EA/HQ
16680
26 June 2017

Ms Carolyn McNally
Secretary
Department of Planning & Environment
GPO Box 39
SYDNEY NSW 2000

Attention: Ben Lusher

Dear Ms McNally,

REQUEST FOR SECRETARY'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS

UNIVERSITY OF WOLLONGONG (UOW)
CONSTRUCTION OF A NEW ARTS & SOCIAL SCIENCES BUILDING

We are writing on behalf of the University of Wollongong (UOW) in relation to the construction of a new Arts and Social Sciences Building in the western section of the campus (referred to as the Western Building). In accordance with Part 13 of the *Environmental Planning and Assessment Regulation 2000*, the University of Wollongong may undertake development on behalf of the Crown. The proposed development is therefore a Crown Development.

In accordance with Clause 3 of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000 (EP&A Regulation)* and Schedule 1 (Clause 15) of *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP), UOW requests the issuance of Secretary's Environmental Assessment Requirements (SEARs) for the above proposed building and surrounding public domain upgrades.

As the proposed development will have a capital investment value (CIV) in excess of $30 million and is for an educational establishment, it qualifies as a State Significant Development (SSD) for the purposes of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

To support the request for the SEARs, this letter provides an overview of the proposed development, sets out the statutory context, and identifies the key likely environmental and planning issues associated with the proposal. Also enclosed are concept plans of the proposal (**Attachment A**) prepared by HASSELL Studios Architects which reference the site boundaries and probable locations and shape of the building footprint. A preliminary Flood Assessment prepared by Cardno is also provided (**Attachment B**), along with a preliminary Bushfire Protection Assessment prepared by Eco Logical Australia (**Attachment C**).

1.0 BACKGROUND

UOW is a teaching and research-intensive institution of international, national and state significance. In 2016 the University was ranked in the top 1% of universities worldwide. The university is renowned for the quality of graduates in a global workplace and its commitment to a research capacity to work on complex and interdisciplinary problems.

UOW was established in 1951 and has grown to a research-intensive institution with more than 30,000 students enrolled on more than 80 hectares of land. The new Arts and Social Sciences building will become a hub for both faculties with state of the art spaces, and will contribute to the amenity of the surrounding public domain.

The *Strategic Plan 2016-2020* and the *UOW 2016-2036 Campus Master Plan* forms the foundation for the future expansion of the campus and the aspirations for the University as the fundamental platform to which the new Western Building will be considered.

The proposed Arts and Social Science Building (Western Building) will contribute to the delivery of the *Strategic Plan 2016-2020* and the *UOW Campus Master Plan 2016-2036*. This Strategic Plan will establish UOW as a leading research-intensive institution.

The Faculty of Law, Humanities and the Arts has experienced a significant increase in demand reflecting extensive growth in the Creative Industries sector. In this context, the Faculty has experienced major constraints in its ability to provide the level of teaching and research which the market has been demanding. Additionally, this has been exacerbated by the 32% growth in undergraduates to the School of the Arts, English and Media since 2010 and the need to rely on existing limiting space, services infrastructure and ageing facilities to service the growth. As such, the two main drivers for change are the need for co-location of faculties and identity as well as the need to replace and expand ageing and inadequate facilities.

2.0 THE SITE

UOW is located within the Wollongong Local Government Area (LGA) and is situated approximately 2.4km north-west from the Wollongong CBD and 80km south of Sydney.

The Wollongong Campus includes the developments that sit within the boundaries of Robson Road (to the west), Northfields Avenue (to the south) and the Princes Motorway (to the east and north). It also includes the Innovation Campus located on Squires Way to the east of the main campus. The proposed Western Building site is within the Western Precinct of the Wollongong Campus and opposite Building 1 Early Start Facility on the campus Ring Road. The Wollongong Campus is shown below at **Figure 1**.

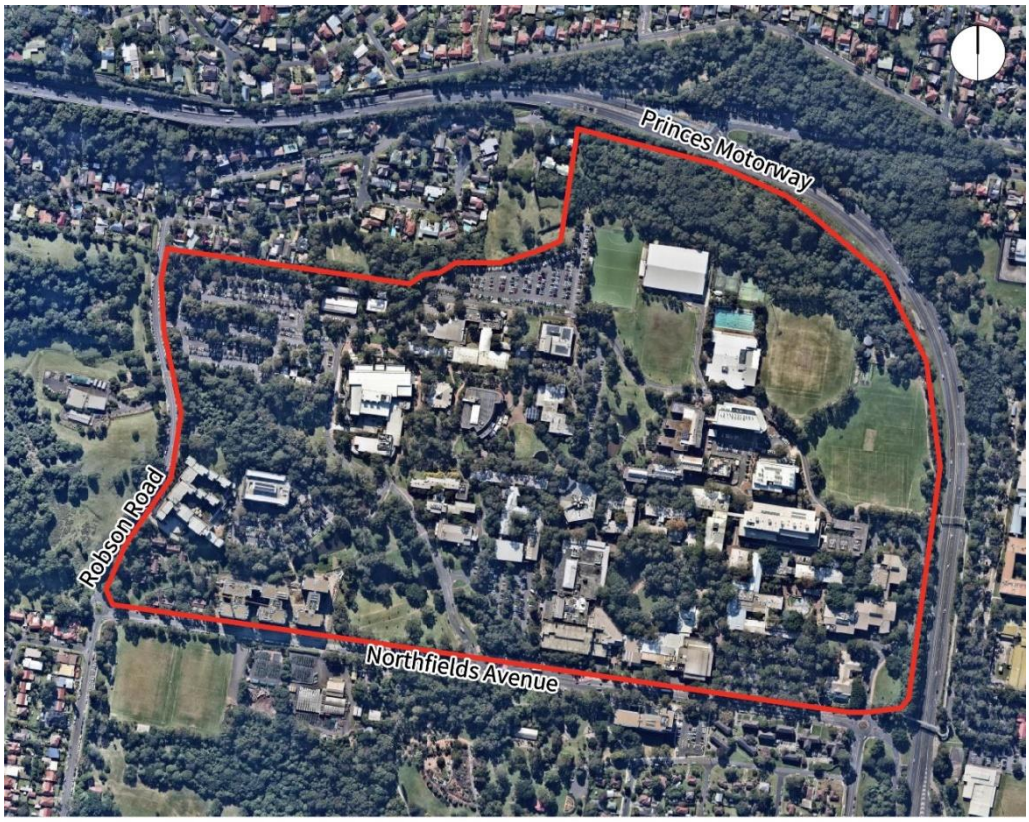


Figure 1 – Wollongong Campus
Source: Nearmap/JBA

3.0 THE PROJECT

UOW has identified the need for new facilities to provide modern, functional and compliant teaching and research facilities, and to accommodate the growth of the Schools of Arts and Social Sciences at its Wollongong campus. The key objectives of the Western Building will be to establish:

- a building footprint of approximately 4,000m^2, maintaining the opportunity to expand the building into the adjacent car park within the next 10 years;
- a building height of four or five storeys (approximately 25m);
- an identifiable architectural presence on the campus;
- an external arrival forecourt in the Western Precinct to activate the adjacent buildings;
- informal student amenity facilities, including options for future retail and student services;
- a building with multiple fronts, and access points from multiple directions;
- a building and precinct that supports the University's values and aspirations; and
- sustainable facilities that balance economic, social and environmental factors.

The Western Building and any associated refurbishment works will deliver co-located student facilities with informal and formal private and group learning spaces, and appropriate infrastructure and technology suited to the specific activities to be undertaken for each School.

Figure 2 below shows the project site within the Wollongong Campus.

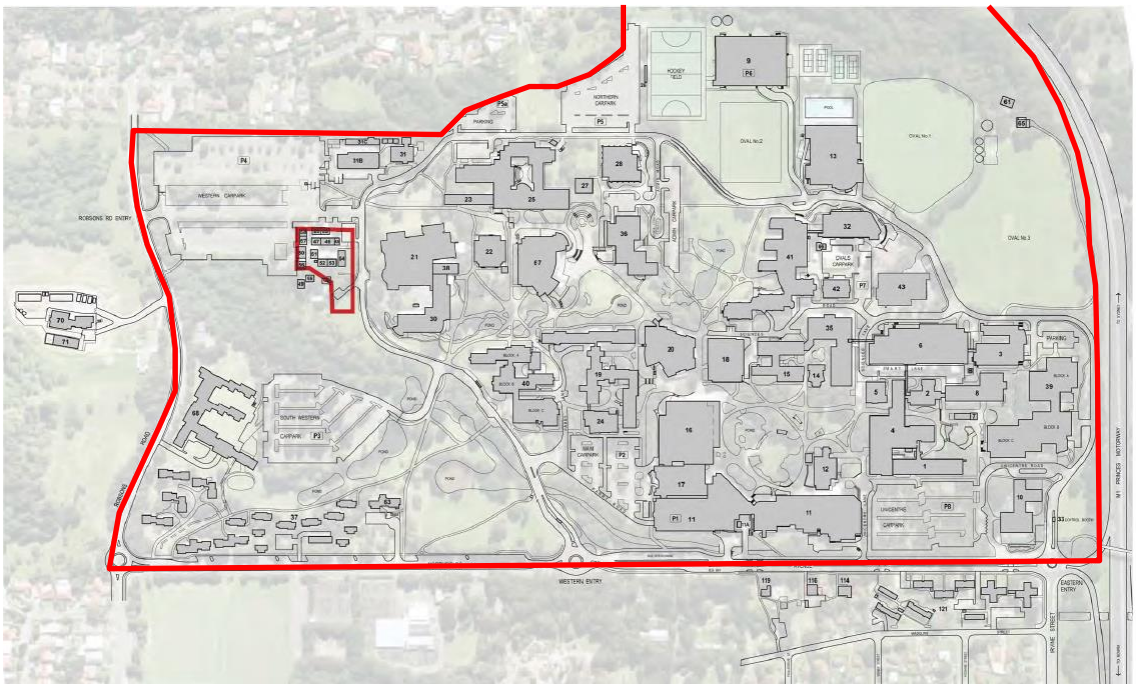


Figure 2 – Site Plan (subject site shown in red)
Source: DWP Suters

3.1 Scope of Works

To realise the objectives of the project, the University is proposing to submit a State-Significant Development Application (SSDA) for the Western Building. The areas and uses indicatively proposed within the Western Building are illustrated within **Table 1**. The site of the proposed development will have been cleared prior to the commencement of works, so no demolition works are proposed as part of this development.

The proposed building will complement the future Mount Keira Walk and separately proposed Ring Road public domain upgrades. The landscaping works will incorporate the existing trees along Ring Road and will facilitate the creation of informal and formal outdoor learning spaces.

Table 1 – Western Building details

Floor	Indicative Use	Floor area (approximate)
Ground	- Lobby and reception - Gallery, store, meeting room - Visual media studio - Common teaching facilities - Specialised learning facilities - Informal learning spaces - End of trip facilities - Performance and theatre space - Public courtyard/outdoor informal learning - Core: lift and stair	Up to 4,000m^2
Level 1	- Specialised teaching facilities - Informal learning spaces - Collaborative workplace environment	Up to 4,000m^2
Level 2	- Common office facilities - Informal learning spaces - Design labs - Visual communications - Collaborative Workplace - Informal learning spaces	Up to 4,000m^2
Level 3	- Collaborative workplace environment (offices and common facilities) - Specialised learning facilities and sound recording - Terrace	Up to 4,000m^2

4.0 STATUTORY AND STRATEGIC PLANNING CONTEXT

The following are the key relevant legislation and environmental planning instruments that will apply to the proposed development:

- *Environmental Planning and Assessment Act 1979*;
- *Water Management Act 2000*
- *State Environmental Planning Policy No. 55 - Remediation of Land*;
- *State Environmental Planning Policy (State and Regional Development) 2011*;
- *Illawarra-Shoalhaven Regional Plan*;
- *Wollongong Local Environmental Plan 2009*;
- *Wollongong Development Control Plan 2009*;
- *UOW 2016-2020 Strategic Plan; and*
- *UOW 2016-2036 Wollongong Campus Master Plan.*

4.1 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) establishes the assessment framework for State Significant Development. Under Section 89D of the EP&A Act the Minister for Planning is the consent authority for State Significant Development. Section 78A(8A) requires that a development application for SSD is to be accompanied by an Environmental Impact Statement (EIS).

4.2 Water Management Act 2000

The Site is identified as being within a Riparian Corridor. The EIS will assess the development's impacts as a controlled activity in accordance with the provisions of the *Water Management Act 2000*.

4.3 State Environmental Planning Policy No. 55 – Remediation of Land

State Environmental Planning Policy No. 55 – Remediation of Land (SEPP 55) aims to promote the remediation of contaminated land for the purpose of reducing the risk of harm to human health or any other aspect of the environment. Appropriate site investigation documentation will be provided to support the SSDA.

4.4 State Environmental Planning Policy (State and Regional Development) 2011

The State and Regional Development SEPP (SEPP SRD) identifies development which is declared to be State Significant. In accordance with Clause 15 of Schedule 1, development for the purpose of educational establishments (including associated research facilities) that has a capital investment value of more than $30 million is declared to be State Significant Development (SSD) for the purposes of the EP&A Act. The proposed development has a CIV in excess of $30million and is therefore defined as State Significant Development.

4.5 Illawarra-Shoalhaven Regional Plan

The proposal aligns with a number of key directions and actions outlined within the Regional Plan for the Illawarra-Shoalhaven Region. The University of Wollongong has been identified as a priority growth area due to the appeal of the region's tertiary offerings. In particular:

- Action 1.1.5 Enhance the growth potential of the University of Wollongong to drive innovation in the region.

The proposed development will ensure the level of teaching and facilities are provided to meet the ever-increasing demand in the Faculties of Arts and Social Sciences.

The overarching aim for the University as outlined in the Regional Plan is to capitalise on the 'knowledge based' assets of the region. The University has been identified as a high quality Education and Training Precinct and as such, the proposed Western Building will provide a specialised space for the Faculties of Arts and Social Sciences. Specifically, the Western Building will:
"*create a place which provokes, inspires and facilitates connections between Social Science and Creative Arts and Industries, welcomes our communities, provides a forum for new thinking and drives teaching, research excellence and growth."* (UOW)

4.6 Wollongong Local Environmental Plan 2009

The *Wollongong Local Environmental Plan 2009* applies to the site. Under the provisions of the LEP the site is zoned for *SP2 - Infrastructure (Educational Establishment).* The proposed development is permissible within the zone as it comprises an Educational Establishment. The LEP provides no maximum building height or maximum floor space ratio (FSR) development standards for the site.

4.7 Wollongong Development Control Plan 2009

The *Wollongong Development Control Plan 2009* (WDCP 2009) does not contain any development objectives in relation to Educational Establishments. However, Chapter E13 Floodplain Management and Chapter E23 Riparian Land Management apply to the site. In accordance with Clause 11 of the SEPP SRD, the requirements of Development Control Plans (DCPs) do not apply to State Significant Developments.

Notwithstanding the above, an assessment against the relevant Section of the DCP will be provided as part of the SSD application.

4.8 UOW 2016-2036 Wollongong Campus Master Plan

The *UOW Wollongong Campus Master Plan 2016-2036* sets goals and objectives for development within the campus. The EIS will assess the Western Building against the goals of the Master Plan as outlined in Section 1.0. Additionally, the Master Plan identifies key development standards and objectives that apply to the site including:

- maximum building height of 4-5 storeys (plus plant);
- extend and establish new informal student amenity facilities; and

- opportunity for multiple entrances and access points from multiple directions.

The proposal has been developed in accordance with the University's Master Plan and supports the strategic objectives of UOW.

4.9 UOW 2016-2020 Strategic Plan

The *UOW 2016-2020 Strategic Plan* guides the future direction and planning for the University, specifically with respect to operational planning, faculty and unit planning and development, staff development and performance. The Strategic Plan aligns with the Wollongong Campus Master Plan and is the fundamental platform to which the Western Building will be considered and developed.

5.0 PRELIMINARY IMPACT IDENTIFICATION AND RISK ASSESSMENT

The impacts and risks associated with the proposal are summarised below:

5.1 Built Form

The EIS will address the height, density, bulk and scale of the proposed development within the context of the locality and will demonstrate how the proposal integrates with the local environment, and that the form, layout and siting of the building achieves optimal design and amenity outcomes. The proposed built form will be assessed against the Wollongong Campus Master Plan.

The EIS will provide a detailed overshadowing analysis to assess the overshadowing impact on existing and proposed development and open space surrounding the site.

5.2 Ecologically Sustainable Development

The UOW has a commitment to sustainability. The proposed development will demonstrate consistency with the sustainability objectives outlined in the Wollongong Campus Master Plan, and seek to create a sustainable campus that can attract high quality staff and students. The construction works will be carried out in accordance with the University's Environmental Management Plan and Environmental Policy.

Whilst formal Green Building Council of Australia (GBCA) assessment of the design and built form may not be undertaken by the University, the expectation is that the Western Building will be designed and constructed to the equivalent of a 5 Star Green Star rated building. The ongoing monitoring of the building's performance will be assessed against the National Australian Built Environment Rating Scheme (NABERS).

The Ecologically Sustainable Development Design Standard Version 2-5 dated March 2012, identifies the minimum design characteristics that should be applied to all new construction and refurbishment works.

5.3 Traffic, Transport and Access

A traffic and parking assessment will be prepared by a specialist traffic consultant and submitted with the EIS. The report will examine:

- road safety;
- demand for car parking;
- loading and servicing arrangements;
- traffic impacts of the proposed development on the surrounding road network and intersections; and
- accessibility to public transport.

5.4 Ecology

One Eucalypt tree is located on the south-western corner of the site, which is preferred to be retained. An Arborist Report and a Flora and Fauna Report will be prepared as part of the EIS, this will include an assessment of the impact of the development on the local ecology.

A riparian zone is located to the south of the development site. An assessment of the impact of the development on this riparian zone will be undertaken within the EIS.

5.5 Construction and Operational Impacts

The EIS will address and consider the construction and operation impacts of or on:

- noise and vibration;
- soil, groundwater, and geotechnical attributes of the site and environs;
- access, parking and traffic;
- stormwater and air-borne pollutant control; and
- servicing and infrastructure for the development.

5.6 Development Contributions

Wollongong City Council Section 94A Development Contributions Plan 2016 (Wollongong S94A Plan) applies to the site. Under Section 94E of the EP&A Act, exemptions to the levy cannot be imposed on development in relation to (but not limited to) public infrastructure i.e. hospitals, police stations, fire stations, education facilities (primary and secondary) and public transport infrastructure.

UOW relies on grants, donations, and external funding to provide new education facilities. On this basis and consistent with recent redevelopment projects within the campus, UOW has provided various works-in-kind projects to offset cash contributions which would otherwise be at the expense of funding teaching and research programs within the university. This aspect is subject to on-going discussions with Wollongong Council.

5.7 Other Issues

- **Flooding**: The site is not within a known flood plain. A Preliminary Flood Assessment has been prepared by Cardno at **Attachment B**. The preliminary report indicates that the flood constraints will not prevent the construction of the Western Building. A full Flood Assessment Report will be prepared as part of the EIS and appropriate flood mitigation works included and assessed within the EIS.
- **Heritage**: A search of the Office of the Environment and Heritage Aboriginal Heritage Information Management System (AHIMS) has indicated that no Aboriginal sites or places are recorded in or near the location.
- **Bushfire**: The site is not mapped as being bushfire prone, however as outlined in the preliminary Bushfire Protection Assessment Prepared by Eco Logical Australia (**Attachment C**), an area of low hazard vegetation occurs to the south A Bushfire Protection Assessment will be prepared as part of the EIS.

6.0 EXPECTED DELIVERABLES

To assist in confirming the SEARs, we have undertaken an analysis based on our experience of what the expected deliverables will be to support the EIS, which include:

- Owner's Consent
- DA Fees
- QS Certificate
- Environmental Impact Statement (EIS)
- Site Survey Plan
- Architectural Package (design statement and drawings)
- Photomontages/Perspectives
- Acoustic/Noise Impact Assessment
- Traffic, Parking and Access Statement
- Public Domain Plan/Landscape Plan and Design Statement
- ESD Report/Strategy
- Services and Infrastructure Report
- Stormwater/OSD Concept Report and Plans
- Contamination Report/Remediation Action Plan/Site Audit Statement (as relevant)
- Geotechnical Report
- Waste Management Plan

- Bushfire Risk Assessment
- Flora and Fauna Study
- Preliminary Construction Management Plan/Preliminary Environmental Management Plan/ Preliminary Construction Traffic Management Plan
- Fire Engineering Report
- BCA Statement
- Accessibility Statement

7.0 CONSULTATION

In preparing the EIS, it is expected the proponent will undertake consultation with Wollongong City Council, the surrounding landholders, community and relevant stakeholders as required. Service Utility providers will be consulted throughout the process.

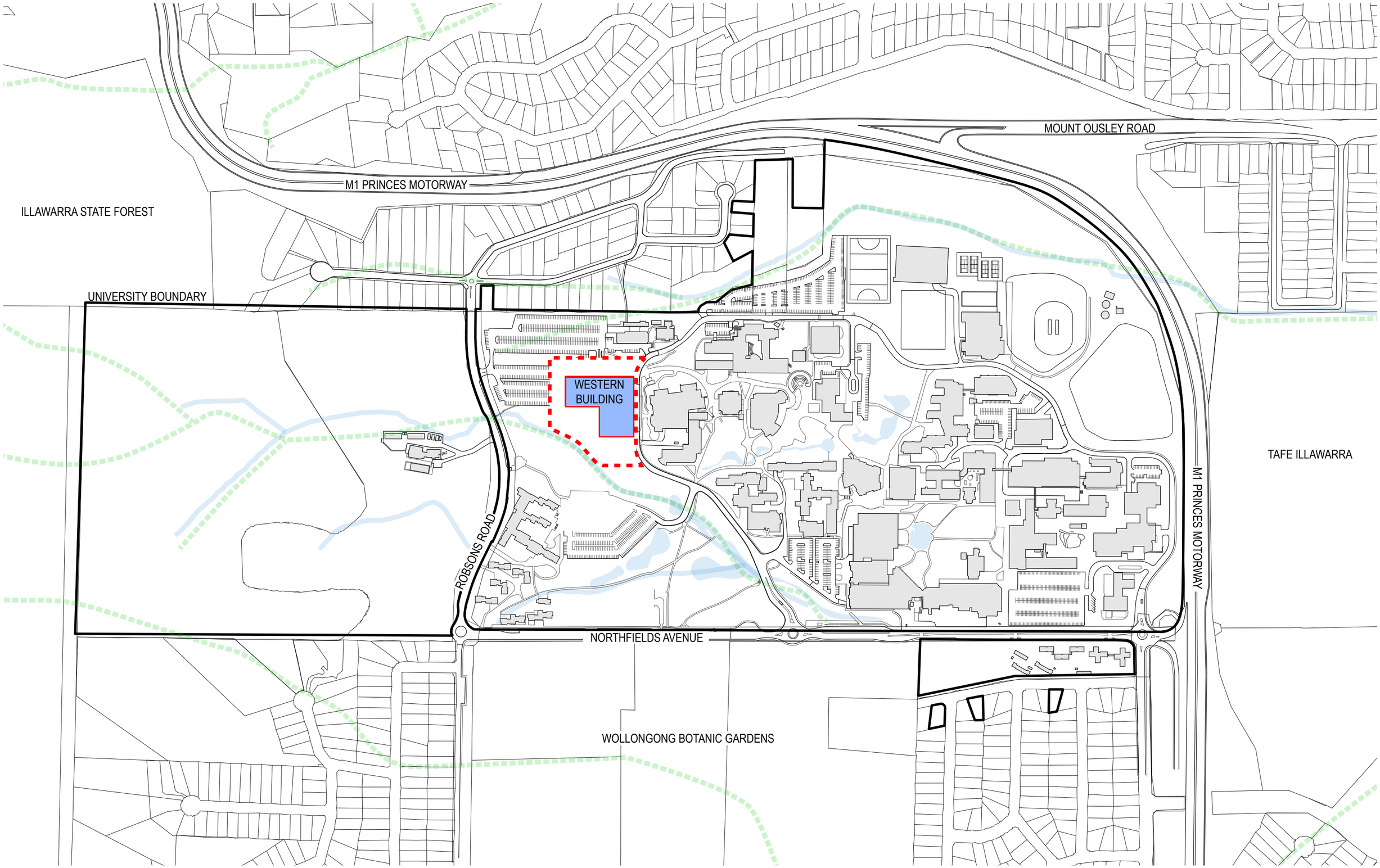
8.0 CONCLUSION

The CIV of the project is in excess of $40 million, as such the Development will be classified as a State Significant Development in accordance with the provisions of Clause 15 of Schedule 1 of the SRD SEPP being *development for the purpose of educational establishments (including associated research facilities) that has a capital investment value of more than $30 million.* As such, UOW formally requests the Department issue the SEARs for the project to facilitate the preparation of the EIS to accompany the DA for the project. A Quantity Surveyors certificate verifying an estimated CIV has been provided for reference.

Should you have any queries about this matter, please do not hesitate to contact me on 9956 6962 or hquartermain@jbaurban.com.au.

Yours sincerely,

Harry Quartermain
Principal Planner



INDICATIVE SITE BOUNDARY

INDICATIVE PROPOSED WESTERN BUILDING OUTLINE

INDICATIVE RIPARIAN CORRIDORS (AS PER WOLLONGONG COUNCIL INTERACTIVE MAPS)

0 50 100 200m

Revision	Date
A - SEARS REQUEST DRAFT - FOR REVIEW	06-JUNE 2017
B - SEARS REQUEST DRAFT - FOR REVIEW	07-JUNE 2017
C - SEARS REQUEST	09-JUNE 2017

Scale
1:2500@A1
1:5000@A3

Client
UNIVERSITY OF WOLLONGONG

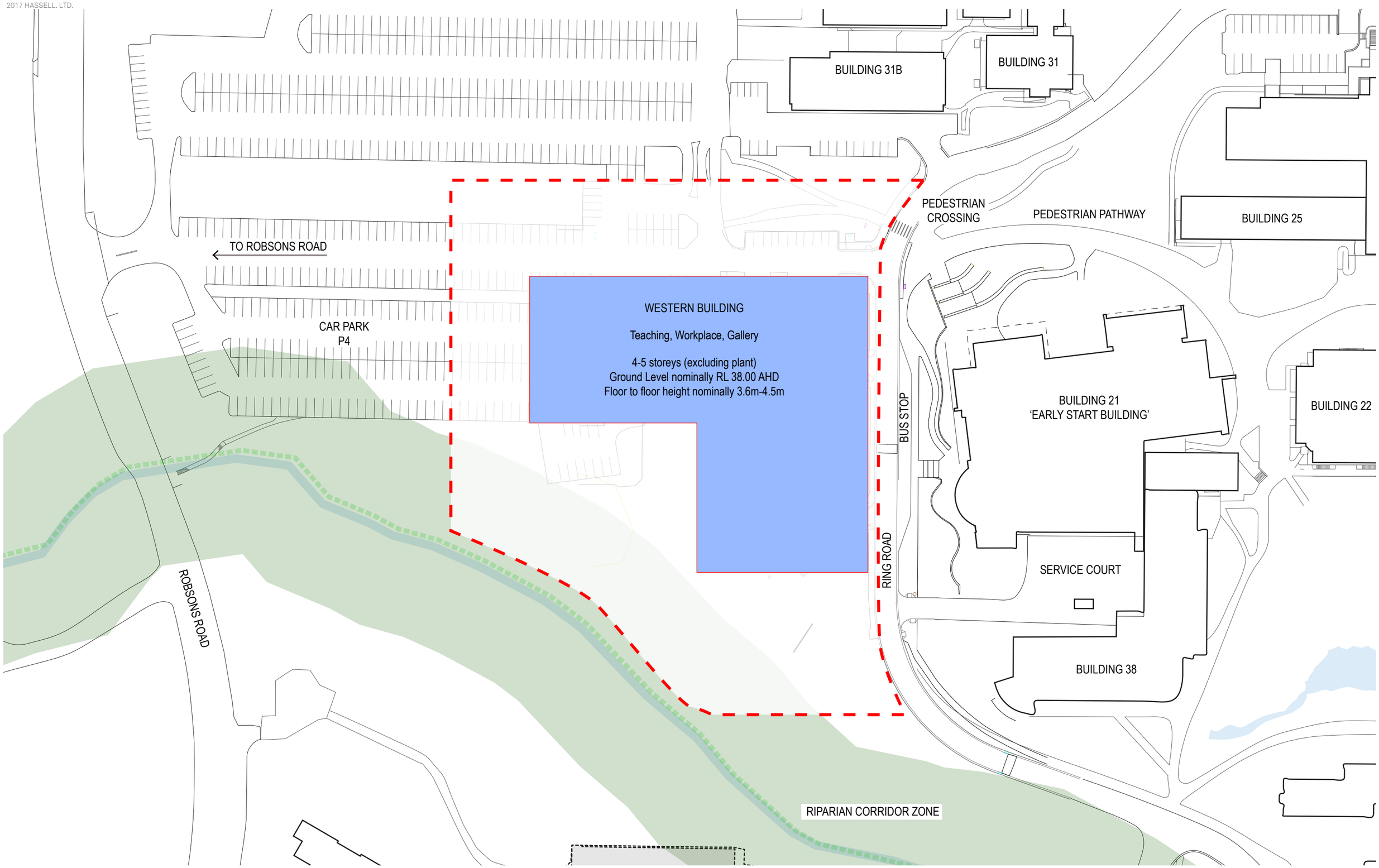
Project Name
012734
WESTERN BUILDING
UNIVERSITY OF WOLLONGONG

Drawing
SK001
BUILDING LOCATION PLAN

HASSELL
ABN 24 007 711 435

Indicative layout only - not for construction.
Nominated architects NSW: Tony Grist 5350 Ross de la Motte 7398

UNIVERSITY OF WOLLONGONG AUSTRALIA



INDICATIVE SITE BOUNDARY
INDICATIVE PROPOSED WESTERN BUILDING OUTLINE
INDICATIVE RIPARIAN CORRIDOR 30m SETBACK
INDICATIVE RIPARIAN CORRIDORS (AS PER WOLLONGONG COUNCIL INTERACTIVE MAPS)

0 10 20 40m

Revision	Date
A - SEARS REQUEST DRAFT - FOR REVIEW	06-JUNE 2017
B - SEARS REQUEST DRAFT - FOR REVIEW	07-JUNE 2017
C - SEARS REQUEST	09-JUNE 2017

Scale
1:500@A1
1:1000@A3

Client
UNIVERSITY OF WOLLONGONG

Project Name
012734
WESTERN BUILDING
UNIVERSITY OF WOLLONGONG

Drawing
SK002
SITE PLAN

HASSELL
ABN 24 007 711 435

Indicative layout only - not for construction.
Nominated architects NSW: Tony Grist 5350 Ross de la Motte 7398

UNIVERSITY OF WOLLONGONG AUSTRALIA

INDICATIVE SITE BOUNDARY
INDICATIVE PROPOSED WESTERN BUILDING OUTLINE
INDICATIVE RIPARIAN CORRIDOR 30m SETBACK
INDICATIVE RIPARIAN CORRIDORS (AS PER WOLLONGONG COUNCIL INTERACTIVE MAPS)

0 10 20 40m

Revision	Date
A - SEARS REQUEST DRAFT - FOR REVIEW	06-JUNE 2017
B - SEARS REQUEST DRAFT - FOR REVIEW	07-JUNE 2017
C - SEARS REQUEST	09-JUNE 2017

Scale
1:500@A1
1:1000@A3

Client
UNIVERSITY OF WOLLONGONG

Project Name
012734
WESTERN BUILDING
UNIVERSITY OF WOLLONGONG

Drawing
SK003
CONTEXT PLAN

HASSELL
ABN 24 007 711 435

Indicative layout only - not for construction.
Nominated architects NSW: Tony Grist 5350 Ross de la Motte 7398

UNIVERSITY OF WOLLONGONG AUSTRALIA

Our Ref: 8201720801

Contact: Nathan Pomfret

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15 June 2017

University of Wollongong
Via Email: egarbayo@uow.edu.au

Attention: Ms Erika Garbayo

RE: UOW ARTS AND SOCIAL SCIENCES BUILDING – PRELIMINARY FLOOD ASSESSMENT

1. Introduction

The University of Wollongong (UOW) has engaged Cardno (NSW/ACT) Pty Ltd to provide preliminary advice for the proposed Arts and Social Sciences Building (ASSB) to be located at UOW's Wollongong campus. This letter presents the outcome of the preliminary assessment to inform the SEAR's application as well as to highlight potential requirements of the proposed building defined in Chapter E13 – Floodplain Management of Wollongong City Council's (WCC's) Development Control Plan (DCP).

1.1 Site Description

The site is situated in the north west of the UOW main campus on Northfields Avenue in Keiraville. The site fronts a car parking area and has direct access to the Ring Road and backs onto the riparian corridor of an upper tributary of Fairy Creek. The proposed building is to replace a group of existing demountable buildings and some ground level carpark area.

2. Hydraulic Modelling

2.1 Existing Scenario

A 2D TUFLOW model was established over a 2 m grid with elevations extracted from detailed survey and ALS data. The model grid extent covers the entire UOW Campus and the adjacent sub-catchments.

Culverts and pipes inspected within the study area were modelled in accordance with WCC's new blockage policy as detailed in the Review of Conduit Blockage Policy Summary Report (WMA, May 2016).

2.2 Proposed Scenario

A maximum possible footprint was created by combining the extents of all options to identify the largest possible shape the ASSB would occupy. This was overlaid on flood modelling results to identify flood constraints for the proposed development. Based on this assessment any of the provided options will result in similar flood requirements which are discussed in Section 3.

2.3 Simulation Results

The hydraulic model was simulated for the existing 100 year ARI and PMF storm events. The results show that flooding occurs through the group of existing demountable buildings as overland flow. This overland flow originates from Northfields Ave, which is overtopped when flows exceed the capacity of the existing 1.8m diameter pipe under the road. The overland flow does not return to the creek but flows east towards the buildings to the Ring Road. It is noted that the watercourse south of the site is not overflowing (Refer to **Figure 2-3** below) and if the overland flow from Northfields Ave could be returned to the creek via a swale, then flooding on the site would reduce significantly.

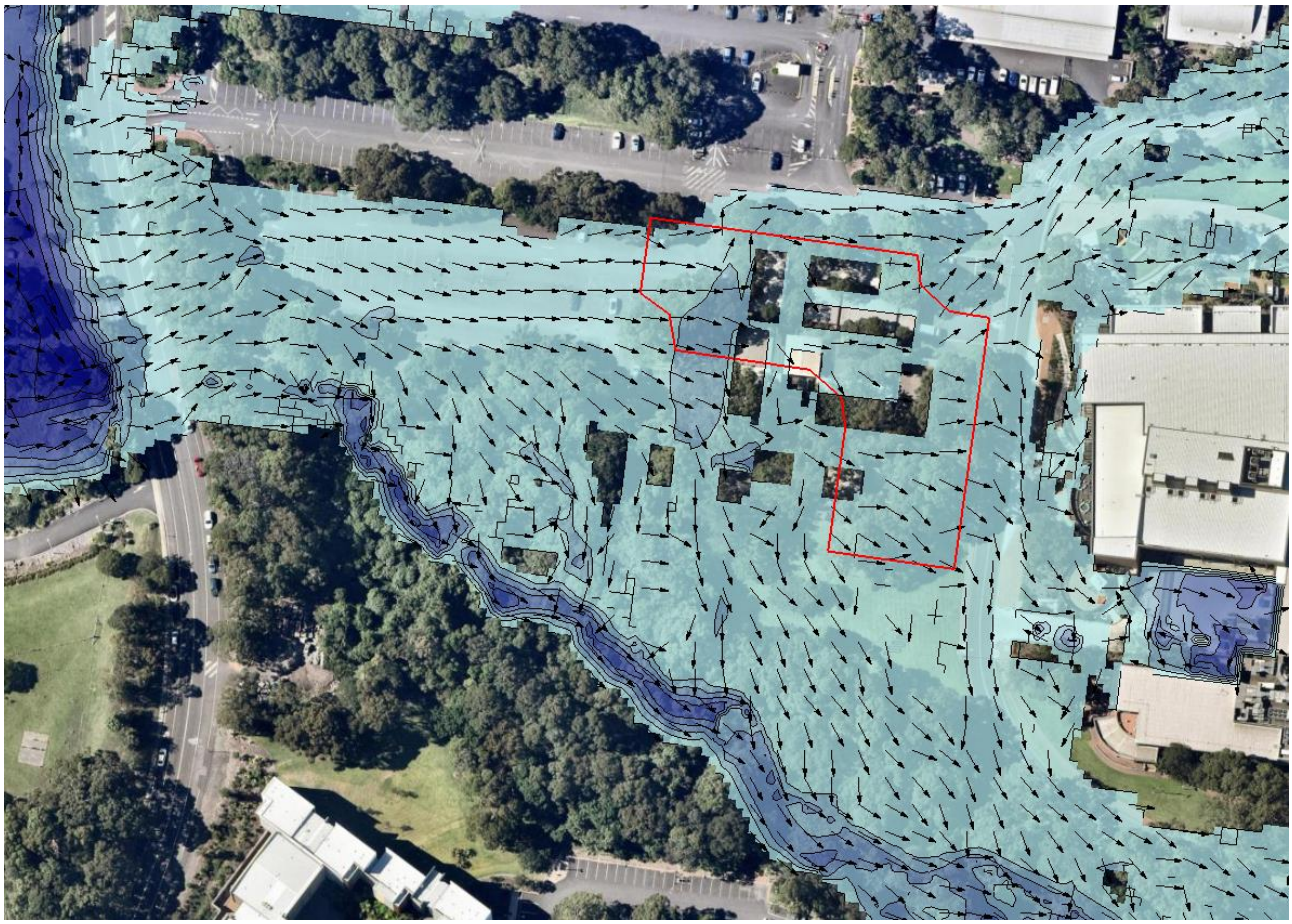
Overland flows will occur in the western carpark and adjacent to the demountable buildings in both the 100 year ARI and PMF events. Flood results are shown in **Figures 2-1** and **2-2** below.

The depth of flow adjacent to the demountable buildings is below 100 mm during the 100 year ARI event and generally less than 200 mm during the PMF. The exception to this is one small area that has a maximum depth of 200 mm in the 100 year ARI event and 700 mm in the PMF. This deeper section appears to be due to the effect of the current demountable buildings obstructing the overland flow.

Flood velocities in the area adjacent to the demountable buildings are less than 0.3 m/s during the 100 year ARI event and as much as 3 m/s during the PMF event. The areas of high flow rate during the PMF event are a result of flow constriction between the demountable buildings, in areas where flow is unconstricted, flood velocities are much lower.

Figure 2-1 Existing 100 year ARI Flood Depth and Extent

Figure 2-2 Existing PMF Flood Direction, Depth and Extents



3. Discussion

3.1 Proposed Development

The proposed ASSB will interrupt the existing overland flow path that passes over the western carpark and through the demountable buildings in the existing scenario. This does not preclude the site from development, but will likely require the proposed design to accommodate and control flood flows. Options to improve the flood immunity and design of the proposed building are discussed in **Section 3.4.1.1**.

3.2 Hydraulic Hazard Categorisation

Flood model results were assessed to identify hazardous areas. The area proposed for the ASSB is currently predominantly low hydraulic hazard, with some small areas being flood free.

3.3 Flood Risk Precincts

WCC's DCP 2009 states that flood prone land should be divided into three flood risk areas (**Figure 1-1Table 3-1**).

Table 3-1 Council DCP 2009 Risk Precinct Definitions

High	The area within the envelope of land subject to a high provisional hydraulic hazard (in accordance with FPDM, 2005) in a 100 year flood event plus all land within 10m from the top of the creek bank.
Medium	Land below the 100 year flood level (plus 500mm freeboard) that is not within the High Flood Risk precinct.
Low	All other land within the floodplain (i.e. the extent of the PMF) but not defined within either the High or Medium Flood Risk precincts.

The site is primarily classed as being within the medium Flood Risk Precinct (FRP). The proposed development is considered to be suitable for medium FRP, with the following prescriptive controls expected to apply in order to comply with the WCC DCP (2009).

3.4 Floodplain Management

3.4.1 Flood Planning Level (FPL)

The proposed ASSB is inside the 100 year average recurrence interval (ARI) flood extents. As such, the FPL for the ASSB is to be equal to or greater than the 100 year ARI flood level (including the effects of climate change) adjacent to the site plus 500 mm freeboard.

As the design and climate change scenarios have not yet been modelled the exact FPL for the proposed building cannot be confirmed at this point. However, hydraulic modelling results show that the 100 year ARI water level adjacent to the proposed building site (upstream extent) in the 100 year event is approximately 39.9 m AHD. Assuming a climate change impact of 0.1 m (to be confirmed at design) the estimated FPL for the proposed building is 40.5 m AHD. This is the highest FPL applicable to the proposed building, assuming a single floor level and could be modified through a split level design, flood mitigations and/or surface works at the design stage.

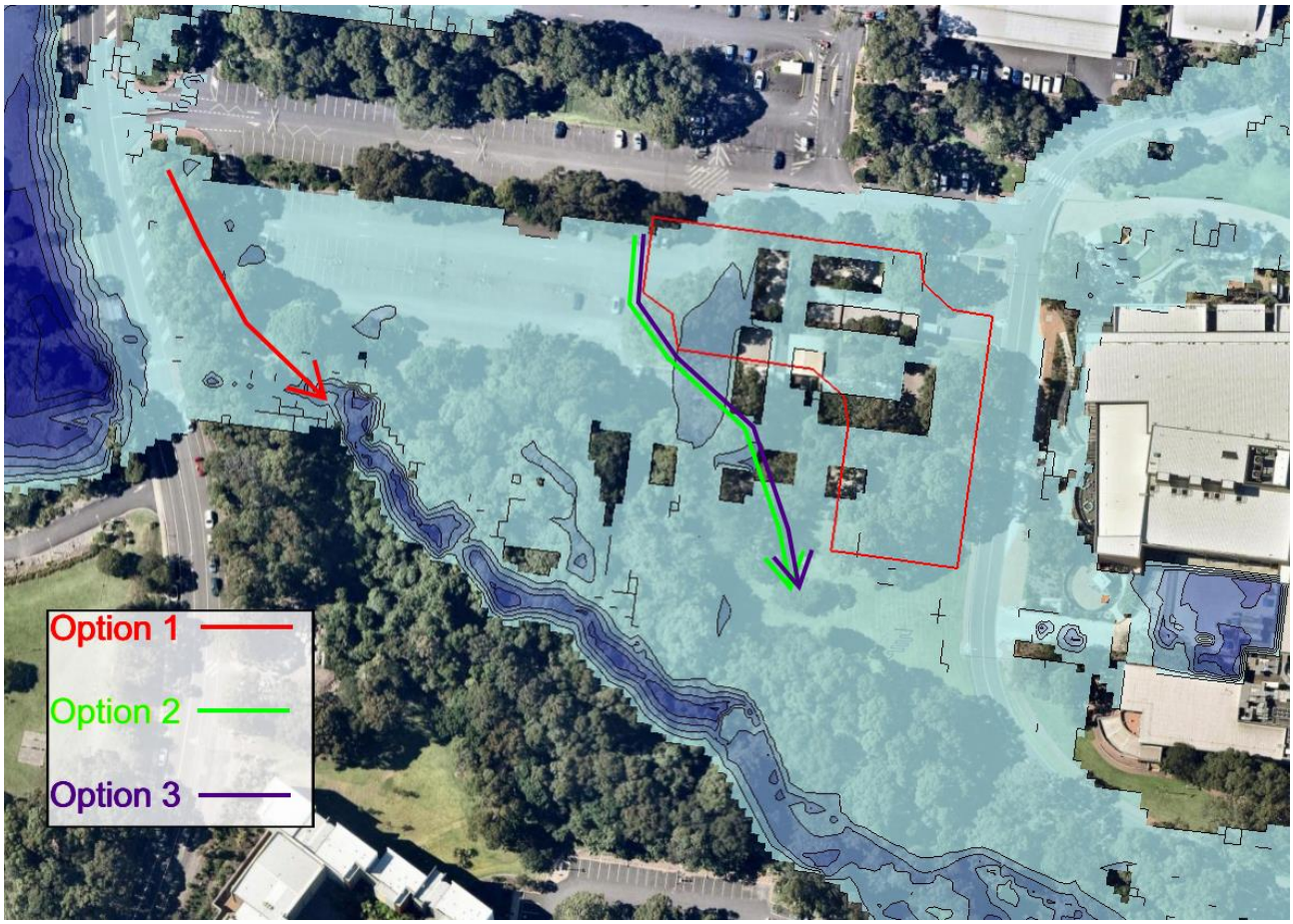
3.4.1.1 Flood Mitigation Works to Reduce FPL Requirements

It is understood that a split level North and East wing building design is being considered as a design option. This approach based on the methodology above would result in FPL's of 40.5 m AHD for the north wing and 38.9 m AHD for the east wing.

It is also understood, that the desired floor level for a split level building is circa 39.5 m AHD for the north wing and 38 m AHD for the east wing. Three options to further reduce the FPL for each wing are detailed below. Indicative locations of these options are shown in **Figure 3-1**. It is noted that the effectiveness of these options are only an estimation at this stage and are pending detailed flood assessment and will need to comply with all conditions specified in **Section 3.4** of this letter.

- **Option 1** involves designing a flow diversion (such as a swale) at the western end of the western carpark (adjacent to Robsons Road) to divert flow back into the watercourse. This option would aim to eliminate sheet flow from the carpark and building and could eliminate the requirement for a FPL or reduce it to 38.7 m AHD and 37.3 m AHD for the north and east wings respectively.
- **Option 2** involves designing a diversion closer to the western boundary of the proposed ASSB to divert flow back into the watercourse. This option would aim to eliminate sheet flow from the proposed building and could reduce the FPL's to between 40.0 – 40.5 m AHD and 38.4 – 38.9 m AHD for the north and east wings respectively.
- **Option 3** would incorporate a swale in a similar fashion to **Option 2**, but would also incorporate a flood training wall or bund to provide the freeboard requirements (approximately 600 mm). This option would aim to have the proposed building be considered flood free and could eliminate the need for a FPL altogether.

Figure 3-1 Indicative Locations of Flood Mitigation Measures for the Proposed ASSB



3.4.2 Flood Compatible Buildings Materials and Structural Soundness

Flood compatible building components would be required for any portion of the building which is below the flood planning level. This includes masonry foundations and other such features. An extensive list of approved materials is available in WCC's DCP (2009) and should be referenced during detailed design.

A structural soundness certificate will be required as part of the Construction Certificate to demonstrate that the proposed works can withstand the force of floodwater, debris and buoyancy up to and including the PMF.

3.4.3 Evacuation and Safe Access

Evacuation and safe access will need to be assessed at the design stage.

3.4.4 Flood Affectation

Changes in flood elevations in the 100 year ARI and PMF storm events as a result of the proposed works will need to be assessed at the design stage.

3.4.5 Floodplain Storage

Floodplain storage will need to be assessed at the design stage. WCC generally requires no net floodplain storage loss during development.

3.4.6 Trafficability

The effect of this development on trafficability of adjacent roads, particularly the University Ring Road that passes to the east of the proposed ASSB will need to be assessed at the design stage.

4. Conclusions

It can be concluded that:

> Flood constraints do not prohibit any of the proposed design options. All of the options will result in similar flood prescriptive controls.

> Flooding occurs as overland flows over the area of the proposed ASSB and adjacent carpark.

> The depth of inundation adjacent to the existing demountable buildings is generally below 100 mm in the 100 year ARI and 200 mm in the PMF event in the existing and scenarios with some small areas during the PMF event reaching a maximum of 700 mm.

> Velocities are generally less than 0.3 m/s in the 100 year ARI event. Higher velocities during the PMF event are small and localised and can be attributed to the constricting of flow caused by the demountable buildings.

> The proposed ASSB building area is within the medium risk flood precinct, and is subject to low hydraulic hazard.

> The flood planning level for the proposed building is dependent on the design and flood mitigation measures implemented.

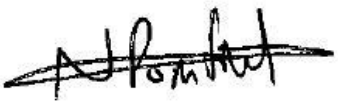
> A climate change assessment will need to be undertaken and considered when setting the proposed FPL.

> Flood affectation, floodplain storage and trafficability will need to be assessed at the design stage.

Prepared by
for and on behalf of
CARDNO (NSW/ACT) PTY LTD

Samuel Kelly
Graduate Water Engineer

Reviewed by



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Ref/Job No: 17SUT_7499

15 June 2017

Dear Erika,

RE: Bushfire Protection Assessment - Proposed Western Building – University of Wollongong, Mount Ousley

Eco Logical Australia (ELA) was engaged to provide bushfire advice regarding the proposed development of a new western building for teaching and offices at the University of Wollongong Campus. The subject site is proposed to be located directly west of the existing Early Start Facility (Discovery Space) building in the western section of the university campus, where existing carpark and demountable buildings are located.

The advice in this letter is based on the following research and knowledge:

- A site inspection undertaken on 9/06/2017;
- Indicative site plans provided by Hassell – Drawing code: SK002 (**Figure 2**);
- A detailed site analysis of the vegetation and topography within and surrounding the subject land;
- The legislative requirements of the Environmental Planning & Assessment Act 1979 (EP&A Act) and Rural Fires Act 1997 (RF Act);
- The requirements of both the current 'Planning for Bush Fire Protection 2006' (PBP) and the draft 'Planning for Bush Fire Protection 2017' .

The purpose of this letter is to identify the constraints posed by the adjoining bushfire hazard in accordance with *Planning for Bush Fire Protection* and bushfire attack level (BALs) for the purposes of future planning for the site.

Assessment pathway

Section 100B of the RF Act identifies development types that are captured as a Special Fire Protection Purpose (SFPP) development. This includes schools, nursing homes, child care centres, tourist accommodation and retirement villages. Whilst universities are not captured within the definition of a school by the *Wollongong Local Environment Plan 2009* (LEP) and therefore not specifically referenced by Section 100B, the supporting *Rural Fires Regulation 2013* identifies that 'student or staff accommodation associated with a school, university or other educational establishment' are also a prescribed purpose.

As the proposed uses do not fall within this prescribed purpose, it is not captured as Integrated Development under Section 91 of the EP&A Act. Instead the proposed development will be assessed under Section 79BA of the EP&A Act.

Notwithstanding the above, PBP identifies that universities are required to meet the specific objectives for a (SFPP) regardless of the assessment pathway. SFPP developments are considered to be more vulnerable to bushfire attack and have stringent requirements that much be met, including increased separation distances (asset protection zones).

A draft Planning for Bush Fire Protection 2017 is currently on exhibition (closing 25 June 2017). The revised document includes changes to asset protection zone (APZ) requirements and have also been considered in this assessment. It is important to note that the APZ required by the final Planning for Bush Fire Protection 2017 may differ to those shown below and will not be known until gazettal.

Objectives for SFPP development

The specific objectives for SFPP within PBP 2006 (page 28) are as follows:

- *provide for the special characteristics and needs of occupants. SFPP developments are more likely to be affected by smoke or heat while being evacuated; and*
- *provide for safe emergency evacuation procedures and provide greater separation from bush fire threats.*

The specific objectives within PBP 2017 are more refined, but still consistent with the above:

- *minimise levels of radiant heat, smoke and ember attack through increased APZ, building design and siting;*
- *provide an appropriate operational environment for emergency service personnel during firefighting and emergency management;*
- *ensure the capacity of existing infrastructure (such as roads and utilities) can handle the increase in demand during emergencies as a result of the development; and*
- *ensure emergency evacuation procedures and management which provides for the special characteristics and needs of occupants.*

Bushfire assessment

PBP 2006 determines asset protection zones (APZs) and construction levels for proposed development based on vegetation type and structure, and effective slope. The predominant bush fire prone vegetation influencing the development consists of a narrow corridor of riparian vegetation along a small drainage line to the south of the proposed development site. Apart from this low hazard vegetation, the nearest bushland in the vicinity that could be considered a bushfire hazard is located to the west over 100 m away, which is associated with the Illawarra Escarpment foothills.

The Wollongong Bush Fire Prone Land Map maps the escarpment bushland as a bushfire hazard, with the large allotment that the university is situated captured as a bush fire prone property. It is noted that the development site does not fall within mapped bush fire prone land. In addition, the low hazard vegetation associated with the adjoining drainage line is not mapped as bush fire prone.

An area of low hazard vegetation occurs to the south of the proposed development and is less than 1 ha in size, forming a corridor parallel to the proposed development ranging from 30m to 50 m for a length of approximately 280 m. In accordance with PBP 2006 low hazard vegetation uses 'Rainforest' to determine setbacks and construction standards as a surrogate for the reduced fire behaviour expected from small areas of vegetation as shown in in **Figure 1** and **Table 1**.

Acceptable solutions for APZ

To meet the Performance Criteria in section 4.2.7 of the PBP, the following acceptable solutions are required for proposed buildings:

- APZ's are to be provided in accordance with **Table 1** – noting that the indicative APZ provided in **Figure 1** is based on a worst case scenario for the Option 1 footprint.
- The APZ is managed in perpetuity in accordance with the requirements of 'Standards for Asset Protection Zones (RFS 2005)';
- Exits to the proposed building are located away from the hazard side of the buildings.

Table 1: Threat assessment, APZ and category of bushfire attack

Direction from envelope	Vegetation[1]	Slope[2]	PBP 2006 SFPP APZ[3]	PBP 2017 SFPP APZ[4]
South	Low Hazard	Flat/Upslopes	30 m	38 m
West	Wet Sclerophyll	Located greater than 100 m from the proposed development		
All other directions	Managed lands			

[1] Predominant vegetation is identified, according to PBP 2006.

[2] Slope most influential to the fire behaviour of the site having regard to vegetation found.

[3] APZ in accordance with Table A2.6 of PBP 2006

[4] APZ in accordance with Table A1.11.20 of PBP 2017

The above table outlines the acceptable solution APZ for SFPP development which addresses the performance criteria, intent of measures and specific objectives for SFPP development. A detailed technical assessment using a performance solution, and bushfire attack modelling of the reduced fuel loads within the vegetation, reflecting current management practices may result in reduced APZ distances.

Wollongong Development Control Plan (DCP) 2009

Under the Wollongong DCP the drainage line adjacent to the proposed development to the south is identified as a category 2 watercourse, requiring a 30 m riparian buffer on each side of the watercourse in accordance with Chapter E23, section 6.2 (Table 2). The application of the riparian buffer in conjunction with the required APZ distances from **Table 1**, is not achievable for the proposed footprint.

However, Section 7 of the DCP provides for part of the required APZ to be included within the category 2 riparian corridor, with selective clearing allowed within the edge of the riparian corridor when site constraints limit an alternative approach. A Flora and Fauna Assessment would likely be required to support this approach should it be proposed for the development.

APZ management

It is expected that some tree removal/thinning and vegetation clearance will be required within the APZ. The following management will be expected to address the performance criteria for an APZ surrounding the proposed building:

- No tree or tree canopy is to occur within two metres of the building roofline;
- The presence of a few shrubs or trees in the APZ is acceptable provided that they:
    - are well spread out and do not form a continuous canopy
    - are not species that retain dead material or deposit excessive quantities of ground fuel in a short period or in a danger period
    - are located far enough away from the building so that they will not ignite the building by direct flame contact or radiant heat emission.
- Any landscaping or plantings should preferably be local endemic mesic species or other low flammability species;
- A minimal ground fuel is to be maintained to include less than four tonnes per hectare (t/ha) of fine fuel (fine fuel means ANY dead or living vegetation of < six millimetres (mm) in diameter e.g. twigs less than a pencil in thickness. four t/ha is equivalent to a one cm thick layer of leaf litter).

Bushfire Attack Levels

The proposed setback distances (APZ), vegetation, slope and location of future buildings will determine the Bushfire Attack Level (BAL) required in accordance with *Australian Standard 3959 Construction of buildings in bushfire-prone areas 2009*. Based on the minimum APZ distance required for SFPP development, the proposed building will require BAL 12.5 level construction.

Access

Both PBP 2006 and PBP 2017 require an access design that enables safe evacuation away from an area whilst facilitating adequate emergency and operational response to the area requiring protection. It also requires emergency management arrangements such as procedures and routines for evacuation and consideration of safe havens.

The current road configuration of the existing campus provides sufficient hard stand areas and turning circles to accommodate fire fighting vehicles. Evacuation by occupants is provided d by separate parking facilities using alternative road system.

Water Supply

PBP 2006 and PBP 2017 require adequate water supply for fire fighting. There are existing hydrants located within the university campus which comply with the minimum water supply requirements of PBP.

Conclusion

This letter has outlined the bushfire constraints associated with the proposed university development which is located within proximity of a bushfire hazard. Assessment of the site has identified that the minimum required APZ separation distances from the bushfire hazard using an acceptable solution approach may not be achievable. However, the application of alternative solutions using bushfire attack modelling and management of the riparian buffer zone may facilitate development of the site as proposed.

If you have any questions or concerns in respect to this report, please contact Steven Houghton on (02) 8536 8634.

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Environmental Planning & Assessment Act 1979 (EP&A Act).

NSW Rural Fire Service (RFS). 2006. Planning for Bush Fire Protection: A Guide for Councils, Planners, Fire Authorities, Developers and Home Owners. Australian Government Publishing Service, Canberra.

Standards Australia. 2009 (Amendment 3). Construction of buildings in bushfire-prone areas, AS 3959, Third edition 2009, Standards Australia International Ltd, Sydney.

Rural Fires Act 1997 (RF Act).

Figure 1: Bushfire hazard assessment and asset protection zones.

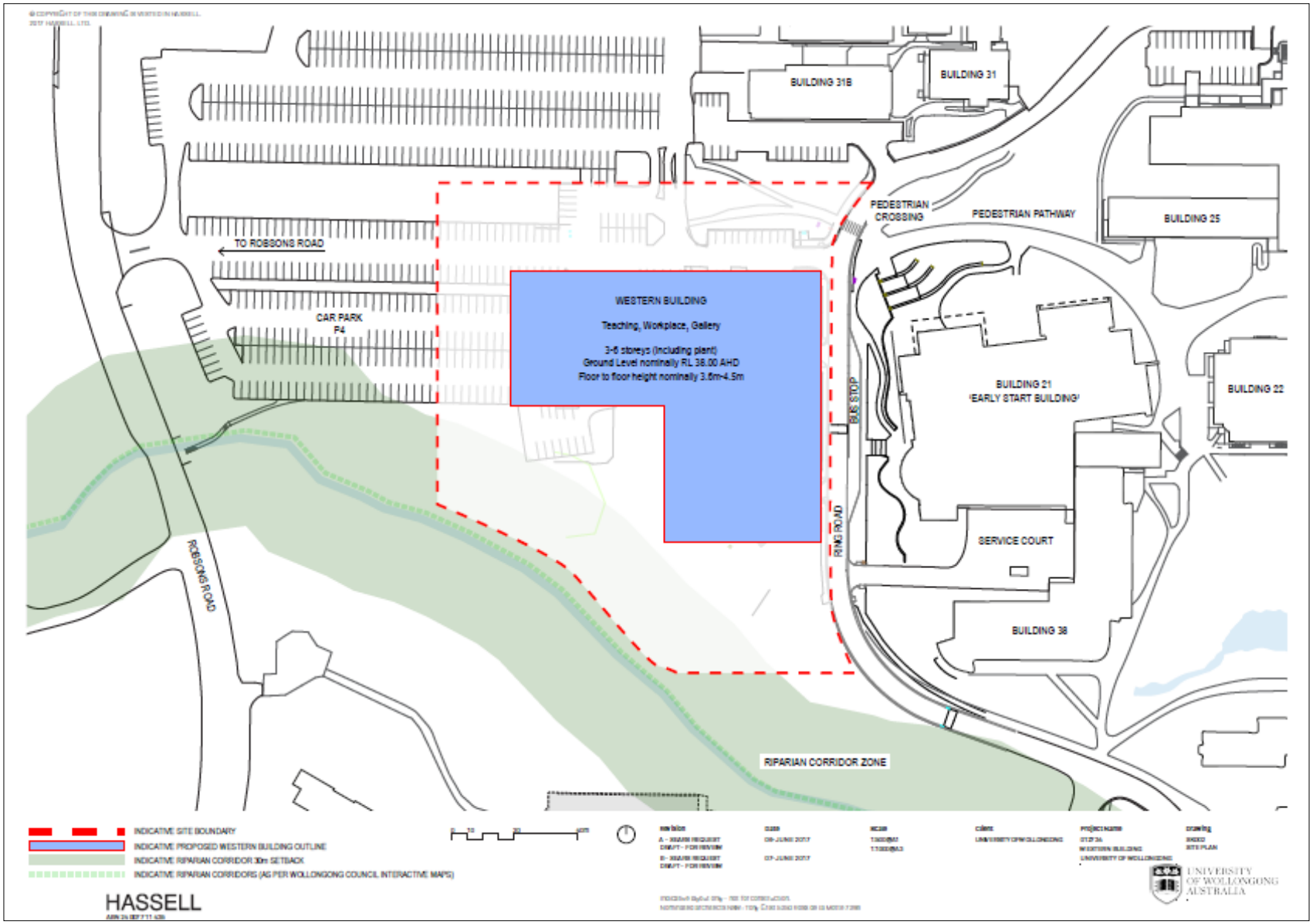

Figure 2: Site plan