GRAHAM BROOKS AND ASSOCIATES
ARCHITECTS HERITAGE CONSULTANTS

Sydney University Engineering Precinct
CIP Staged Development

Assessment of Heritage Impact

November 2013

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Introduction

1.0

1.1 Background

1.1.1 Introduction

The Director General's Requirements (DGRs) for a State Significant Development application of the University of Sydney's Campus Improvement Program 2014-2020 for the Camperdown - Darlington Campus Improvement Program (CIP) 2014-2020 have been issued by the Department of Planning and Infrastructure (DP&I).

The report is a preliminary assessment of significance at the high level, strategic, approach for the proposed redevelopment for the Engineering Precinct and evaluates the proposed Concept Plan, prepared by the University of Sydney Campus Infrastructure and Services department (CIS).

The CIP will result in an implementation program and strategy that identifies, prioritises and stages the campus development, infrastructure and access priorities over the next 7 to 10 year period.

Graham Brooks and Associates Pty Ltd have been engaged by The University of Sydney to assist in updating and refining details regarding the potential heritage significance of the Engineering Precinct in response to the Heritage Council request which form part of the Director General's Requirements (DGRs). This preliminary heritage assessment will assist in the review and updating of the existing campus Grounds Conservation Management Plan. It also provides a preliminary assessment on the heritage significance of the Engineering Precinct. This in turn will guide the CIP from a heritage perspective.

This report has been prepared to accompany a development application to the DP&I for Concept Plan approval for the redevelopment of the University of Sydney, Engineering Precinct, as per the DGR's issued.

1.1.2 Campus Improvement Program

In March 2008, CIS published the draft University of Sydney Campus 2020 Masterplan. The document did not address development priorities, staging and budget estimates over time.

CIS subsequently prepared a CIP Framework evolving beyond the 2008 Masterplan document, and applies a feasible and prioritised development and infrastructure program based on internal business case studies developed within the University's faculties and professional service units.

Emerging Precincts are the priority campus precincts that co-locate faculties and schools with related synergies and opportunities for shared teaching, learning and research facilities. The CIP framework identifies 6 principal growth and development precincts of which the Engineering Precinct is identified as Precinct C: Engineering Darlington for the upgrade of the existing Engineering precinct bounded by Shepherd Street, Cleveland Street (Shepherd Street car park), and east edge of the campus Cadigal Green.

1.1.3 State Significant Development

The proposed redevelopment of the overall University of Sydney Campus will form part of the State Significant Development. Consent will be sought for each of the six precincts. A Concept Plan has been prepared for the Engineering Precinct which identifies the potential building envelopes for areas of expansion and / or new development.

This preliminary assessment of significance and assessment of heritage impact responds to the Concept Plan which forms part of the CIP. Specific Development Applications will later follow the approval process for the State Significant Development of the Concept Plan.

1.2 Report Objectives

The main objective of this Preliminary Assessment of Significance is to determine the level of any heritage significance associated with the Engineering Precinct and the potential effect that works proposed as part of the CIP will have on that preliminary heritage significance.

The Campus Improvement Program 2014 – 2020 maps heritage buildings within the Camperdown – Darlington Campus. No heritage Buildings are identified within the Engineering Precinct. This report will assist in the identification of any potential heritage significant buildings within the Engineering Precinct.

1.3 Methodology and Structure

This Statement of Heritage Impact has been prepared in accordance with guidelines outlined in the *Australia ICOMOS Charter for Places of Cultural Significance, 1999*, known as *The Burra Charter*, and the New South Wales Heritage Office (now the Heritage Division of the NSW Office of Environment and Heritage) publication, *NSW Heritage Manual*.

The Burra Charter provides definitions for terms used in heritage conservation and proposes conservation processes and principles for the conservation of an item. The terminology used, particularly the words *place, cultural significance, fabric*, and *conservation*, is as defined in Article 1 of *The Burra Charter*. The *NSW Heritage Manual* explains and promotes the standardisation of heritage investigation, assessment and management practices in NSW.

1.4 Precinct Identification

The subject site, the University of Sydney Engineering Precinct, is located within the University's Shepherd Precinct. It comprises the following buildings and their immediate surrounds:

- Information Technology Building (J12)
- Shepherd Street Carpark (J10)
- Aeronautical Engineering building (J11)
- Mechanical Engineering building (J07)
- Electrical Engineering building (J03)
- Engineering Link building (J13)
- Rose Street building (J04)
- PNR building (J02)
- Civil and Mining Engineering building (J05)
- Materials and Structures building (J05)
- Chemical Engineering building (J01)
- Gordon Yu Choi building (J14)
- Various Sheds and ancillary structures (J10A, J10B, J11A, J11B)

The precinct is located on the eastern side of the University of Sydney Darlington Campus, as shown in Figure 1.1. There are four distinct periods of construction within the precinct. These include prior to 1960, the 1960s, the 1970s and the 1980s onwards. These construction periods are illustrated below in Figure 1.3.

Figure 1.1
Location map showing the subject site marked with a red circle.

Source: street-directory.com.au

Figure 1.2
Aerial photo of the Darlington Precinct with the subject outlined in red.

Source: NSW LPI 2008

1.5 Heritage Management Framework

The subject site at the University of Sydney Engineering Precinct is not listed as a heritage item in Schedule 5 of the *Sydney Local Environment Plan (LEP) 2012* as an item of local heritage significance. It is not located within a heritage conservation area. It is located in the vicinity of three heritage items including:

- Victoria Park, Gardener's Lodge and its interior, entry gates and piers, park layout, paths and plantings, Camperdown (I39)
- Terrace group including interiors, 50-52 Calder Road, Darlington (I521)
- Former Darlington Primary School including interior, 96-148 City Road, Darlington (I524)

The precinct is also located adjacent to three heritage conservation areas including C9: Chippendale, C10: Darling Nursery Estate and C18: Golden Grove.

As such the property is subject to the heritage provisions of the *Sydney LEP 2012* and the *Sydney Development Control Plan (DCP) 2012* under the *Environmental Planning and Assessment Act 1979*. The consent authority must take into consideration the potential impact of any proposed development on the heritage significance of the heritage items in the vicinity of the precinct.

The relevant policies for the Engineering Precinct from the Campus Grounds CMP will also need to be considered as part of any future development within the precinct.

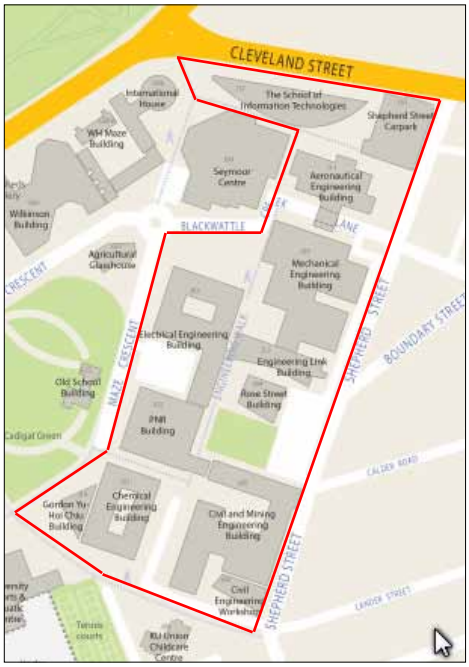


Figure 1.3
Map identifying the building numbers within the Engineering Precinct, which is outlined in red.

Source: Basemap - University of Sydney, 2013.

1.6 Authorship

This report has been prepared by Graham Brooks and Associates Pty Ltd with the assistance of Dr Michael Bogle. It has been reviewed by the Director, Graham Brooks. Unless otherwise noted all of the photographs and drawings in this report are by Graham Brooks and Associates Pty Ltd and Dr Michael Bogle.

1.7 Report Limitations

This report is limited to the analysis of the European history of the precinct. The heritage significance of the overall precinct has been considered as part of this report, rather than the significance of the individual buildings. Recommendations have been made on the basis of documentary evidence viewed and inspection of the existing fabric.

The history within this report focusses on the development of the Darlington Precinct as part of the expansion of the Sydney University and not prior to this period. Research was limited for the reasons stated below and relies on historical information in reports provided by the University.

The time frame given to prepare this report has been limited. As a result, the required research has been somewhat limited.

Adding to this, no access was provided to the University of Sydney Archives as they were closed for the duration of the preparation of this report.

Archaeological assessment of the subject site is outside the scope of this report.

This report only addresses the relevant heritage planning provisions and does not address general planning or environmental management considerations.

1.8 Acknowledgments

Graham Brooks and Associates Pty Ltd would like to acknowledge the assistance of Ken Woolley with his input into the recommendations of this report.

Precinct Historical Summary

2.0

2.1 Introduction

This section briefly summarises the Pre University era of the former suburb of Darlington relevant to the Engineering Precinct and the subsequent establishment of the University of Darlington Precinct, Phase 1 (1960s), including the University of Sydney Master Plan Phase 2 (1970s) and Phase 3 (Post 1980s).

Summary sheets of the individual buildings within the Engineering Precinct are included in chronological order within these sections and include the building name, address, location map (including outline of buildings that predate the subject building within the precinct). photographs, architectural firm, architect, builder (where known), construction date, building phase, description, historical notes, AIA Register of Significant Architecture listing and any associated Awards.

2.2 Overview of the Establishment of the Darlington and Engineering Precinct

2.2.1 Pre University Darlington

The 1943 aerial of the subject precinct was used to give an indication of the former use of the Darlington suburb. It included a mix of traditional mid to late nineteenth century residential and early twentieth century light industrial and commercial buildings and a school precinct.

Only the former school building and two buildings within the subject precinct, the Rose Building (J04) and the Engineering Workshop (J06), survived during the development of the Engineering Precinct.

Figure 2.1
The 1943 aerial photo of the Darlington Precinct with the approximate location of the Engineering Precinct outlined in red.

Source: NSW LPI 1943.

2.2.2 History of the Darlington Precinct

The concept behind the establishment of the Darlington Precinct was to move the technical facilities of the university from the main campus to this precinct. The overall Master Plan of the new development to the south of City Road was guided by Wally Abraham, the University's City Planner.[1]

1 Discussion with Ken Woolley, 25 September 2013.

The following history regarding the expansion of the university into the Darlington Precinct is sourced from the University of Sydney Grounds Conservation Management Plan.

> *Immediately after the War it was assumed that the University would be able to expand across Parramatta Road into Glebe. The corresponding area across City Road (formerly Newtown Road) in Darlington was intended for a new University of Technology. However that institution was relocated to Kensington and became the University of New South Wales. The 50 acres that had been set aside in Darlington was then dedicated for expansion of the University of Sydney and Royal Prince Alfred Hospital under the Cumberland County Plan. By 1958 the Darlington area amounted to 70 acres but this was later reduced to 35 acres following an adverse reaction from residents of the areas that were to be displaced. A large section was accordingly rezoned residential.*
>
> *The increased involvement of the Federal Government in funding universities paved the way for a massive building program and in the late 1950s the University extended its campus across City Road into Darlington. Darlington was a fully developed suburb, almost all of which was gradually acquired by the University. The only sections of the original suburb not taken up for University use were a small portion bounded by Cleveland, Shepherd and Boundary Streets, and two half blocks either side of Golden Grove Street. Darlington had its own development pattern, much of which was retained as University buildings and open space replaced suburban residential, public and industrial buildings. The majority of university buildings in this area represented a departure from previous construction in that for the first time the University built a large purpose-designed complex using state of the art architecture.*[2]
>
> *In 1958 an area of some 70 acres, including a large part of the Darlington area was set aside under the Cumberland County Council Plan for "Special Uses- Educational and Medical", to ensure that land was available for any necessary expansion of the University into the Darlington area. The special uses zoning meant the University became the principal buyer of land parcels when they came onto the market. Funds for land purchase came from the State Grants (Universities) Act 1958 and the Australian Universities Commission, the latter providing £400,000 for 1961-1963. In 1960 the special uses area was reduced to 35 acres, later called the University Extension Area, after opposition to the extensive purchasing program from local land owners and tenants. In 1968 the area up to Golden Grove Street was restored to the University Extension Area, and another 9 acres were added. By this time, the University had acquired about 10 percent of the area bounded by Darlington Road, Golden Grove, Abercrombie and Codrington Streets.*[3]

2 Pearson, M. Marshall, D. Ellsmore, D. Attenbrow, V. Rosen, S. Kerr, R & Betteridge, C. *University of Sydney Grounds Conservation Management Plan*, 2002.

3 Pearson, M. Marshall, D. Ellsmore, D. Attenbrow, V. Rosen, S. Kerr, R & Betteridge, C. *University of Sydney Grounds Conservation Management Plan*, 2002.

The University's expansion into this area involved a major reorientation of the campus and represented a departure from previous construction as for the first time, the University built a large, purpose designed complex using state of the art architecture. In the end the new region housed a disparate collection of facilities, including modern structures, restored buildings dating from the nineteenth century and a "tin sheds" centre.[4]

In 1959 the first building in the University extension area in Darlington was completed for Architecture and this became the first facility to relocate to the opposite side of City Road in 1960.[5]

2.2.3 Plan for the Future Development of the University of Sydney

In 1957, a University Senate Committee prepared a plan for the future development of the University. Finalised in 1961, this plan earmarked a total area of around 27.6 hectares for University expansion, much of it into the adjoining Darlington area.[6]

The acquisition of this area by the University resulted in the loss of a "reasonably active community." Around two thousand members of the Darlington population and six hundred and fifty dwellings were lost, as well as other developments including shops, factories, a bank, a post office and the Town Hall. Some roads and laneways were closed off or removed completely.[7]

The University Extension Area was made up of the dense old suburbs of Darlington and Golden Grove. Acquisitions from 1958-9, relocations and evictions of residents and businesses, as well as demolitions continuing alongside new construction, all contributed to the growing opposition from local residents and landholders. Within a decade, most of the built fabric and community that had existed in the area had been demolished, replaced with a modern university campus that bore little resemblance to anything built there before, or to what remained around it.[8]

The first new University construction was the Architecture building facing onto City Road in 1959, followed by the Materials and Structures Laboratory for the Department of Engineering in 1960. The Civil Engineering building followed

4 Pearson, M. Marshall, D. Ellsmore, D. Attenbrow, V. Rosen, S. Kerr, R & Betteridge, C. *University of Sydney Grounds Conservation Management Plan*, 2002.
5 Pearson, M. Marshall, D. Ellsmore, D. Attenbrow, V. Rosen, S. Kerr, R & Betteridge, C. *University of Sydney Grounds Conservation Management Plan*, 2002.
6 Blake, J. Martens, J. Burke-Smith, L. *Conservation Management Plan - The Rose Street Building (J04)*, 2008.
7 Blake, J. Martens, J. Burke-Smith, L. *Conservation Management Plan - The Rose Street Building (J04)*, 2008.
8 Ali, R. Hardingham, S. Rahman, K. Wood, M. *Civil Engineering Building University of Sydney Conservation Management Plan*, 2011.

closely, beginning in 1961, amidst continuing acquisition and demolition of surrounding buildings. It was completed in 1963.[9]

The location of the Darlington Precinct was chosen because of proximity to Redfern Station.[10]

2.2.4 History of the Engineering Precinct

The eastern section of the Darlington area, towards Cleveland Street, was designated for development as a large Engineering precinct. In 1963 a building for Civil and Mining Engineering was established followed by Chemical Engineering in 1964; Mechanical and Aeronautical Engineering and Electrical Engineering in 1965 and the new Peter Nichol Russell Building in 1966. By 1975 the entire Engineering faculty had been relocated to the new premises in Darlington.[11]

The various buildings and the overall planning for the Engineering Precinct was designed by the architectural firm Anchor Mortlock Murray under the guidance of Bryce Mortlock. Commencing in 1960, the following buildings were developed generally in a northerly direction across the precinct:

- Materials and Structures Laboratory (J05), 1960 (Architect: Bryce Mortlock)
- Civil and Mining Engineering Building (J05), 1961 (Architect: Bryce Mortlock)
- Chemical Engineering Building (J01) 1963 (Architect: Bryce Mortlock)
- Electrical Engineering Building (J03) 1963 (Architect: Bryce Mortlock)
- PNR Building (J02) 1970 (Architect: Stuart Murray)
- Mechanical Engineering Building (J07) 1970 (Architect: Stuart Murray)
- Aeronautical Engineering Building (J11) 1973 (Architect: Stuart Murray)

The last major structure from this era was the Allen Jack & Cottier Shepherd Street Carpark (J10), constructed in 1975..

Subsequent works within the precinct since the carpark have included alterations, additions, upgrades, 2 new buildings and the reuse of 2 of the buildings.

9 Ali, R. Hardingham, S. Rahman, K. Wood, M. *Civil Engineering Building University of Sydney Conservation Management Plan*, 2011.
10 Discussion with Ken Woolley, 25 September 2013.
11 Pearson, M. Marshall, D. Ellsmore, D. Attenbrow, V. Rosen, S. Kerr, R & Betteridge, C. *University of Sydney Grounds Conservation Management Plan*, 2002.

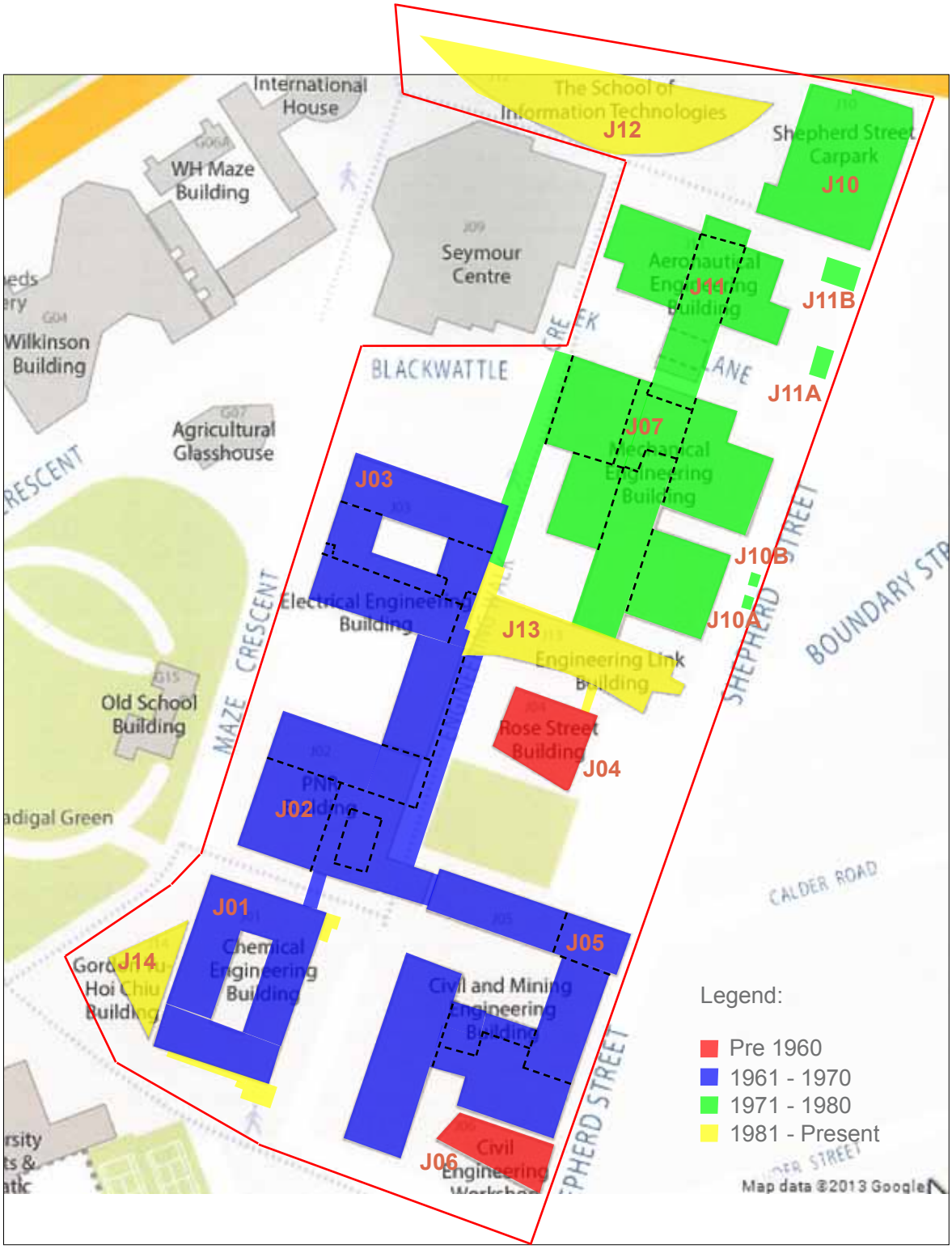


Figure 2.2
Construction periods of buildings within the Engineering Precinct. The subject site and precinct is outlined in red.

Source: Basemap - University of Sydney, 2013.

2.2.5 Adaptive Reuse of Buildings

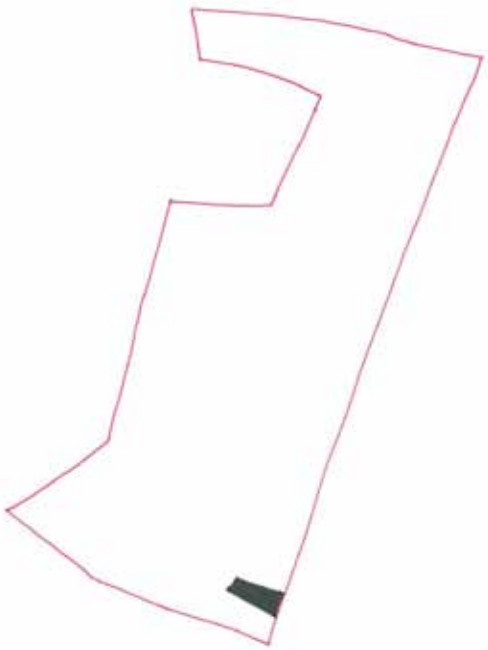
The subject buildings have been specifically designed for institutional purposes. With this in mind, they can and have been adaptively reused over the years as their use evolves and changes and technology advances.

The Rose Street Building and the Civil Engineering Workshop buildings predate the 1960s Engineering Precinct and have been adaptively reused for their institutional uses.

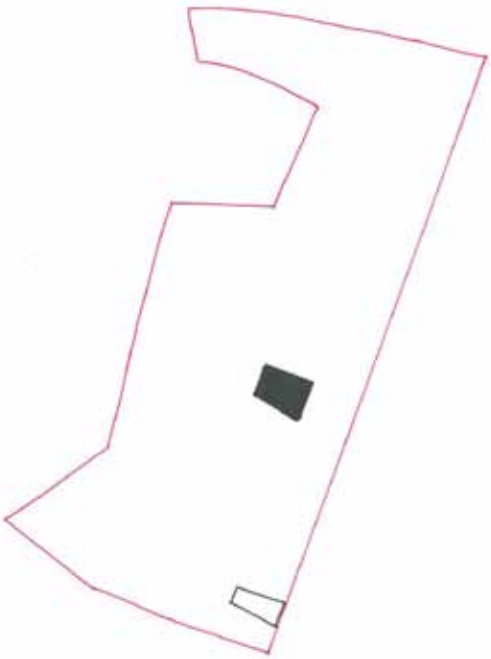
The Engineering buildings, as with any institutional building, will need to continue to evolve as uses and technology change. Therefore, these buildings were specifically designed with the intention that they will continue to evolve.

2.3 Pre University - Darlington (Pre 1960)

2.3.1 Civil Engineering Workshop (J06)

Address	225 Shepherd Street, Darlington
Location within Precinct / Photo	 
Architectural Firm	Unknown
Architect	Unknown
Builder	Unknown
Construction Date	Circa 1920
Building Phase	NA
Description	This Dutch-gabled workshop with a frontage to Shepherd Street is constructed on concrete floor plates with external brick elevations on top of a sandstone foundation.
Historical Notes	A site plan (413-99) dated October 1962 in the University Archives identifies this building as “Joseph’s Factory”. This building is the former Lewis Joseph’s bedding factory and newspaper references from around 1920 suggest that this could be the approximate date of the structure. Shepherd Street was the location of a number of manufactories and light industrial businesses including engineering works, printing (refer to the Rose Street building), building materials, chemical manufactures and a box factory.
AIA Register:	No
Awards:	NA

2.3.2 Rose Street Building (former Boxton & Carr printery and carton manufactory) (J04)

Address	56 Rose Street, Darlington	
Location within Precinct / Photos		 
		
Architectural Firm	Unknown	
Architect	Unknown	
Builder	Unknown	
Construction Date	1935	
Building Phase	1935 - 1940	
Description	The first level uses a concrete column supported floor plate and the second level is supported by timber posts. Adapted for a number of earlier uses, the building is connected to the Engineering Link building by an elevated walkway. The multi coloured brick elevation forms one side of the Engineers Lawn.	

Historical Notes	The 56 Rose Street building is a former print and carton works. The firm began in Abercrombie Street, moving to Rose Street, Darlington circa 1948. The design and construction phase was between 1929 to 1948. The floor plan follows the alignment of earlier streets. 1991 architectural drawings prepared by GSa architects indicate the proposed rendering and painting of the northern elevation of this building.
AIA Register:	No
Awards:	NA

2.4 Phase 1 (1960s)

The Civil Engineering Precinct was the first installment of the planning program for the engineering campus and while it has hints of the 1950s British "Brutalist" methodology such as the accentuated brick tower, the concrete canopy over the main entrance and the concrete-formed sunshades, the overall compositional elements are tentative and not carried through into the later stages of the precinct's design development.[1]

The development of the Engineering Precinct and Anchor Mortlock and Woolley's involvement with the Engineering precinct occurred at the same time that Ken Woolley was engaged to work on the Wentworth building.[2]

The 1961 University of Sydney Development Plan, illustrates the current footprint of the Civil and Mining Engineering building. The plan identified this building as proposed to be constructed between 1961 to 1963 and the Materials and Structures building as being under construction. The Electrical Engineering building footprint is also identifiable, and was identified as a proposed building for 1964 to 1966.

The 1964 Development Plan identified the Materials and Structures building, the Civil Engineering building, the Chemical Engineering building and the Electrical Engineering building as existing buildings. The PNR building had been identified in the plan as a projected building.

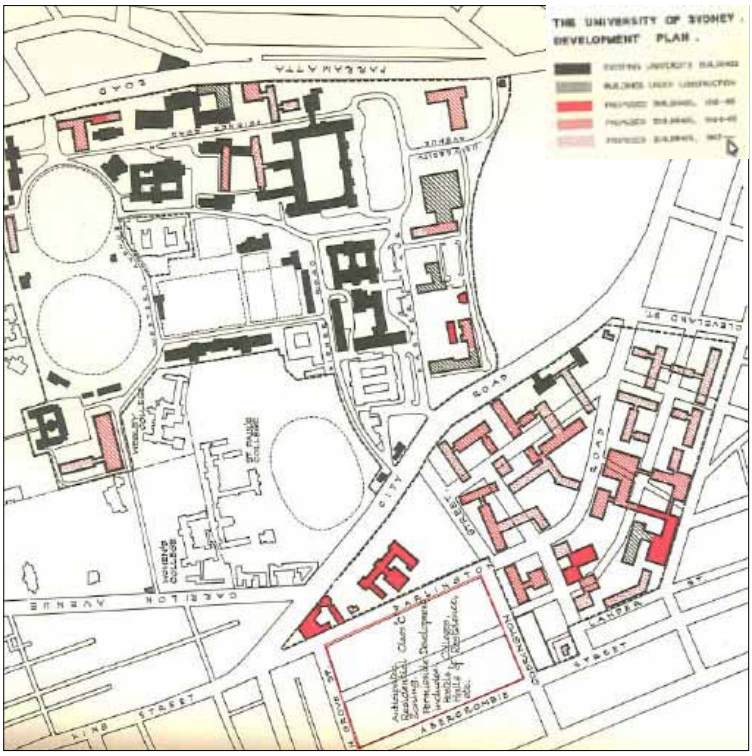


Figure 2.3
The 1961 University of Sydney Development Plan, 1961. This plan illustrates the Materials and Structures building as being under construction. Other identifiable "future" buildings include the Civil and Mining Engineering building and the Electrical Engineering building.

Source: Parker, K. Percival, L. Shrestha, CR. Sorensen, E. *Old Darlington School, University of Sydney CMP*, 2006.

1 Michael Bogle, Civil Engineering and Mining Engineering Buildings
2 Discussion with Ken Woolley, 25 September 2013.

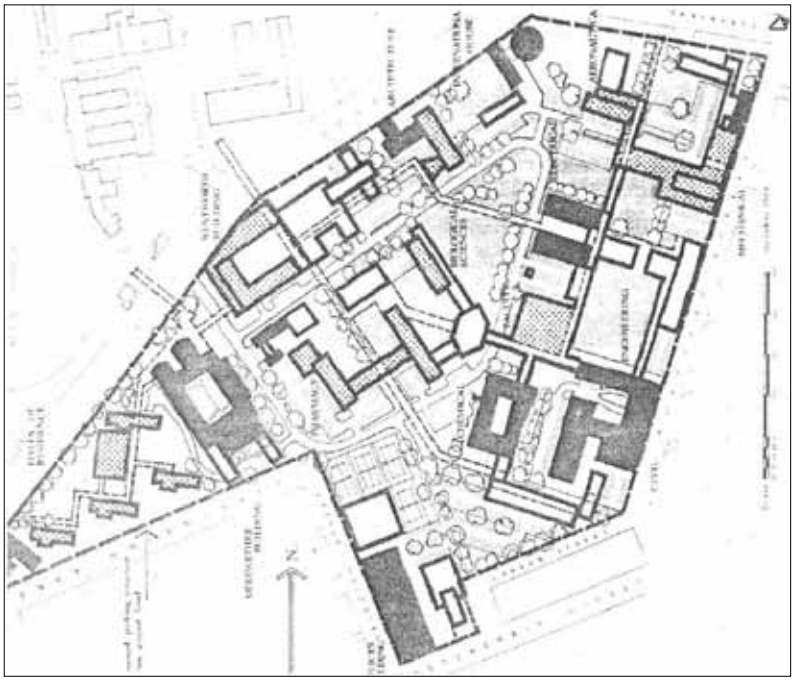


Figure 2.4
The 1964 Development Plan identified the Materials and Structures building, the Civil Engineering building, the Chemical Engineering building and the Electrical Engineering building as existing buildings. The PNR building had been identified in the plan as a projected building.

Source: Parker, K. Percival, L. Shrestha, CR. Sorensen, E. *Old Darlington School, University of Sydney CMP*, 2006.

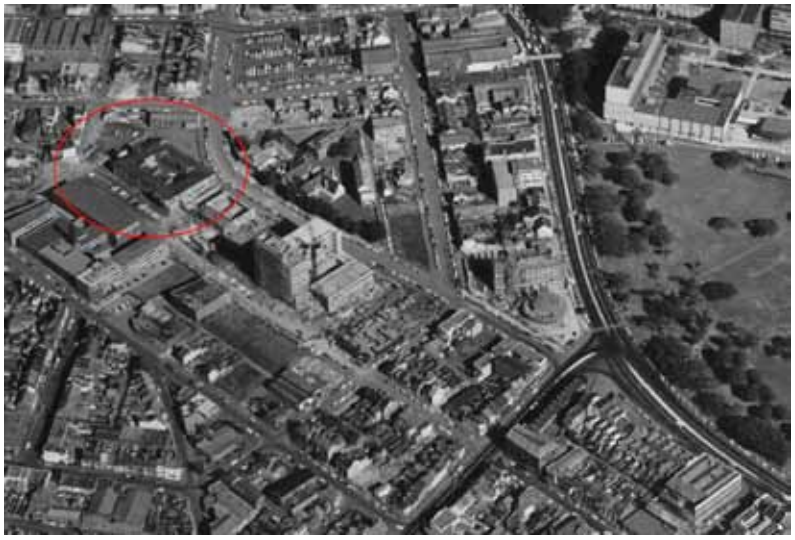
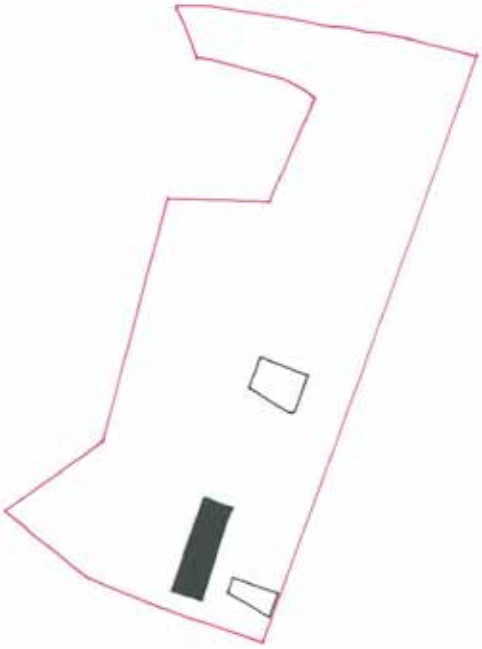
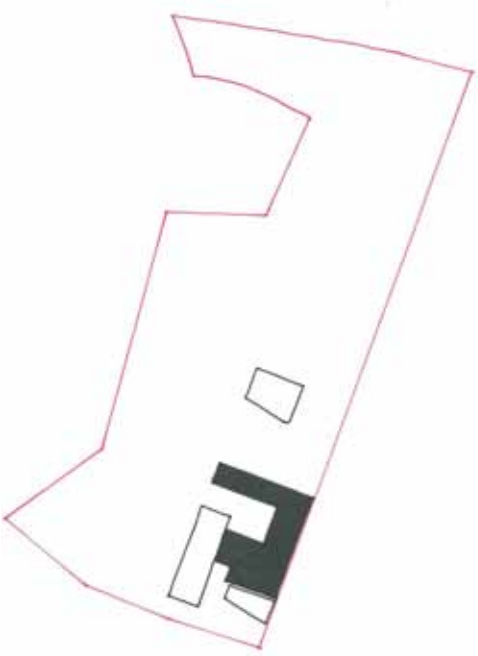


Figure 2.5
This 1965 aerial of the Engineering Precinct illustrates the completed Materials and Structures building, the Civil and Mining Engineering building, the Chemical Engineering building and the Electrical Engineering building.

Source: Allen, R. Ghazali, N. Hendry, J. Misra, P. *CMP Seymour Centre University of Sydney*, 2012.

2.4.1 Civil and Mining Engineering Building, including Materials and Structures Laboratory (J05)

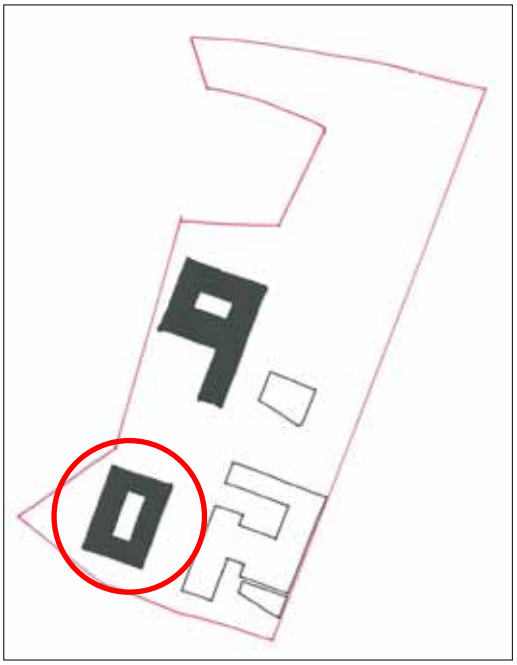
Address	Engineering Precinct, Darlington	
Location within Precinct / Photos		
		
		

Architectural Firm	Anchor Mortlock Murray
Architect	Bryce Mortlock
Builder	Unknown for the Materials and Structures Laboratory Civil and Mining Engineering Building: Max Cooper and Sons, Building & Civil Engineering Contractors
Construction Date	1960 (Materials and Structures Laboratory) 1961 (Civil and Mining Engineering Building)
Building Phase	1960 - 1962 (Materials and Structures Laboratory) 1970s: Additions to the south of the building (Civil and Mining) Appears to be a later second storey addition to the Shepherd Street elevation (Civil and Mining)

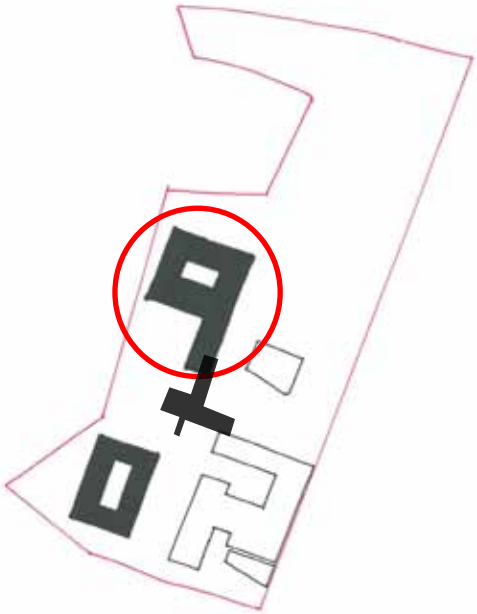
Description	Materials and Structures Laboratory: Constructed in brick and steel with a generous glazed clerestory, the building is a refined but purely functional structure with generous roller doors, internal gantry cranes and good natural light. Civil and Mining Engineering Building: This is an L-shaped building formed from brick infill and concrete. Some building elements such as the solar-shades are pre-cast concrete are described as “fins” by the architects. The window framing is steel with main doors and frames in timber. The internal walls of the Staff Wing and later extensions are also formed in brick with all concrete elements using the off-form finishing treatment. Stage Two also included the Hydraulics Laboratory (Block B) positioned to the south along Shepherd Street and the Cement and Concrete lab and upper level Drawing Offices (Block C) forming the third range of buildings. It appears the southern section of this building was added later given different building materials and techniques used. The architectural drawings are inconclusive as they indicate this section was constructed as part of the main building.
Historical Notes	Materials and Structures Laboratory: There were several stages to the development of the Civil Engineering buildings. The earlier was Stage One, the Materials and Structures Testing Laboratory. Originally glazing was timber framed. This was later replaced with aluminium framed glazing. Civil and Mining Engineering Building: Originally glazing was timber framed. This was later replaced with aluminium framed glazing. The architectural drawings for this building illustrate windows along most of the Shepherd Street facade. These have since been removed and filled in with face brickwork.
AIA Register:	AIA Register No. 4703276 (Materials and Structures Laboratory) AIA Register No. 4703277 (Civil and Mining Engineering Building)
Awards:	NA

2.4.2 Chemical Engineering Building (J01)

Address	Engineering Precinct, Darlington	
Location within Precinct / Photos		
		
		
		

		
Architectural Firm	Anchor Mortlock Murray	
Architect	Bryce Mortlock	
Builder	Unknown	
Construction Date	1963	
Building Phase	1963 - 1965 Infill additions to the south of the building	
Description	It is formed from brick infill and off-form concrete. The window framing is steel. The brickwork extended to the internal walls and the off-form concrete process is used on the internal soffits of the floor plates. Services were exposed and painted in accordance with the codes of the 1960s. The floor treatments were industrial linoleum.	
Historical Notes	Described by Joseph Buch as the earliest purely “Brutalist” building at the University, it was the practice’s second building in the new engineering precinct building and establishes for the first time the dominant north-south axial planning, the materials palette and the scale of the precinct. The inner courtyard provides an example of the Smithson-inspired “Brutalism” where “the space between [buildings becomes] the collective of the spaces that each of the buildings carries with it”. Originally glazing was timber framed. This was later replaced with aluminium framed glazing.	
AIA Register:	AIA Register No. 4703280	
Awards:	NA	

2.4.3 Electrical Engineering Building (J03)

Address		
Location within Precinct / Photos		 
Photos		
Architectural Firm	Anchor Mortlock Murray	
Architect	Bryce Mortlock	
Builder	Unknown	
Construction Date	1963	
Building Phase	1963 - 1965	

Description	The building rises several levels from a three level podium that contains and shelters the north-south axial pedestrian walk that characterises the Engineering Precinct. As a building designed when the “Brutalist” aesthetic was at its most popular phase for education buildings, Electrical Engineering employs much of the methodology including sun control panels (brises soleil), “light scoops”, cantilevered terraces and/or balconies, a ground level courtyard and internal concourses. A survey article in the Constructional Review cites the architects’ specification as calling for “not a perfect finish, not an imitation of cement render but good concrete without pronounced surface blemishes” . Most of the internal and external concrete work was formed and poured on site with the exception of the “sun louvres” or light scoops which were precast. The white paint finishes applied to the off-form concrete is not original. The internal finishes are glass mosaic tile in the main entrance, concrete flooring with timber floors used in some of the electrical engineering laboratories with vinyl tiles and/or quarry tiles used elsewhere dependent on traffic levels. The window framing is steel and timber detailing is also employed.
Historical Notes	Consulting engineers were Taylor, Thompson and Whitting. At the time of construction in 1964-1966, the Electrical Engineering building was amongst the first NSW buildings to commit so thoroughly to a “Brutalist” methodology but was joined in 1965-1966 by the NSW Government Architect’s design for the library for the Wollongong Teachers College and the Randwick High School.
AIA Register:	AIA Register NO. 4703281
Awards:	NA

2.4.4 1961 Development Report

A report was published in 1961, titled "Development of the University Site". This was prepared in the office of Mr WH Maze, assistant Principal of the University. Mr Maze stated that development plans must be flexible and must be "Continually under review". He identified three main factors influencing university planning which included academic and other needs of the university, acquisition and allocation of sites for new buildings, together with the reallocation of older buildings as they are vacated and the provision of finance.[1]

Figure 2.6
The Development for the University of Sydney, 1961. This plan identifies existing buildings (dark) and proposed buildings (light).

Source: Colman, J. Darlington and the University of Sydney Report, 1961.

2.4.5 University of Sydney Master Plan

Walter (Wally) Abraham was the university architect and worked with the concept of the Master Plan (MP) from 1964. After the Second World War, Abraham studied architecture and town planning at the University of Sydney. He then accepted a position with the former Cumberland County Council. He later returned to Sydney University, where he lectured for five years on town planning. He also assisted with planning Sydney University's post-war expansion, until 1965.[2]

Anchor, Mortlock and Murray were appointed master planners for the engineering precinct at Sydney University and Bryce Mortlock's 1963 Civil Engineering Building was the firm's first large commercial building.[3]

The MP included existing buildings and proposed buildings. Bryce Mortlock was engaged by the University in 1964 to work on the MP. Design components including the Engineer's Walk (spine), is derived from the MP. The current MP identified the Chemical Engineering Building (J01) for demolition, though the building was retained.[4]

The following buildings within the Engineering Precinct were constructed prior to the preparation of the MP:

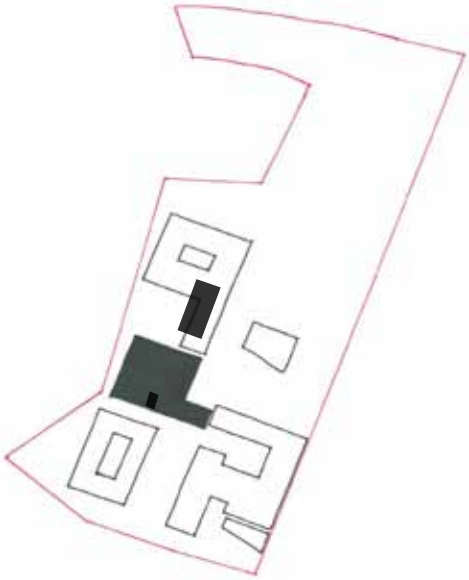
- Civil Engineering Workshop (J06)
- Rose Street Building (J04)
- Materials and Structures Laboratory (J05)
- Civil and Mining Engineering Building (J05)
- Chemical Engineering Building (J01)
- Electrical Engineering Building (J03)

Figure 2.7
The University Extension Area, as identified in the 1964 Master Plan. The Engineering Precinct is to the left.

Source: Old Darlington School, University of Sydney Conservation Management Plan.

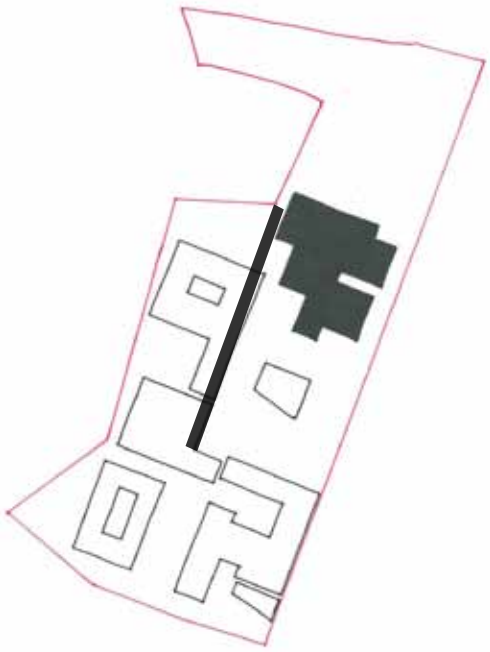
1 Colman, J. *Darlington and the University of Sydney Report*, 1976.
2 Sydney Morning Herald, 2006.
3 Sydney Morning Herald, *Intellect Behind the Aesthetic*, 2004.
4 Discussion with Ken Woolley, 25 September 2013.

2.4.6 PNR Building (J02)

Address	Engineering Precinct, Darlington	
Location within Precinct / Photos		
		
		
Architectural Firm	Anchor Mortlock Murray	
Architect	Stuart Murray	
Builder	Unknown	
Construction Date	1970	
Building Phase	1970 - 1971	

Description	The building is composed of off-form concrete and the precinct's familiar brick, Steel-framed casement windows are provided to all elevations. Like the adjacent Chemical Engineering building, the complex roof plan of two asymmetrical planes uses glazed terracotta tiles with an extension of copper in a Kliplok style. A clerestory captures the eastern light. The PNR Building with its privileged view onto the Engineers Lawn is the architectural centre of the Engineering Precinct and through a series of elevated concourses, wings and pedestrian walkways, the structure integrates the Chemical Engineering, Civil Engineering and Electrical Engineering structures into a unified whole. This is accomplished by using the materials palette established by Anchor Mortlock and Murray in 1960-1961 and a modest scale that is precisely calibrated to the Engineers Walk, the adjacent Engineers Lawn and the Peter Nicol Russell courtyard with the memorial sculpture of the Australian engineer and a sample of a cast iron column from his Sydney foundry.
Historical Notes	The engineers were Taylor, Thomson and Whiting. The building has recently been reroofed given ongoing problems with leaking. Architectural drawings prepared by GSa architects in 1991 illustrate the offices located in the south eastern corner of the PNR building was originally a pedestrian link providing access from the Chemical Engineering building to the PNR building, through to the Civil and Mining Engineering building. The building was totally refurbished on the interior between 2 to 3 years ago. It has recently been reroofed.
AIA Register:	AIA Register No. 4702719
Awards:	NA

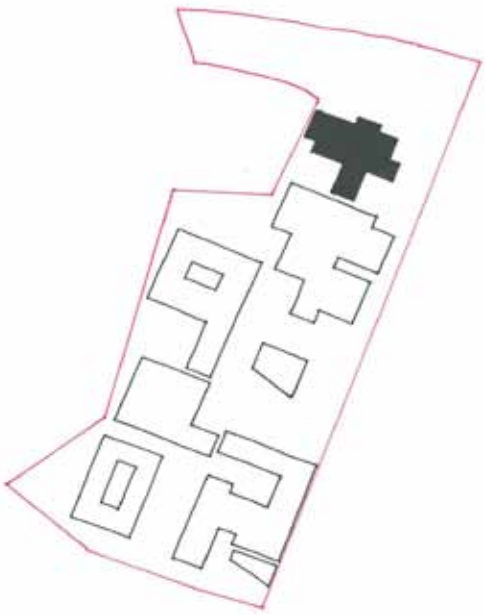
2.4.7 Mechanical Engineering Building (J07)

Address	Engineering Precinct, Darlington	
Location within Precinct / Photo		
		
		
Architectural Firm	Anchor Mortlock Murray & Woolley	
Architect	Stuart Murray	
Builder	Unknown	
Construction Date	1970	
Building Phase	1970-1971	

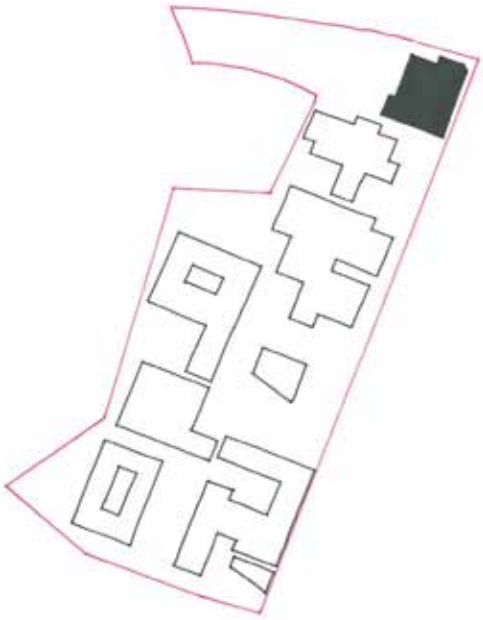
Description	The buildings employ much of the “Brutalist” methodology including brises soleil, “light scoops”, cantilevered terraces and/or balconies and internal concourses. On the other hand, much of the juxtaposition of the surfaces and colours of brick and concrete in some of the early buildings has been abandoned in favour of dominant concrete elevations in the main building and unrelieved brick for the lower levels. Anodised aluminium window framing is used in a red hue. The site had a significant fall toward Shepherd Street and one level of the complex is below grade. The former Ivy Street is retained as an access way and the street is spanned by an elevated concourse.
Historical Notes	The consulting engineers were Taylor, Thompson and Whitting. At the time of the commission for this addition to the Engineering Precinct, the architects had committed the practice to a thorough exploration of mainstream concrete-based “Brutalism”. This work was undertaken during the design development of Anchor, Mortlock, Murray and Woolley’s Union Building for Macquarie University and it is unsurprising that there would be some overlap (and similarity) in the design development of the buildings.
AIA Register:	AIA Register Number 4702719
Awards:	NA

2.5 Phase 2 (1970s)

2.5.1 Aeronautical Engineering Building (J11)

Address	Engineering Precinct, Darlington
Location within Precinct / Photos	  
Architectural Firm	Anchor Mortlock Murray & Woolley
Architect	Stuart Murray
Builder	Unknown
Construction Date	1973
Building Phase	1973- 1975
Description	Much of the juxtaposition of the surfaces and colours of brick and concrete in some of the early buildings has been abandoned in favour of dominant concrete elevations in the main building and unrelieved brick for the lower levels. Anodised aluminium window framing is used in a red hue. The site had a significant fall toward Shepherd Street and one level of the complex is below grade. The former Ivy Street has been decommissioned and retained as an access-way. The street is spanned by an elevated concourse connecting the two buildings.
Historical Notes	At the time of the commission for this addition to the Engineering Precinct, the architects had committed the practice to a thorough exploration of mainstream concrete-based “Brutalism”. This work was undertaken during the development of Anchor, Mortlock, Murray and Woolley’s Union Building for Macquarie University and it is not surprising that there would be some overlap (and similarity) in the design development of the buildings. The buildings employ much of the “Brutalist” methodology including concrete light shades (brises soleil), “light scoops”, cantilevered terraces and/ or balconies and internal concourses.
AIA Register:	AIA Register No. 7403285
Awards:	NA

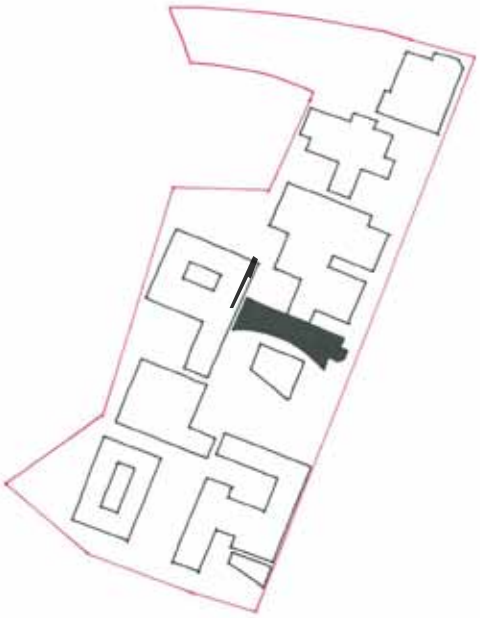
2.5.2 Shepherd Street Carpark (J10)

Address	Engineering Precinct, Shepherd Street, Darlington	
Location within Precinct / Photos		
		
Architectural Firm	Allen Jack & Cottier	
Architect	Keith Cottier	
Builder	K.B. Hutchinson	
Construction Date	1975	
Building Phase	1975 - 1976	

Description	The carpark structure is an example of the uncompromising “Brutalism” of the mid-1970s applied to the elevations of an element of precinct infrastructure. An excavation brought the first level of the carpark to the Shepherd Street level to allow vehicle access and a lift and/or stairs were required to reach the adjacent Seymour Centre level. The Seymour Centre precinct was developed as a cultural grouping to include an art gallery for hosting the University’s Power Bequest. The gallery was omitted from the development, leaving the Shepherd Street carpark in isolation with tenuous pedestrian connections to the Seymour Centre. Many of the elements of the elevations of the carpark were precast, some with moulded “reeded” surface decoration and hoisted into position. The concrete elements are surprisingly thin, perhaps to keep weight to a minimum for the crane lifts. The lightweight sections have resulted, however, in too little concrete cover over the steel reinforcement and the steel is corroding with spalling is taking place internally and externally throughout the structure and precast units. Precast concrete can be less expensive than formwork and precast unit construction has been used in Sydney since the 1950s with precast structural elements used in Kevin Curtin’s St Bernards Catholic Church, Botany (1957), Loder and Dunphy’s Caringbah Methodist Church (1959) and in the “Brutalist” methodology, McConnel, Smith and Johnson’s precast façade panels for the Metropolitan Water, Sewerage and Drainage Board building, Bathurst Street (1966).
Historical Notes	The Shepherd Street carpark was designed as a service pendant to the Seymour Centre for the Performing Arts (1972-1975). Both projects were underway simultaneously with formwork going up while the concrete cured in the performing arts centre. The engineers were Taylor, Thomson. The responsibility for the carpark is unclear although the NSW AIA Register of Significant Architecture in NSW attributes it to Keith Cottier.
AIA Register:	AIA Register No. 4703284
Awards:	NA

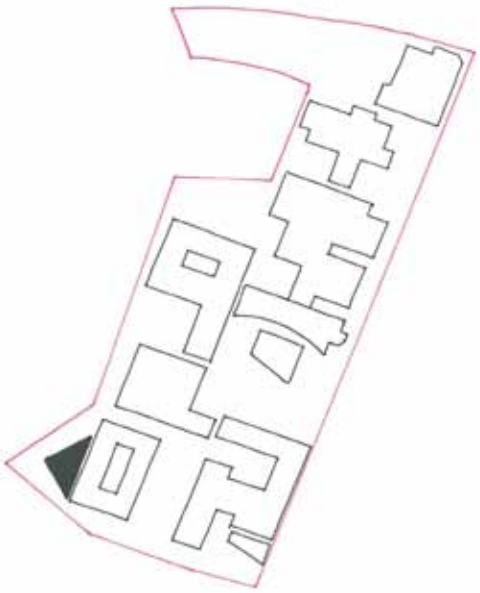
2.6 Phase 3 (Post 1980s)

2.6.1 Engineering Link Building (J13)

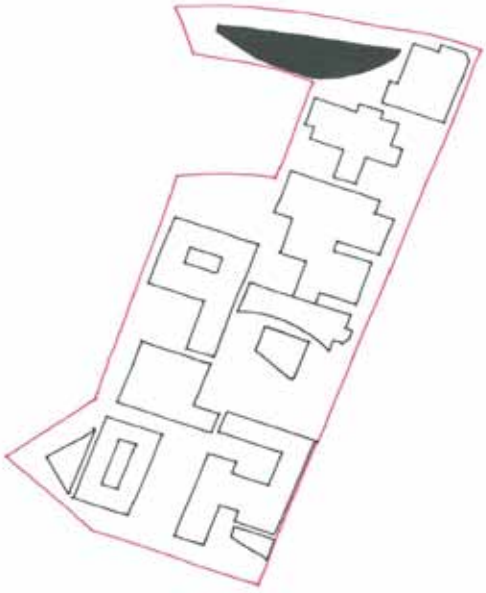
Address	Engineering Precinct, Darlington	
Location within Precinct / Photo		 
Architectural Firm	Gazzard Sheldon	
Architect	Don Gazzard	
Builder	Unknown	
Construction Date	1993	
Building Phase	1993	

Description	This building is described as responding to the Sydney University 1990 Conybeare Morrison Master Plan to develop further courtyards and intimate outdoor spaces within the campus. Inserted into the Electrical Engineering building and built over a bitumen carpark, Gazzard's design maintains the Engineers Walk link with the Mechanical Engineering building and beyond. His design, however, turns away from the Anchor, Mortlock & Murray precinct language of brick and raw concrete to embrace the adjacent Rose Street Building, a former carton and printing factory constructed in multi-coloured brick. A small skillion annex to the north elevation of the Rose Street building was removed to provide additional courtyard space. The Engineering Link building is one of the few buildings in the precinct to acknowledge the streetscape of Shepherd Street and provide an enhancing contribution to this suburban precinct. The building is constructed in multi-coloured brick, glass brick and cement render. Casement windows are in aluminium-clad timber and a clerestory provides some internal light.
Historical Notes	NA
AIA Register:	NA
Awards:	1993 Horbury Hunt Awards, Excellence in Brickwork (attributed to the fine detailing of the brickwork)

2.6.2 Gordon Yu-Hoi Chiu Building (J14)

Address	Engineering Precinct, Darlington
Location within Precinct / Photos	  
Architectural Firm	Hassell Pty Ltd
Architect	John Choi and Mike Smith
Builder	
Construction Date	1987
Building Phase	1987- 1998
Description	Like Gazzard Sheldon's Engineering Link building, the Hassell design development chose to introduce a new form and material language into the precinct. Developed to respond to the emerging Maze Crescent landscape, the building does not participate in the Engineering Precinct dialogue. The University of Sydney is of the opinion that this building erodes the historical subdivision pattern of the area as the building footprint encroaches into the alignment of the former Darlington Road.
Historical Notes	One of the design architects, John Choi, was a joint winner in the design competition for the re-design of the TKTS booth in Times Square, New York as a partner in Choi Ropiha Fighera.
AIA Register:	NA
Awards:	1998 RAIA Architecture Award for Public Buildings, Alterations

2.6.3 Information Technology Building (J12)

Address	Engineering Precinct, Darlington
Location within Precinct / Photos	 
Architectural Firm	
Architect	
Builder	
Construction Date	2006
Building Phase	2006 -
Description	This is a multi storey building with glazed facades.
Historical Notes	
AIA Register:	NA
Awards:	NA

Cultural Significance: Assessment of Precinct

3.0

3.1 Introduction

The preliminary Statement of Significance contained in this section is prepared from a representative high level strategic perspective. This is not meant to be a high level analysis of individual buildings. Such an analysis is not considered appropriate in the context of the study.

Heritage, or "cultural" value is a term used to describe an item's value or importance to our current society and is defined as follows in *The Australia ICOMOS Burra Charter,* 1999, published by Australia ICOMOS (Article 1.0):

Cultural significance means **aesthetic, historic, scientific** or **social** or **spiritual value** for past, present or future generations.[1]

This section establishes the criteria which are used to understand significance and identifies the reasons for the cultural value of the site and its components.

Significance may be contained within, and demonstrated by, the fabric of an item; its setting and relationship with other items; historical records that allow us to understand it in terms of its contemporary context, and in the response that the item stimulates in those who value it.[2] The assessment of significance is not static. Significance may increase as more is learnt about the past and as items become rare, endangered or illustrate aspects that achieve a new recognition of importance.

Determining the cultural value is at the basis of all planning for places of historic value. A clear determination of significance permits informed decisions for future planning that will ensure that the expressions of significance are retained and conserved, enhanced or at least minimally impacted upon. A clear understanding of the nature and degree of significance will determine the parameters for, and flexibility of, any future development.

A historical analysis and understanding of the physical evidence provides the context for assessing the significance. These are presented in the preceding sections. An assessment of significance is made by applying standard evaluation criteria to the facts of the item's development and associations.

1 *The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance,* (1999), p.2.

2 ie "social", or community, value

3.2 Comparative Analysis

Other examples of Post World War II Modernism architecture which were occurring at the same time as the Engineering Precinct at the University of Sydney include Northeborne Avenue, Newcastle University, Macquarie University and Town Hall House, Sydney. Materials and patterns from the Engineering Precinct were adopted and applied to the Macquarie University.[3]

3.3 Preliminary Analysis of Cultural Significance

Historical analysis has indicated the major heritage values of the precinct relate to its 1960 to 1975 development phase. In this context the pre-War buildings while of some historical interest, are not regarded as contributory to the main thrust of the Precinct's heritage values.

The following commentary discusses how each of the criterion established by the New South Wales Heritage Office (now the Heritage Division of the NSW Office of Environment and Heritage) relate to the subject precinct.

Criterion (a) – An item is important in the course, or pattern, of NSW's cultural or natural history (or the cultural or natural history of the local area)

The Darlington Precinct is of historical significance to the University of Sydney because of its association with the expansion to the new campus in the 1960s and its unified collection of engineering related educational buildings.

The Darlington Precinct is also of some historical significance as it retains two buildings from the former suburb of Darlington, being the Engineering Workshop (J06) and the Rose Street Building (J04).

Criterion (b) - An item has strong or special association with the life or works of a person, or group of persons, of importance in NSW's cultural or natural history (or the cultural or natural history of the local area)

The Engineering Precinct has a strong association with the Anchor Mortlock and Murray architectural firm as it undertook most of the design work within this precinct during its major construction phase in the 1960s and 1970s. Therefore, the Engineering Precinct is significant to Anchor Mortlock and Murray as it was a major project for the firm. The work created the initial growth of the firm and let the firm shift from its former residential work to institutional and educational projects. This shift in work occurred through Bryce Mortlock's involvement with the Engineering Precinct buildings.

3 Discussion with Ken Woolley, 25 September 2013.

Criterion (c) - An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the local area)

The Engineering Precinct is a stylistically consistent precinct of Brutalist architecture with the majority of the buildings being constructed between 1960 to 1973 and demonstrates the evolution of this style across those years within a consistent, architectural and institutional framework. The individual building designs are of technical interest as they respond to the individual needs of each of the specific educational requirements and the resultant building functions. The integrity of individual buildings varies due to alterations and additions carried out over the years.

The University Master Plan was of fundamental importance to the layout and continuity of the Engineer's Walk, a pedestrian spine located in the centre, and the consistency of building materials within the Engineering Precinct.

Criterion (d) - An item has strong or special association with a particular community or cultural group in NSW (or the local area) for social, cultural or spiritual reasons

The Engineering Precinct is of social significance because of its affiliation with Engineers who have been educated at the faculty.

Criterion (e) - An item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history (or the cultural or natural history of the local area)

The Anchor Mortlock Murray buildings within the precinct are note worthy as they were leading edge architecture of the day responding to the requirements of the specific uses for the buildings. The Engineer's Walk and pedestrian spine are indicative of the former Rose Street and Rose Lane locations.

Criterion (f) - An item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history (or the cultural or natural history of the local area)

There are no known uncommon, rare or endangered aspects associated with the precinct.

Criterion (g) - An item is important in demonstrating the principal characteristics of a class of NSW's cultural or natural places; or cultural or natural environments (or a class of the local area's cultural or natural places; or cultural or natural environments)

There are no known characteristics of a class associated with the precinct.

3.4 Preliminary Statement of Significance

The University of Sydney acquisition and development of Darlington is an example of both the expansion of Sydney University and tertiary education in general from the 1950s, related to the increasing role of the Commonwealth in funding the sector.

The Engineering Precinct is associated with the 1960s major expansion of the University of Sydney across to the eastern side of City Road. The move of the Engineering Faculty to this precinct resulted in the appointment of the well known and established architectural firm, Anchor Mortlock and Murray to design the associated buildings between 1960 and 1973, with Bryce Mortlock being the principal architect for the Engineering Precinct. The first building was the Civil Engineering Workshop which was the firm's largest commercial building at the time. This resulted in the stylistically consistent precinct through the evolution of Brutalist architecture which range from single storey to multi storey buildings. Materials consist of concrete, face brickwork and glass. Individual buildings were leading edge architecture in their day, responding to the specific building uses.

Bryce Mortlock was engaged by the University in 1964 to work on the Master Plan which included the Engineering Precinct. The Precinct is significant to the Anchor Mortlock and Murray architectural firm as it was a major project for the firm that allowed for the shift in the firm's work from residential to commercial.

The Precinct is of social significance because of its affiliation with the engineers who have been educated at the faculty.

The history of the former suburb is reflected in surviving buildings within the Engineering Precinct, including the Civil Engineering Workshop (J06) and the Rose Street Building (J04), the road network which still demonstrates the former suburb layout of Darlington and the Engineer's Walk and pedestrian spine which are indicative of the former Rose Street and Rose Lane locations.

3.5 Preliminary Grading of Significance

3.5.1 Grading of Significance

This preliminary assessment of the Engineering Precinct at the University of Sydney has been carried out to determine a relative grading of significance into five levels. This process examines a number of factors, including:

Relative age
Original design quality
Degree of intactness and general condition
Extent of subsequent alterations

Association with important people or events
Ability to demonstrate a rare quality, craft or construction process

Grading reflects the contribution the element makes to overall significance of the item (or the degree to which the significance of the item would be diminished if the component were removed or altered).

The categories for the levels of significance applied relate to those used in the University of Sydney Campus Plan which determined the relative gradings of significance for buildings.

EXCEPTIONAL SIGNIFICANCE
Includes rare or outstanding building fabric that displays a high degree of intactness or can be interpreted relatively easily.

HIGH SIGNIFICANCE
Includes the original extant fabric and spaces of particular historic and aesthetic value. Includes extant fabric from the early phases of construction.

MODERATE SIGNIFICANCE
Includes building fabric and relationships which were originally of higher significance, but have been compromised by later, less significant modifications.

SOME SIGNIFICANCE
Includes most of the fabric associated with recent alterations and additions made to accommodate changing functional requirements. These are components generally of neutral impact on the site's significance.

LITTLE SIGNIFICANCE
Recent fabric, which adversely affects the significance of the site.

Grading has been established as a valuable tool, to assist in developing appropriate conservation measures for the treatment of the building and its various elements. In general, good conservation practice encourages the focussing on change, or upgrading of, an historical building/site to those areas or components, which make a lesser contribution to significance. The areas or components that make a greater or defining contribution to significance should generally be left intact or changed with the greatest care and respect.

PRECINCT ELEMENTS	GRADING OF SIGNIFICANCE
There are no elements of name considered to be of Exceptional significance.	EXCEPTIONAL
• Chemical and Biomelecular Engineering building (J01) • Materials and Structures Laboratory (J05) • Civil Engineering and Mining Engineering building (J05) • Engineer's Walk • Pedestrian Link	HIGH
• Peter Nicol Russell (PNR) building (J02) • Electrical Engineering building (J03)	MODERATE
• Rose Street building (J04) • Civil Engineering Workshop (J06) • Mechanical Engineering building (J07) • Shepherd Street Carpark (J10) • Aeronautical Engineering (J11) • Electrical & Hazardous Material Store (J10A) • Meter Room (J10B) • University Store (J11A) • Engineering Workshop (J11B) • Engineering Link Building (J13) • Gordon Yu-Hoi Chiu Building (J14)	SOME
There are no elements of name considered to be Intrusive.	LITTLE

In addition, discussion with architect Ken Woolley revealed that he considers the Civil and Mining Engineering Building (J05) as having the highest level of architectural significance, the Electrical Engineering Building (J03) and then followed by all of the other Anchor Mortlock and Woolley engineering buildings. This is based on the building age and relevance on the Post Modern Brutalist architectural style.

3.5.2 Explanation of Gradings:

The following gives an explanation of levels of significance in respect of heritage recommendations.

High:

Heritage Recommendations:

- Retain principal building form
- Retain essential original architectural features
- Interior alterations and refurbishment acceptable

Significance:

Exteriors. Contribution to the Brutalist architecture within the Engineering Precinct. Typical examples of pre Brutalism architecture and Brutalism architecture at its peak. Inclusive of the Engineer's Walk and the second pedestrian spine. Contribution to the integrity of the precinct.

Moderate:

Heritage Recommendations:

- Retain principal building if possible within Master Plan context
- Sympathetic alterations and additions to the exterior are acceptable
- Interior alterations and refurbishment acceptable
- Additional levels may be acceptable if within Master Plan context
- Demolition of buildings of moderate significance may be considered if acceptable within the Master Plan context if there is a significant overall benefit to the Engineering Precinct

Significance:

Exteriors. Contribution to the strong Brutalist architecture within the Engineering Precinct. Typical examples of strong Brutalism architecture at its peak. Contribution to the integrity of the precinct.

Some:

Heritage Recommendations:

- Retain principal building if possible within Master Plan context
- Sympathetic alterations and additions to the exterior are acceptable
- Interior alterations and refurbishment acceptable
- Additional levels may be acceptable if within Master Plan context

Significance:

The exterior of the buildings rated with some significance contain examples of industrial and commercial architecture that predate the Darlington Campus and post Brutalism architecture. Association with post Brutalism architecture. In the case of the pre Darlington Campus buildings, it is pre Brutalism architecture. Exteriors. Contribution to the integrity of the precinct.

Little:

Heritage Recommendations:

- Retention and/or redevelopment subject to Master Plan and preference for connection to the major circulation spine
- Interior alterations and refurbishment acceptable
- Exterior alterations and additions, including additional levels, acceptable

Significance:

The building's association with the Engineering Precinct may be of significance. Association with post Brutalism architecture. They consist of recent buildings, alterations and additions to existing buildings and ancillary structures.

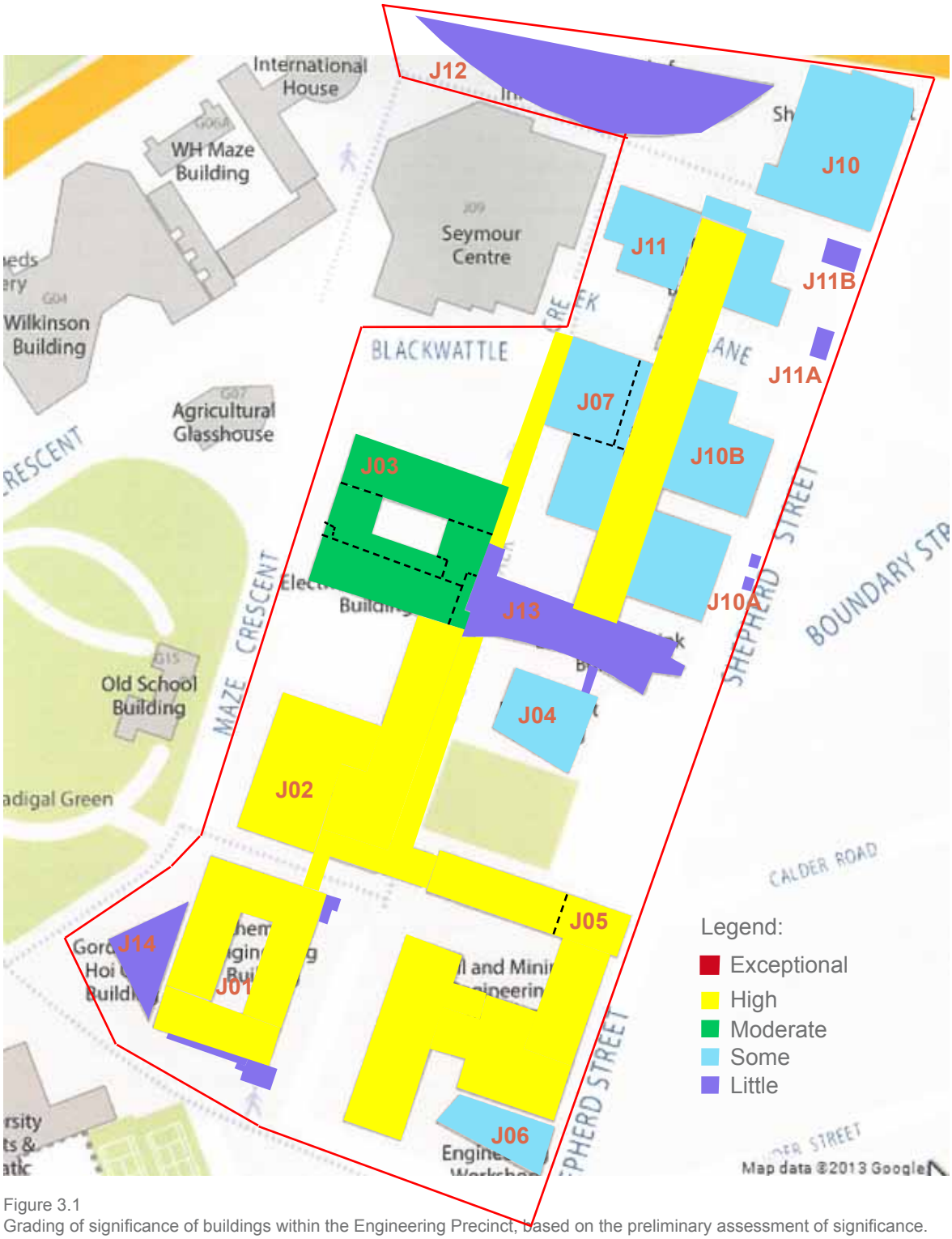


Figure 3.1
Grading of significance of buildings within the Engineering Precinct, based on the preliminary assessment of significance.

Source: Basemap - University of Sydney

3.6 Potential Development Opportunity Areas

Based on the preliminary assessment of heritage significance and the subsequent grading of buildings within the Engineering Precinct in this report, the following figure identifies the potential development opportunity areas within the precinct from a heritage perspective. It identifies areas located within the centre of the precinct and respects the need for redevelopment areas to hook into the existing Engineer's Walk and the pedestrian spine within the precinct.

Figure 3.2
Potential areas for redevelopment opportunities within the Engineering Precinct.

Source: Basemap - University of Sydney

3.6 Archaeological Potential

Although Archaeological Assessment is outside the scope of this Report it should be noted that the Archaeological Management Provisions of the *NSW Heritage Act 1977* apply to any relics which are essentially located below ground level. If, at any time, unexpected archaeological remains are uncovered or disturbed, work must stop immediately and the NSW Heritage Council must be notified.

In addition, we are aware of the following two reports which have been undertaken in relation to archaeology and Aboriginal heritage regarding the Sydney University Campus.

- Non-Indigenous Archaeological Assessment - University of Sydney Campus, 2010
- University of Sydney Campus Improvement Program - Aboriginal Heritage Due Diligence Report, 2013

The Statement of significance from the Non-Indigenous Archaeological Assessment is reiterated below:

> *The potential archaeological remains within the study area would contribute to our knowledge of the pre-university land-use in the area, both in the Eastern Avenue precinct and on the Darlington Campus. The Darlington campus would also retain remains belonging to the later nineteenth-century working-class occupation of the area. These remains would be representative of working-class housing and late nineteenth-century occupation. They are considered to have limited ability to answer research questions and to have a moderate to low level of heritage significance at a Local level.*

The University of Sydney Campus Improvement Program - Aboriginal Heritage Due Diligence Draft Report states the following for the Engineering Precinct:

> *Heavily disturbed with low potential to preserve intact subsurface Aboriginal archaeological deposits.*

Description of the Campus Improvement Program

4.0

4.1 Background

The University of Sydney's Faculty of Engineering and Information Technologies is one of Australia's largest and most prestigious, consistently ranking among the world's top 100 engineering and IT faculties.

The Faculty needs to ensure that it continues to be internationally oriented, responsive to society's needs and performing at internationally recognised benchmark levels.

The Faculty needs to strengthen its learning and teaching outcomes and curriculum to ensure it produces high quality research enriched graduates.

The Faculty needs to continue recruiting high quality students as well as utilising existing resources more effectively and encourage teamwork to enhance research and education outcomes to sustain our competitive advantage.

With changing technology and pedagogy, the existing buildings have become inefficient and impractical. The Faculty needs to be able to recruit, retain and nurture the best staff to enhance performance outcomes and provide an environment for continuous development.

The Engineering Precinct was originally designed around a Central Spine that runs in a North South direction. This strong Design element allows all buildings to be accessed from the spine. Currently it terminates at the southern end, near the Civil Engineering building as the space dissolves when it blends with a car parking pocket.

The Central Spine is disconnected from the Shepherd Street board walk due to a level change and the shared path and there is a lack of through site link opportunities and poor visual connection.

4.2 Campus Improvement Program

As part of the Campus Improvement Program (CIP), the University of Sydney have developed a master plan that looks at the Engineering Precinct as a whole, identifying its original structure and key elements.

The University of Sydney requires the redevelopment of the Engineering Precinct to be planned and sequentially staged so as to enable the continuing of teaching and research while the construction phase takes place.

The precinct is structured around a pedestrian central spine, with all schools accessed from it. The CIP have identified buildings that are capable of being refurbished, adapted or having their spaces augmented through sensible alterations and additions.

Other buildings have been identified as being:

a) incapable of receiving additional floor space due to structural reasons, or

b) potential redevelopment sites as they no longer contribute to the future teaching and research of the Faculty.

These buildings are proposed to be replaced with buildings that incorporate flexible contemporary learning and teaching spaces that allow for integrated learning and collaborative research.

New buildings are required to be efficient, flexible and functional structures so as to enable the faculty to maintain its internationally recognised position. New buildings should be designed as socially, commercially and environmentally sustainable structures and spaces.

The CIP recognises the need to almost duplicate the Gross Floor Area to accommodate the Engineering and Information Technologies requirements.

The Faculty's infrastructure should be identified as Australia's leading edge building environment.

4.3 Proposed Concept Plan

The long term vision of the precinct is to improve and rationalise internal and external spaces, replace certain buildings or part of buildings, construct new buildings where existing ones are inefficient, or have reached the end of their life cycle, improve the general amenity of the Precinct, provide through-site links and connections and to providing world class teaching and research facilities.

The proposal for the precinct is a systematic upgrade and refurbishment of existing buildings, extending some facilities where possible, and the demolition and redevelopment of two buildings which are no longer feasible to maintain.

4.4 Proposed Staging Plan

The proposed Concept Plan for the Engineering Precinct at the University of Sydney, designed by Campus Infrastructure Services, is summarised below. The various schools of Engineering need to remain in full operation whilst the building works is in progress. Consequently staging and sequencing plan of the works is proposed as follows in relation to the Engineering Precinct:

1. Construction of a new building to enable the relocation of the School of Chemical Engineering.

2. Demolition of the old Chemical Engineering Building (J01) and the Gordon Yu-Hoi Chu Building (J14) to enable the construction of a new building to accommodate new collaborative teaching spaces, laboratories and student hubs.

3. Construction of additional teaching and learning spaces to the existing Electrical Engineering Building (J03), as well as a complete refurbishment of the building, to provide the School of Electrical Engineering with 'state of the art' facilities.

4. Construction of a new building adjacent to the Civil Engineering Building (J05) to provide additional workshop space for collaborative testing and research, complementing the facilities currently used by Civil and Mining Engineering.

5. Demolition of the Engineering Workshops (J06) and the construction of a new loading dock to provide a more functional and efficient central loading facility for the precinct. It will enable large items to be delivered directly to adjacent testing and research workshops. Smaller goods would be delivered, in a more effective way via electric carts, from the loading dock to other areas within the precinct.

As part of the proposed works, the central spine (Engineering Walk) has been identified as a strong design and circulation element. It is proposed to extend this circulation spine to the south, so that it connects with the Shepherd Street board walk. This will result in a principal gateway to the Darlington Campus at the north eastern corner of the campus via an enlarged entrance between International House and the School of Information Technology. From this point pedestrians will connect with the central spine or continue to circulate along Maze Crescent, bypassing the Engineering Precinct.

The redevelopment of the precinct is envisaged to be accommodated both within the CIP period to 2020 and beyond.

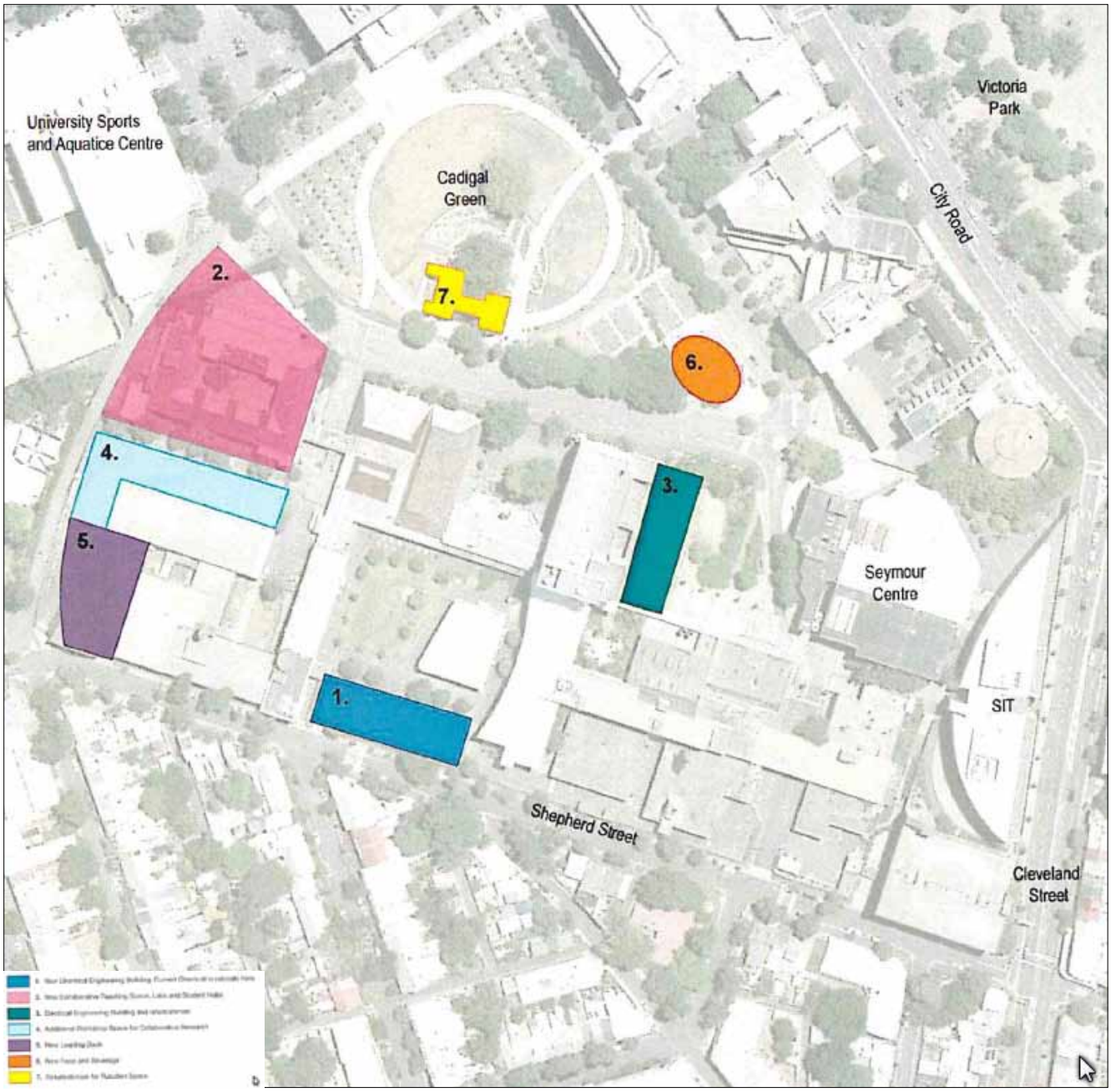


Figure 4.1
The Engineering Precinct Location Plan (D-DIA-01) included in the Campus Improvement Program Development Strategies which forms the basis of the potential heritage impact, conclusions and recommendations of this report. Stages 6 and 7 do not relate the Engineering Precinct.

Source: University of Sydney, *Campus Improvement Program Development Strategies*, 2013.

4.5 Structural Review of Buildings

A Structural Review of Four Buildings for the University of Sydney was undertaken in September 2013. This review included three buildings within the Engineering Precinct; the Chemical Engineering building, (J01); the Electrical Engineering building (J03) and the Rose Street building (J04). The review recommends the following in terms of potential development in relation to potential development of these buildings:

Chemical Engineering Building (J01):

- A further detailed structural analysis will be required to determine best approach for design of additional level/s
- The building is flood prone.
- The building will be reroofed because of leaking.

Electrical Engineering Building (J03):

- Potential for designing a new independent building structure adjacent to the existing building and cantilever floors off vertical concrete or steel structures.
- Soil will not allow for any additional extensions
  - Could cantilever extension to the north of the building

Rose Street Building (J04):

- Does not have the capacity to support additional floor loads
- Still possible to extend vertically. Would require incorporation of an independent steel framework within the building
- Either 1 additional floor, or 2 additional levels plus a passenger lift, is possible
- Not economical to extend by one storey

Potential Heritage Impact on Precinct

5.0

5.1 Introduction

The preliminary assessment of heritage significance of the Engineering Precinct identifies the grading of significance of the site as high at its southern end, inclusive of the buildings J01, J02 and J05 and deceases to the north of the site. The potential impact of the proposed works are not imminent.

The institutional qualities of the subject precinct need to be recognised. It has in the past evolved to meet the changing needs and technologies of the tertiary institution. These needs are very specific, given the use as the Engineering Precinct. The way in which the individual buildings and the precinct functions as a whole will need to continue to grow and evolve to ensure it continues to be progressive and a leading international university facility to attract and retain the reputation of the University and staff, research quality and calibre of students.

5.2 Overview of the Potential Heritage Impacts

The table below identifies the potential heritage impact of the proposed staging plan for the Engineering Percent, as identified in the CIP. The potential heritage impact has been graded as high, moderate, little and none in respect of the subject buildings.

Building No.	Building Name	Description of works proposed in the CIP	Preliminary Heritage Significance	Potential Heritage Impact
J01	Chemical Engineering building	The building is proposed to be demolished and to construct an engineering building maximizing the site and height opportunities.	High	High
J02	PNR building	It is proposed to retain this building, no work is proposed.	High	None

J03	Electrical Engineering building	The University intends to future proof this asset by refurbishing teaching, learning and research spaces, including a services upgrade, so it can improve its energy efficiency and functionality. The existing building structure will be reinforced and supplemented by additional elements, providing it with three new floors above the northern wing.	Moderate	Moderate
J04	Rose Street building	The proposal will retain this building in the foreseeable future.	Some	None
J05	Civil and Mining Engineering building including the Materials and Structures building	New loading dock immediately to the south. The opportunity to upgrade food and beverage facilities at ground level, as well as possible outdoor / indoor casual seating.	High	Some
J06	Civil Engineering Workshop	This building is proposed to be demolished to allow for a better utilization of the site. This site has been identified as an ideal location for consolidated loading dock, taking the loading function off other areas on Shepherd Street. Its removal and redevelopment will improve pedestrian access from Shepherd Street onto the boardwalk through to Cadigal Green. A new building will be provided for combined research allowing for collegial and interdisciplinary research exercises in a workshop environment.	Some	Some
J07	Mechanical Engineering building	This building will be retained during the timeframe of the CIP. New Collaborative Research Space will require additions to the existing building.	Some	Moderate
J10	Shepherd Street Carpark	Partial remedial work to address BCA requirements.	Some	Little
J10A	Various Sheds and ancillary structures	These buildings will be retained.	Little	None
J10B	Various Sheds and ancillary structures	These buildings will be retained.	Little	None

J11	Aeronautical Engineering building	This building will be retained.	Some	Moderate
J11A	Various Sheds and ancillary structures	These buildings will be retained.	Little	None
J11B	Various Sheds and ancillary structures	These buildings will be retained.	Little	None
J12	The School of Information Technologies	This building will be retained.	Little	None
J13	Engineering Link building	This building will undergo partial refurbishment and relocation of selected functions but will not be affected by demolition or major building works at this time.	Little	None
J14	Gordon Yu Choi building	The building is proposed to be demolished simultaneously with J01 to construct an engineering building maximizing the site and height opportunities.	Little	None
NA	Engineering Link	Will be retained.	High	None
NA	Pedestrian Link	Will be retained.	High	None

Conclusions and Recommendations

6.0

6.1 Conclusions

6.1.1 Relevant Heritage Management Framework

1. The Sydney University Engineering Precinct reflects the outcome of a two decade long major redevelopment programme that commenced in the early 1960s and resulted in the construction of a major complex of purpose built educational buildings on the eastern side of City Road, separated from the traditional University campus. The master planning and architectural design for the original precinct was guided by the well known architectural firm Ancher Mortlock and Murray, later Ancher Mortlock Woolley, with the continuing involvement of Bryce Mortlock. Two light industrial buildings survived from the pre-existing 20th century urban landscape, while three modern buildings including the multi-level Shepherd Street Carpark, date from subsequent decades or are not directly related to the Engineering complex. The Seymour Centre is not within the Engineering Precinct.

2. The Sydney University Engineering Precinct falls within the Campus Improvement Program (CIP) Staged Development project. Relevant heritage management requirements associated with this project approval process will apply.

3. The Sydney University Engineering Precinct, in Shepherd Street, Darlington, is located within the overall University Campus. As such it falls within the general guidance of the University of Sydney Grounds Conservation Plan.

4. In terms of Sydney LEP 2012, the Engineering Precinct is not described as or located within a Conservation Area.

5. Within the Engineering Precinct there are no individually heritage listed buildings included on the Heritage Schedule of Sydney LEP 2012.

6. In terms of Sydney LEP 2012, the Engineering Precinct is located in the vicinity of three heritage items:

    - Victoria Park, Camperdown (I-39)
    - Terrace Group 50-52 Calder Road, Darlington (I-521)
    - Former Darlington Primary School, 96-148 City Road, Darlington (I-524)

7. In terms of Sydney LEP 2012, the Engineering Precinct is also located in the vicinity of three Heritage Conservation Areas:

    - C9: Chippendale
    - C10: Darling Nursery Estate
    - C18: Golden Grove

6.1.2 Precinct Assessment of Significance

1. Essentially, the heritage significance of the Engineering Precinct derives from its important role as the first large scale and comprehensively planned faculty teaching precinct development undertaken by Sydney University in the post war decades.

2. The Sydney University Engineering Precinct, primarily designed between the early 1960s and mid 1970s, is of historic significance as the first major educational precinct constructed to the east of City Road, becoming a precursor to the long term eastern expansion of the University from the original core campus surrounding the main Quadrangle.

3. The Precinct is of aesthetic significance for its architectural evolution and master planning clarity across a decade long evolution of the Late 20th Century Brutalist style under the guidance of the well known Sydney architectural firm of Ancher Mortlock Murray, particularly Bryce Mortlock and later Stuart Murray.

4. Individual buildings from the primary development phase of the Precinct, particularly Chemical Engineering (J01) PNR (J02), and Civil and Mining Engineering (J05) and the pedestrian spine through Mechanical Engineering (J07) are considered to be of high heritage significance. The circulation spine associated with the “Engineers’ Walk” was also an important feature of the functional organisation of the Precinct. The large scale Electrical Engineering Building (J03) is of moderate heritage significance as a major visual feature of the Precinct and a well resolved Brutalist architectural composition. Supporting teaching spaces and workshops associated with Mechanical and Aeronautical Engineering (J07 and J11) are of Some Significance as the least architecturally distinctive of the original components of the major development phase of the Precinct.

5. The two buildings that survived from the previous urban character of Darlington, the 1920s Civil Engineering Workshops (J06) and 1930s Rose Street Building (J04) are considered to be of Some Significance, given their lack of direct association with the major development phase. The recently completed Engineering Link Building (J13) and Gordon yu-Hoi Chiu Building (J14) are of comparatively Little Significance in heritage terms.

6. The multi-storey Shepherd Street Carpark (J10) associated with the Seymour Centre is not considered to be part of the Engineering Precinct in heritage terms, as is the modern School of Information Technologies (J12) on the Cleveland Street frontage. The Seymour Centre (J09) is not part of the defined area of the Engineering Precinct.

6.1.3 Assessment of Heritage Impact

1. The Assessment of Heritage Impact for the overall development strategies for the Engineering Precinct proposed as part of the Sydney University Campus Improvement Plan Staged Development has taken account of the need to maintain the Precinct as a continuing teaching precinct over the duration of a major staged upgrade and expansion of teaching facilities. This requirement has generated a proposed staged development approach requiring the early construction of several major new buildings to facilitate the relocation of certain teaching areas and subsequent upgrading or expansion of some older facilities. In this context, the University has determined that the relatively recent Engineering Link Building (J13) should be retained within the current Precinct project for economic reasons.

2. Stage 1, the introduction of a new building near the Shepherd Street frontage will have little adverse impact on the heritage significance of the Precinct as a whole. It is located on an area currently used for car parking. The scale of this building is intended to relate well to the adjoining conservation area and historic urban environment on the southern side of Shepherd Street.

3. Stage 2, a major new building for Chemical Engineering, requires the demolition of the current Chemical Engineering Building (J01) and the Gordon Yu-Hoi Chiu Building (J14). The loss of the 1960s Chemical Engineering Building will have the greatest impact of any of the proposed staged development on the overall heritage significance of the Precinct as it completely removes an important “link in the evolutionary and physical chain” from the overall complex.

4. Stage 3 involves extensions to the multistorey Electrical Engineering Building (J03), which if well planned and designed to respect the original Brutalist architectural strength of the building should have an acceptable impact on the heritage significance of the Precinct.

5. Stage 4 includes additional spaces wrapped around the existing Workshop volume on the western side of the Civil and Mining Engineering Building (J05). The intention is to virtually double its effective floor space. This large, single volume workshop was one of the earliest buildings in the Engineering Precinct development and is highly regarded. A major extension to the floor space, if well planned and designed to respect the architectural integrity of the original building should have an acceptable impact on the heritage significance of the Precinct.

6. Stage 5 involves replacing the 1920s Civil Engineering Workshop (J06) with a new Loading Dock for the Precinct as a whole. The existing building is a remnant of the previous late 19th and early 20th century urban cultural landscape. Its removal is acceptable in terms of the primary aspect of heritage significance of the Engineering Precinct, being its late 20th century development phase.

7. Stages 6 and 7 are not contained within the defined area of the Engineering Precinct and will have no adverse impacts on the heritage significance of the Precinct. Stage 7, being the refurbishment of the former Darlington Primary School, if done in a sensitive manner that respects its Victorian architectural character and current park-like setting, should have no adverse impact on its individual heritage significance.

8. None of the buildings or works proposed as part of the University of Sydney Campus Improvement Program Staged Development is likely to have any adverse impact on any heritage items or conservation areas within the vicinity of the Precinct.

6.1.4 Conclusion

1. In general, the proposed new buildings and upgrading of existing buildings within the Engineering Precinct are likely to have a neutral to positive impact on the overall heritage significance of the Precinct. This will arise from the new lease of life breathed into this important educational and architectural ensemble, sustaining its heritage significance within the University into the medium to long term future. The loss of the highly significant 1960s Chemical Engineering Building (J01) component of the Precinct is unfortunate in heritage terms, but can be supported if it becomes an effective mechanism to achieve the broader upgrading and continuity of the remaining significant buildings and important circulation spines within the Precinct.

6.2 Recommendations

The following Recommendations have been derived from this Assessment of Heritage Impact for the overall development strategies for the Engineering Precinct proposed as part of the University of Sydney Campus Improvement Program Staged Development. They have taken account of the need to maintain the Precinct as a continuing teaching precinct over the duration of a major staged upgrade and expansion of teaching facilities. This requirement has generated a proposed staged development approach requiring the early construction of several major new buildings to facilitate the relocation of certain teaching areas and subsequent upgrading or expansion of some older facilities.

6.2.1 General Recommendations

1. The relevant consent authority for the Sydney University Engineering Precinct component of the Campus Improvement Program (CIP) Staged Development project should accept the conclusions and recommendations of this Heritage Impact Assessment and grant the appropriate approvals.

2. As a general rule, extending the life of an existing significant building by upgrading and sensitive adaptive re-use should always be considered prior to the taking of a final decision for its demolition and redevelopment.

3. Any adaptive re-use or upgrading proposal for any significant building within the Engineering Precinct should take careful note of the original architectural and structural characteristics and connectivity's within the Engineering Precinct as part of the design development phase.

4. The planning and design of all major alterations and additions, including selective demolition and internal refurbishments of all the late 20th century significant buildings and features of the Precinct need to be undertaken with the benefit of detailed analysis and advice from experienced heritage consultants and as relevant, advice from the original architectural firm for the Precinct.

5. Each approval application for individual or groups of buildings within the Precinct should be accompanied by the preparation of detailed Heritage Assessments and Heritage Impact Assessment reports and advice.

6. A condition of consent for any specific application should include a requirement for a detailed digital photographic recording of the building or feature prior to physical intervention.

7. Future stages that may involve the introduction of new buildings within the Engineering Precinct may consider the replacement of the less significant Rose Street (J04) and Engineering Link (J13) Buildings and the less architecturally distinguished workshops, administration and teaching spaces of the Mechanical and Aeronautical Engineering Buildings (J07 and J11).

8. Similarly, redevelopment of the Shepherd Street Carpark and the School of Information Technologies Building may be considered in future development stages, given the lesser impact on the heritage significance of the overall Engineering Precinct.

6.2.2 Stage Specific Recommendations

1. The new, free standing building to be developed as Stage 1 should be of a scale and quality that reflects the highly resolved surrounding planning and architectural context of the late 20th century Engineering complex.

2. The planning and design of the new building to be developed as Stage 2 should pay careful attention to the planning and circulation principles inherent in the way that the existing building is connected into the main circulation spine known as “Engineers’ Walk”. Its architectural expression should respect (but not mimic) its physical and spatial relationships with the nearby significant Engineering Precinct buildings and not simply consider itself to be a major new free standing entity in this section of the overall University campus.

3. The planning and design of the Stage 3 extensions to the Electrical Engineering Building need to take careful consideration of its existing architectural, spatial, and structural aspects as well as its connections to the main circulation spine through the Precinct.

4. Similarly, the planning and design of the Stage 4 additions to the Workshop facilities of the Civil and Mining Engineering Building (J05) need to give detailed consideration of and respect to its current architectural character and identity.

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7.0

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