl. drop-off)	3%	5%
Bus	30%	33%
Train/Metro	32%	32%
Other	5%	5%
Total	**100%**	**100%**

Arup's report notes that there would be up to 650 staff on-site at any one time. On this basis, a total of 98 car parking spaces would be required to satisfy the 15 per cent car driver mode share target of the site. It is also recommended that an additional 1-2 car parking spaces be provided for visitor use (99-100 spaces in total).

TTPP understands that 84 car parking spaces are currently proposed on the site (reduced from 94 spaces). This represents a shortfall of 14 staff car parking spaces. In recognition of this, TTPP recommends that car share spaces be provided in lieu of staff car parking spaces to encourage carpooling and car share to/from the site. It is expected that one car share could be provided in lieu of say three to 12 car parking spaces.

However, it is expected that these car share facilities would be shared with the public, which may not be desirable from a security perspective for the site. On this basis, the Proponent could also consider installing off-site car share locations, subject to consultation with Council and relevant car share operations (e.g. GoGet).

Stage 3 Summary

The planning proposal is considered consistent with the strategic direction of the area by introducing educational facilities (i.e. the WSU Bankstown university campus) in the Bankstown CBD. The proposal would be supported by future infrastructure and services, including the future Sydney Metro between Sydenham and Bankstown.

However, the following sets of principles to guide the transport and parking requirements of the planning proposal should be adopted:

- minimising the provision of car parking to promote more sustainable modes of transport; this would also be expected to reduce the anticipated traffic being generated by the site
- improving pedestrian and cycle links to/from the site, as well as connections within the site, should be considered to maximise walking and cycle trips
- providing a green travel plan to outline travel demand management strategies to manage car use and reduce car trips to/from the site, particularly single-occupancy trips, and to maximise car sharing and carpooling to the site
- participating and contributing in local area plans to ensure offsite works and/or measures assist achieve the proposed mode share targets for the site, such as the provision of time restricted on-street car parking and future pedestrian and cycle network improvements within the immediate vicinity of the site.

Recommended Off-Site Works

A summary of the recommended off-site works is as follows:

- According to the Draft Bankstown Complete Streets Plan, *"when WSU develops existing parking either to be retained on–site or relocated to another car park"* (page 133). As the 89 spaces are not proposed to be retained on the site, the loss of the car parking spaces is an infrastructure deficiency. It is therefore recommended that the Applicant apply to contribute towards Council's Planning Agreements Policy (via a planning agreement) to address this car parking shortfall. This would enable Council to use the funds to construct public car spaces within the Bankstown CBD.
- It is important to promote sustainable transport and provide high quality pedestrian and bicycle cycleways and public transport connections to discourage car use to/from the site. It is therefore recommended that the Applicant consider entering an agreement with Council to contribute to the proposed off-site works, as part of Council's Complete Streets projects, to ensure a well-established network is created to/from the proposed WSU Bankstown Campus.

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