Urban Design Peer Review

Tract

Western Sydney University - Bankstown Campus Proposal

Prepared for City of Bankstown Canterbury

Quality Assurance.

Revisions

Rev	Issued	Details	Prepared By	Reviewed By	Project Principal
[01]	[23 August 2019]	Draft report issued for council review	YX	OH	OH
[02]	[27 August 2019]	Draft report issued for council review	YX	OH	OH
[03]	[06 September 2019]	Final Draft report issued for council review	YX	OH	OH
[04]	[09 September 2019]	Final Report issued for council record	YX	OH	OH
[05]	[18 September 2019]	Final Report	YX	OH	OH

Contents.

Executive Summary

Purpose of Review

An Urban Design Review has been undertaken for the City of Canterbury Bankstown for the Western Sydney University (WSU) Bankstown Campus Proposal. This report summarises the key findings and recommendations to guide Council's assessment of the application.

This report provides urban design analysis and ensuing discussion around key components of the Campus Proposal including :

- The site and its immediate urban context.
- Analysis of how the planning proposal responds to the context in an urban design sense.
- Analysis of the shadowing impacts of the building, and the resulting solar access to the adjacent public realm.
- Analysis of the visual bulk and form at street level; and the ground level interface with the surrounding urban environment.

A 3D scenario modelling and testing process was undertaken, to include:

- ***Scenario 1*** - LEP Base Case model (maximum LEP allowed building envelope)
- ***Scenario 02*** - WSU proposed built form of 14 storeys
- ***Scenario 03*** - WSU proposed built form of 19 storeys

The 3D testing was used to inform solar studies, visual impacts and the public domain interface review.

To inform our considerations, a number of benchmark investigations were undertaken, particularly around the relevant precedents of the vertical campus and the solar access controls from other municipalities.

All the preliminary findings and the benchmark investigation were workshopped and tested with Council prior to conclusion and recommendations being finalised.

Key Findings

The WSU Proposal as a Vertical Campus will provide new employment, education, community and social opportunities, and will make an important contribution in establishing the desired future character of the area

Building Height, Bulk and Scale

- The development typology is for a large vertical campus building that utilises a majority of the subject site. The design is considered appropriate from a built form and massing point of view (subject to further detailed comments below).
- The full height of the proposal borders The Appian Way, where the proposal forms a gateway landmark. It further visually responds to the newly approved mixed use development located immediately to the south of Paul Keating Park, referred to as the Compass Site.
- At 83m in height, it is a tall building for the city centre precinct, and significantly taller than the current LEP approved height limit of 53m.
- Taking into account the site location and dimensions, and the design response to existing site constraints, including flood level and flight path height restrictions, the increase in height is considered appropriate and can be supported for the following reasons:
    - The desire to establish a landmark building for the city centre, at an appropriate location within the Civic Precinct,
    - The requirements of a university campus building to incorporate a critical mass of useable building space, and resulting floor plate sizes (refer further detail below)
    - The surrounding tall buildings adjoining the site such as the Council Building, and the similar maximum height for the recently approved 'Compass Site' building which has set a preferred character of built form and height for the Civic Precinct.
    - The building articulation and design response in terms of scale and built form, especially when taking into account the strategic context of the area.
    - It is considered a high-quality response to the scale and form of the surrounding built environment and will sit comfortably within the future character of the Civic Precinct.
- The above points not-withstanding, the proposal for the built form has a potential impact on the Paul Keating Park to the south of the site in terms of overshadowing. This is discussed in more detail below.

Floor Plate Size

- The proposed floor plate sizes are justified in the proposal as being required to viably incorporate the various functional uses of a vertical campus. The precedent studies of similar vertical campus developments provides a wide variation of building, floorplate and area sizes, (due to varied site conditions and urban environments and constraints) making direct comparisons challenging.
- On balance, the proposed floor plate sizes are broadly consistent with those found in the precedents, and as such can be supported.

Floor Space Ratio (FSR)

- FSR is one control used to define the size of a building and control the intensity of development on a parcel of land.
- As the main factor of FSR, the gross floor area (GFA) needs to reflect the functional requirements of the University, and also need to be accommodated within the proposed built form, i.e. the height and bulk (Refer further detail below)
- The original proposed maximum FSR of 8:1 (December 2018) and revised maximum FSR of 8.1:1 (3 September 2019) exceeds the existing LEP control of 4.5:1.
- To mitigate the visual bulk of WSU's proposal, we recommend that a reduction be considered to the upper cantilevered portion of the building, to align with the articulation of the building below. In doing this, the total GFA will be reduced, with the consequential reduction on the proposed FSR.

Key Findings

Building Setbacks

- The street-level and tower-podium setbacks of the proposal are generally considered appropriate in terms of the articulation of the building design, and the site interfaces with the surrounding urban environment.
- The proposed setbacks contribute to maximising the solar access to the immediate public domain.
- The proposed setbacks up to Level 13 provide visual articulation and relief for the built form when viewed at street level and also on key view lines within the city centre, and as such are considered appropriate.
- However, the articulation and building setbacks above this to Levels 14-18 present challenges to both overshadowing and visual bulk and can be supported with amendments (outlined in detail below)

Overshadowing

- The overshadowing challenges presented through development of a tall, urban building directly north of a key civic and public park have been considered in detail within the proposal and analysed accordingly.

Solar Access Study - Paul Keating Park

- The precedent studies of appropriate solar controls for overshadowing public open space in highly urbanised or town centre environments provide guidance that the following solar control is considered appropriate and supported for this site:
    - The proposal must retain 3 hours of solar access between the hours of 10am - 2pm, for at least 50% of the open space area, measured at the winter solstice.
- The analysis reinforces the fact that overshadowing to the Park is unavoidable if any tall, urban development (such as the WSU Proposal) is proposed on the site.
- The Proposal does provide increased overshadowing to the Park across the day when compared to the existing situation of the undeveloped site.
- The Proposal does provide increased overshadowing to the Park across the day when compared to the existing LEP approved building envelope.
- The difference of additional overshadowing to the Park between the three modelled scenarios is limited, largely due to the building articulation incorporated in the proposed built form,
- The additional height and orientation of the upper-most section of the building imposes only very limited further solar impacts on the Park.
- The amount of additional overshadowing is considered appropriate when measured against our recommended solar controls.
- The Proposal can further reduce the additional shadow impacts onto the public realm of Paul Keating Park through a reconsideration of the form and orientation of the upper levels of the building to further mitigate impacts on the public domain and overall park experience.
- The solar access studies outlined in this report, provide further detailed analysis of the relative shadows, and impacts for each of the three development scenarios modelled - Refer Section 5.0.5 for more detail.

Solar Access Study - The Appian Way

- The precedent studies of appropriate solar controls for overshadowing of local streets (which is partly developed as open space) in highly urbanised or town centre environments do not provide clear guidance nor an applicable precedent for The Appian Way.
- As such, the solar access study has focused on the two key criteria for analysing and mitigating overshadowing to The Appian Way, being:
    - Ensuring good solar access is retained to the public open space component of The Appian Way (to the southern end)

Key Findings

    - Ensuring, where possible, good solar access is retained to the outdoor dining and shop-fronts to the east side of The Appian Way, south of the east-west access street), noting that outdoor dining in this area is currently covered by awnings which themselves limit solar penetration.
- The Appian Way is defined as a key 'activity spine' with future characters of eat street, street life, retail and night-time activities. Most activities tend to happen in the later part of the day currently. Therefore overshadowing to The Appian Way becomes less of a concern in comparison with the Paul Keating Park.
- The Proposal does provide increased overshadowing to the The Appian Way across the day when compared to the existing situation of the undeveloped site.
- The Proposal does provide increased overshadowing to the The Appian Way across the day when compared to the existing LEP approved building envelope.
- All three scenarios provide better outcomes of the solar access to The Appian Way on Equinox than on Winter Solstice.
- All three scenarios achieve 5 hours of direct sunlight to more than half of the retail facade, and at least 3 hours of direct sunlight to more than 50% of The Appian Way between 9am-4pm on Equinox.
- All three scenarios therefore satisfy our recommended solar controls.

Visual Impacts

- The Proposal outlines a desire to create an architectural character for the building which visually represents a 'tertiary education' institution and is distinctly different from what might be considered a commercial building. This desire is considered appropriate and is supported.
- The architectural form of the building is visually striking, with a podium, tapered midsection, and an angled cantilevered top section hanging over large voids in some areas.
- The tapered and chamfered sections also serve to mitigate some of the overshadowing and visual challenges, an appropriate response which is supported.
- When viewed from certain street-level vantage points, the cantilevered upper sections of the built form however presents a jutting and prominent visual form and bulk high up in both the viewers eye-line, and the skyline. This has a visual impact from street level, and as such it considered to be one of the less supported elements of the built form for this reason.
- The built form is supported with minor mitigation of these upper level overhanging elevates through selected reductions in the size, angle and articulation of the upper levels.

Public Domain Interfaces

- The Proposal includes street frontage activation and a setback at the ground level along Rickard Road, The Appian Way, and Paul Keating Park, which are considered appropriate.
- The nature and impact of vehicle circulation within The Appian Way from neighbouring properties is not clear from proposal and should be considered further.
- The nature and impact of the intrusion of the 'research and industry pop-up space' into the setback zone along Rickard Road is not clear. This provides the potential to interrupt or affect pedestrian movements and should be considered further.

Executive Summary

Built Form Control Recommendations

Building Height

1. The maximum building height of 83m is supported on the site.

Visual Bulk:

When viewed from most street-level vantage points, the top cantilevered section presents a significant and unnecessary visual form and bulk very high up in both the viewers eye-line and the skyline.

2. It is recommended that if the proposal is to be approved with the maximum height of 83m, the upper sections of the building (i.e. visual impacts occurring from Levels 14-18) be mitigated through reductions in the floorplate size, building angle and level articulations.
3. Introducing a setback above podium level to Rickard Road and The Appian Way would potentially reduce the stark form at this corner and could be more visually consistent with the surrounding built form, as well as further mitigate potential wind impacts.

Building Setbacks

It is recommended that the following building setbacks be considered:

4. South - Paul Keating Park: As per WSU Proposal.
5. East - The Appian Way: As per WSU Proposal; Or alternatively introducing a setback above podium level for a more articulated built form at the corner of The Appian Way and Rickard Road;
6. North - Rickard Road: 3m wide continuous Ground Level setback with the intrusive space removed; Or alternatively introduce a setback above podium level for a more articulated built form at the corner of The Appian Way and Rickard Road;
7. West - BLAKC Driveway: 1.5m wide continuous Ground Level setback for pedestrian movement; Above Podium setback as per WSU Proposal.

Solar Controls to Paul Keating Park

8. It is recommended that the Proposal achieves at least 3 hours direct sunlight (each hour) to more than 50% of the total Paul Keating Park area, between 10am - 2pm on the Winter Solstice.

Solar Controls to The Appian Way

9. It is recommended that further consideration be given to the nature of solar access objectives and the level of relevant policy control over solar access to The Appian Way. In particular its dual role as both a working street reserve (vehicle access and parking) and a public space to the south means that the typical public open space solar controls are not considered entirely appropriate.
10. It's therefore recommended to use the equinox solar access for The Appian Way, i.e. achieve 5 hours of direct sunlight to more than half of the shop-fronts, and at least 3 hours of direct sunlight to more than 50% of The Appian Way between 9am-4pm on Equinox.

FSR

11. It is recommended that an increase in the FSR for the site from the existing 4.5:1 FSR to 8:1 be considered.
12. To mitigate the visual bulk of WSU's proposal, we recommend that a reduction be considered to the upper cantilevered portion of the building, to align with the articulation of the building below. In doing this, the total GFA will be reduced, with the consequential reduction on the proposed FSR.

Public Domain Recommendations

Ground Level Setbacks

It is recommend the following ground level setbacks for the WSU Proposal:

1. South -Paul Keating Park: As per WSU proposal.
2. East - The Appian Way: As per WSU proposal.
3. North - Rickard Road: 3m wide continuous Ground Level setback with the intrusive space removed.
4. West - BLAKC Driveway: 1.5m wide continuous Ground Level setback for pedestrian movement through.

Ground Level Transition

5. It is recommended that each entry level to WSU building should correspond to the relevant existing ground level, taking into account all flooding mitigation requirements.
6. Any ground level difference between internal and external areas of the WSU Proposal should be addressed through the implementation of ramps, steps and lift services, so as to offer smooth and equitable access for all users and visitors.

Street Frontage Activation

7. It is recommended that a variety of functional spaces should be programmed at the ground level so as to encourage street life and retail activity. The provision of active street frontages enables a safe, comfortable and engaging environment for pedestrians.
8. All ground level activation spaces should be well illuminated, consider Crime Prevention Through Environmental Design (CPTED) principles, and establish a consistent visual amenity across the precinct.

Weather Protection

9. It is recommended that a street level awning be provided along The Appian Way and a colonnade space be provided alongside Rickard Road and Paul Keating Park.
10. Tree planting should also be provided along The Appian Way frontage and Paul Keating Park interface, where people interact, gather together and/ or linger. These elements provide necessary shading for pedestrians during summer and protection from wind and rain in winter.
11. It is noted that part of The Appian Way may be impacted for solar access in winter and appropriate tree species will need to be considered.

Deep Soil Landscape Zone

12. Deep soil zones are essential for trees and vegetation planting and storm water management purposes. It is recommended that an adequate deep soil landscape zone be provided along The Appian Way frontage. Paul Keating Park to the south of the site can provide additional areas for deep soil planting within the Park to encourage urban tree canopy cover.

Shared Zone

13. It is recommended that a well-designed feature paving should be applied to the dedicated shared zone along The Appian Way to clearly define the different modal functions. The paving will serves as informal zones helping to separate users of The Appian Way (pedestrians, people congregating, and vehicles).
14. Ensuring that the shared zone is designed to pedestrian orientated experience will assist in controlling vehicle speeds and help mitigate pedestrian vehicle conflicts.

Introduction

1 Purpose of Review

Engagement

Tract has been engaged by the City of Canterbury Bankstown to undertake an urban design peer review of the Western Sydney University's (WSU) Bankstown Campus Proposal for a new multi-storey campus building at the corner of Rickard Road and The Appian Way. The primary purpose of this peer review is to provide recommendations to guide Council in the assessment of the development application.

Purpose & Assessment

The WSU Campus Proposal presents a significant opportunity to contribute to the heart of Bankstown in terms of the economic opportunity and vibrant activation to the site, and the surrounding city centre.

Given the WSU Campus Proposal's location at an important street junction between Rickard Road and The Appian Way, and next to the public open space of Paul Keating Park, it is important to review the Proposal's design merits and assess the appropriateness of its built form elements for the locality.

This report provides urban design analysis and ensuing discussion around key urban design components of the WSU Campus Proposal including:

- The proposal site and surrounding local urban context.
- Analysis of how the proposal's design responds to its local context in terms of the final urban design outcomes.
- Analysis of overshadowing impacts resulting from the building, and solar access impacts to the public realm.
- Analysis of the building's visual bulk and form from the street level, and its ground-level interfaces with the surrounding urban environment.

In conclusion, this report provides a variety of essential recommendations to inform the planning and design controls that will apply to the site (and surrounds) to ensure that a well-designed outcome is achieved for the Proposal.

Limitations

It is important to acknowledge that this review and its assessment incorporates urban design analysis only, and should be read as such. It assesses urban design components of the Proposal (such as the overall built form, solar access, and landscape architectural components) solely on the extent that they inform, shape or impact the planning and design controls for Council.

This report is not intended as a full architectural design assessment of the proposal, nor a discussion and review of the intrinsic design merits of the building per se.

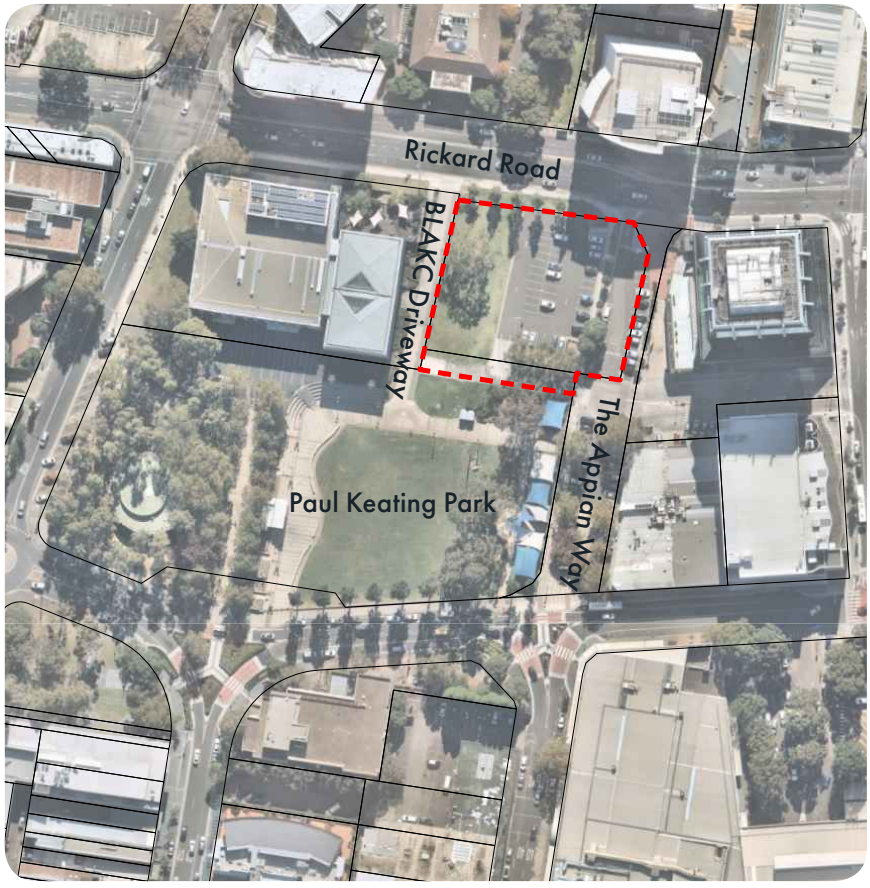


Figure 1. Site Plan *(Source: Tract 2019)*

2 Approach of Review

This report is based around a clear and logical design review process, commencing with site visits and detailed discussions with Council officers, with the proponent and their architectural design team. The approach is informed by a comprehensive understanding of the WSU Proposal to ascertain the key design drivers, assumptions and challenges.

The review includes a desktop review of documentation associated with the Planning Proposal along with any applicable strategic directions and urban studies applicable to the site and the desired future character such as the *"Bankstown Complete Streets Project"*. The review also includes a detailed consideration of the relevant local planning controls established in Council's current Local Environmental Plan (LEP) and Development Control Plan (DCP).

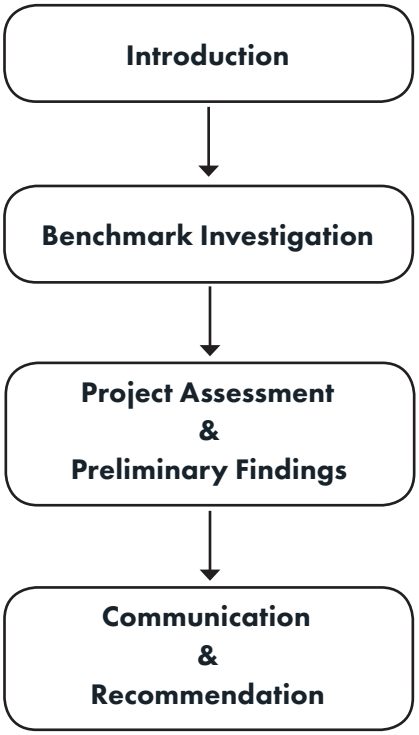
A 3D scenario modelling and testing process was undertaken, to include:

- ***Scenario 1*** - LEP Base Case model (maximum LEP allowed building envelope)
- ***Scenario 02*** - WSU proposed built form of 14 storeys
- ***Scenario 03*** - WSU proposed built form of 19 storeys

Comparison analysis was then undertaken between the three scenarios to inform solar analysis, assess visual impacts, and review the public domain interfaces.

Desktop precedent investigations were also undertaken, particularly around the relevant vertical campus precedents, and the solar access controls from other municipalities.

The key findings have been workshopped and tested prior to the preparation of the recommendations. being finalised.



In preparing this report, the following documentation has been reviewed:

- Planning Proposal Western Sydney University Bankstown City Campus and Appendix, by Urbis (18 December 2018).
- Western Sydney University Bankstown City Campus Urban Design Report, by Lyons (20 December 2018).
- Bankstown Local Environmental Plan 2015 and Bankstown Development Control Plan 2015.
- Bankstown CBD MIKE FLOOD Model Upgrade - Western Sydney University Site Flood Assessment, by DHI Water & Environment (8 May 2019).
- WSU Bankstown City Campus Development Aeronautical Impact Assessment, by Landrum & Brown Worldwide (Aust) (26 March 2019).
- WSU Pedestrian Wind Environment Study Bankstown City Campus Development, by Windtech (May 28 2019).
- WSU Bankstown City Campus Heritage Impact Statement, by Urbis (8 July 2019).
- WSU Bankstown City Campus Transport Management and Accessibility Plan (Rev B), by Arup (17 July 2019).
- State Design Review Panel SDRP Session 26 (2nd Review) & SDRP Session 32 (3rd Review) Formal Comments (21 March 2019 & 18 June 2019).
- Bankstown Draft Complete Streets: CBD Transport and Place Plan, by City of Canterbury Bankstown (April 2019).
- Best Practice Research Open Spaces in City Centres, by City of Canterbury Bankstown (16 August 2019).
- Open Spaces In City Centres Solar Amenity Study, Case Study: Paul Keating Park, by City of Canterbury Bankstown (16 August 2019).
- Government Architect NSW's 'Better Placed' Design Policy (2017).
- Western Sydney University Bankstown City Campus Supplementary Planning Information Package and Appendix, by Lyons (12 August 2019).
- Bankstown CBD Campus: Bulk and Scale Justification, by Western Sydney University (30 August 2019).
- Schematic Design Phase - Interior Narrative Concept, by HDR (1 August 2019).
- Not Lazing, Learning, by Hassell (September 2017)

Context

3 Urban Environment

Bankstown is a suburb approximately 16 kilometres south-west of the Sydney CBD. Bankstown serves as a major district centre providing extensive civic, retail, and commercial destinations within a relatively compact CBD precinct. The CBD's location is situated next to the Bankstown train station and features an urban fabric comprising a mixture of medium and high-density buildings.

The surrounding development character includes lower ground retail mixed with commercial and/or residential on the upper levels, larger ageing commercial office towers, and more recent contemporary development and civic buildings to the north of the station established around Paul Keating Park.

Site Context

The WSU Campus Proposal site is currently functioning as an at-grade grassed car park that fronts Rickard Road to the north and The Appian Way to the east. It is located between the Bankstown Library and Arts Centre and the City of Canterbury Bankstown offices building to the east, and Paul Keating Park to the south.

Paul Keating Park (The Park) is recognised as a major civic open space within the city centre, with direct axial views and connections to many key destinations, including the Bankstown Train Station. Paul Keating Park hosts a variety of daily interactions and many community and cultural and events and activities.

Open Space Context

A park masterplan for the Paul Keating Park is currently underway which will establish the future vision, uses and layout of the park. The Park's existing layout includes a civic pathway and stairs orientated at the axis of Fetherstone Street, and a significantly sized flat grassed area used for sports, recreational activities and events to the east. At the eastern edge of the park, adjacent to The Appian Way, is a shaded playground and communal seating areas.

The Park is an important open space that supports much of the recreational activity that occurs within central Bankstown. In terms of community activity and use, the grassed area and stairs are used for informal gatherings, social activities, and general enjoyment of the natural elements. School students and youth use the lawn and the adjacent playground for general play. A variety of community activities and local gatherings are often held at the paved and pathway areas.

Currently the Park has a high level of solar amenity, with the open green lawn areas receiving a good amount of solar coverage that is unaffected by overshadowing for the majority of the day. The Park receives some shadowing from the Council office building to the north-east in the morning, and minor overshadowing from the Bankstown Library Building to its north-west in the afternoon.

Figure 2. Paul Keating Park - Overhead *(Source: City of Canterbury Bankstown)*

Public Realm Context

Given the open, undeveloped nature of the subject site directly to its north, the Park is mostly unaffected by shadowing through the main part of the day. Any current overshadowing that occurs has not affected any of the landscaped, vegetation or lawn areas within the Park from growing. The large distribution of solar access allows community activities and events to take place in the park daily and year-round.

75 The Mall (The Appian Way) is located to the east of the subject site, aligned north south to connect Rickard Road to 75 The Mall. In its current state, it does not allow vehicle connection through to The Mall, and incorporates a number of on-street carparks accessible from Rickard Road and from Jacobs Street to the east.

The southern section of The Appian Way is closed to traffic and features public realm space including paved areas with mature trees, seating, and public art connecting shopfronts on the eastern side of The Appian Way into Paul Keating Park. The Appian Way currently receives reasonably good solar access, with significant shadowing caused by the Council building to the southern end of the street reserve in the morning. Shopfronts to the eastern side of The Appian Way cast some limited shadows on public realm spaces in the morning.

Any development of the subject site with significant building height has the potential to create amenity and overshadowing impacts to The Appian Way in a similar way to the Park.

Development Considerations

Any development proposed for the subject site is likely to create additional overshadowing and public realm amenity considerations which will need to be balanced in the consideration and assessment of this strategic development site. Understanding the visual, and amenity impacts caused by the Proposal will be critical to maintaining an equilibrium between development of the subject site, and retention of adequate open space, amenity, and community aspects of the Park.

Similarly, how the Proposal influences the public realm locally from the street-level and as viewed from a wider precinct perspective is a crucial requirement to be considered.

Figure 3. Paul Keating Park - Ground Level (Source: *City of Canterbury Bankstown)*

Proposal Summary

4 Summary of Planning Proposal and DRP Revision

WSU Planning Proposal

Lyons Architect has prepared an architectural design and urban design study for the WSU Bankstown Campus. The Proposal's urban design study is to inform the proposed amendments to the maximum building height and floor space ratio (FSR) standards under the Bankstown LEP 2015 pertaining to the existing site at 74 Rickard Road and part 375 Chapel Street, Bansktown.

The proposed development, as interpreted in '*Western Sydney University Bankstown City Campus Urban Design Report*' by Lyons (20 December 2018) (Referred as Lyons Report, December 2018), is a stand-alone Vertical Campus facility, which offers the following:

- 19 storeys above ground to accommodate academic and non-academic spaces;
- 2 storeys of basement parking, and 4 drop-off parking spaces at grade on The Appian Way, plus 2 small rigid van loading bays on Rickard Road;
- Varied building floor plate sizes from ground level to roof top reflecting the building setbacks and articulations. Refer Lyons' list on right;
- Proposed GFA of 29,266sqm to meet the functional and NLA requirement of 26,200sqm as defined by the University;
- Proposed building height of 83.05m with the peak of roof proposed RL 106.780 AHD;
- Proposed FSR of 8:1.

WSU Planning Proposal - DRP Revision

As of 3 September 2019, Tract has been informed from the '*Bankstown CBD Campus: Bulk and Scale Justification*' statement by Western Sydney University (30 August 2019) that the GFA and NLA has been slightly increased to include a GFA of 29,270sqm and NLA of 26,622sqm.

The revised WSU Proposal design (including amendments to GFA and NLA) has been developed through a design review panel (DRP) chaired by the NSW Architect. The revised plans have been justified on the basis that a vertical campus requires larger floor plates than other commercial tower developments to accommodate larger room sizes, improved building services access, circulation spaces, and distribute social spaces for students.

COUNCIL GFA AREA SCHEDULE	
LEVEL	AREA
LEVEL 18	785 m²
LEVEL 17	1122 m²
LEVEL 16	1232 m²
LEVEL 15	1434 m²
LEVEL 14	1504 m²
LEVEL 13	1059 m²
LEVEL 12	1395 m²
LEVEL 11	1423 m²
LEVEL 10	1339 m²
LEVEL 9	1403 m²
LEVEL 8	1399 m²
LEVEL 7	1191 m²
LEVEL 6	1909 m²
LEVEL 5	1862 m²
LEVEL 4	1897 m²
LEVEL 3	1462 m²
LEVEL 2	2546 m²
LEVEL 1	2362 m²
GROUND LEVEL	1649 m²
BASEMENT 1	160 m²
Grand total	29132 m²

Figure 4. GFA Schedule (*Source: F 190814 Updated Draft Architectural Drawings, Western Sydney University Bankstown City Campus Supplementary Planning Information Package, by Lyons,12 August 2019)*

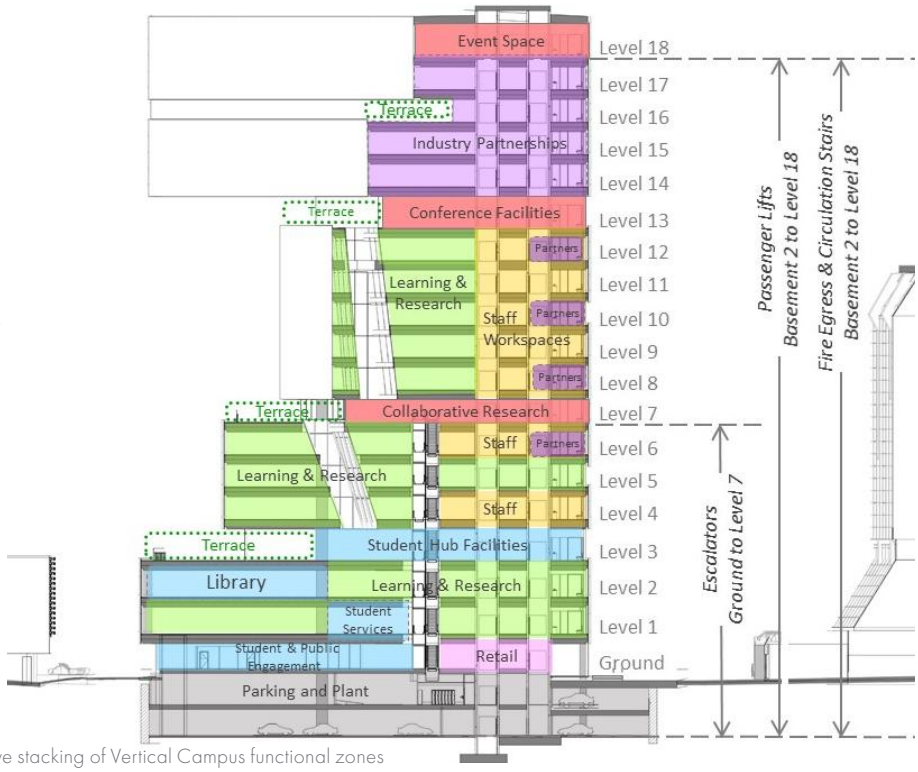


Figure 5. Section Diagram showing indicative stacking of Vertical Campus functional zones *(Source: WSU Bankstown City Campus Urban Design Report, by Lyons, 20 December 2018)*


Thurlow Fisher Lawyers

Project Assessment

Assessment Overview

In order to undertake any design assessment, it is critical to understand the design principles that underpin a proposed development scheme.

For the WSU Bankstown Campus Proposal, the relevant design principles are identified within Section 5 of Lyons Report (December 2018).

In addition to these proposed principles, we consider that the proposal should also be assessed in relation to the additional design principles from our independent point of view, including:

- DP-AD01 to DP-AD05

When combined, these principles are a logical, considered and robust base for the development proposal.

Our project assessment focused on the following two aspects in response to the purpose of review mentioned in Section 1 of this report, being:

- Bulk and Scale; and
- Public Domain Interface.

5 Bulk and Scale

To assess the bulk and scale of WSU's proposed built form, a review of the **building size** was undertaken, including the building floor plate sizes, the building height and the setbacks. This included a desktop review on the relevant sections of Lyons Report (December 2018).

The review has further tested the **solar access** and **visual impacts** of the following three scenarios to understand how variations of the proposed built form may impact upon the public domain;

1. ***Scenario 01*** - LEP Base Case, which reflects the maximum building envelope following the current Bankstown LEP and DCP controls, including:
    - Building height: 53m
    - FSR: 4.5 : 1
    - Council GFA: 16,550 sqm
    - Building setbacks: compatible with the surrounding context and desired character of the precinct, i.e.
        - Rickard Road street setback: 3m
        - The Appian Way street setback: alignment with the full width of The Appian Way
        - BLAKC driveway setback: 12m
        - Paul Keating Park setback: 10m
2. ***Scenario 02*** - WSU proposed built form of 14 storeys excluding Level 14 -18 (i.e. non-academic spaces). This scenario has a similar height which roughly aligned with the existing Council building on the east.
3. ***Scenario 03*** - WSU proposed built form of 19 storeys including Level 14 -18 (i.e. non-academic spaces)

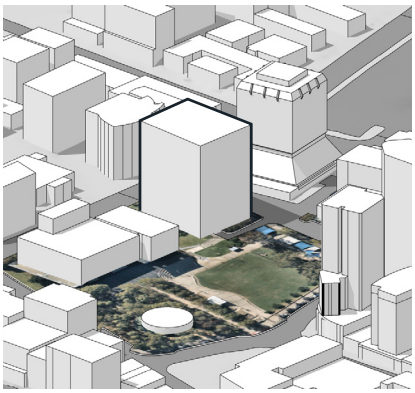


Figure 6. Scenario 1 - Base Case *(Source: Tract 2019)*

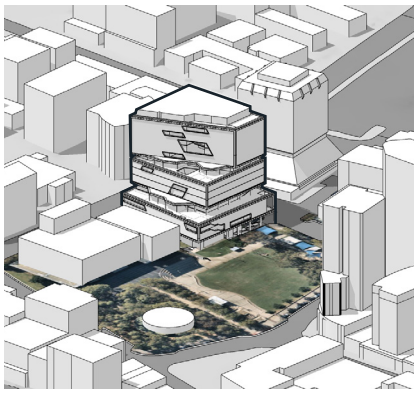


Figure 7. Scenario 2 - WSU's proposed built form of 14 storeys excluding Level 14 -18 *(Source: Tract 2019)*

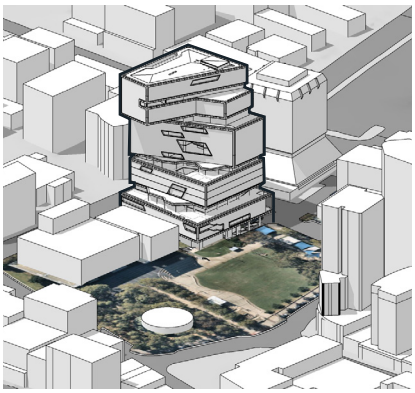


Figure 8. Scenario 3 - WSU's proposed built form of 19 storeys including Level 14 -18

Bulk and Scale Design Principles

Lyons' Design Principles:

- ***DP01*** *- Building size considered in relation to the current and future context of the site.*
- ***DP02*** *- Preserve open space along The Appian Way alignment.*
- ***DP03*** *- Optimise solar access to a diversity of public spaces at Paul Keating Park and The Appian Way throughout the year.*
- ***DP04*** *- The building form shall reflect the typology of a Vertical Campus.*
- ***DP05*** *- Align the lower building form with the adjacent Bankstown Library and Knowledge Hub.*

Additional Design Principles:

- ***DP-AD01*** *- Minimise the visual impacts to the surrounding context, especially the views from the immediate public domain, e.g. Paul Keating Park, The Appian Way and Rickard Road.*

5.0.1 Vertical Campus Precedents

The assessment of relevant precedents includes an independent investigation of four contemporary vertical campus projects to benchmark similar high-level scale of building and floorplate areas against the proposed WSU site development.

This investigation was undertaken to understand the scale of the WSU building, its component uses and resulting floorplates in comparison with other national 'current best practice' vertical campus examples. Understandably, this is a desktop study and intended for high-level comparison only, to inform the Urban Design Review.

There are several clear limitations to this information including, but not limited to:

- Limited to publicly available information only for each site and proposal.
- In most cases, floorplate and building size areas were not readily available, and in some instances have been approximated either from indicative plans or site aerial studies.
- Many of these projects are still in the proposal or development stage, and as such as subject to change, refinement and alteration.

With the above limitations in mind, these examples are nonetheless relevant to inform the context of the WSU Proposal's bulk and scale, and the appropriateness of the design to its proposed function.

Vertical Campus Precedents

The vertical campus precedents analysed and independently benchmarked include:

1. Victoria University Vertical Campus - Melbourne CBD.
2. New Space, University of Newcastle - Newcastle.
3. Carlton Connect - Melbourne.
4. University of Technology Sydney Broadway - Sydney.

A summary of each campus and the corresponding design, function, and approximate GFA is provided for reference and review.

1. *Victoria University Vertical Campus - Melbourne CBD*

The proposed new Victoria University (VU) CBD vertical campus comprises around 43,300sqm floor area over 32 levels.

It creates the opportunity for the university to consolidate many existing CBD facilities into a contemporary campus building that becomes the major component of its vision for a VU City Queen Campus.

The 24,000-square-metre City West Precinct will provide space for students from VU's Polytechnic campus, as well as its Business School, College of Law and Justice, and College of Health and Biomedicine. It will also house research facilities and the VU College.

The new vertical campus will also include approximately 10 upper levels of academic and support offices and workspaces, and a provision and need for flexibility of floor layout within. The proposed faculty and office levels provide functionality and a "*future-proofing*" of the building. The floorplate area for the building is approximately 1,800sqm average.

Jackson Architecture has described the project as *"a modern and evolutionary way of delivering a high density campus on a city site footprint"*.

The floorplate area for an average/ typical is approximately 1,800 sqm average, and the tower is reasonably uniform in the size of its floorplates as it rises above street level (podium and ground-level areas are potentially varied and harder to discern at this point).

The typical average Floorplate GFA approx. 1,800 sqm

Figure 9. VU Tower Concept - 364-370 & 372-378 Little Lonsdale Street, Melbourne Victoria (*Source: Jackson Architecture)*

Figure 10. VU Tower Public Domain Concept - 364-370 & 372-378 Little Lonsdale Street, Melbourne Victoria (*Source: Jackson Architecture)*

2. *NeW Space, University of Newcastle*

NeW Space is a $95 million landmark education precinct in the heart of Newcastle's CBD, comprising a 10 storey vertical campus-style building.

The total building floorspace is in the order of 16,000 - 17,000 sqm GFA (approximate without having access to the exact floor areas) over 10 storeys, accommodating 2,340 people.

The building comprises:

- 2,316 sqm of teaching space.
- 2,390 sqm of learning/ social space.
- 4,370 sqm of office space.

NeW Space is the heart of the Universities' City campus, offering University-supported activities across all faculties including:

- Administrative learning and research spaces.
- Digital library services and information commons.
- Social spaces.
- Work-integrated learning.
- Facilities for industry, professional and community engagement.

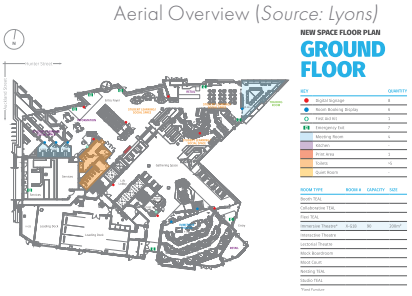
"The contemporary teaching spaces reflect new ways of learning that focus on collaboration and group work, as well as harnessing technology. Standard lecture theatres have been replaced with flexible working spaces and booth seating. " (Source: Lyons Architects)

The customised teaching spaces are located on the first three levels. Levels 4 to 8 feature smaller teaching spaces, and staff areas, and throughout the balance of the building social spaces and facilities support engagement with industry, business and the community.

The floorplate area for lower 'podium' levels 1 and 2 is approximately 2,850 sqm average. The floorplate area for upper levels 3-8 is approximately 1,800 sqm average - noting there are a number of floors with cantilevered floorplates similar in articulation and nature to the proposed WSU Building.

Figure 12. NeW Space, Hunter St & Auckland Street, Newcastle NSW 2300 - Civic Interface (*Source: Lyons)*

Figure 13. NeW Space, Hunter St & Auckland Street, Newcastle NSW 2300 - Aerial Overview (*Source: Lyons)*



Ground Floor Floorplate
GFA approx. 2,850 sqm

8th Floor Floorplate
GFA approx. 1,800 sqm

Figure 11. NeW Space - Ground Floor and 8th Floor Floorplate Plans (*Source: Lyons)*

3. *Carlton Connect Initiative - Melbourne*

"The vision for the CCI is to establish Australia's leading campus-centred, multi-disciplinary innovation precinct where industry, government, entrepreneurs and researchers co-locate and collaborate to enhance Australia's innovation, productivity and sustainability agendas." (Source: Urbis).

The site area is 8,362 sqm, and the proposal includes 75,821 sqm GFA (64,102 sqm above ground).

The proposal is for a building of 12 storeys incorporating:

- 50,000 sqm of offices, labs, co-working and event spaces.
- A new central open space of 1,300sqm.
- 3,000 direct jobs including 2,500 jobs in the commercial and scientific industry.

An important element of the evolution of Carlton Connect has been its response to changing trends in vertical campus design including:

- A design incorporating fewer floors, with better connectivity to foster collaboration.
- Larger floorplates with fewer visual and physical barriers to make the learning and collaboration spaces more effective.
- Built form articulation that responds to the context and demonstrates sustainability initiatives.
- Inclusion of multiple access points and a hierarchy of laneways to promote activity and permeability.
- Incorporation of a central open space occulus for the enjoyment of the public and future occupants and visitors to the CCI.
- A people-centric ground plane (around 30% of the site coverage) that provides at-grade connections between surrounding streets, the laneways and the occulus space.

A comparison between the CC floorplate sizes and the proposed WSU floorplates is less effective or informative given the infill nature of the development. However, the size of larger, better-connected floorplates is instructive for this peer review of the WSU Proposal and its design.

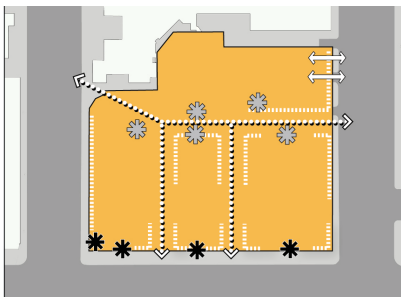


Figure 14. Carlton Connect Development Plan - Urban Design Principles (*Source: Architectus 2014)*

Figure 15. CCI Development Plan - Building Massing (*Source: Architectus 2014)*

Figure 16. CCI Carlton Victoria - Building Render (*Source: BVN)*

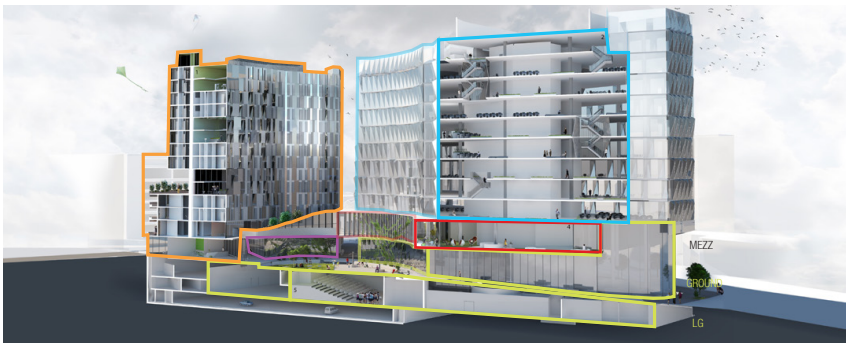


Figure 17. CCI Carlton Victoria - Building Uses (*Source: BVN)*

4. *UTS Broadway - Sydney*

The proposed 17 storey city-based vertical campus for University of Technology Sydney (UTS) in Sydney is an example of a highly constrained development that is significant in both size and its creation as a visual landmark.

The project brief identifies the site as an opportunity to create a new campus heart for the very dense urban campus of UTS which is spread over several city blocks.

The new floor space will accommodate a range of educational and ancillary educational uses, such as:

- Library and services.
- Research offices.
- Teaching spaces.
- Informal learning spaces.
- Student Centre.
- Student Union spaces.
- Food and beverage outlets.
- Academic (including faculty space).

The lower levels consist of a podium, overlooking Broadway to the south and Alumni Green to the north, housing the bulk of the social, student-focused areas, learning commons, collaborative classrooms, general teaching spaces and a Student Services hub. The floorplate area for the podium is approximately 3,050 sqm average.

The upper levels take the form of a tower that twists and rotates as it climbs, in response to the surrounding building and site geometries. The floorplate area for the upper levels reflects approximately 1,500 sqm average.

"The new development will also provide the opportunity to move CB01 into the realm of 21stC learning and enable a much greater integration of the major student focussed areas with not only the university as a whole but also the broader community."
(Source: FJMT Architects)

Ground Floor Floorplate
GFA approx. 3,050 sqm

Upper Floor Floorplate
GFA approx. 1,500 sqm

Figure 18. UTS Broadway Entry Point Diagram (*Source: FJMT 2016)*

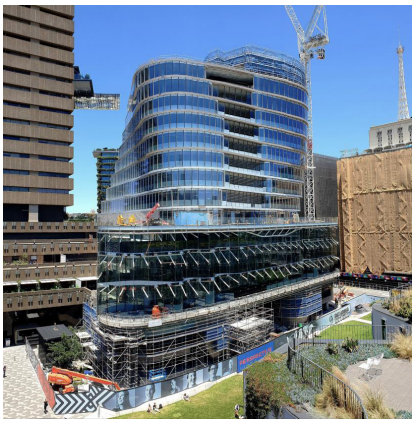


Figure 19. UTS Broadway Building Construction (*Source: UTS)*

Figure 20. UTS Broadway Render (*Source: FJMT 2016)*

5.0.2 Building Floor Plate Size Review (DP01, DP04)

The proposed building areas will accommodate the required learning, research, working spaces and supporting facilities for the campus's future population of student, staff, industry partners, tenants and public users.

Section 6.2 of Lyons Report (December 2018) outlines the WSU Proposal as having a GFA of 29,266 sqm and a Net Lettable Area (NLA) of 26,200 sqm. The GFA is identified as addressing all the functional and NLA requirements specified during the design process.

A review of the architectural plans indicates that the GFA for each level varies as the building is articulated - ranging from 811 sqm at the Top level, to 2,544 sqm for Level 2. The typical floor plate size is approximately 1,900 sqm for Level 4 to Level 6, and approximately 1,400 sqm for Level 8 to Level 15.

We note that the GFA and NLA has been slightly increased from the December 2018 proposal, as updated in the *'Bankstown CBD Campus: Bulk and Scale Justification'* statement by Western Sydney University (30 August 2019).

Four vertical campus precedents have been identified within Lyons Report (December 2018), which find the typical floor NLA ranging from 1,150 sqm to 2,860 sqm, which aligns with each of the WSU Proposal's floor plates.

The review of vertical campus precedents identifies that the typical floor plate sizes vary significantly depending on the location of the site, its context, and each organisation's functional specifications.

The size and nature of floorplates are typically highly responsive to the context of the proposed development - i.e. they are often informed or shaped by the physical limitations of the site allocated for the vertical campus building.

WSU Bankstown site is one of the more physically limited vertical campus sites in terms of the site's dimensions, size and orientation.

The proposed floor plate sizes are justified in the proposal as being required to viably incorporate the various functional uses of a vertical campus. The precedent studies of similar vertical campus developments provide a wide variation of building, floorplate and area sizes, (due to varied site conditions and urban environments and constraints) making direct comparisons challenging.

On balance, the proposed floor plate sizes are broadly consistent with those found in the precedents, and as such can be supported.

Figure 21. WSU's Typical Floor Plate (*Source: F 190814 Updated Draft Architectural Drawings, Western Sydney University Bankstown City Campus Supplementary Planning Information Package, by Lyons,12 August 2019)*

Figure 22. Precedents' Typical Floor Plate (*Source: WSU Bankstown City Campus Urban Design Report, by Lyons, 20 December 2018)*

5.0.3 Building Height Review (DP01)

Building height is a critical issue for a site as high-profile, visible and central to the Bankstown Civic Precinct, as the subject site is.

Section 6.3 of the Lyons Report (December 2018) indicates that the WSU Proposal's building height is 83.05m, with the peak of the roof proposed at RL 106.780 AHD. It lists a number of design constraints and objectives, from which the proposed height was derived. These design constraints and objectives reflect the existing site conditions, such as local flood level and flight path height restrictions, and meeting educational and development objectives expected from a modern vertical campus typology.

The building height has also been examined from a strategic context, whereby there is a desire by the Council to facilitate high quality development outcomes within the Civic Precinct to support the growth and development of the Bankstown CBD. This is reflected within the City of Bankstown Canterbury LEP 2015 and Bankstown CBD Local Area Plan (September 2011) which identifies the Northern CBD Core and the Civic Precinct as a strategic position for the concentration of higher densities and modern office tower buildings. The existing planning controls support these strategic objectives through the provision of a building height limit of 53m and an FSR of 4.5:1, sited generally around Paul Keating Park.

It is understood that currently there are some commercial sites within the Northern CBD Core precinct undergoing a phase of urban renewal and redevelopment in anticipation of the new Bankstown Metro Station. An example of which is the large scale mixed use development located to the south of Paul Keating Park (referred to as the Compass Site) which was approved by Council in 2018 with the maximum building height of 83m.

The proposed development of the subject site is for a large vertical campus building that utilises a majority of the subject site. It, like the Compass Site, is proposed at 83m in height. It is a tall building for the city centre precinct, and significantly taller than the current LEP approved height limit of 53m.

The design is considered appropriate from a built form and massing point of view (subject to further detailed analysis around shadow impacts and other amenity impacts examined in this report).

The proposal for the built form does have the potential to impact on the Paul Keating Park to the south of the site in terms of overshadowing (Refer 5.0.5 for further analysis).

Taking into account the site location and dimensions, and the design response to existing site constraints, including flood level and flight path height restrictions, the increase in height is considered appropriate and can be supported for the following reasons:

- ***The desire to establish a landmark building for the city centre, at an appropriate location within the Civic Precinct,***
- ***The requirements of a university campus building to incorporate a critical mass of useable building space, and resulting floor plate sizes.***
- ***The surrounding tall buildings adjoining the site such as the Council Building, and the similar maximum height for recently approved 'Compass Site' building which set a character of built form height for the Civic Precinct.***
- ***The building articulation and design response in terms of scale and built form, especially when taking into account the strategic context of the area.***
- ***It is considered a high-quality response to the scale and form of the surrounding built environment and would sit comfortably within the future character of the Civic Precinct.***

- **Building Setback Review (DP02, DP053, DP05, DP-AD01)**

Section 7 of the Lyons' Report outlines the design process through a series of 'Massing Strategy' diagrams that outline how the Proposal's final built form was generated.

It is recognised that this proposed built form design incorporates the following setbacks on each of the east, south and west sides.

- A 9m setback to the eastern boundary with a minor building intrusion into The Appian Way alignment. There is some complexity to the eastern interfaces as the land title extends into The Appian Way as illustrated in Figure 23. However, the proposal generally maintains a clear and open view along The Appian Way - *Addresses Design Principle DP02.*
- The upper portion of the proposed tower is rotated and setback approximately 6.5m-14.8m on the southern side. The proposal's stepping form at Levels 3 & 7-13, which reduces the bulk facing the Park, provides a relatively slender profile. (These setbacks also assist with the minimisation of overshadowing to the public domain, as outlined in Section 5.0 of this report) - *Addresses Design Principles DP03, DP-AD01.*

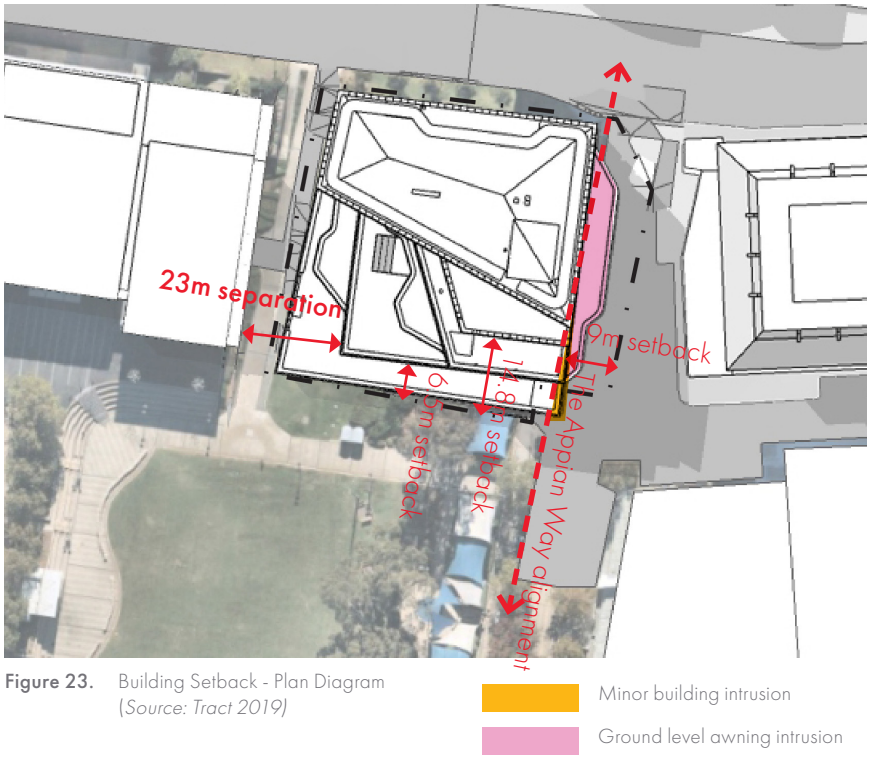


Figure 23. Building Setback - Plan Diagram (*Source: Tract 2019*)

- The tower above the podium (Level 3-13) is setback by at least 23m on the west from the Bankstown Library and Knowledge Hub - *Addresses Design Principle DP05.* However, Levels 14-18 are cantilivered toward the west and become visually prominent when viewed from the surrounding public domain.

The street-level and tower-podium setbacks of the proposal are generally considered appropriate in terms of the articulation of the building design, and the site interfaces with the surrounding urban environment.

The proposed setbacks contribute to maximising the solar access to the immediate public domain.

The proposed setbacks up to Level 13 provide visual articulation and relief for the built form when viewed at street level and also on key view lines within the city centre, and as such are considered appropriate.

However, the articulation and building setbacks above this to Levels 14-18 present challenges to both overshadowing and visual bulk and can be supported with amendments (outlined in "Design Implications" on page 49 of this report).

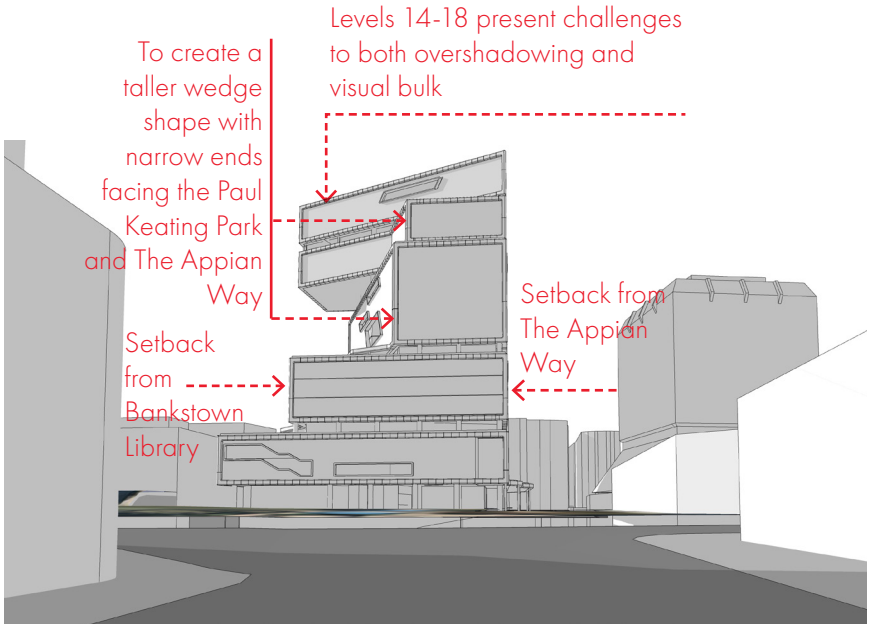


Figure 24. Building Setback - The Appian Way Street View (*Source: Tract 2019*)

Bulk and Scale

Key Findings:

Based on the review of the bulk and scale of the Proposal (including the building floor plate size, building height and building setbacks) and having regard to the comparison of precedents, in assessing the proposal we find:

Floor Plate Size

- The proposed floor plate sizes are justified in the proposal as being required to viably incorporate the various functional uses of a vertical campus. The precedent studies of similar vertical campus developments provides a wide variation of building, floorplate and area sizes, (due to varied site conditions and urban environments and constraints) making direct comparisons challenging.
- On balance, the proposed floor plate sizes are broadly consistent with those found in the precedents, and as such are supported.

Floor Space Ratio (FSR)

- The Proposal is subject to a Floor space ratio (FSR) of 4.5:1 under the Bankstown LEP 2015, however the proposed FSR of 8.1:1 (3 September 2019) exceeds the existing LEP control.
- The increased FSR is considered appropriate for the site, in light of the other considerations outlined here in terms of building height, contextual response, and overshadowing mitigation.

Building Height:

- WSU's proposal responds to the existing site constraints and future context, and proposes a similar maximum height as the newly approved Compass Site proposal. The development typology is for a large vertical campus building that utilises a majority of the subject site. At 83m in height, it is a tall building for the city centre precinct, and significantly taller than the current LEP approved height limit of 53m.
- The design is considered appropriate from a built form and massing point of view (subject to further detailed analysis around shadow impacts and other amenity impacts examined in this report).
- The proposal for the built form does have the potential to impact on the Paul Keating Park to the south of the site in terms of overshadowing (Refer 5.0.5 for further analysis).

- Taking into account the site location and dimensions, and the design response to existing site constraints, including flood level and flight path height restrictions, the increase in height is considered appropriate and can be supported for the following reasons:
  - The desire to establish a landmark building for the city centre, at an appropriate location within the Civic Precinct.
  - The requirements of a university campus building to incorporate a critical mass of useable building space, and resulting floor plate sizes.
  - The surrounding tall buildings adjoining the site such as the Council Building, and the similar maximum height for recently approved 'Compass Site' building which set a character of built form height for the Civic Precinct.
  - The building articulation and design response in terms of scale and built form, especially when taking into account the strategic context of the area.
  - It is considered a high-quality response to the scale and form of the surrounding built environment and would sit comfortably within the future character of the Civic Precinct.
- On balance, the proposed building height is appropriate for the city centre environment, and the central location within the Civic Precinct, and as such can be supported.

Building Setback:

- The street-level and tower-podium setbacks of the proposal are generally considered appropriate in terms of the articulation of the building design, and the site interfaces with the surrounding urban environment.
- The proposed setbacks contribute to maximising the solar access to the immediate public domain.
- The proposed setbacks up to Level 13 provide visual articulation and relief for the built form when viewed at street level and also on key view lines within the city centre, and as such are considered appropriate.
- However, the articulation and building setbacks above this to Levels 14-18 present challenges to both overshadowing and visual bulk and can be supported with design refinements as set out in "Design Implications" on page 49 of this report.

5.0.4 Solar Access Controls Precedents

Tract has investigated various NSW local government planning controls for protecting solar access within the public domain. Reviewing these planning controls assist in understanding how local governments can condition appropriate levels of solar access and protect the public domain from adverse solar impacts caused from high density development in urban environments.

The investigated controls include:

- Green Square Town Centre DCP 2012.
- Harold Park DCP 2011.
- Sydney DCP 2012.
- North Sydney CBD Public Domain Strategy (2018).
- North Sydney LEP 2013.
- North Sydney DCP 2013.
- North Sydney Centre Capacity and Land Use Strategy (2017).

We have investigated the solar access provisions within City of Sydney (Green Square, Harold Park, and the Ashmore Precinct) and North Sydney DCP's on the basis that these controls, similar to the Bankstown CBD, are expected to balance development within a dense urban CBD (or urban renewal) environments and provide positive public domain outcomes.

City of Sydney - Green Square Town Centre DCP 2012

GSTC 3.1.1 The Drying Green

Provisions

(1) A park of a minimum size of 5,500sqm is to be provided in the location identified in Figure 3.1: Public open space and is to:

(k) achieve direct sunlight each hour between 11am and 2pm for at least 50% of the park.

GSTC 3.1.2 Neilson Square

Provisions

(1) A neighbourhood plaza, Neilson Square, of a minimum size of 1,559sqm (including the Transit Corridor) is to be provided in the location identified in Figure 3.1: Public open space and is to:

(j) achieve direct sunlight each hour between 12 midday and 2pm for at least 50% of a 4m wide strip along the full length of the southern edge.

Figure 25. Green Square Town Centre DCP 2012 - Figure 3.1: Public Open Space (*Source: Green Square Town Centre DCP 2012, City of Sydney*)

GSTC 3.1.3 Green Square plaza

Provisions

(1) A plaza of a minimum size of 6,257sqm (including the Transit Corridor), is to be provided in the location identified in Figure 3.1: Public open space and is to:

(m) excluding shadows cast by community buildings in site 20, achieve direct sunlight each hour between 12 midday and 2pm on 21 June for at least 50% of a 4m wide strip along the full length of the southern edge of the Green Square plaza; and

(n) excluding shadows cast by community buildings in site 20, achieve consolidated areas of direct sunlight each hour between 12 midday and 2pm on 21 June generally consistent with the location and size indicated in Figure 3.2: Direct sunlight to Green Square plaza.

GSTC 6.10.1 Daylight access

Provisions

(1) Living rooms and private open spaces for at least 70% of apartments in a development are to receive a minimum of two hours direct sunlight between 9 am and 3 pm in mid winter.

GSTC 6.10.2 Sun access

Provisions

(1) Development sites and neighbouring dwellings adjacent to the Town Centre are to achieve a minimum of 2 hours direct sunlight between 9am and 3pm on 21 June onto at least 1sqm of living room windows and at least 50% of the required minimum amount of private open space (50% of 16sqm).

Where this standard is not currently achieved then the total reduction in direct sunlight should not be more than 10%.

(2) The development application is to include hourly diagrams in plan and elevation that show the shadow impact of the proposal.

GSTC 12.4.3 Design of play areas

Provisions

(1) Indoor play areas are to have access to sunlight, natural ventilation and views to the outdoors, have convenient access between indoor and outdoor areas, and enable clear lines of sight to allow for staff supervision from other areas of the child care centre.

(2) Outdoor areas are to be located away from areas where objects can be dropped down onto play areas, with at least 4 hours of solar access to 50% of the required outdoor area, away from main entrances, car parking areas and vehicle circulation areas, away from existing noise and environmental pollution sources, and away from the living/bedroom windows of surrounding dwellings in predominantly residential areas.

Figure 3.2: Direct sunlight to Green Square plaza

Note: the plan is to scale and the area in orange should be in direct sunlight.

Figure 26. Green Square Town Centre DCP 2012 - Figure 3.2: Direct Sunlight to Green Square Plaza (*Source: Green Square Town Centre DCP 2012, City of Sydney)*

City of Sydney - Harold Park DCP (2011)

3.2 Public Domain

Provisions

(6) All publicly accessible open space is to be designed to maximise the amenity of users by ensuring:

(a) 50% of publicly accessible open space is to receive at least four hours direct sunlight between 9am and 3pm on 21 June.

(b) shade from strong sun is available between September and March, for at least 20% of the area used for passive recreation; and

(c) protection from strong winds is provided to any space that is open to winds from the south.

5.7 Sun access

Objectives

(a) Ensure new developments do not result in a deterioration of direct sunlight access to public spaces and neighbouring properties; and

(b) Establish standards for daylight and direct sunlight access in new developments, particularly living areas and open space.

Provisions

(1) Development must result in:

(a) neighbouring developments receiving whichever is the lesser of:

i) at least three hours of direct sunlight to 50% of the primary private open space and into living rooms between 9am and 3pm on 21 June; or

ii) the existing levels of direct sunlight between 9am and 3pm on 21 June;

(b) proposed apartments receiving a minimum of two hours of direct sunlight between 9am and 3pm on 21 June onto at least 1m2 of living room windows and to at least 50% of the required minimum area of private open space; and

(c) 30% of required common open space receiving at least two hours of direct sunlight between 9am and 3pm on 21 June; and

(2) The development application is to include solar diagrams that, as a minimum, demonstrate compliance with the above provision and include plans and elevations showing the shadows of the proposal at each hour between 9am and 3pm on 21 June.

City of Sydney - Sydney DCP 2012

3.1.4 Public open space

Provisions

(3) In relation to parks (i.e. non-linear public open space):

(a) 50% of the total area is to receive sunlight for 4 hours from 9am to 3pm on 21 June;

(b) protection from direct sun is to be available on 21 December for a minimum of 20% of the area used for passive recreation; and

(c) protection from strong winds is to be provided, where practicable

3.2.1 Improving the public domain

Provisions

3.2.1.1 Sunlight to publicly accessible spaces

(1) Overshadowing effects of new buildings on publicly accessible open space are to be minimised between the hours of 9am to 3pm on 21 June.

(2) Shadow diagrams are to be submitted with the development application and indicate the existing condition and proposed shadows at 9am, 12 noon and 2pm on 14 April and 21 June. If required, the consent authority may request additional detail to assess the overshadowing impacts.

Section 5.5 Ashmore Neighbourhood – 5.5.4.1 Solar access

Provisions

(1) New development must ensure that it provides a minimum of three hours of direct sunlight between 11am and 2pm on 21 June to the public square (within the Sydney Park Village development) in the southwest corner of Coulson Street and Mitchell Road.

(2) A minimum of 60% of the total area of McPherson Park is to have direct solar access between 10am and 2pm at the winter solstice.

Figure 5.119 Ashmore Open Space and Setbacks

Figure 28. Sydney DCP 2012 - Figure 5.119: Ashmore Open Space and Setbacks (*Source: Sydney DCP 2012, City of Sydney)*

North Sydney LEP 2013

Clause 6.3 Building heights and massing

2. Development consent must not be granted for the erection of a building on land to which this Division applies if:

a. the development would result in a net increase in overshadowing between 12pm and 2pm from the March equinox to the September equinox (inclusive) on land to which this Division applies that is within Zone RE1 Public Recreation or that is identified as "Special Area" on the North Sydney Centre Map, or

b. the development would result in a net increase in overshadowing between 10am and 2pm from the March equinox to the September equinox (inclusive) of the Don Bank Museum, or

c. the site area of the development is less than 1,000 square metres and any building resulting from the development would have a building height greater than 45 metres.

North Sydney DCP 2013

S2 Commercial & Mixed Use Development

2.3.7 Solar Access

P1 – Developments within the North Sydney Centre must comply with the height and overshadowing requirements contained within cl.4.3, and cl.6.4 of the NSLEP 2013.

P2 – Developments located outside of the North Sydney Centre should be designed and sited such that solar access at the winter solstice (21st June) provides a minimum of 3 hours between the hours of 9:00am and 3:00pm to:

a. Any solar panels;

b. The windows of main internal living areas;

c. Principal private open space areas; and

d. Any communal open space areas.

P4 – New development should not overshadow existing or proposed public open spaces located outside of the North Sydney Centre between 11:30am and 2:30pm

S8 Outdoor Dining and Display of Goods on the Footpath

8.4.3 Solar Access

Objectives

O1 To provide a comfortable environment within which to enjoy outdoor dining or shopping.

Provisions

P1 Solar access to nearby open spaces, outdoor dining areas or residential areas, is not to be obstructed, particularly between the hours of 12 noon and 2.00pm.

P2 Locate outdoor dining areas that have good solar access and daylight.

S3-9 Area Character Statements - St Leonards / Crows Nest Planning Area

Solar access

P13 Development to the north of Atchison Street and east of Mitchell Street is restricted in height and massing to maintain and improve existing solar access on June 21 between 12pm and 3pm to the open space area at the south end of Mitchell Street.

P14 Development should not increase overshadowing of the existing or proposed public open space area at Hume Street Park bounded by Pole Lane, Oxley Street, Clarke Street and Hume Street between the hours of 9am – 3pm.

North Sydney Capacity and Land Use Strategy (2017)

Future Capacity Analysis 2016

The following filters were applied in creating the base case:

b. Height of buildings determined by "prohibition" on overshadowing or any dwelling outside the North Sydney Centre (between 9am and 3pm in mid-winter)

c. "Special Area" shadow impact controls (12pm-2pm, 10am-2pm or Don Bank Museum) on 20 March, 21 June and 23 September

Special Areas Objectives

- *Minimise overshadowing or, and loss of solar access to important areas of outdoor space in North Sydney Centre, particularly in mid-winter*
- *Promote a scale and massing that provides for pedestrian comfort in relation to protection from the weather, solar access, human scale and visual dominance; and*
- *Retain the openness and sunny aspect of the centre*

Solar Access Review

Key Findings:

Based on our investigation of other council's controls, it is found that:

- **Winter solstice** has been used in the most scenarios and locations for the solar access control;
- **Equinox** has also been used, especially in a high density urban environment, e.g. North Sydney Centre;
- The time frame between **9am - 3pm** appears the most common in the solar controls, however **10am-2pm**, 11am-2pm and 12pm-2pm are also used in response to different situations.
- Minimum **50%** of the **total area** of the park or publicly accessible open space is to receive direct sunlight.
- A minimum of **four hours** of direct sunlight to the park or publicly accessible open space between **9am-3pm**, or **three hours** between **10am-2pm** at high density area, e.g. Green Square Town Centre, are required to be achieved.
- **Solar access exemptions for buildings may apply** in certain instances whereby the development proposed is for a community building and/or considered by Council as a strategic site *(see Green Square Town Centre DCP 2012 - GTSC 3.1.3 Green Square Plaza Clause (1)(m).*

The comparative review of other municipal indicators creates two key directions:

- Achieve 4 hours of direct sunlight to minimum 50% of the total area of the public park between 9am and 3pm on winter solstice; or
- Achieve 3 hours of direct sunlight to minimum 50% of the total area of the public park between 10am and 2pm on winter solstice in highly urbanised areas.

Solar Access Review

One of the primary issues and concerns for Council in assessing the WSU Proposal is related to the subject site's location directly north of Paul Keating Park. Paul Keating Park serves as the key public park and open space within the Bankstown CBD. As such, any overshadowing caused by a new building on the site has the potential to adversely affect the park and impact its function as an important local open space. Accordingly, this is a primary focus for this urban design peer review.

Individual solar studies were undertaken for each of the three development scenarios outlined previously. These studies produced a range of shadow diagrams to be analysed on the extent of the shadowing impacts on the public domain areas:

- Paul Keating Park (the Park).
- The Appian Way.

Important assumptions underpinning the solar access analysis and shadow diagrams include:

1. Given the studies are particularly focused on understanding and retaining high quality solar access to the Paul Keating Park, the definition of where the 'park' begins and ends is particularly important. The Paul Keating Park area we have used for the solar study is defined in green in the adjacent Figure 29. This area has been defined on the basis of the following:
    - The most common recognition of the Park incorporates all public land south of the proposed site and the Bankstown Library and Knowledge Centre/ Bryan Brown Theatre bounded by The Appian Way, The Mall and Chapel Road. This would include the former Council Chambers Building and the heavily landscaped and vegetated surrounds within the 'park'. The total park area to be assessed is 12,450 sqm.
    - Further, the solar study is used to assist our understanding of the solar impacts on the immediate public domain surrounding WSU Proposal site. The broader extent of the public domain that is included, the better comprehension of the issues and opportunities could be achieved.
2. Given the future use and function of The Appian Way, it is important to understand the solar impacts on The Appian Way, which should include the existing road between the Mall to the south and Rickard Road to the north; and the footpath and retail facades on the eastern side of The Appian Way toward the southern end. The study area of The Appian Way is defined and highlighted in purple in the adjacent Figure 29, with the retail facades and the adjacent footpath at southern end highlighted in yellow.
3. These shadow diagrams incorporate two critical times of the year - the Equinox of September 22nd, and Winter Solstice of June 21st. These are widely accepted and adopted standards for planning and design controls related to solar access. They represent a 'reasonable' indication of standard overshadowing impacts (Equinox), and the maximum overshadowing caused during the shortest day in winter (Winter Solstice). While the Winter Solstice shadows provides an important indication of the maximum shadows to be used to inform design decisions, it is also recognised that mitigating all of the Winter Solstice shadowing is very difficult (and often impossible) in high density urban environments. Therefore Equinox is used for an alternative assessment.
4. Shadow diagrams were produced at one hour intervals between 10am and 3pm (or 10am-2pm inclusive) for Paul Keating Park, and between 9am and 4pm (or 9am-3pm inclusive) for The Appian Way. Many typical LEP controls use 9am - 3pm as their standard shadow assessments. However, we recognise that it is important to analyse the Park and The Appian Way separately and under different time frames due to their different nature of uses.
    - We focused between 10am-3pm for the Park as that is the time period of the day when people mostly and/or actively use the park.
    - We have included an extra hour assessment at 3pm-4pm for The Appian Way as it specifically relates to solar access to shops and retail tenancies on the eastern side of The Appian Way where people/students congregate for their afternoon tea break.

Methodology

The solar study has been undertaken based on a combined 3D model, which comprises:

- Project context model in Sketchup, provided by Council on 4th July 2019. Building footprints and heights of existing buildings, cadastral boundary information, along with topographical data (from 1.0m contours) provided in Council's 3D model; and
- 3D models of three different WSU Campus scenarios:
    - **Scenario 03** - The latest 3D model in CAD of the proposed WSU building, provided by Lyons Architects on 2nd August 2019 that was incorporated into Council's Sketchup 3D context model. The site boundary for the WSU 3D model received was at RL0.0 and was correctly and accurately aligned with Council's cadastre.
    - **Scenario 02** - The latest 3D model in CAD of the proposed WSU building, provided by Lyons Architects on 2nd August 2019, with top 5 levels, i.e. Level 14-18, removed.
    - **Scenario 1** - A 'base case' scenario created under with the current Bankstown LEP and DCP controls as listed in Section 5 of this report.

A series of overshadowing diagrams were produced using the 3D model to generate shadows for the hours between 9am and 4pm on June 21st (Winter Solstice).

Figure 29. Plan Diagram Defining the Public Domain *(Source: Tract 2019)*

The software settings for shadowing reflect the location as being 'Sydney' and then adjusted to Bankstown's Latitude of 33.918 degrees south and Longitude of 151.035 degrees east.

These combined overshadowing impact diagrams incorporate outputs from the 3D model to illustrate the level of solar impacts caused by built forms across the day. Each of the diagrams in the following pages only presents the shadows within the study areas, which include the shadow of existing built form and the shadow of the three scenarios in different colours and patterns.

We have separated the shadow diagrams into two timeframes for clarity and simplicity of visual assessment. The two timeframes for the Park are 10am-12pm and 12pm-2pm; and the two time frames for The Appian Way are 9am-11am and 12pm-4pm, as the shadow patterns shift to the east from 12pm onwards.

The overshadowed areas were measured in CAD and calculated and input into a table as a way to compare directly each of the overshadowing outcomes and inform the key considerations and recommendations for the Proposal. Existing trees have been shown in the analysis for the purpose of context, but the overshadowing impact of these existing trees has not been included in the overshadowing calculations.

With any shadow diagrams there are limitations as to their accuracy due to shortcomings of 3D modelling and the simplicity of the shadow-casting. Specifically, the extent of shadows are indicated at ground level (i.e not where they impact building or vertical surfaces). These limitations are standard for assessment of shadows and do not diminish the conclusions that can be drawn from the shadow study.

5.0.5 Summary of Solar Impacts - Paul Keating Park

TIME @ WINTER SOLSTICE	IMPACT IN SCENARIO 1 Base Case	IMPACT IN SCENARIO 2 WSU 14-Storey Built Form	IMPACT IN SCENARIO 3 WSU 19-Storey Built Form
10am	54% of the total Park area will receive direct sunlight with 44% on the west side of the park and 10% on the east side of the park	46% of the total Park area will receive direct sunlight with 41% on the west side of the park and 5% on the east side of the park	40% of the total Park area will receive direct sunlight with 35% on the west side of the park and 5% on the east side of the park
11am	65% of the total Park area will receive direct sunlight with 63% on the west side of the park and 2% on the east side of the park	61% of the total Park area will receive direct sunlight with 61% on the west side of the park	55% of the total Park area will receive direct sunlight with 55% on the west side of the park
12pm	72% of the Park will receive direct sunlight	72% of the Park will receive direct sunlight	68% of the Park will receive direct sunlight
1pm	80% of the Park will receive direct sunlight	77% of the Park will receive direct sunlight	76% of the Park will receive direct sunlight
2pm	81% of the Park will receive direct sunlight	77% of the Park will receive direct sunlight	77% of the Park will receive direct sunlight
3pm	69% of the Park will receive direct sunlight	66% of the Park will receive direct sunlight	66% of the Park will receive direct sunlight
Approx Total Hours of Direct Sun > 50% of the Total Park Area	5 Hours	4 Hours	4 Hours

Source: Areas of direct sunlight are calculated from shadow diagrams, which are generated by Sketchup 3D model (Tract 2019).

At 10am, more than half of the total Park area receives direct sunlight for Scenario 1, whilst more than half of the total Park area is overshadowed for both Scenarion 2 and Scenario 3 due to the additional height and bulk of the proposed built form.

From 11am, the shadows begin to be reduced for each of the three scenarios, with direct solar access increased to more than 55% across the Park area. Scenario 1 performs better than Scenario 2 & 3 by achieving 65%.

Between 10am-11am, the Park areas receiving direct sunlight are not consistent due to the shadow movement. The percentage listed above represents the total park area in sun.

Between 12pm-3pm, all three scenarios could achieve a good result, i.e. more than 66% of the Park area receiving the direct sun.

Summary

- All three scenarios achieve at least **3 hours** direct sunlight to more than **50%** of the **total** Park area, between **10am - 2pm** on Winter Solstice.
- Compared with Scenario 2 and 3, Scenario 1 achieves one more hour direct sunlight to more than 50% of the total Park area at 10am due to its reduced building height and bulk.

Winter Solstice [10am-12pm, 21st June]

Figure 30. PKP Shadow Diagram Winter Solstice [10am-12pm, 21st June] (*Source: Tract 2019*)

Winter Solstice [12pm-2pm, 21st June]

Figure 31. PKP Shadow Diagram Winter Solstice [12pm-2pm, 21st June] (*Source: Tract 2019*)

5.0.6 Summary of Solar Impacts - The Appian Way (Winter Solstice)

TIME @ WINTER SOLSTICE	IMPACT IN SCENARIO 1 Base Case	IMPACT IN SCENARIO 2 WSU 14-Storey Built Form	IMPACT IN SCENARIO 3 WSU 19-Storey Built Form
9am	16% of the Appian Way & 0% retail facade will receive direct sunlight. None of the scenarios cast shadow on the Appian Way.	16% of the Appian Way & 0% retail facade will receive direct sunlight. None of the scenarios cast shadow on the Appian Way.	16% of the Appian Way & 0% retail facade will receive direct sunlight. None of the scenarios cast shadow on the Appian Way.
10am	40% of the Appian Way & 0% retail facade will receive direct sunlight. None of the scenario cast shadow on the Appian Way.	40% of the Appian Way & 0% retail facade will receive direct sunlight. None of the scenario cast shadow on the Appian Way.	40% of the Appian Way & 0% retail facade will receive direct sunlight. None of the scenario cast shadow on the Appian Way.
11am	87 % of the Appian Way & 100% retail facade will receive direct sunlight.	82% of the Appian Way & 100% retail facade will receive direct sunlight.	82% of the Appian Way & 100% retail facadewill receive direct sunlight.
12pm	42% of the Appian Way & 100% retail facade will receive direct sunlight.	24% of the Appian Way & 38% retail facade will receive direct sunlight.	23% of the Appian Way & 38% retail facade will receive direct sunlight.
1pm	13% of the Appian Way & 0% retail facade will receive direct sunlight.	15% of the Appian Way & 0% retail facade will receive direct sunlight.	13% of the Appian Way & 0% retail facade will receive direct sunlight.
2pm	30% of the Appian Way & 15% retail facade will receive direct sunlight.	33% of the Appian Way & 42% retail facade will receive direct sunlight.	33% of the Appian Way & 42% retail facade will receive direct sunlight.
3pm	43% of the Appian Way & 60% retail facade will receive direct sunlight.	38% of the Appian Way & 53% retail facade will receive direct sunlight.	38% of the Appian Way & 53% retail facade will receive direct sunlight.
4pm	20% of the Appian Way & 36% retail facade will receive direct sunlight.	20% of the Appian Way & 36% retail facade will receive direct sunlight.	20% of the Appian Way & 36% retail facade will receive direct sunlight.
Approx Total Hours of Direct Sun	Less than 1 Hour to more than 50% of The Appian Way; More than 1 Hour to more than 50% of retail facade.	Less than 1 Hour to more than 50% of The Appian Way; More than 1 Hour to more than 50% of retail facade.	Less than 1 Hour to more than 50% of The Appian Way; More than 1 Hour to more than 50% of retail facade.

Source: Areas of direct sunlight are calculated from shadow diagrams, which are generated by Sketchup 3D model.

At 9am, most of the Appian Way and 100% retail facade are overshadowed by the existing surrounding built form. There are no additional solar impacts caused from any of the proposed scenario built forms.

From 10am solar access to the Appian Way increases with retail facade still in shadow. At 11am, the least shadows cast on the Appian Way. More than 80% of the Appian Way and 100% retail facade receive direct sun, with slightly better performance from Scenario 1.

At 12pm, the shadows on the Appian Way start to increase. Again Scenario 1 performs better than the other two scenarios.

At 1pm, the overshadowed area reach the maximum for all three scenarios. Then the shadows start to clear up from 2pm onward. There is not much difference among the three scenarios.

Summary

- All three scenarios indicate reduced solar access for The Appian Way during the Winter Solstice.
- The peak hour of receiving most direct sun to the Appian Way happens at 11am-12pm for all three scenarios. Then the Appian Way is largely overshadowed at 12pm-2pm, when most people come out for lunch break.
- The Appian Way starts to receive more sun after 2pm around the southern end. About 30% of the Appian Way and more than half of the retail facade receive direct afternoon sun at 3pm, when people would like to enjoy the afternoon-tea break.

Winter Solstice [9am-11am, 21st June]

Figure 32. The Appian Way Shadow Diagram Winter Solstice [9am-11am, 21st June] (*Source: Tract 2019*)

Site Boundary
Base Case Scenario (LEP Envelope)
Proposed Built Form
Appian Way
Base Case Scenario Shadow
Building Envelope Excluding Level 14-18 Shadow
Building Envelope Including Level 14-18 Shadow
Shadow Of Surrounding Built Form on Appian Way
Shadow Of Proposed Building Envelope Excluding Level 14-18 on Appian Way
Shadow Of Proposed Building Envelope Including Level 14-18 on Appian Way

INFERENCE (AT 11.00AM)
(Base case doesn't cast any shadow on Appian Way at 11.00 am)

SCENARIO 1 - BASE CASE (LEP ENVELOPE)

APPIAN WAY - 85% IN SUNLIGHT
- 15% IN SHADOW (shadow of surrounding built form)

SCENARIO 2 - PROPOSED BUILDING ENVELOPE EXCLUDING LEVEL 14-18

APPIAN WAY - 80% IN SUNLIGHT
- 20% IN SHADOW (shadow of surrounding built form)

SCENARIO 3 - PROPOSED BUILDING ENVELOPE INCLUDING LEVEL 14-18

Winter Solstice [12pm-4pm, 21st June]

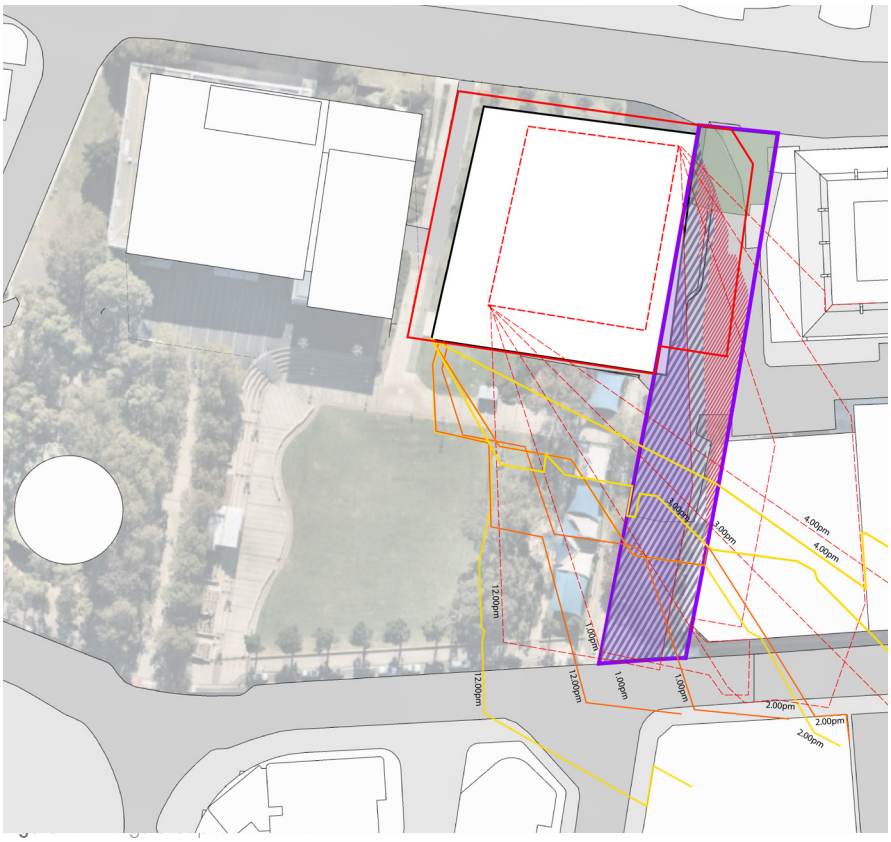


Figure 33. The Appian Way Shadow Diagram Winter Solstice [12pm-4pm, 21st June] (*Source: Tract 2019*)

Site Boundary
Base Case Scenario (LEP Envelope)
Proposed Built Form
Appian Way
Base Case Scenario Shadow
Building Envelope Excluding Level 14-18 Shadow
Building Envelope Including Level 14-18 Shadow
Shadow Of Surrounding Built Form on Appian Way
Shadow Of Base Case Scenario on Appian Way
Shadow Of Proposed Building Envelope Excluding Level 14-18 on Appian Way
Shadow Of Proposed Building Envelope Including Level 14-18 on Appian Way

INFERENCE (AT 12.00PM)

SCENARIO 1 - BASE CASE (LEP ENVELOPE)

APPIAN WAY - 30% IN SUNLIGHT
- 70% IN SHADOW

SCENARIO 2 - PROPOSED BUILDING ENVELOPE EXCLUDING LEVEL 14-18

APPIAN WAY - 28% IN SUNLIGHT
- 72% IN SHADOW

SCENARIO 3 - PROPOSED BUILDING ENVELOPE INCLUDING LEVEL 14-18

APPIAN WAY - 28% IN SUNLIGHT
- 72% IN SHADOW

5.0.7 Summary of Solar Impacts - The Appian Way (Equinox)

TIME @ **EQUINOX**	IMPACT IN SCENARIO 1 Base Case	IMPACT IN SCENARIO 2 WSU 14-Storey Built Form	IMPACT IN SCENARIO 3 WSU 19-Storey Built Form
9am	47% of the Appian Way & 0% retail facade will receive direct sunlight. None of the scenario cast shadow on the Appian Way.	47% of the Appian Way & 0% retail facade will receive direct sunlight. None of the scenario cast shadow on the Appian Way.	47% of the Appian Way & 0% retail facade will receive direct sunlight. None of the scenario cast shadow on the Appian Way.
10am	80% of the Appian Way & 0% retail facade will receive direct sunlight. None of the scenario cast shadow on the Appian Way.	80% of the Appian Way & 0% retail facade will receive direct sunlight. None of the scenario cast shadow on the Appian Way.	80% of the Appian Way & 0% retail facade will receive direct sunlight. None of the scenario cast shadow on the Appian Way.
11am	100 % of the Appian Way & 100% retail facade will receive direct sunlight.	100% of the Appian Way & 100% retail facade will receive direct sunlight.	100% of the Appian Way & 100% retail facade will receive direct sunlight.
12pm	86% of the Appian Way & 100% retail facade will receive direct sunlight.	68% of the Appian Way & 100% retail facade will receive direct sunlight.	58% of the Appian Way & 100% retail facade will receive direct sunlight.
1pm	53% of the Appian Way & 85% retail facade will receive direct sunlight.	44% of the Appian Way & 74% retail facade will receive direct sunlight.	43% of the Appian Way & 74% retail facade will receive direct sunlight.
2pm	50% of the Appian Way & 90% retail facade will receive direct sunlight.	49% of the Appian Way & 90% retail facade will receive direct sunlight.	49% of the Appian Way & 90% retail facade will receive direct sunlight.
3pm	56% of the Appian Way & 100% retail facade will receive direct sunlight.	51% of the Appian Way & 100% retail facade will receive direct sunlight.	51% of the Appian Way & 100% retail facade will receive direct sunlight.
4pm	62% of the Appian Way & 100% retail facade will receive direct sunlight.	54% of the Appian Way & 100% retail facade will receive direct sunlight.	54% of the Appian Way & 100% retail facade will receive direct sunlight.
Approx Total Hours of Direct Sun	6 Hours to more than 50% of The Appian Way; 5 Hours to more than 50% of retail facade.	3 Hours to more than 50% of The Appian Way; 5 Hours to more than 50% of retail facade.	3 Hours to more than 50% of The Appian Way; 5 Hours to more than 50% of retail facade.

Source: Areas of direct sunlight are calculated from shadow diagrams, which are generated by Sketchup 3D model.

At 9am, less than half of the Appian Way and no retail facade receives direct sun. There is no solar impacts from the built forms of the three scenarios.

Between 10am-12pm, all three scenarios achieve 2 hours of direct sunlight to more than 50% of The Appian Way and the full length of the retail facade.

Between 12pm - 4pm, all three scenarios achieve direct sunlight to approximately 50% of The Appian Way. All three scenarios provide good solar access to more than 70% of the retail facade at the southern end of The Appian Way.

Summary

- All three scenarios provide better outcomes of the solar access to The Appian Way on Equinox than on Winter Solstice.
- All three scenarios achieve 5 hours of direct sunlight to more than half of the retail facade, and at least 3 hours of direct sunlight to more than 50% of The Appian Way between 9am-4pm on Equinox.

Equinox [9am-11am, 22nd September]

Site Boundary
Base Case Scenario (LEP Envelope)
Proposed Built Form
Appian Way
Base Case Scenario Shadow
Building Envelope Excluding Level 14-18 Shadow
Building Envelope Including Level 14-18 Shadow
Shadow Of Surrounding Built Form on Appian Way

INFERENCE (AT 9.00AM)

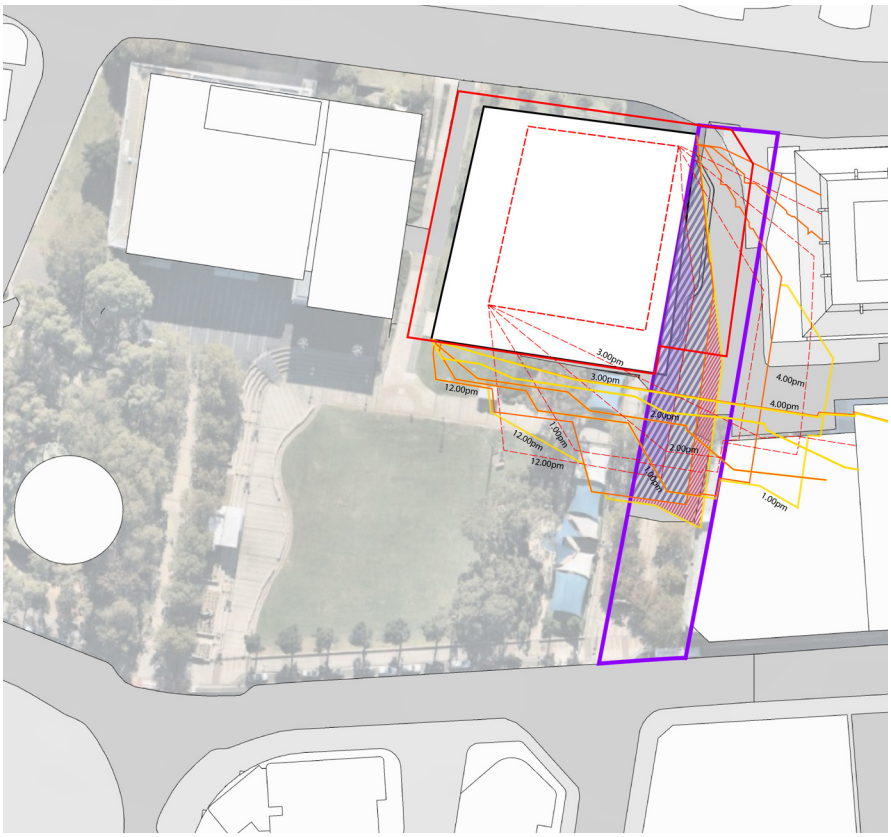
SCENARIO 1 - BASE CASE (LEP ENVELOPE)
(Base case doesn't cast any shadow on Appian Way at 9.00am)

SCENARIO 2 - PROPOSED BUILDING ENVELOPE EXCLUDING LEVEL 14-18
(Scenario 2 doesn't cast any shadow on Appian Way at 9.00am)

SCENARIO 3 - PROPOSED BUILDING ENVELOPE INCLUDING LEVEL 14-18
(Scenario 3 doesn't cast any shadow on Appian Way at 9.00am)

Figure 34. The Appian Way Shadow Diagram Equinox [9am-11am, 22nd September] *(Source: Tract 2019)*

Equinox [12pm-4pm, 22nd September]



Site Boundary
Base Case Scenario (LEP Envelope)
Proposed Built Form
Appian Way
Base Case Scenario Shadow
Building Envelope Excluding Level 14-18 Shadow
Building Envelope Including Level 14-18 Shadow
Shadow Of Base Case Scenario on Appian Way
Shadow Of Proposed Building Envelope Excluding Level 14-18 on Appian Way
Shadow Of Proposed Building Envelope Including Level 14-18 on Appian Way

INFERENCE (AT 12.00PM)

SCENARIO 1 - BASE CASE (LEP ENVELOPE)

APPIAN WAY - 80% IN SUNLIGHT
- 20% IN SHADOW

SCENARIO 2 - PROPOSED BUILDING ENVELOPE EXCLUDING LEVEL 14-18

APPIAN WAY - 62% IN SUNLIGHT
- 38% IN SHADOW

SCENARIO 3 - PROPOSED BUILDING ENVELOPE INCLUDING LEVEL 14-18

APPIAN WAY - 55% IN SUNLIGHT
- 45% IN SHADOW

Figure 35. The Appian Way Shadow Diagram Equinox [12pm-4pm, 22nd September] *(Source: Tract 2019)*

Key Findings:

Paul Keating Park

- Paul Keating Park is an urban park located in the centre of Bankstown CBD rather than a traditional neighbourhood park. Having regard to the proposed and expected development surrounding the area, the Park is considered to be located in a highly urbanised area. It is considered reasonable to adopt 3 hours of sunlight between 10am to 2pm as the relevant benchmark identified in the Key Findings of Section 5.0.4 within this report.
- All three scenarios achieve at least **3 hours** direct sunlight to more than **50%** of the **total** Park area, between **10am - 2pm** on Winter Solstice, and only Scenario 3 falls 6% below the benchmark that would otherwise apply to a traditional neighbourhood park, i.e. 4 hours direct sunlight to more than 50% of the total Park area, between 10am - 2pm on Winter Solstice.
- Accordingly, all three scenarios are considered acceptable.

Key Findings:

The Appian Way

- The Appian Way is defined as a key 'activity spine' with future characters of eat street, street life, retail and nighttime activities. Most activities tend to happen in mid to late afternoon. Therefore overshadowing to The Appian Way becomes less of a concern in comparison with the Paul Keating Park.
- All three scenarios provide better outcomes of the solar access to The Appian Way on Equinox than on Winter Solstice.
- All three scenarios achieve 5 hours of direct sunlight to more than half of the retail facade, and at least 3 hours of direct sunlight to more than 50% of The Appian Way between 9am-4pm on Equinox.

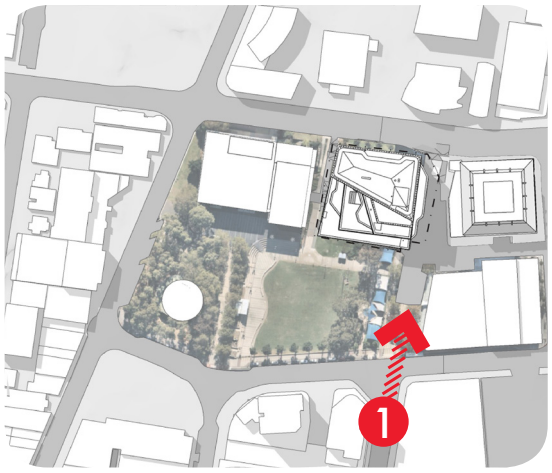
Figure 2. Figure Caption

5.0.8 Visual Bulk Review

The proposed scale and position of the proposal will have prominence on the skyline of Bankstown's civic precinct, and the visual impact of this must be carefully considered.

Four view points have been selected to test the visual impacts to the immediate public domain around the site.

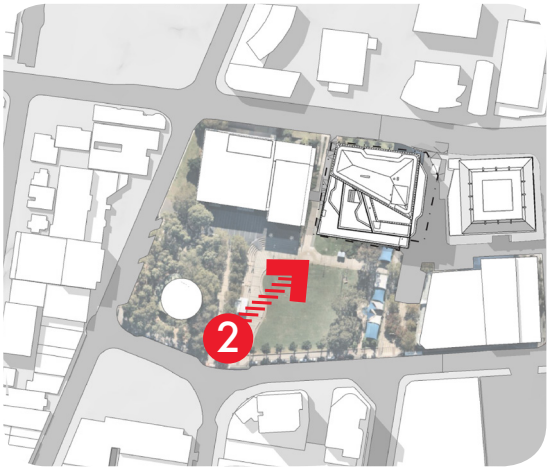
Each view compares three scenarios, including the Base Case, WSU's proposed built form of 14 storeys excluding Level 14 -18 and WSU's proposed built form of 19 storeys including Level 14 -18. This allows for the significance of any additional height beyond the existing planning controls to be established.



This viewpoint along The Appian Way demonstrates the visual impact of the proposal's stepping form at Levels 3, 7 & 13, which reduces the bulk facing the Park and provides a relatively slender profile.

Levels 14-18 are visually prominent from this perspective, due to the angle of the cantilever.

The full height of the proposal borders The Appian Way, and this view presents an opportunity for the building to form a gateway landmark along this vista. Scenario 2 is more consistent with the height of the existing surrounding built form context, while Scenario 3 is taller.



Similarly, from the Park the highlighted levels 14-18 are prominent due to the orientation of this section of the floorplate. Whilst the stepping of the form provides the opportunity for variation in the profile, it is less evident when viewed from these southern perspectives, and the mass of the building does not appear reduced.

The visual bulk of the upper levels are accentuated by the cantilevered top section, and reduction of this impact should be considered.

Scenario 1: Base

Scenario 2: Excluding L14-18

Scenario 3: Including L14-18

View 1 north from The Appian Way

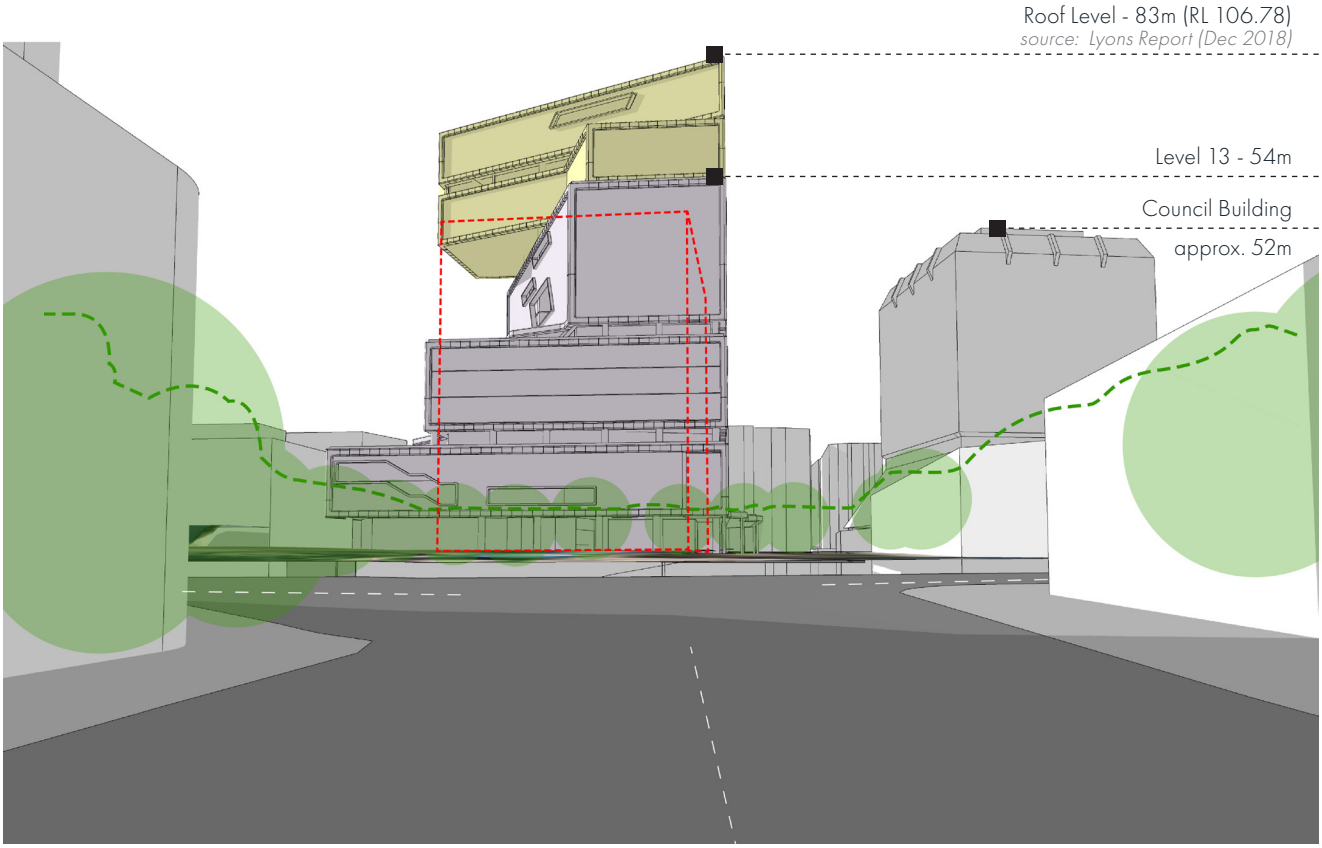


Figure 36. View 1 north from The Appian Way
(Source: Tract 2019)

View 2 from south of Paul Keating Park

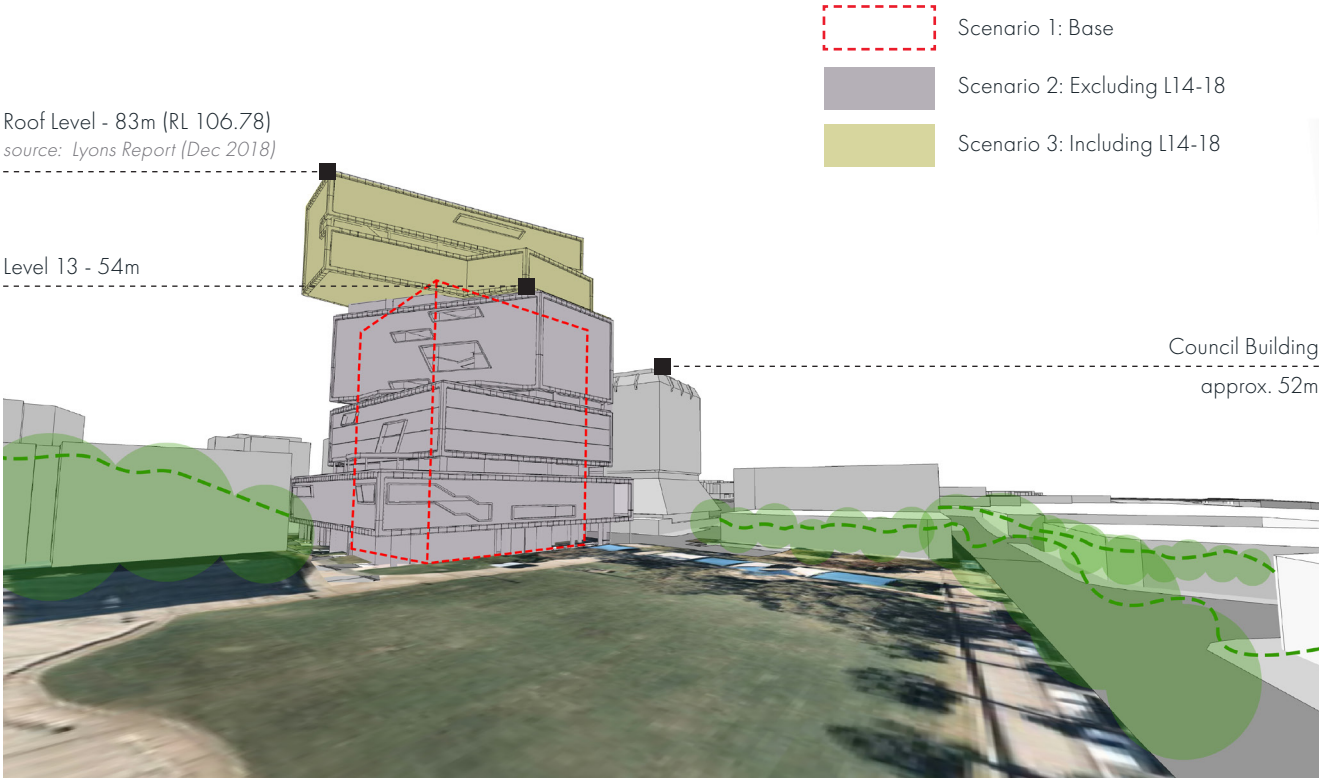
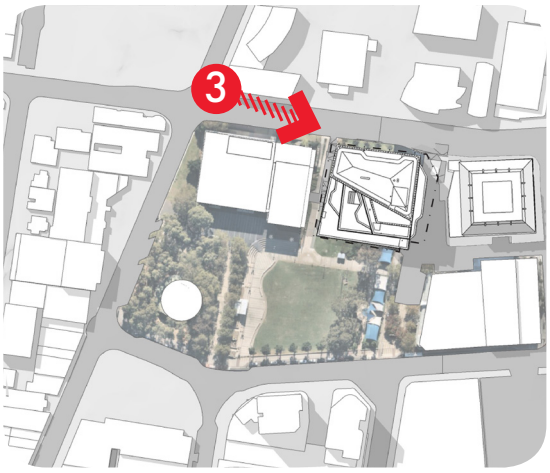
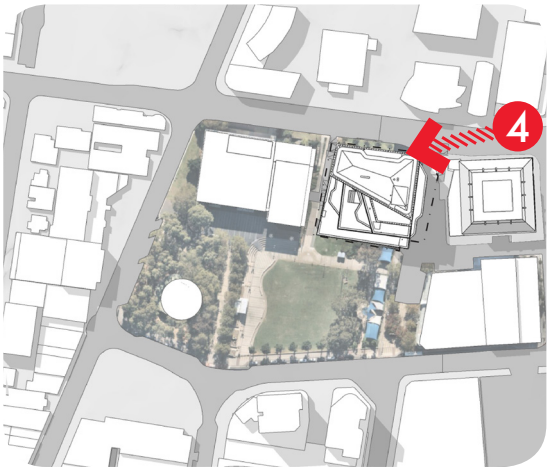


Figure 37. View 2 from south of Paul Keating Park
(Source: Tract 2019)



View 3 along Rickard Road presents a comparatively slender visual profile, due to the orientation of Levels 14-18 from this perspective.

There is no stepping back of the form facing Rickard Road, as evident on the adjacent existing buildings. Therefore the height of the building from Rickard Road is urbanised and immediately apparent. The profile of the building is visually varied in form and provides visual interest on the west elevation facing this viewpoint, which is supported.



Whilst the facade is treated to provide visual interest, the stepping is not visible from the west, and the building's bulk appears large and solid.

The articulation of the facade appears to line up with the Council building from this approach, which is supported.

If feasible, a podium setback from Rickard Road to align with the Council building may assist in reducing some of the visual impacts from the building's height.

Scenario 1: Base

Scenario 2: Excluding L14-18

Scenario 3: Including L14-18

View 3 east along Rickard Road

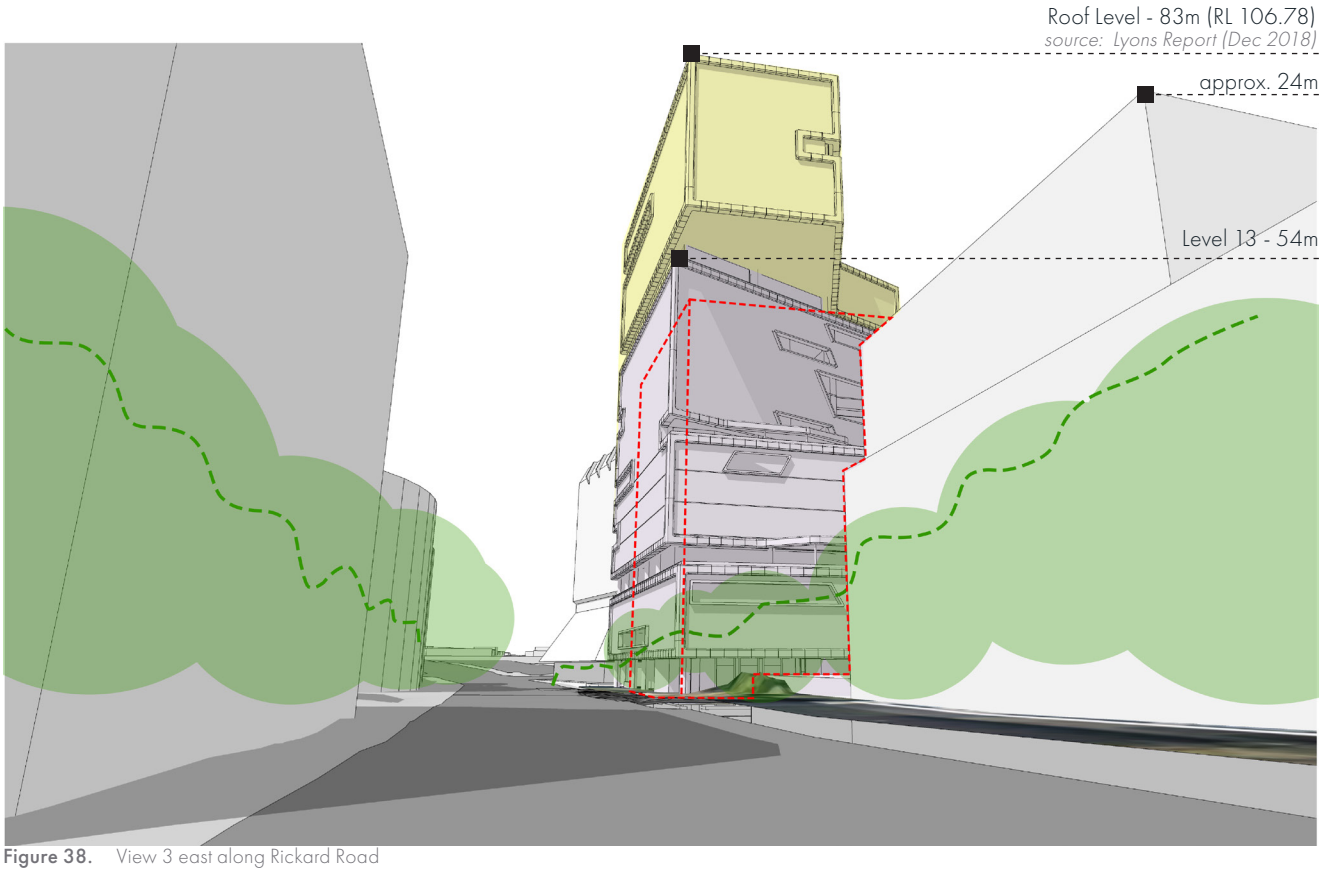


Figure 38. View 3 east along Rickard Road
(Source: Tract 2019)

View 4 west along Rickard Road

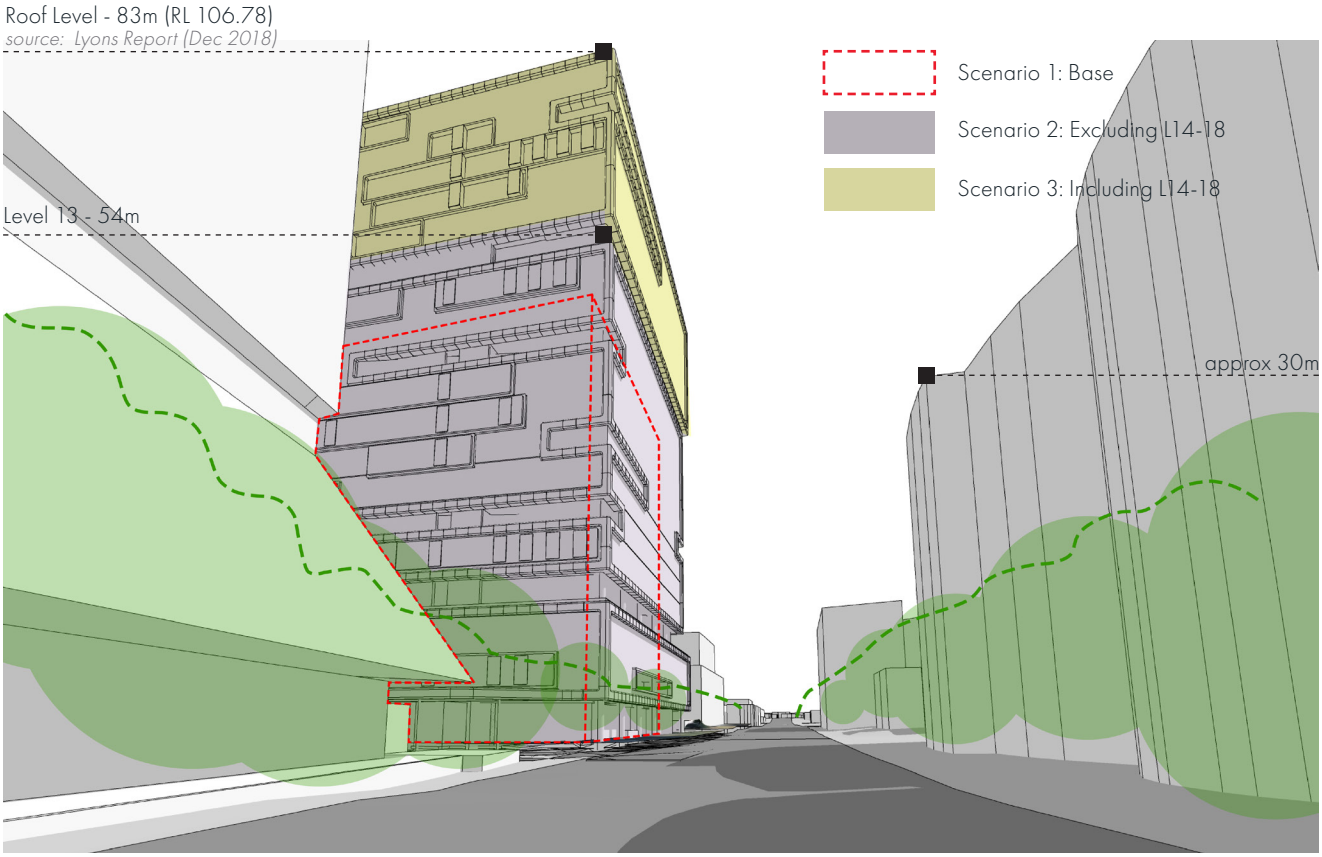


Figure 39. View 4 west along Rickard Road
(Source: Tract 2019)

Visual Bulk Review

Key Findings:

We note that the proposed vertical campus will occupy a prominent position on the future skyline of Bankstown's civic precinct. There is an opportunity for the design, and the detailed articulation of the facade, to positively impact on the surrounding urban environment, creating a landmark gateway along The Appian Way and from Paul Keating Park. The Proposal outlines a desire to create an architectural character for the building which visually represents a 'tertiary education' institiution and is distinctly different from what might be considefred a commercial building. This desire is considered appropriate and is supported.

It is noted that the height and scale of the building exceeds the existing planning envelope and the size of the existing built context. To summarise our findings on the visual impact of the proposed:

- The architectural form of the building is visually striking, with a podium, tapered midsection, and an angled cantilevered top section hanging over large voids in some areas.
- The tapered and chamfered sections also serve to mitigate some of the overshadowing and visual challenges, an appropriate which is supported
- The angle and size of the cantilevered upper floors of the proposal in Scenario 3 (Levels 14-18) has an obvious visual impact on the skyline in Views 1 and 2 from the south (from The Appian Way & Paul Keating Park). When viewed from certain street-level vantage points, these cantilevered upper sections of the built form present a jutting and prominent visual form and bulk high up in both the viewers eye-line, and the skyline. This has a visual impact from street level, and as such it considered to be one of the less supported elements of the built form for this reason.
- Scenario 2, which removes this top section, is generally keeping with the existing heights of the surrounding built form, as viewed from these points.
- Whilst the form is stepping and varied towards the south, which is supported, the building presents its full height to The Appian Way and Rickard Road which requires further consideration. Whilst the Wind Tech Study suggests using vegetation, screens and awnings to mitigate the wind impacts on the surrounding public domain, a setback above podium level to Rickard Road and The Appian Way may further reduce the wind implications for pedestrian amenity on the surrounding streets.
- The built form could be supported with minor mitigation of these upper level overhanging reduced in the size, angle and articulation, as shown in Fig. 40 & 41. With this potential refinement, the visual impact of the proposal can be supported.

Design Implications

Given the analysis of the building height, building setbacks and visual bulk challenges within the proposal, the following is a brief summary of potential deisgn implications and refinements. To mitigate the visual bulk of WSU's proposal, i.e. Scenario 3, we recommend that a reduction be considered to the upper cantilevered portion of the building, to align with the articulation of the building below.

In doing this, the total GFA will be reduced, with the consequential reduction on the proposed FSR.

Without undertaking a comprehensive architectural planning review, the GFA/FSR advised will be estimated and indicative.

By approximate measurement, the Gross Building Area (GBA) of the removed top section is 450sqm per level. The total GBA of 5 levels (Levels 14-18) is 2,250sqm. Based on the rule of thumb for architectural design, if we assume the GFA (commercial) = 85% of GBA, then the reduced GFA is approx. 1,900sqm. The total GFA will be reduced from 29,266sqm to 27,366sqm. The FSR is consequentially reduced to 7.4:1.

These overall refinements are high-level and subject to design detail and investigation, and are provided to give further urban design direction for the Proposal.

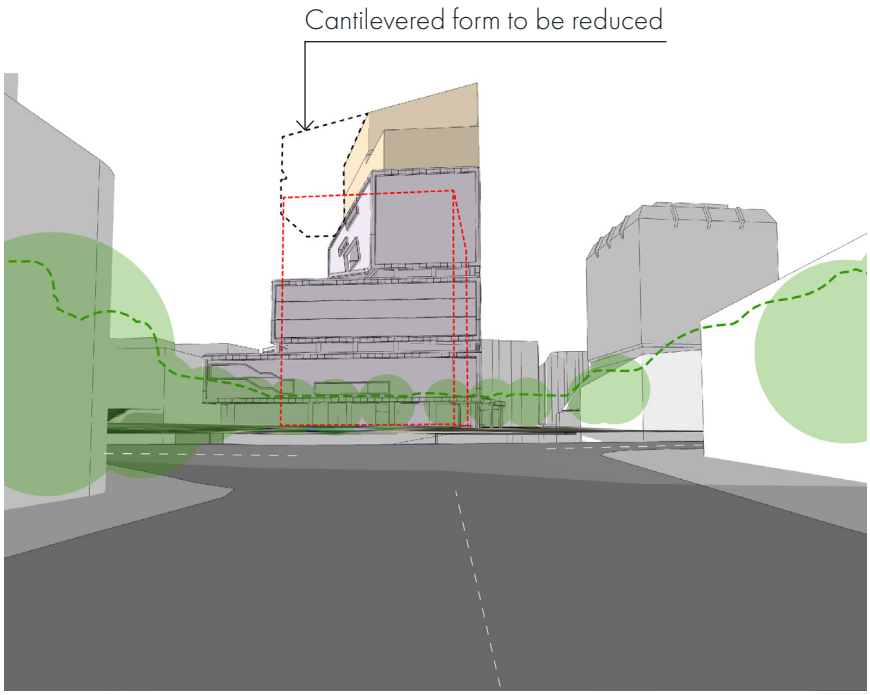


Figure 40. Design Alternative from The Appian Way (*Source: Tract 2019*)

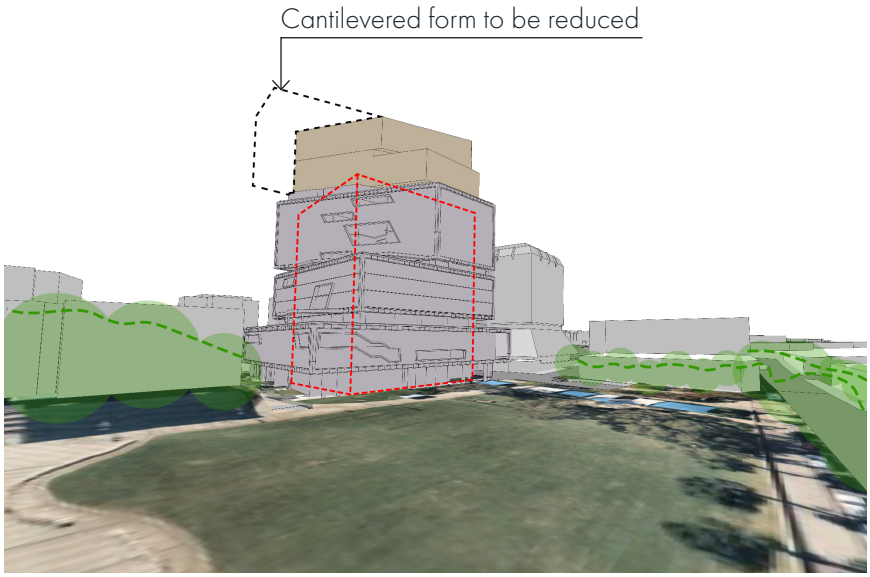


Figure 41. Design Alternative from south of Paul Keating Park (*Source: Tract 2019*)

6 Public Domain Interface

Public Domain Interface Design Principles

Lyons' Design Principles:

- ***DP02 -*** *Preserve open space along the The Appian Way alignment.*
- DP07 - *A variety of active ground level interfaces will address The Appian Way, Paul Keating Park, BLAKC Driveway and Rickard Road:*
  - *Highly connected Ground level pedestrian environment;*
  - *Retail spaces supporting The Appian Way Eat Street.*

Additional Design Principles:

- ***DP-AD02 -*** *Enhance pedestrian priority along The Appian Way.*
- ***DP-AD03 -*** *Improve pedestrian amenity along The Appian Way and Rickard Road:*
  - *Ensure pedestrian ease of movement by providing continuous movement through;*
  - *Weather protection for pedestrian.*
- ***DP-AD04 -*** *Enhance visual connectivity at ground level.*
- ***DP-AD05 -*** *Provide ground level activation and improve street safety along The Appian Way, Rickard Road and Paul Keating Park.*

Assessment Overview

For this secondary review task, we focused on the ground level interfaces, which address The Appian Way, Paul Keating Park, Rickard Road and BLAKC Driveway.

The urban design principles listed to the left were used to assess all the four interfaces.

We further refer to *Bankstown Draft Complete Streets, Apr. 2019,* which establishes the use and the characters, the design principles and guidelines for the future streets of Bankstown.

6.0.1 The Appian Way

Bankstown Draft Complete Streets (April 2019) defines The Appian Way as a key 'activity spine' that links the Civic Precinct and WSU to the train station and bus interchange, with a shared zone environment which prioritises pedestrian movement and encourages street life and retail activity.

Pedestrian Priority (DP02, DP-AD02)

- A linear landscape park is proposed along The Appian Way frontage, which is dedicated as a shared pedestrian zone to promote pedestrian priority.
- However, the existing vehicle circulation from neighbouring properties plus the proposed pick-up/drop-off traffic at the northern end of The Appian Way may cause interruptions to pedestrian movements.
- Feature paving which defines different function zones between walking, staying and slow speed driving, are applied to The Appian Way. It helps to raise people's awareness of the speed control and pedestrian movement zones.

Pedestrian Connectivity (DP07, DP-DA04)

- The proposed entries along The Appian Way correspond to the existing ground level. The proposal provides smooth and equal access for all users between WSU and its immediate public domain via ramps, steps and lift.
- Visual connectivity between WSU and The Appian Way public domain is enabled through the WSU entrances and ground-level glazing facade.

Pedestrian Amenity (DP02, DP-DA03)

- A continuous pedestrian movement is proposed along The Appian Way frontage between WSU and the linear park for pedestrian ease of movement.
- A glazed awning is proposed at ground level along The Appian Way frontage, which provides the weather protection for pedestrians benefit. It also helps to mitigate the wind impact at street level as recommended by *Pedestrian Wind Environment Study, by Windtech (May*

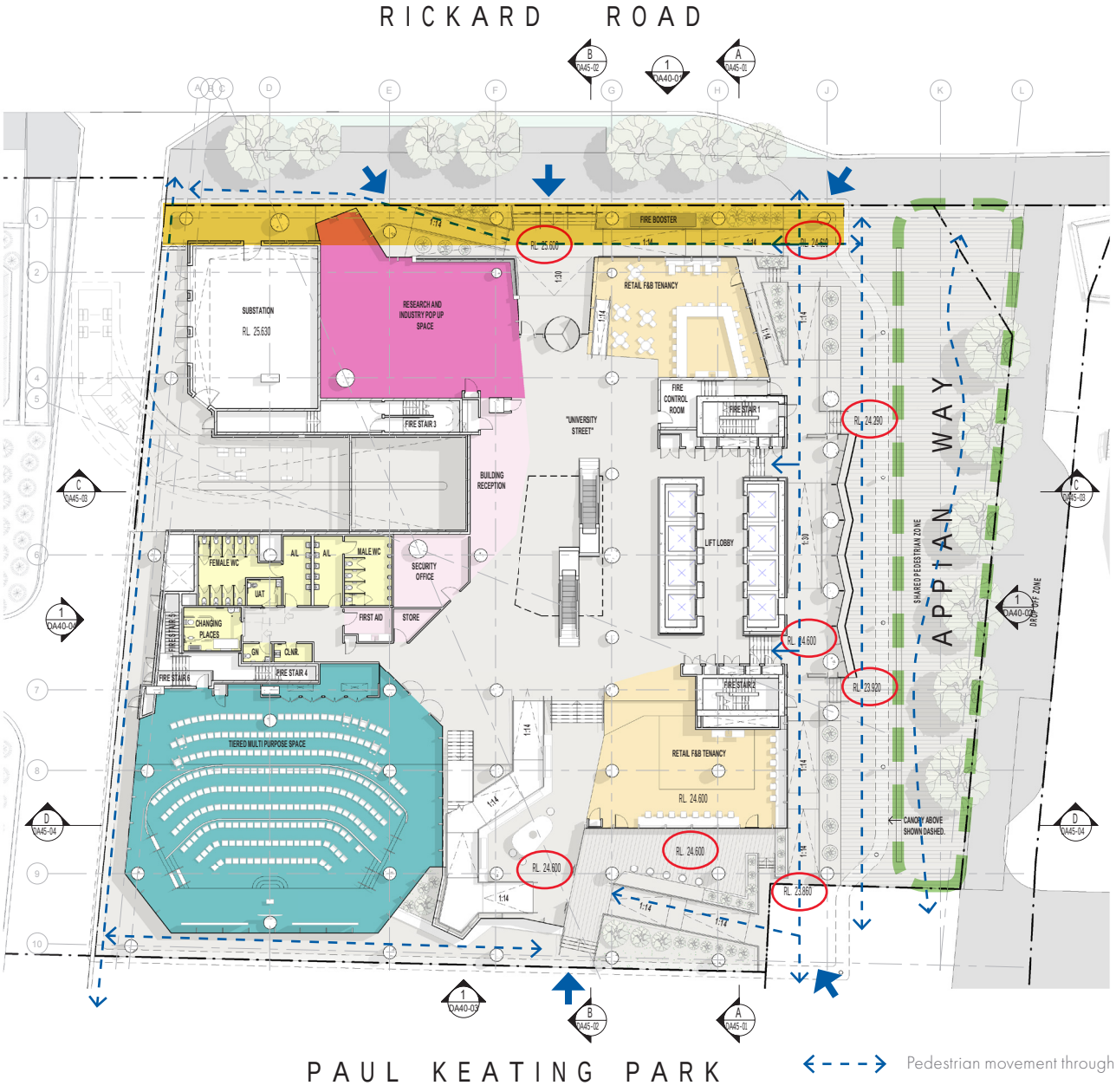


Figure 42. Lyons Updated Ground Level Plan
(Source: Lyons Updated Draft Architectural Drawings 5 (F 190814))

2019).

- Deep soil zone and tree planting are proposed along The Appian Way frontage, which would contribute to the urban tree canopy and provide shades and visual interest for pedestrian, as well as reduce wind impact. However, the limited solar access to The Appian Way may constrain tree and vegetation growth. Consideration needs to be given to the selection of tree species which will prosper in shades.

Ground Level Activation (DP07, DP-DA04)

- Ground level retail spaces and main entry lobby along The Appian Way provide street activation opportunities.
- Street furniture, bench seating and cafe seating along The Appian Way frontage encourage the uses by

pedestrian and retail patrons.

6.0.2 Paul Keating Park

Pedestrian Connectivity (DP07, DP-DA04)

- The major pedestrian flows will arrive from Bankstown train station on the south via The Appian Way. Apart from The Appian Way entry lobby, there are two ground-level entries to WSU proposed along the Paul Keating Park interface. One is located at the south-east corner of the building, while the other is located toward the middle of the southern interface.
  Both entries correspond to the existing ground level. The level difference between internal and external are picked up by a series of ramps and steps, which offer smooth and equal access for all users. Refer to figure 43.
- Visual connectivity between WSU and the Paul Keating Park is enabled through the WSU entrances and ground level glazing facade.

Pedestrian Amenity (DP-DA03)

- A ground-level colonnade is proposed along the Paul Keating Park interface to provide weather protection for the pedestrians and other users.

Ground Level Activation (DP-DA04)

- Different functional spaces are programmed at the ground level alongside the Paul Keating Park interface. These include a multi purpose hall, entry lobby and retail spaces. These functional spaces provide great opportunities for activation and vibrancy on the ground level and provide passive surveillance to the Park.

In general, the design approach for the Paul Keating Park ground level interface is considered appropriate.

6.0.3 Rickard Road

Pedestrian Amenity (DP-DA03)

- There is a setback proposed at ground level on north side of WSU along Rickard Road, which provides the sense of alignment to both Council building on the east and the Bankstown Library and Knowledge Hub on the west.
- A series of ramps and steps are accommodated within the setback zone, which pick up the level difference between internal and external. This offers smooth and equitable access for all users. Refer to figure 45.
- A space intrudes into the setback zone, which interrupts the under-covered pedestrian movement through. It also conflicts with the design guidance of "2.3m wide pedestrian movement through within Lot Boundary" as suggested in *Bankstown Draft Complete Streets (April 2019).* Refer to figure 44 and 45.
- Reconfiguration of the 'research and industry pop-up space' is required to avoid the front setback interference.

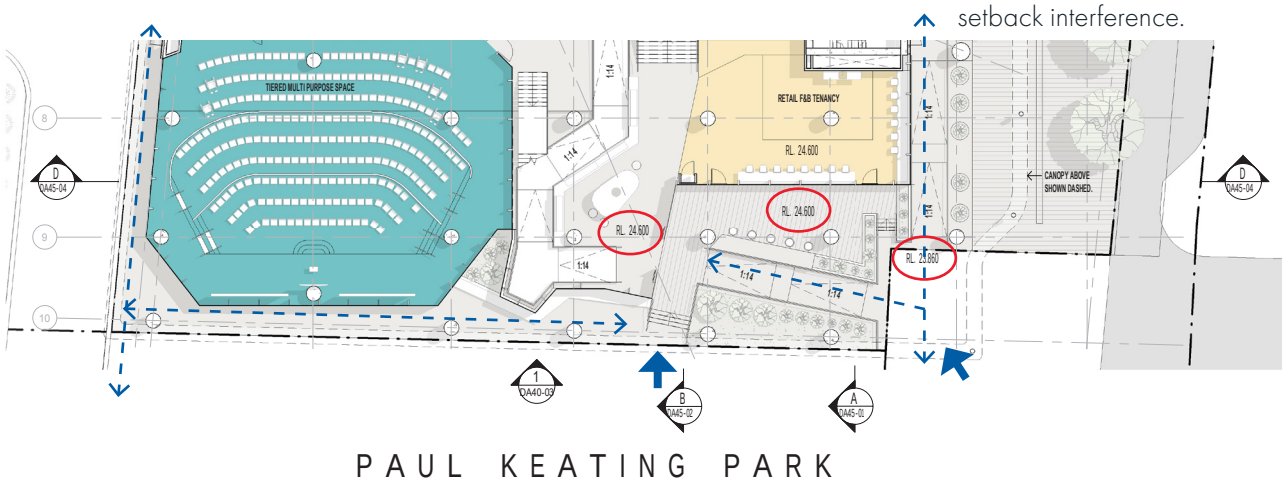


Figure 43. Lyons' Updated Ground Level Plan - Paul Keating Park Interface *(Source: Lyons Updated Draft Architectural Drawings 5 (F 190814))*

Ground Level Activation (DP-DA04)

- Different functional spaces are programmed at ground level along Rickard Road, including university research and industry pop-up spaces, entry lobby and retail. These spaces provide additional opportunities for ground level activation and provide passive surveillance to Rickard Road.

6.0.4 BLAKC Driveway

BLAKC Driveway is treated more as a service lane than a pedestrian link.

WSU's proposal provides a linear setback to encourage greater pedestrian movement through this area.

There is limited street level activation along this interface given the proposed building functions, except the southern end where the multi purpose hall wrapped around the south west corner.

The proposed approach is supported given the nature of BLAKC Driveway.

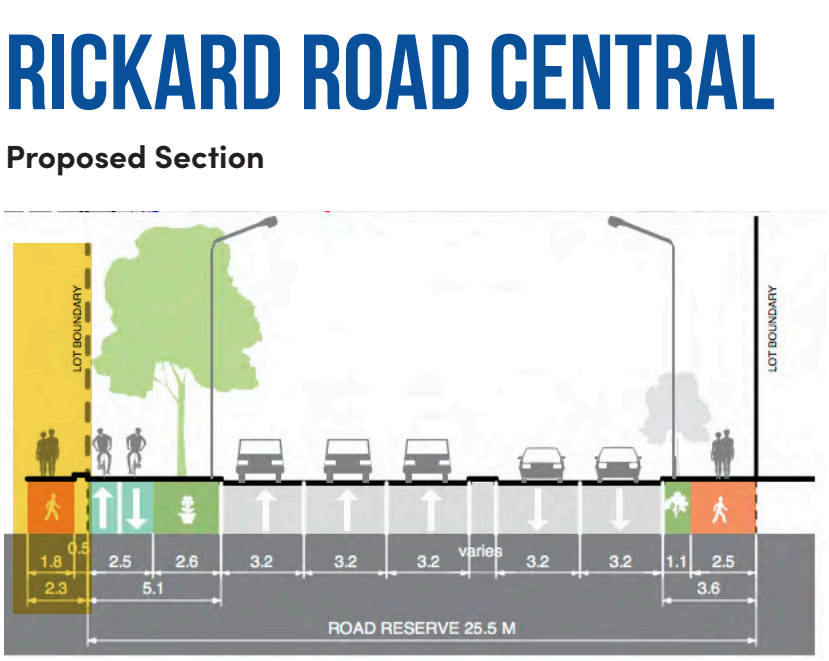


Figure 44. Ground level setback for pedestrian movement suggested by *Bankstown Draft Complete Streets (April 2019)* (Source: *Bankstown Draft Complete Streets (April 2019) - Section 7 Concept Design)*

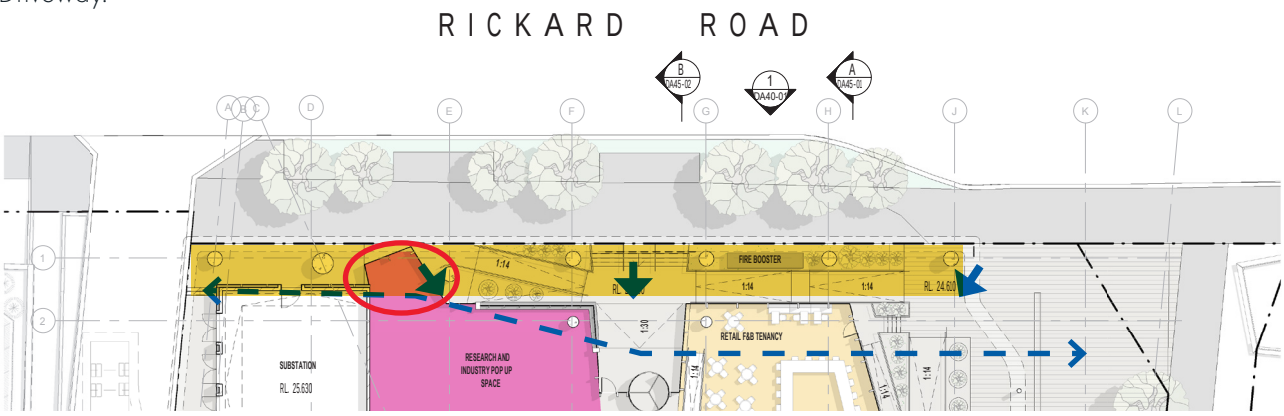


Figure 45. Lyons' Updated Ground Level Plan - Rickard Road Interface *(Source: Lyons Updated Draft Architectural Drawings 5 (F 190814))*

Public Domain Interface

Key Findings:

The Appian Way

- The WSU Proposal has responded effectively to the desired future character of The Appian Way as a key 'activity spine', addressing most of the design principles identified at the beginning of this section. These principles focus on supporting pedestrian priority, pedestrian connectivity and pedestrian amenity, as well as providing positive ground-level activation to encourage street life and retail activity.
- The existing vehicle circulation from neighbouring properties, when combined with the proposed pick-up and drop-off traffic at the northern end of The Appian Way, may interrupt and impede pedestrian movements. The nature and impact of vehicle circulation within The Appian Way from neighbouring properties is not clear from the proposal and should be considered further.
- Feature paving which defines different function zones between walking, staying and slow speed driving and raises people's awareness of the speed control and pedestrian movement, is recommended to mitigate traffic impacts.

Paul Keating Park

- The Proposal's southern interface at the ground-level alongside Paul Keating Park has addressed most of the design principles identified at the beginning of this section.
- These principles focus on ensuring that the Proposal supports pedestrian connectivity, stimulates visual interest and orientation, provides pedestrian amenity, and activates the ground-level.
- The general outcome appears to be an active, safe, comfortable and engaging environment for the pedestrian and open space user.
- As such the interface treatments to the Park is generally supported.

Rickard Road

- The Proposal includes street frontage activation and a setback at the ground level along Rickard Road. A series of ramps and steps have been accommodated within the setback zone to offer smooth and equal access for all WSU users and visitors. These approaches are considered appropriate.
- The nature and impact of the intrusion of the 'research and industry pop-up space' into the setback zone along Rickard Road is not clear. This provides the potential to interrupt or affect pedestrian movements and should be considered further. This design element also conflicts with the design guidance for a '2.3m wide pedestrian movement through within Lot Boundary' as suggested in *Bankstown Draft Complete Streets (April 2019)*. Reconfiguration of the 'research and industry pop-up space' is required to avoid the front setback interference.

BLAKC Driveway

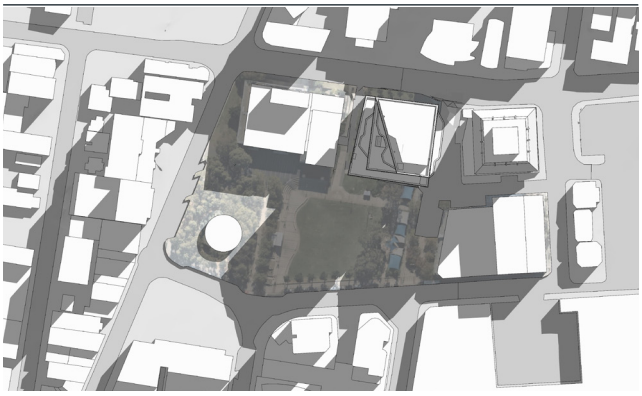
- It is recognised that while the BLAKC Driveway proposes a linear setback for pedestrian movements, it appears to be treated primarily as a service lane rather than a pedestrian link. As such, this interface will likely not include much opportunity for street level activation.

Appendices.

Appendix A Shadow Diagrams

Winter Solstice [21st June]

WSU Proposal -14 Storeys-Excluding Level 14-18



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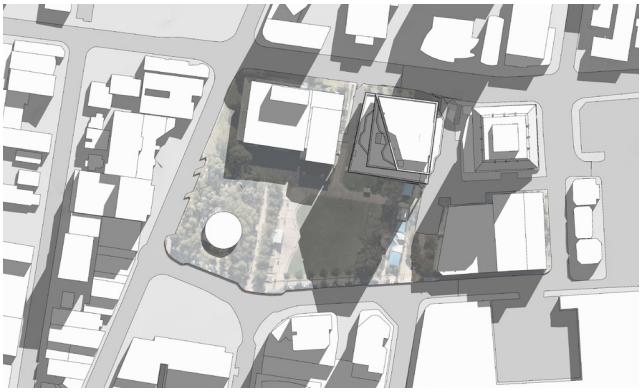

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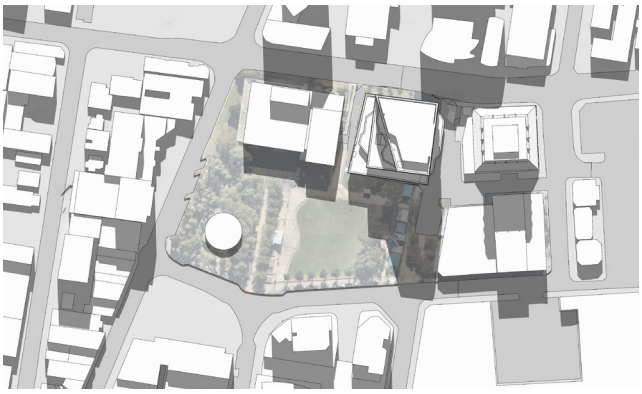

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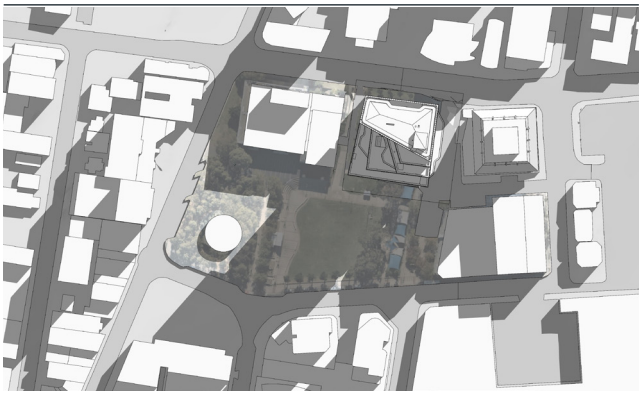
WSU Proposal -19 Storeys - Including Level 14-18



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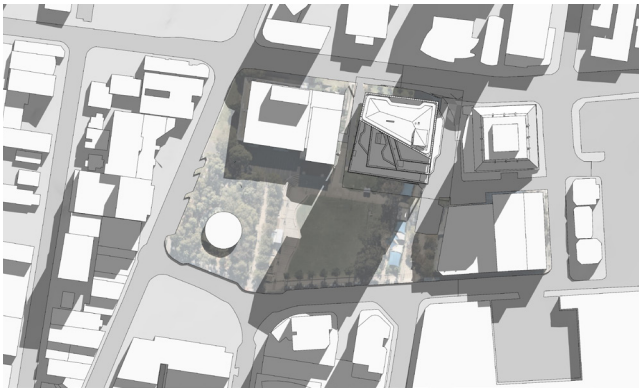

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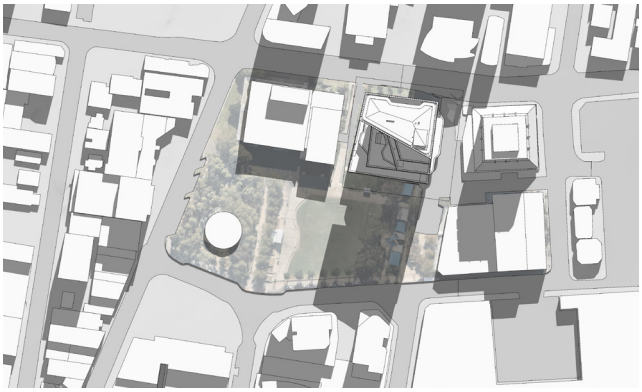

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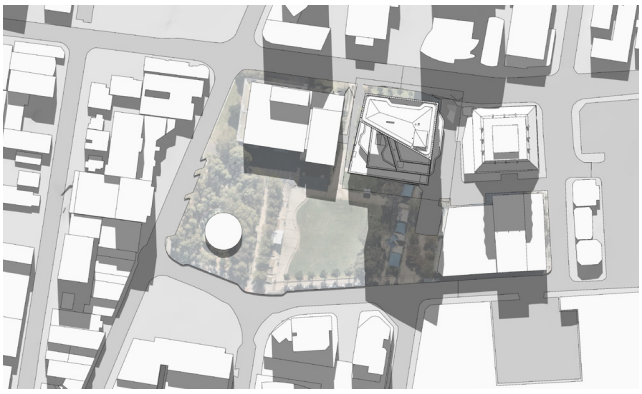

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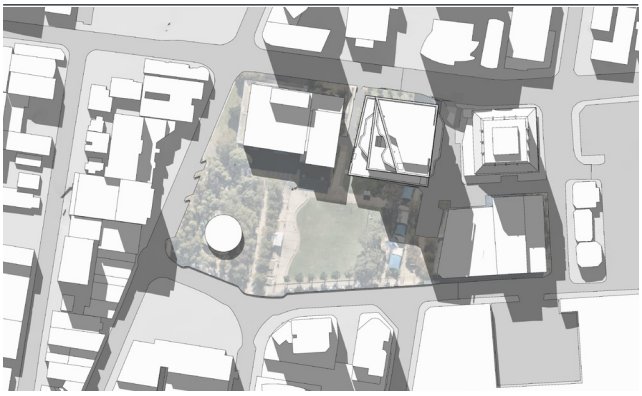
Winter Solstice [21st June]

WSU Proposal -14 Storeys-Excluding Level 14-18



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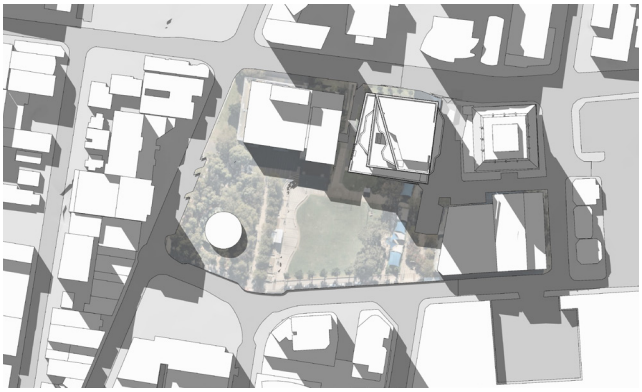

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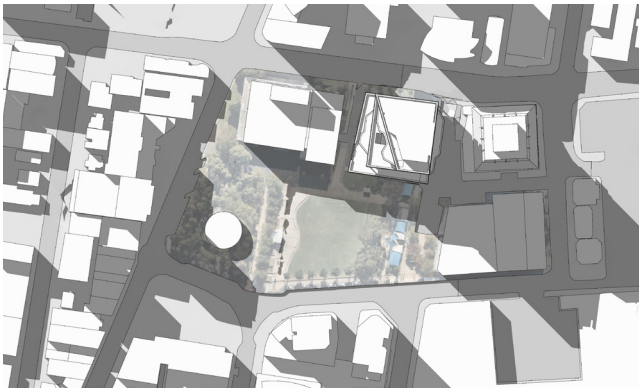

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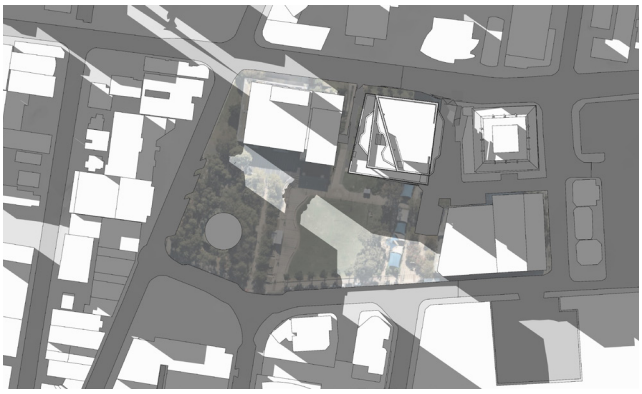

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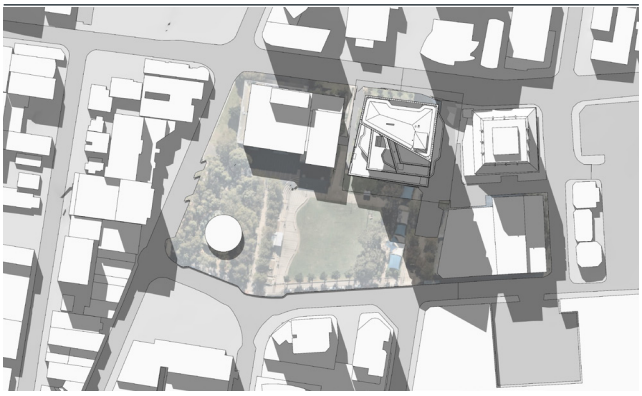

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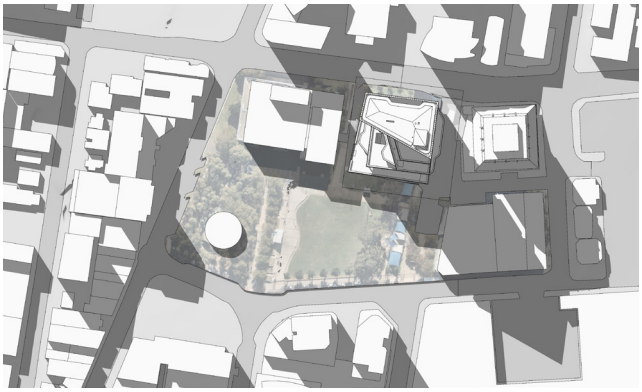

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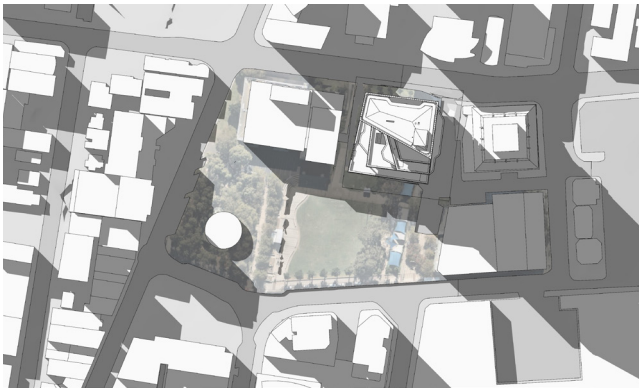

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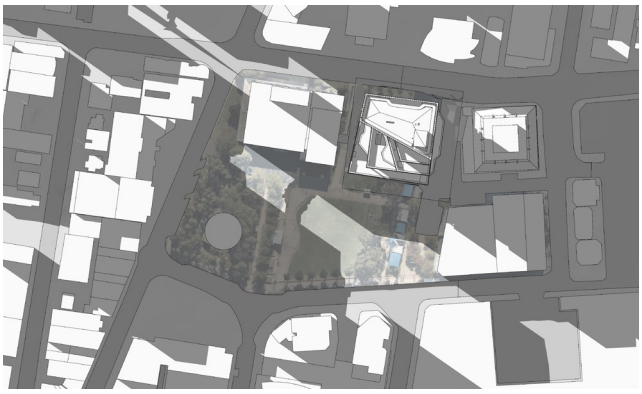

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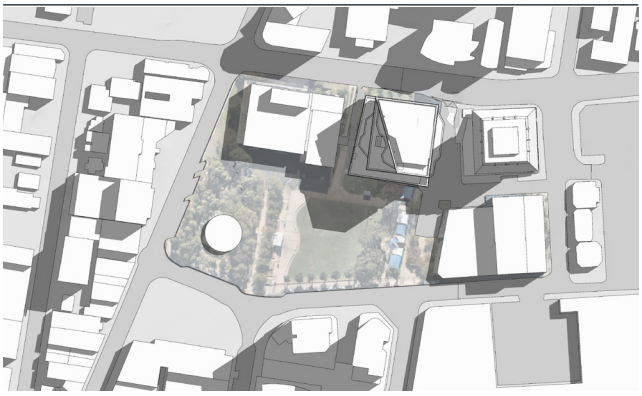
Equinox [22nd September]

WSU Proposal -14 Storeys-Excluding Level 14-18



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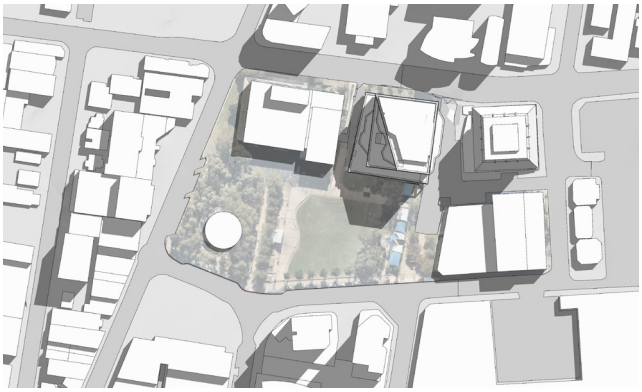

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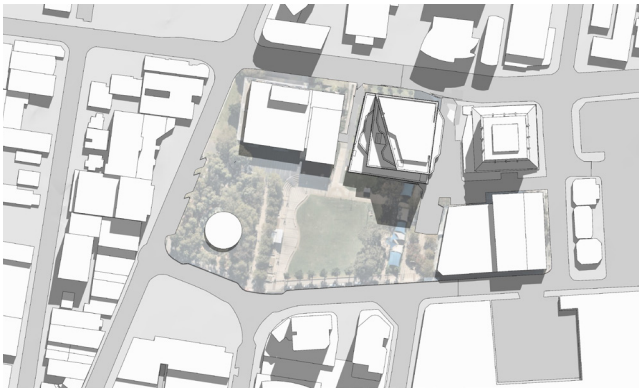

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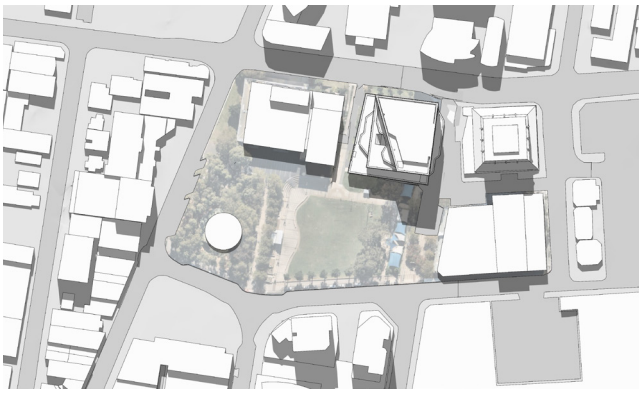

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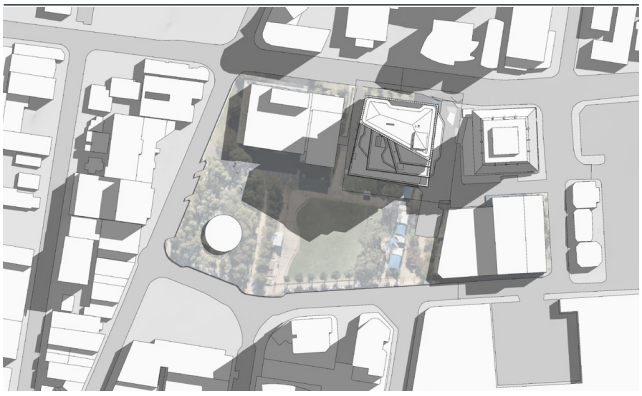
WSU Proposal -19 Storeys - Including Level 14-18



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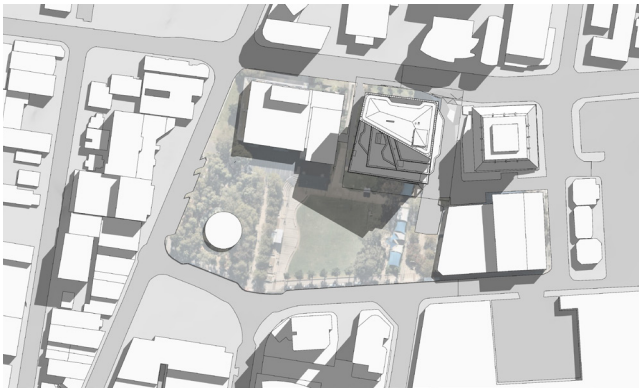

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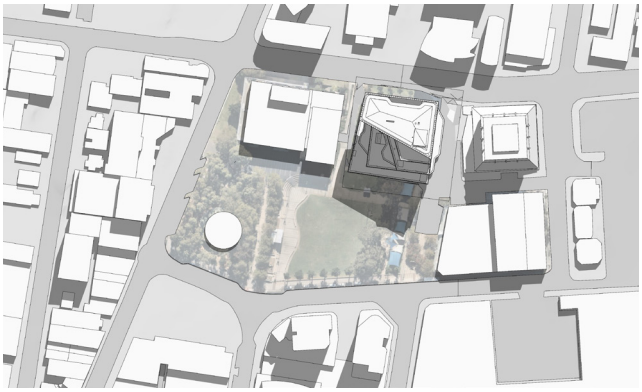

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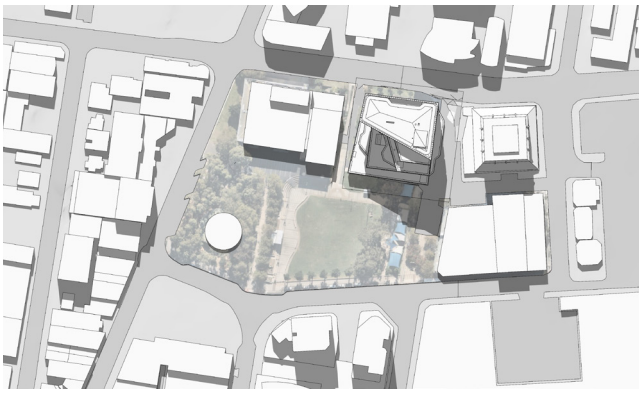

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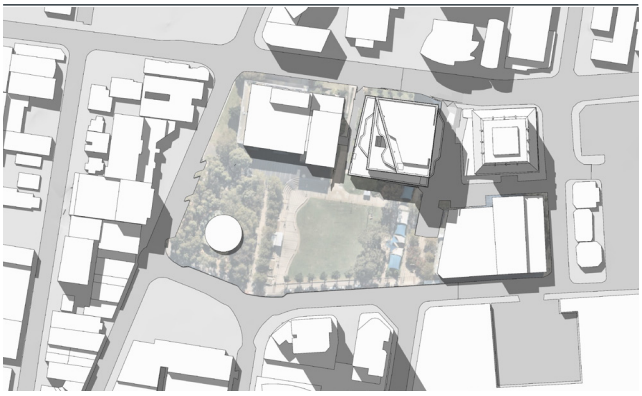
Equinox [22nd September]

WSU Proposal -14 Storeys-Excluding Level 14-18



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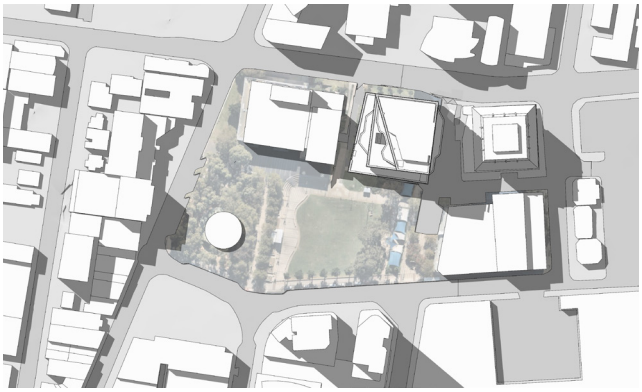

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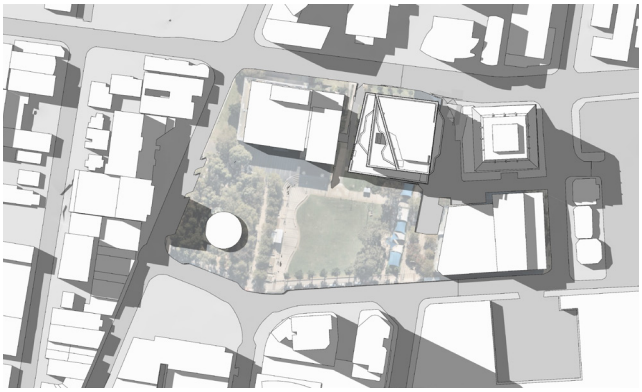

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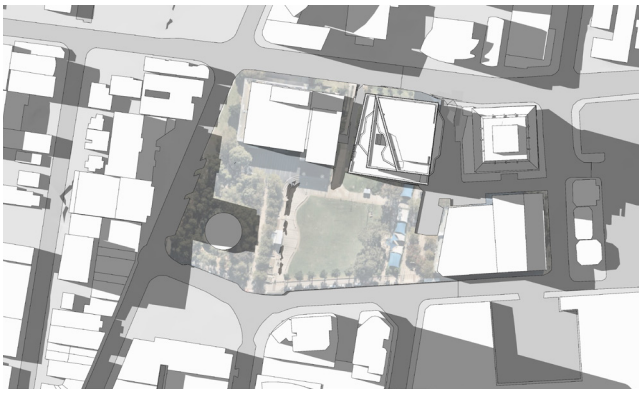

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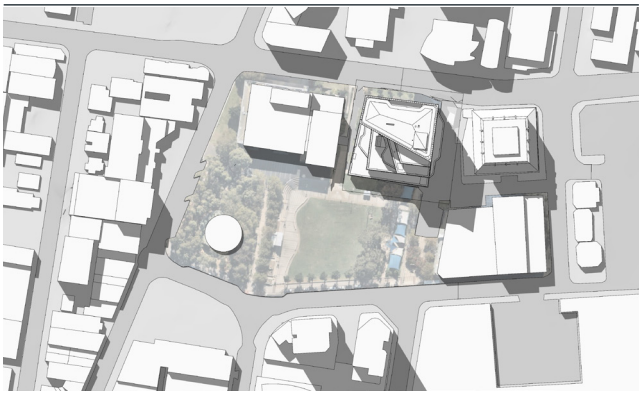
WSU Proposal -19 Storeys - Including Level 14-18



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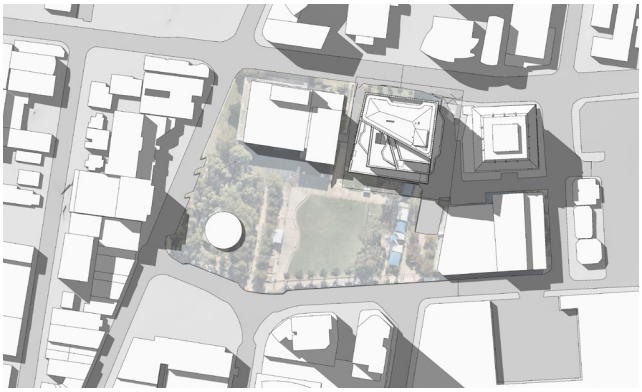

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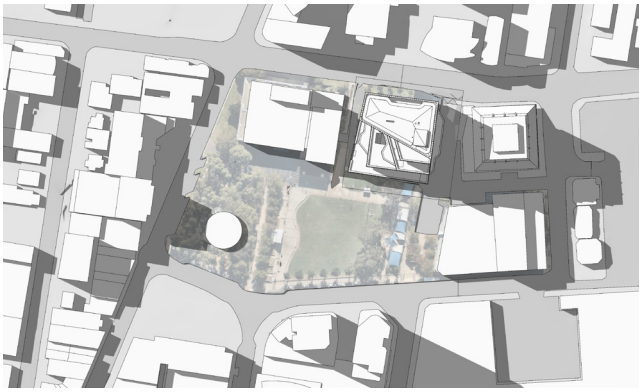

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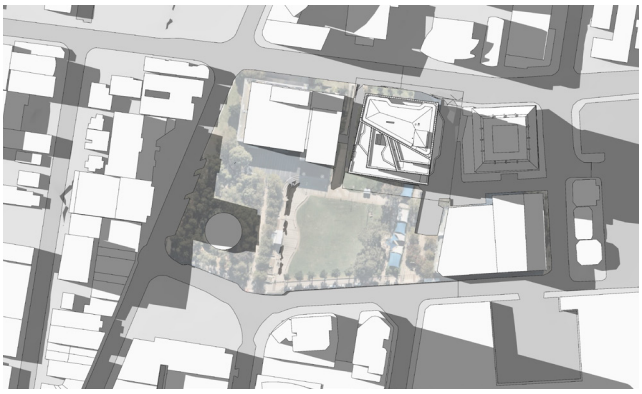

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Figures

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