Science Research and Education Facility

Australian Institute of Nanoscience

The University of Sydney

Environmental Impact Statement

(SSD 5087-2011)

January 2013

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Statement of Validity

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Applicant Details

Name	The University of Sydney ABN 15 211 513 464
Address	Campus Infrastructure & Services The University of Sydney NSW 2006

Site Details

Site Address	Physics Road, Camperdown Campus
Lot and DP	Part Lot 101 in DP 11171804; and Part Lot 1966 in DP 1117595

Project Description

The University of Sydney is proposing to construct a new science research and education facility at its Camperdown Campus to house the Australian Institute for Nanoscience (AIN) on land located immediately behind and to the south of building A28, the existing School of Physics Building. The AIN Building will accommodate the rapidly expanding and internationally competitive research activities in physical sciences within a purpose built facility comprising research, training, laboratory, office and seminar rooms. The building will enable the institute to expand scope for industrial collaboration with emerging Australian high-tech businesses, in alignment with the NSW innovation strategy for smart manufacturing, leading to direct economic and social benefits through the uptake of these new technologies.

Environmental Impact Assessment

An Environmental Impact Statement (EIS) is attached. The EIS and the accompanying consultant reports and plans contain all available information required to assess the environmental impact of the development.

I certify that I have prepared the contents of the Environmental Impact Statement in accordance with the requirements of Schedule 2 of the Environmental Planning and Assessment Regulation 2000 and that, to the best of my knowledge, the information contained in this report is not false or misleading.

Signature

Name Derek Sinclair
Date 14 January, 2013

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Executive Summary

The University of Sydney is proposing to construct a new science research and education facility at its Camperdown campus to house the Australian Institute for Nanoscience on the campus of The Sydney University on land located immediately behind and to the south of the existing School of Physics.

The Australian Institute of Nanoscience (AIN) will be a world leading research and teaching facility designed to meet the demanding requirements of nanoscience research in decades to come and the only building in Australia to house such an advanced research capability alongside comprehensive facilities for undergraduate and postgraduate teaching.

The AIN Building will accommodate the rapidly expanding and internationally competitive research activities in physical sciences within a purpose built facility comprising research, training, laboratory, office and seminar rooms. The building will enable the institute to expand scope for industrial collaboration with emerging Australian high-tech businesses, in alignment with the NSW innovation strategy for smart manufacturing, leading to direct economic and social benefits through the uptake of these new technologies.

The project has been designed in a manner that is consistent with the University's draft Campus Masterplan and the heritage provisions of the School of Physics Conservation Plan. The project involves:

- Demolition of a small number of site works and structures across the site
- Construction earthworks and site service installation;
- Construction and use of the AIN Building comprising a single 4 storey building with 2 wings with a total gross area of 11,600m^2 which is integrated with the Existing Heritage Building;
- Construction of a two storey utility building attached to the eastern end of the AIN Building;
- Construction of a pedestrian pathway between the new AIN Building and the Edward Ford Building to provide a new north south link; and
- Provision of ancillary services. landscaping and site parking.

The capital cost of the proposed AIN Building excluding land is $70.77m. Pursuant to Schedule 2 of the State Environmental Planning Policy (Major and Regional Development) 2011, the proposed development is considered to be State significant development (SSD) as the subject site is an education facility (and associated research facilities), and has an estimated capital investment value of greater than $30 million.

Director General's Requirements (DGRs) were issued on 1 February 2012, listing aspects to be addressed in this Environmental Impact Statement (EIS).

The key environmental issues identified for assessment in this Environmental Impact Assessment include:

- Built Form and Urban Design
- Ecologically Sustainable Development
- Amenity
- Noise and Vibration
- Transport and Accessibility
- Heritage
- Infrastructure and utilities.
- Sediment erosion and dust control
- Drainage Waste

- Impact on Trees
- Hazards
- Operational Management
- Public Domain
- Accessibility
- Building Height

The assessment of the above issues concludes that the project is able to be undertaken in a manner that will not result in significant environmental impacts including to local heritage items in the vicinity of the proposed AIN Building.

The mitigation measures proposed are outlined in Section 7 of this Report and cover the following matters:

- Arboreal Impacts
- Contamination
- Heritage
- Traffic and Parking

In conclusion it is considered that the site is suitable for the proposed development. In the process of development measures have been taken in the design of the AIN Building to respect the heritage values of surrounding buildings, the proposed St Pauls college development, and the university campus as a whole. Off-site impacts of the proposal are not anticipated.

It is requested that the Minister grant approval to the project as proposed.

1 Introduction

1.1 Overview

The Australian Institute of Nanoscience (AIN) will be a world leading research and teaching facility designed to meet the demanding requirements of nanoscience research in decades to come and the only building in Australia to house such an advanced research capability alongside comprehensive facilities for undergraduate and postgraduate teaching.

The AIN Building will have first in Australia capabilities in nanoscience: it will house precision instruments and provide the highly controlled environments required to support basic and applied research aimed at understanding nature at a fundamental level and translating this new knowledge into next generation technological outcomes underpinning revolutionary new electronic and optical devices, biomedical sensors and material systems.

The proposal is for a new building to house the Australian Institute for Nanoscience. It is proposed that the new building be located immediately behind and to the south of A28, the existing, heritage-protected School of Physics building, on land presently held by St Pauls College as part of a sub-lease from the University. The proposed building would accommodate the rapidly expanding internationally competitive research activities in physical sciences within a building that houses a major Nanoscience laboratory for national access and which will facilitate strong interdisciplinary linkages to other major on-campus research initiatives, the CODCD in particular.

The proposed site for the project is a near green field site, well away from traffic and its topography (a steep slope facing North) offers an ideal environment to build an extremely "quiet" laboratory with excellent environmental characteristics located right in the heart of The University of Sydney's Camperdown Campus.

Pursuant to Schedule 2 of the *State Environmental Planning Policy (Major and Regional Development) 2011*, the proposed development is considered to be State Significant Development (SSD) as the subject site is an education facility (and associated research facilities), and has an estimated capital investment value of greater than $30 million. Accordingly, as required under the Environmental Planning and Assessment Act 1979 (E P & A Act) the Director-General Requirements for this Environmental Impact Assessment was sought and a copy of the DGRs is contained in Appendix A and summarised in Section 1.8 of this report.

1.2 What is Nanoscience?

Nanoscience covers the behaviour of materials structured on the extremely small scale on nanometres. A nanometre is one millionth of a millimetre. The prominent influence of quantum physics effects at this scale, new modes of interaction of electromagnetic waves with nano-structured materials and the strong electrostatic fields associated with nanoscale materials makes this a unique field of research.

Nanostructured materials include nanostructures "written" into centimetre-sized substrates of material. The development of new approaches to fabricate these nanoscale structures has led to a dramatic increase in research in this area, and opened up a host of potential applications in engineering and medical science many of which have the potential to transform communications, medical treatment and energy generation in the 21st Century.

These nano-written substrates will be fabricated and studied in the AIN. The infrastructure used to fabricate the nanostructures on which experiments are performed includes advanced lithography tools, both electron beam-based and optical, which are crucial for this task; they write patterns and circuits at nanometre scale onto the substrates. Writing onto specially prepared surfaces with nanometre precision requires an environment whose isolation from vibration and dust is extreme, while other tools must be near-perfectly screened from electromagnetic interference. These demanding requirements define the performance specifications of the AIN.

1.3 Project Vision

The vision for the project, in the words of Architectus the project architects, is as follows:

a) *The Australian Institute of Nanoscience (AIN) will be a world leading research and teaching facility designed to meet the demanding requirements of nanoscience research in decades to come and the only building in Australia to house such an advanced research capability alongside comprehensive facilities for undergraduate and postgraduate teaching.*

b) *The AIN Physics Building will have first in Australia capabilities in nanoscience: it will house precision instruments and provide the highly controlled environments required to support basic and applied research aimed at understanding nature at a fundamental level and translating this new knowledge into next generation technological outcomes underpinning revolutionary new electronic and optical devices, biomedical sensors and material systems.*

c) *It will provide a rich working environment for staff and students, with teaching facilities to support the multiplicity of modes of academic learning to drive new interactive and collaborative approaches to teaching all levels of Physics.*

d) *The architectural design of the building will embody the visionary aspirations of the research and teaching programs while harmonising with the existing heritage Physics building and integrating the two buildings into a single coherent School of Physics.*

1.4 Overview of the Proposed AIN Building

The proposed development initiative is a new purpose designed building to house the Australian Institute for Nanoscience (AIN). The new AIN building will be located immediately behind the existing School of Physics building. As described in this report the AIN will accommodate internationally competitive research activities in physical sciences within a building that houses a major nanoscience laboratory for national access and which will facilitate strong interdisciplinary linkages to other major on-campus research initiatives.

This new building of approximately 11,600 m^2 of Gross Floor Area will provide high quality laboratory, office and teaching space, with office accommodation for academic, research and administrative staff, postgraduate students, and visiting academics and students. Of the 4,325 m^2 of quality laboratory space, up to 1,200m^2 will be clean rooms built to varying degrees of environmental control ranging from ISO standards grades 4 to 7. Other laboratories will be built with high degrees of immunity to electromagnetic interference to form a comprehensive suite of laboratories dedicated to next-generation research built on nanoscience.

The AIN building will incorporate staff and students previously housed in the form Physics Annex. The change to staff and students numbers is summarised in **Table 1**.

Table 1 Staff and Students Accommodated in the Proposed AIN Building

Category	Current	Additional	Total
Current Staff	201	24	225
Visiting Scholars	15	-	15
Students	169	93	2620
Honorary Positions	15	-	15
Total	**400**	**117**	**518**

1.5 AIN Project Objectives

The University of Sydney's Campus 2020 Masterplan and Masterplan Framework Guidelines 2006 share a primary objective of supporting academic excellence. The AIN Building will accommodate students, teaching staff, research staff and industry partners in a national and international resource.

The AIN will be located in a major research precinct spanning medical and physical science at the University of Sydney and will host a range of nationally accessible research infrastructure, other centres of excellence, and the SKA science centre. The long-term objective of this development is the creation of leading-edge innovations in broadband and low energy, secure communications technology, advanced medical diagnostics and therapies, and advances in astronomy through the development of sensitive new detectors and instruments. The AIN will play a nationally significant role in postgraduate teaching and research and attract international conferences and visitors to Sydney and NSW.

Many of these leading-edge innovations have the capacity to stimulate new high technology companies, and support existing companies, in the Sydney area operating in the telecommunications, green technology and biotechnology market sectors. As well as providing new local employment in these important sectors, such companies generate export revenue and inward investment.

The AIN will also, through its design and accessibility, showcase modern physics and technology to the general public. The building's design will ensure that visitors can easily view the state of the art clean rooms, providing a glimpse of next-generation research to high school students and the general public.

The objectives for the AIN will be to achieve academic excellence the new building will be to:

1. Create a world class nanoscience teaching and research environment, with laboratories that achieve the stringent environmental requirements specified herein to support advanced experimental physics.

2. Provide, where appropriate, contiguous, flexible, adaptable laboratory space with sufficient flexibility and capacity to meet rapidly evolving and emerging fields of opportunity, to accommodate fluctuations in research team sizes, addition of future disciplines, installation of new equipment and to enable the consolidation of research groups fragmented over time.

3. Provide stimulating teaching spaces that complement the research facilities and provide improved learning environments, accommodating recent developments and future innovations in teaching methods, for senior undergraduate and postgraduate students to enthuse the next generation of physical scientists and encourage their continued studies within the School of Physics.

4. Provide workplace environments that support excellence in research.

5. Develop a Physics precinct with a new building that complements and integrates with the existing building facilities to create a singular experience by:

    - Integration with the existing School of Physics building including physical connections that promote seamless transfer of staff, students and equipment between the new and existing building and circulation routes that avoid 'dead-ends' and enable staff located in each building to interact as part of their everyday activities.

    - Creation of strong visual links between the buildings, including exploration of a 'Physics Courtyard' concept between the existing and new building, to act as the social and intellectual heart of the School of Physics, a place for academic debate and social interactions.

    - Creation of a new primary pedestrian route and entry point for the AIN Physics Building to provide a 'front door' to the new facility with a strong visual presence on Campus.

1.6 Overview of the Consent Process

In the initial application for the Director General's Requirements (DGR's) all aspects of the development were mentioned and subsequently covered by the DGR' issued: demolition, site works and service delivery, the AIN building and its proposed use.

After the DGRs were issued the prospect of undertaking the project under different development consents was considered by the University. The reasons for adopting a sequential consent process were as follows. Firstly, the University needed sufficient flexibility to complete parts of the development without disruption to other activities within the University at critical periods of the year. Secondly, various issues associated with the relocation of services through the site suggested that an early works program was required. Finally, a staged process allowed better co-ordination with the residential development proposed by St Paul's College on an adjoining site. Accordingly, the University concluded that the most advantageous approval pathway would be as follows:

1. Demolition of non-heritage items (buildings and structures), and the removal of non-significant vegetation from the site. This aspect of the development could be undertaken by the University as development without consent pursuant to the provisions of *State Environmental Planning Policy (Infrastructure) 2007* as a Part 5 matter;

2. Bulk earthworks to create a future development site; retaining walls and the relocation of site services and stormwater drainage could be undertaken as local development under a development consent from Sydney City Council pursuant to the provisions of the *South Sydney Local Environmental Plan 1998; and*

1. Approval for the construction and use of the Institute building as State Significant Development with the Minister as the consent authority under *State Environmental Planning Policy (State and Regional Development) 2011*. The capital cost of the AIN building exceeds the relevant threshold for State significant development in *State Environmental Planning Policy (State and Regional Development) 2011*.

The proposed planning approach was discussed with planning officers of the Department of Infrastructure and Planning and Sydney City Council in early 2012. Subsequently, advice was received that this approach would not require a change in the DGRs that had already been issued. Copies of the relevant correspondence are contained in Appendix A.

The University has worked within the Director General's requirements and all the requisite studies and investigations have been completed. In submitting this application the results of all the background studies have been included with the EIS although this application only covers the construction and use of the proposed AIN Building.

1.7 Alternatives

Following several decades of success and expansion the current buildings that house the School of Physics are too small and do not provide a suitable physical environment to support the high-tech research required. In addition, inefficiencies in space utilisation have developed over time as research groups have expanded and contracted, with many becoming fragmented across multiple levels resulting in less than ideal interaction and communication within research teams.

The alternative to the proposed development has been considered in terms of acquiring an alternative site or modifying the existing Physics building. The implications of not proceeding with the project have also been considered.

1.7.1 Alternative Sites

The University has considered all possible sites within the University grounds for providing the nationally-leading nanofabrication infrastructure of the Australian Institute for Nanoscience. The option chosen to construct a new purpose-built building immediately adjacent to the existing School of Physics is the only one that enables the full potential of an integrated Nanoscience program with benefits spanning from the health sector to astrophysics. The chosen site is integral to a developing precinct that will ultimately include new facilities for medicine and medical research institutes. The site allows laboratories to be well isolated from external vibrations, essential for Nanoscience. The required floor space of 12,500 square metres is easily accommodated within the available land and architectural constraints.

Vibration levels occurring at alternative sites possibly to the east of City Road are likely to be unsuitable. A detailed study would be required to determine specific vibration levels experienced at the site and if those levels would influence optical and other experiments.

Similar issues would also arise in external sites. However, external sites would require additional funds for land acquisition and the essential integration of services and facilities in the existing Physics building would be lost.

1.7.2 Refurbish the existing Physics Building

Over 2006-2008 the School and the University invested approximately $5m in capital works for the existing heritage listed physics buildings and approximately $0.5m for office refurbishment and maintenance to an annexe building (A29). Extensive capital works in the existing heritage listed physics building is extremely difficult and expensive because of the nature of the building's construction and because of the need to protect the building's heritage values. The condition of the A29 physic annexed building was so poor that demolition was considered to be a better option than the cost of upgrade and continued maintenance.

1.7.3 Do Nothing

In this approach the University would not be able to deliver on its commitment to the vision of world-leading interdisciplinary research.

Doing nothing would make it almost impossible for the University to recruit top-ranked staff because of an inability to offer quality laboratory space. The School of Physics will see increased teaching loads for academic staff. Some of the top-ranked individuals now on the staff may leave if there are no opportunities for growth or prospects for improved laboratory facilities.

At an operational level, the University's ability to support world-leading research in five new Centres of Excellence in physical sciences, two of which are headquartered at Sydney, would be severely compromised. The growth in Physical Sciences, now the most successful discipline in the University measured by high profile academic appointments and by the award of ARC Centres of Excellence, could be abruptly terminated.

The most significant impact of this option however will be in the area of research, where the University will not be well positioned to capitalise on the strong and growing interactions between physical and medical scientists in areas reliant on nanoscale technologies, including new imaging modalities and novel drug delivery techniques. Other areas of research such as photonics and quantum science would also be adversely affected by this approach.

1.8 EIS and Director General's Requirements

Director General's Requirements (DGRs) were issued on 1 February 2012, listing aspects to be addressed in this Environmental Impact Statement (EIS). A copy of the DGRs is attached at Appendix A. The following is an assessment of the project in accordance with those requirements.

Table 2 below provides a summary of the individual matters listed in the DGRs and cross references them with the relevant sections in this report and the technical reports appended to this report.

Table 2 - Director General's Requirements

Director General's Requirements	Report Reference	Appendix Drawing Set
General Requirements		
Declaration	Page ii	
EPA Regulations		
- Summary of the Environmental Impact Statement	Page vii	
- Statement of Objectives	Section4.1	
- Analysis of Alternatives	Section 1.7	
- Analysis of the Development and Environmental Impacts	Section 4 and 6	
- Mitigation Measures	Section 7	
- List of Approvals under any other Act	Section 3	

Director General's Requirements	Report Reference	Appendix Drawing Set
Key Issues		
1.1 Environmental Planning Instruments (EPIs) - Permissibility - Development Standards - Contamination	Section 3	
1.2 Policies, Guidelines & Planning Agreements	Section 3.8	
1.3 Built Form and Urban Design	Section 6.6	Drawing Set
1.4 Ecological Sustainable Development	Section 6.8	Appendix E
1.5 Amenity	Section 6.9	
1.6 Noise and Vibration	Section 6.11	Appendix O
1.7 Traffic and Accessibility	Section 6.12	Appendix K
1.8 Heritage	Section 6.13	Appendix H
1.9 Infrastructure and Utilities	Section 2.7	
1.10 Sediment, Erosion & Dust Control	Section 2.9	
1.11 Drainage	Section 2.8	
1.12 Waste	Section 6.14	
1.13 Impact on Trees	Section 6.15	Appendix B
1.14 Hazards	Section 6.16	Appendix N
1.15 Operational Management		Appendix G
1.16 Public Domain	Section 6.17	Appendix I
1.17 Accessibility	Section 6.18	Appendix J
1.18 Building Height (if applicable)	NA	
1.19 Staging (if applicable)	NA	
Plans and Documents		Drawing Set
Consultation	Section 5	

1.9 Project Team

The application has been prepared on behalf of The University of Sydney (the applicant) and is based on plans and information provided by architects and other specialist consultants as listed in the following Table.

Table 3 Environmental Assessment Team

Discipline	Organisation	Study/ Deliverable
Accessibility	Access Associates Australia	Accessibility Assessment
Archaeological	Archaeological and Heritage Management Solutions Pty Ltd.	Aboriginal and Historical Archaeological Assessment
Arboricultural	TreeiQ	Arboricultural Impact Assessment
Architecture	Architectus	Architectural Design
Civil Works	AECOM	Design of Civil Works
ESD	Steensen Varming	ESD Study
Flooding/Stormwater	WMAwater	Flood Study
Geotechnical, and Contamination	Jeffrey and Katauskas	Hazardous Materials Assessment
Heritage	Graham Brooks & Associates	Heritage Impact Statement
Landscape	Site Image	Landscape Design Report
Planning	Integrated Site Design	Environmental Assessment
Project Management	Campus Infrastructure and Services, University of Sydney.	Project requirements
Quantity Survey	Davis Langton	Cost Assessment
Soil and Water	Aurecon Australia	Geotechnical Assessment
Traffic	ARUP	Traffic and Parking

2 Existing Site & Environment

2.1 The Site

The Camperdown Campus of the University of Sydney is bounded by Parramatta Road, City Road and Missenden Road as shown in **Figure 1.**

The site is located in the centre of the Camperdown Campus, directly to the south of the existing Physics Building (A28). The proposed development site is wholly within the grounds of the University – well removed from residential, commercial and other land uses.

The subject site is currently constrained by the Edward Ford Building to the east, St Paul's College grounds to the south and Wesley College to the west. Topographically, the site slopes from St Paul's toward the existing Physics building. The site also has an east-west fall as part of the existing overland flow path for stormwater from St Paul's cricket oval to the south east.

Partially overshadowed by the existing Physics Building, the site also contains two trees of significant Heritage value to the eastern and western boundaries partially restricting development potential. Owing to its largely northern orientation, the site does have good solar access across the day in both winter and summer, with the exception of minor overshadowing from existing building and trees. Cooling breezes from the east / north east during summer provide some relief from the strong summer heat while in winter protection from strong southerly and south-westerly winds will need to be considered.

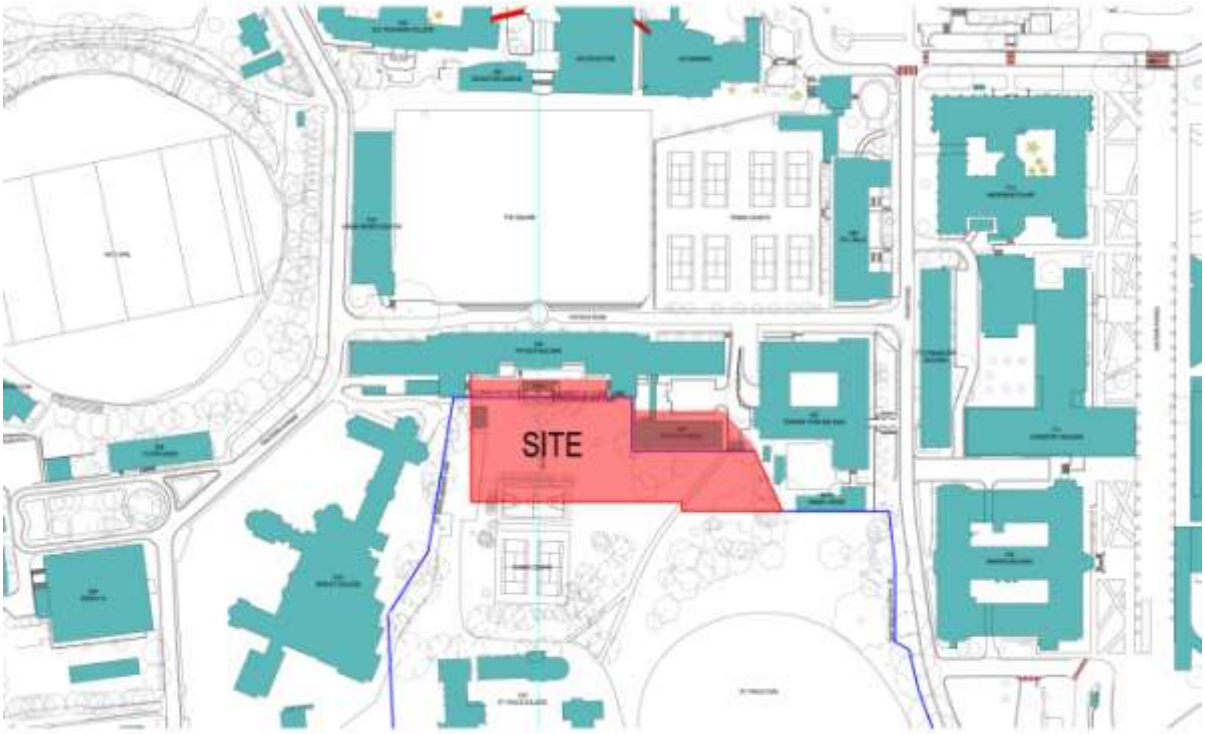

Figure 1 Site Location within the University

The total site area of the proposed development is approximately 5,500m^2.

Agreement has been reached with St Paul's College for the transfer of land from St Paul's to the University.

2.2 Land Ownership

Apart from the immediate perimeter of the Physics Building and the roadway between it and the Edward Ford Building, the site is located on land owned by St Pauls College. The cadastral boundaries of the two properties are shown on the Site Plan – Existing Context of the site (Drawing A 1011).

The respective property descriptions are:

Part Lot 101 in DP 1171804, owned by the University of Sydney; and
Part Lot 1966 in DP 1117595, owned by St Paul's College.

A subdivision and land exchange between the University and St Paul's College is currently being completed.

2.3 Existing Context and Site Conditions

As shown in **Figure 2**, a number of buildings surround the site: the Physics Building (A28), a four storey 1960s Building (A29) which is an Annex to the Physic Building housing offices, and the Cosmic Ray Hut (A28A). The development of the AIN Building requires the demolition of the Annex and Cosmic Ray building. The removal of these elements is covered by a separate planning pathway described in Section 1.6 of this report.

Figure 2 **Site Context**

The site contours, shown on Drawing A-0032, indicates that the land falls gradually from St Paul's College towards the Physics building. There is also an east-west fall as part of the existing overland flow path for

stormwater from St Paul's oval to convey water towards a series of stormwater pits to the north of the sports courts.

A geotechnical study of the site contained in Appendix F, prepared by Jeffrey and Katauskas Pty Ltd, indicates that the site is underlain by the Ashfield Shale unit of the Wianamatta Group. The subsurface profile of the site, disclosed by an analysis of boreholes across the site, consists of shallow fill over a silty clay profile overlaying shale bedrock. The fill was deepest in the eastern half of the site and less than 0.5m elsewhere. The silty clay was assessed to be generally of high plasticity and generally hard strength. The bedrock varied between 2.5 m and 4.9m below the surface. It would appear that groundwater exists at a depth of 5.3m.

Figure 3 View of the development site behind the Physics Building

The margins of the development site are vegetated. The site vegetation and the undulating nature of the grassed area to the south of the Physics building are shown in the photograph of the site in Figure 3.

A detailed arboricultural assessment of the site was undertaken by TreeiQ. A copy of the assessment report in Appendix C contains a map of vegetation type and location and a tree assessment schedule. The Assessment identified three significant trees that should be retained and protected – one of which was subsequently uprooted in a recent storm and had to be removed.

In terms of hydrology the site is within the Johnstons Creek Catchment. Flooding occurs at the site when runoff from St Paul's Oval and College to the south and the roads and buildings to the east converge on the site. The existing Physics Buildings acts as a barrier to overland stormwater flow paths for rainfall events as small as 5 year ARI event. Stormwater on the site is managed by earth mounding, and a series of pits and pipes which traverse the site as shown on Drawing A-1013. Site conditions and the results of flood modeling are discussed in Appendix J of this report.

2.4 Heritage

Much of the University of Sydney, including the subject site, is located within the Sydney University Conservation Area (CA47) which is listed in Schedule 2A of the South Sydney Local Environment Plan (LEP) 1998 and the Draft Sydney LEP 2011. Part of the site is also included in the Sydney University Site Landscaping which is a locally listed heritage item in Schedule 2 of the South Sydney LEP 1998.

The proposed AIN Building will be located immediately adjacent to, and connected to, the University of Sydney School of Physics Building, Building A28. The Physics Building is listed as an individual item of local heritage significance in the South Sydney LEP 1998 and Draft Sydney LEP 2011, and is included in The University of Sydney Section 170 Register.

The following excerpt from the Statement of Significance for this item is sourced from the School of Physics Conservation Management Plan:

> *The School of Physics is historically significant as the direct descendant of the original Physics school established at the University of Sydney, which contained the first purpose built physics laboratory in Australia. The transfer of the collection commenced by Professor Threfall, reflected this continuity, showcasing Australian innovations such as Lawrence Hargraves flying machine models.*
>
> *The construction of a substantial School of Physics outside of the science precinct shows the expansion of the teaching of science in the early 20th century.... The subsequent use of the sections of the building related to technological advances and research undertaken at the School, particularly in the fields of cancer research and nuclear physics.*
>
> *One of a series of university facilities used during World War II by the Australian and the American Armed forces. A largely female staff produced optical munitions and Bailey Boys were trained in the newly emerging technique of radiolocation (radar)...*
>
> *The School of Physics continues to be used for the purpose for which it was designed... Research facilities and professional offices also remain within the building, although these areas have been substantially modified...*
>
> *... Alterations to the building reflect growing staff and student numbers, the requirements of more recent professors and the introduction of new technologies for teaching and research purposes...*
>
> *The Physics Building is one of the largest Mediterranean style buildings constructed in NSW during the 1920s, and is an early use of the style in Australia... Of the two complete faculty buildings designed by Leslie Wilkinson at Sydney University, the Physics Building is generally considered to be one of his finest compositions.*

The proposed development is also located in the vicinity of a number of other identified heritage items, within and adjacent to the University of Sydney Campus. These include the Edward Ford Building, Animal House, St Paul's College and Wesley College.

The site is located within the boundaries of the Sydney University Conversation Area (CA47). The following statement sourced from the NSW State Heritage Inventory entry for item id 2431001, describes its heritage significance as:

> *"The university is a heritage cultural landscape containing buildings of exceptional individual value set within a designed landscape with large areas enclosed by a historic fence. The place developed into a series of precincts each with a special character. The Conservation Area has significance as the site of the first University in Australia established in 1850, operating continuously at Camperdown since 1958. The site has historic significance for its continuing association with the development of tertiary education in Australia. Incorporating Prince Alfred Hospital and various residential colleges, the Area represents the establishment and continued expansion of institutional uses on Grose Farm.*

The area has high aesthetic significance for its collection of fine buildings and public spaces dating from the 1850's and has association with several prominent architects including Blacket, Vernon and Wilkinson.

The continuing function of the institution as a University is also of exceptional cultural significance. An important Sydney landmark, containing what is probably the most significant group of Gothic Revival buildings in the country."

A detailed analysis of the Heritage context of the site and the adjoining heritage items is provided in the Heritage Assessment as Appendix H and further discussed in Section 6.10 of this report.

2.5 Precinct Planning Guidelines

Precinct planning guidelines are outlined in University of Sydney Faculty of Medicine, Faculty of Nursing & Midwifery and School of Physics Masterplan[1]. These guidelines have been followed as summarised here to ensure that the AIN project is consistent with the overall objectives of the Precinct Masterplan. The main principles relate to the provision of:

- Court yards and Open space
- View Corridors
- Pedestrian Pathways and Linkages
- Building Setbacks
- Connectivity

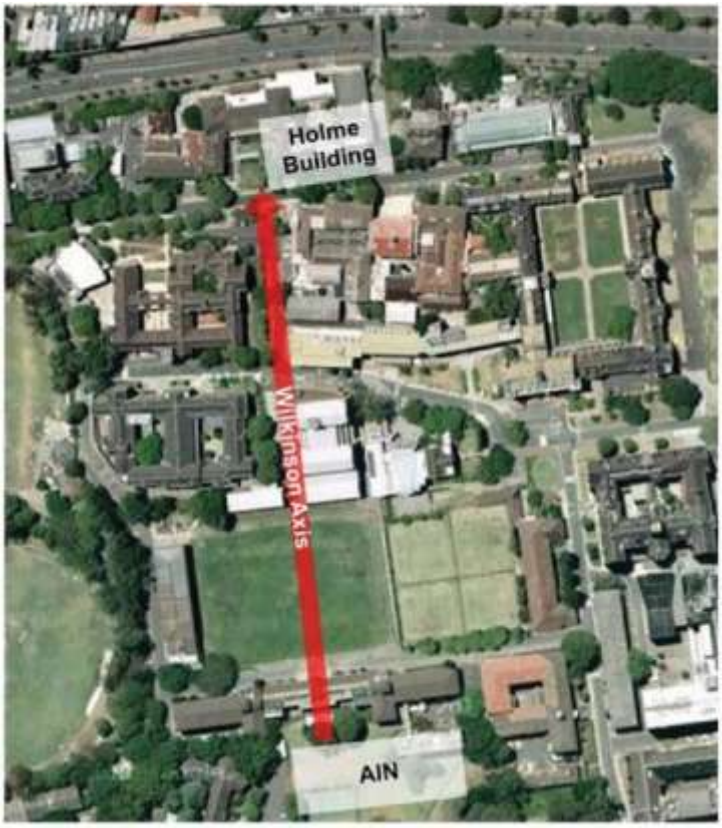

Figure 4 Wilkinson Axis

[1] University of Sydney Faculty of Medicine, Faculty of Nursing & Midwifery and School of Physics Masterplan, Bates Smart 2009.

Courtyards and Open Spaces:

The built form on the University of Sydney Camperdown Campus is characterised by a series of courtyards and open space. These spaces contribute to the character of the Campus and its iconic heritage views.

View Corridors: The Wilkinson Axes

The Wilkinson Masterplan for the university prepared by Architect Leslie Wilkinson in the 1920s established a series of planning axes based upon existing structures and campus topography. In designing the Physics building Wilkinson sought to maintain the vista from St Paul's College across Hockey Square to the Holme Building and to the entrance of the university on Parramatta Road. The location of the Wilkinson Axis is illustrated in Figure 4. Although, the Wilkinson Axis is easy to define on a plan it is not as strong feature visually. However, the axis has been acknowledged in the massing and footprint of the final building design.

Pedestrian Pathways and Linkages

A series of North-South and East-West pathways create an integrated network of pedestrian and cyclist routes through the Campus. This system uses buildings to frame and terminate vistas, providing an easily navigable experience for pedestrians. Two east-west and north-south connecting pathways respectively are illustrated in Figures 5a and 5b.

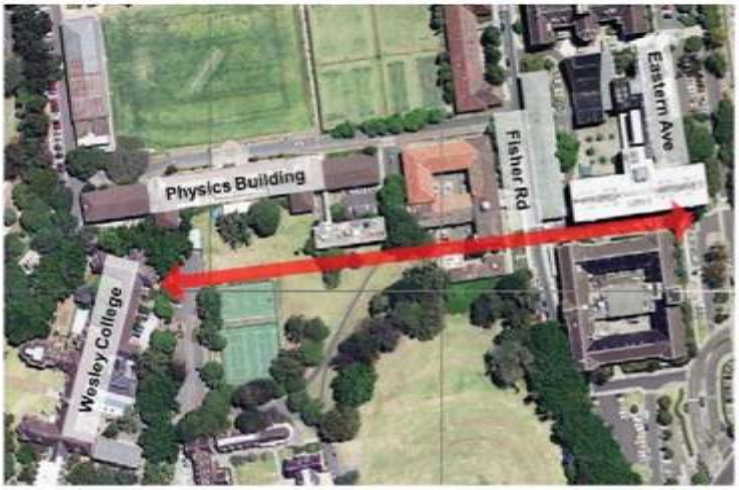

Figure 5a Eastern Ave to Wesley College pathway

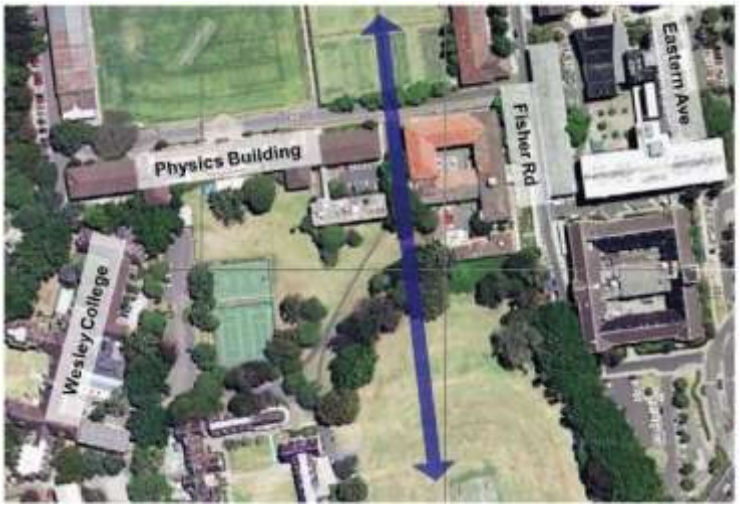

Figure 5b Physics Road to St. Paul's College Linkage

The AIN Building and the adjoining St Paul's development further enhances this network, via the extension of the pathway from Eastern Avenue between the Madsen and Chemistry Buildings to carry through to the eastern façade of Wesley College and by the provision of a pedestrian link to Physics Road.

Building Setbacks

The site offers district views from Physics Road between Edward Ford and the Existing Physics Building through to the landscaped gardens of St Paul's College. These views are maintained in the proposed development by keeping the view corridor free of building mass.

Connectivity

There is a strong desire for the new AIN Building to be closely integrated with the existing School of Physics building. As illustrated in the accompanying architectural drawings two physical connections between the two buildings are proposed. These physical links also echo the network of courtyards which are characteristic of Sydney University and create a central 'Physics Courtyard' which is a place where students, teaching and research staff can meet, collaborate and socialise.

2.6 Traffic and Accessibility

The development site is within the University of Sydney's Camperdown Campus, which is bounded by Parramatta Road and City Road to the north and east respectively. Roads within the university campus are controlled by the university.

Currently vehicular access within the university is only available from Physics Road adjacent to the Edward Ford Building to the east. Pedestrians can reach the site from several directions, through the existing Physics Building (A28), from the west past Wesley College and from the south via a path which currently runs northward from St Paul's College via the Physics Annexe (A29). Within the proposed development there is provision for approximately 12 car spaces.

2.7 Existing Services

Gas, sewer, water supply and stormwater services enter and leave the university boundaries from the local utility supplier or Sydney City Council.

The University has ownership and responsibility of most street services within the Camperdown campus. However, due to the nature of the site and the current ownership of the most of the land by St Paul's College there are still separate mains for some services.

The location of services to and within the site is shown in the site analysis drawing A-1013. Relocation of the main stormwater line through the site has been addressed in the early development application submitted to Sydney City Council and based on discussions with Sydney Water.

2.8 Stormwater

As indicated in the stormwater study in Appendix J the site is potentially susceptible to flooding. Drainage works undertaken under an early works package submitted to Sydney City Council have addressed this issue rendering the site suitable for the proposed development and its intended use.

2.9 Building Platform

Consent for the construction of a building platform for the future development of the AIN building has been sought from Sydney City Council under an early works development application. A series of benches to accommodate the proposed AIN Building will be created through the removal of overlying fill and underlying natural material and stabilised by a system of retaining walls. The general arrangement of these benches and the location of the retaining walls are shown in Figure 6 and Drawing A-0030.

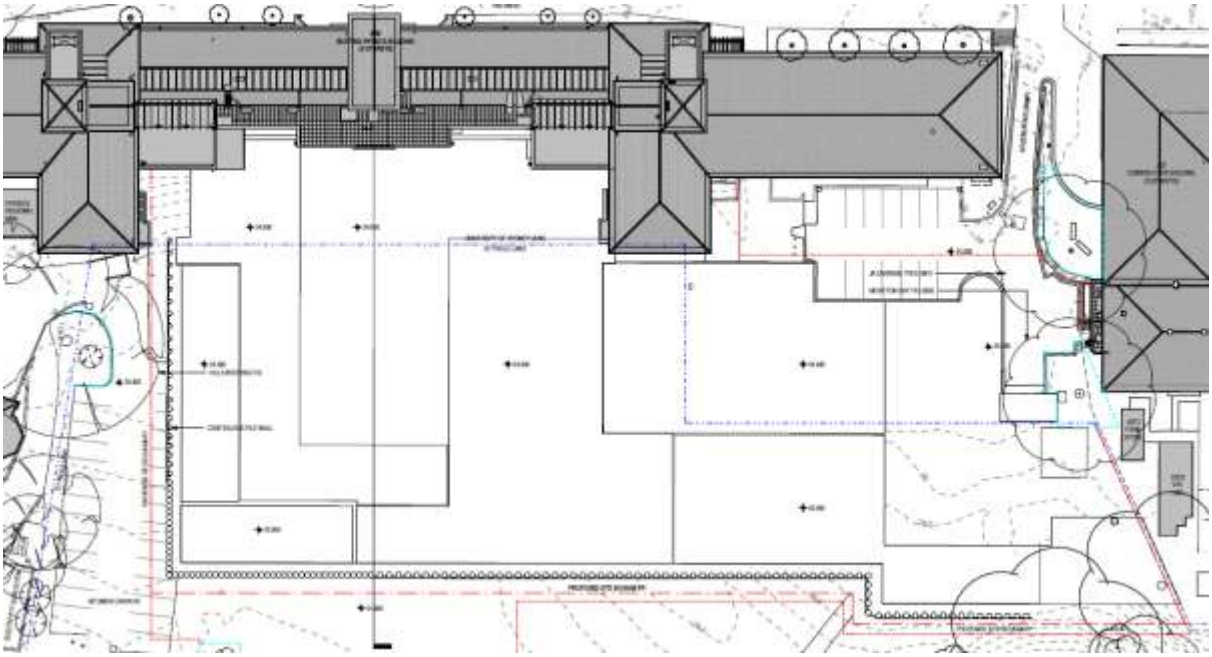

Figure 6 Site Benching in preparation of AIN Building

In undertaking the development of the required building platforms adequate measures for sediment , erosion and dust control were proposed.

2.10 St Paul's Development

The proposed St Paul's development consists of additional residential accommodation in three new buildings and a hall to the southern boundary of the AIN site. The separation between the two developments is a clear space of 8m.

As shown in the accompanying drawings, St Paul's development will essentially screen the AIN building from the south – as illustrated for example in the context drawing A-1050.

The main issue raised by the proximity of the St Paul's development to the AIN project is the potential impact on AIN's research laboratories, particularly in terms of vibration and electromagnetic interference (EMI). These issues have been addressed as part of the structural design of the AIN Building.

The relationship between the Ain development and the St Paul's development is discussed in Section 6.7 of this EIS.

3 Regulatory Context

3.1 Introduction

The *Environmental Planning and Assessment Act 1979* (EP&A Act) provides the statutory basis for the development consent process in New South Wales. This section of the report identifies the statutory planning controls that apply to the development and use of the land and the planning objectives and development standards applicable to the development.

3.2 Environmental Planning and Assessment Act 1979

Of particular relevance to this application is Division 4.1 of Part 4 of the EP & A Act which deals with the State significant development (SSD) applications. The Minister is to determine development applications in respect to SSDs.

This application also responds to the objectives in Section 5 of the EP & A Act in that the proposal:

- promotes the social and economic welfare of the community through the creation of a facility to house the reach and teaching activities of the Australian Institute of Nanoscience;

- makes an economic use of scare land resources for a public purpose within the University Campus and the better utilisation of the existing Physics Building;

- will protect the environment by incorporating adequate measures to protect significant trees on the site and conserving the heritage values of the Physics building; and

- involves ecologically sustainable development.

3.3 Environmental Planning Instruments

The key planning controls are contained in the following instruments and documents:

State

- State Environmental Planning Policy No 55 – Remediation of Land
- State Environmental Planning Policy (Infrastructure) 2007
- State Environmental Planning Policy (Urban Renewal) 2010
- State Environmental Planning Policy (State and Regional Development) 2011.

Local

- South Sydney Local Environmental Plan 1998
- South Sydney Development Control Plan 2007 – Urban Design
- City of Sydney Heritage Development Control Plan

Other Policies and Plans

Sydney City Council has prepared a draft local environmental plan identified as the Sydney LEP 2010.

However, although a draft of this planning instrument has been adopted by Council and the Central Sydney Planning Committee, the draft Plan has not been certified for exhibition by the Director-General of the Department of Planning and is therefore not applicable to this application.

Strategic direction for the application is also provided by the Sydney Metropolitan Strategy (the Metro Strategy) released in December 2005 and Sydney City Subregional Strategy. The proposed development is considered to be consistent with these strategies which respond to the challenges of Sydney's Growth to 2030.

3.4 State Environmental Planning Policies

The following State Environmental Planning Policies are relevant to this application.

3.4.1 State Environmental Planning Policy No 33 – Hazardous and Offensive Development.

State Environmental Planning Policy No. 33 – Hazardous and Offensive Development (SEPP 33) aims to identify proposed developments with the potential to be either hazardous or offensive. A development is defined as potentially hazardous and/or offensive (odour, dust etc) if, without mitigating measures in place, the development would pose a significant risk to the locality in terms of:

- human health, life or property, or
- the biophysical environment.

An analysis of the project with regards to SEPP 33 is provided in Section 6.15 of this Report. It is considered that the project is unlikely to result in any significant risk and is able to be conducted in a manner that is consistent with the aims and objectives of the Policy.

3.4.2 State Environmental Planning Policy No 55 – Remediation of Land

State Environmental Planning Policy No. 55 – Remediation of Land (SEPP 55) was introduced in 1998 to provide a state-wide planning approach to the remediation of contaminated land. Clause 7 of the Policy deals with issues associated with the matters to be considered when determining a development application. Specifically, Council is required to consider whether land is contaminated, and if so:

- Whether the land is suitable in its contaminated state (or will be suitable after remediation) for the proposed use; or

- If the land requires remediation to make it suitable for the proposed purpose it is satisfied that the land will be remediated before the land is suitable for that purpose.

Under the EP & A Act 1979 contaminated land means:

> ***contaminated land*** means land in, on or under which any substance is present at a concentration above the concentration at which the substance is normally present in, on or under (respectively) land in the same locality, being a presence that presents a risk of harm to human health or any other aspect of the environment.

The policy provides for preliminary and detailed investigations of the land (as referred to in the contaminated land planning guidelines). A preliminary environmental site assessment (stages 1 & 2) has been undertaken

for this proposal on behalf of Sydney University by Environmental Investigation Services (EIS) - a division of Jeffrey and Katauskas Pty Ltd. A copy of the EIS report is contained in Appendix D. The conclusions made in the environmental site assessment are discussed in Section 6.4 of this report and are supportive of the proposed development.

3.4.3 State Environmental Planning (Infrastructure) 2007

State Environmental Planning (Infrastructure) 2007 was introduced to facilitate the effective delivery of infrastructure and the provision of services in NSW. There is one aspects of the Policy that is relevant to this development: consultation requirements for traffic generating development with RTA (Clause 104).

In relation to a referral to RTA the proposed AIN Building falls within the application of the clause because it involves a new premises for educational purposes with more than 50 or more students enlargement or extension of a premises as specified in clause 104 (1) (a) of the Policy. Accordingly, there is a statutory requirement for a referral of the proposed development to the RTA (now part of the Roads and Maritime Services (RMS).

The issues raised in relation to the above aspects are considered in Section 6 of this report.

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

The proposed development is **State Significant development** by virtue of the provisions of State Environmental Planning Policy (State and Regional Development) 2011. Clause 8 of the Policy provides:

> **8 Declaration of State significant development: section 89C**
>
> *(1) Development is declared to be State significant development for the purposes of the Act if:*
>
> *(a) the development on the land concerned is, by the operation of an environmental planning instrument, not permissible without development consent under Part 4 of the Act, and*
>
> *(b) the development is specified in Schedule 1 or 2.*

Clause 15 of Schedule 1 of the Policy provides that the following form of development has been declared to be State significant development:

> *Development for the purpose of educational establishments (including associated research facilities) that has a capital investment value of more than $30 million.*

The capital cost of the proposed development, excluding GST, is approximately $77.7m. Accordingly, the development is subject to the provisions of this environmental planning instrument.

3.5.1 State Environmental Planning Policy (Urban Renewal) 2010

State Environmental Planning Policy (Urban Renewal) 2010 (SEPP Urban Renewal) establishes a process to identifying urban renewal precincts, facilitates development and redevelopment of sites in and around urban renewal precincts, and seeks to facilitate State, regional or metropolitan strategies with the renewable of urban areas that are accessible by public transport. The Director-General is required by the Policy to initiate

studies to determine whether a potential precinct should be an urban development precinct, and if so, to determine the appropriate land use and development controls for the precinct.

SEPP Urban Renewal defines three potential precincts, one of which is the Redfern-Waterloo area. The boundary of this area includes all of the University of Sydney between Abercrombie Street and City Road, including the site that is the subject of this development application. Pending the completion of studies of potential precincts, Clause 10 of the Policy applies to proposed subdivision or development with a capital value of more than $5m.

Clause 10 (2) & (3) provides as follows:

> (2) *The consent authority must not grant development consent unless it is satisfied that the proposed development is consistent with the objective of developing the potential precinct for the purposes of urban renewal.*
>
> *(3) For the purposes of subclause (2), the consent authority is to take into account whether or not the proposed development is likely to restrict or prevent the following:*
>
> *(a) development of the potential precinct for higher density housing or commercial or mixed development,*
> *(b) the future amalgamation of sites for the purpose of any such development within the potential precinct,*
> *(c) access to, or development of, infrastructure, other facilities and public domain areas associated with existing and future public transport in the potential precinct.*

The proposed facility is within the Redfern-Waterloo Potential Precinct. In response to the matters listed in clause 10(2) and (3) the following is relevant:

1. Urban renewal is not limited to residential development but includes other land uses and activities commonly found in urban areas. The university has been an integral part of this area for many years and has undertaken a number of important renewal projects in the immediate vicinity of the proposed Sports Halls, including the redevelopment of the adjacent Services Building in 2010. The provision of new facilities as proposed achieves the intent of the Policy and will provide further impetus for renewal. In particular, the proposed Sports Hall has been designed to a high architectural standard and this investment will encourage other development within the area to achieve a similar standard of excellence.

2. The proposed development will not restrict and is unlikely to discourage within the Redfern-Waterloo Precinct:

    - the development of higher density housing or commercial or mixed development,
    - the amalgamation of sites; or
    - access to, or development of, infrastructure – including the university's own infrastructure, other facilities and public domain areas associated with existing and future public transport in the potential precinct.

The proposed development site is wholly within the boundary of the Sydney University campus and any impacts are limited to Abercrombie Street and to a lesser extent Raglan Street. However, it is anticipated that the new built form could act as a catalyst for renewal in the immediate area of the proposed development.

3.6 South Sydney Local Environmental Plan 1998

The permissibility of the proposed development is given by the local planning instrument which is the *South Sydney Local Environmental Plan (SSLEP) 1998*. Under SLEP the site is zoned 5 Special Uses (University).

The objectives of zone 5 of SLEP are:

(a) to facilitate certain development on land which is, or is proposed to be, used by public authorities, institutions, organisations or the Council to provide community facilities, services, utilities or transport facilities, and

(b) to allow other ancillary development which is incidental to the primary use specified on the map, and

(c) to provide flexibility in the development of sites identified for special uses by allowing development which is permissible on adjoining or adjacent land, and

(d) for land in the zone and within Green Square, in addition to the above:

- *(i) to reflect and reinforce the need for proper recognition of community land and facilities as part of a robust public domain in the Green Square locality, and*
- *(ii) to recognise that protecting and improving the quality, accessibility and impact of the public domain makes a fundamental contribution to the social, economic, environmental and urban design outcomes for the area, and*
- *(iii) to ensure that development contributes to a sustainable, vibrant community, and reflects equal and integrated consideration of social, economic and environmental design issues.*

Development for the following purposes is permissible in zone 5 of SSLEP:

> *The particular land use indicated by red lettering on the map, or land uses which are ancillary or incidental to that land use; development that may be carried out (with or without consent) on adjoining or adjacent land in the same or a different zone; roads; temporary buildings.*

Development for 'University' purposes is permissible in the zone. As the proposed development is being undertaken by the University in accordance with its Charter, the proposed development is permissible with consent. In terms of the zone objectives the proposed development is considered to be consistent with these objectives.

This planning instrument does not contain any development standards in respect of height, site coverage, or floor space ratio. Clause 29A of the SSLEP provides (via Clause 7.15 of Sydney Local Environmental Plan 2012) that a consent authority must consider whether the development:

> *(a) is compatible with the flood hazard of the land, and*
>
> *(b) is not likely to significantly adversely affect flood behaviour resulting in detrimental increases in the potential flood affectation of other development or properties, and*
>
> *(c) incorporates appropriate measures to manage risk to life from flood, and*
>
> *(d) is not likely to significantly adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses, and*
>
> *(e) is not likely to result in unsustainable social and economic costs to the community as a consequence of flooding.*

The issue of flooding and stormwater drainage is addressed in Section 6.5 of this EIS.

SSLEP also contains provisions in clauses 22-27 that deal with the conservation of heritage items, heritage conservation areas and heritage streetscape areas. The manner in which the proposed development responds to these clauses in considered in Section 6 of this report.

3.7 South Sydney Development Control Plan – Urban Design 2007

The applicable development control plan is the South Sydney Development Control Plan 1997: Urban Design. This plan contains objectives, performance criteria and controls for development with the South Sydney Area.

The key design standards in this DCP for the type of development covered in this application relate to BCA compliance and the provision of parking. The manner in which the proposed development addresses the objectives of the DCP is considered in Section 6 of this report.

3.8 Policies, Guidelines & Planning Agreements

The development is consistent with the provisions and strategic objectives of the following policies and guidelines.

Table 4 Relevant Policies and Guidelines

Policy/Guideline	Comments
NSW State Plan	The NSW is a 10 plan to strengthen the economy, provided infrastructure and services, and strengthen the local environment and communities. Sections of the Plan are directed to the delivery of jobs through research and education. The proposed development is consistent with the aims and objectives of the State Plan.
Metropolitan Plan for Sydney 2036	The proposed development is consistent with maintaining the University of Sydney as a strategic centre of teaching and research.
Draft Sydney South Subregional Strategy	The Strategy identifies the University of Sydney as a health and medical research hub of the Sydney Education and Health precinct. The precinct is recognised as having specialised research and technology-based activity. A major objective of the Subregional strategy (A2) is to increase innovation and skills development in new and established hubs. The strategy supports a joint effort by institutions to promote world-class education infrastructure with substantial capabilities in health and medical research in order to strengthen partnership and increase global competitiveness. As such, development of the proposed research and education facility is consistent with the aims of the Draft Sydney City Subregional strategy.
Development near Rail Corridors and Busy Roads – Interim Guidelines 2008	The Interim Guidelines for Development near Rail Corridors and Busy Roads is relevant to assessing the noise and vibration impacts on developments arising from proximity to rail and road corridors. These Guidelines are not directly relevant to the proposed AIN building because of its location

	between the existing Physics Building and the proposed St Pauls College development.
NSW Groundwater Policy Framework – General (DLWC, 1997) and the NSW Groundwater Quality Protection Policy.	The NSW Groundwater Policy Framework establishes a broad objective to "To manage the State's groundwater resources so that they can sustain environmental, social and economic uses for the people of NSW" by setting out a range of legislative and management provisions that will enable the protection of local groundwater systems, aquifers and dependent ecosystems. The policy adopts the principles of Ecologically Sustainable Development and recognises the importance of an integrated approach to resolving management of groundwater issues and land use planning decisions. The Policy also constitutes the management of surface water treatment which infiltrates geologic formations to become groundwater. The right to control, manage and use groundwater in NSW is vested in the Minister responsible for water resources, under the Water Management Act 2000. The Act stipulates that where interference with an aquifer occurs an Aquifer Interference Approval must be obtained. The NSW Groundwater Quality Protection Policy is a component policy of the NSW Groundwater Policy Framework. The Groundwater Quality Protection Policy specifically targets the protection of valuable groundwater resources and dependent ecosystems against pollution. Where the policy addresses new developments, it recommends that the work be required to demonstrate adequate groundwater protection shall be commensurate with the risk the development poses to a groundwater system and the value of the groundwater resource. Analysis of groundwater at the proposed site reveals that it occurs at depths of 5.3m. Groundwater inflows are not expected and can be controlled by conventional; dewatering systems. Site pollution risks from the proposed development are low and therefore the proposed development does not pose a risk the existing ground water system.

3.9 Conclusion

The proposed development is permissible with consent under the SSLEP and is as declared to be State significant development under State Environmental Planning Policy State and Regional Development) 2011. The Minister for Planning is the consent authority for State significant development.

This section addressed the legislation applicable to the proposed development. Relevant environmental planning instruments, policies and guidelines are also addressed in accordance with the DGRs. Some additional matters considered to be of relevance are also identified.

The proposal is consistent with the relevant planning provisions and policies and is an appropriate form of development within its context.

4 Proposed Development

4.1 Introduction

This Section of the report provides a description of the proposed development which should be considered along with the accompanying architectural drawings and illustrations contained in the drawing set. An Architectural Performance Brief, prepared by Architectus included at Appendix G, provides a detailed overview of the university's project specification. A Landscape Masterplan for the open space areas and public domain, prepared by Site Image Pty Ltd, is contained in Appendix I.

The Project Objectives for the project are described in Section 1.5 of this Report.

4.2 Matters for which consent is sought

Consent is sought for the following matters as described in the accompanying reports and drawings:

• Demolition of minor structures, construction earthworks and services.	Drawing A-1015 Site Plan Demolition Drawing A-1501/2 & A-1505 -7
• Construction of the AIN Building & Utility Building	Architectural Drawing Set generally
• Construction of New Links to Physics Building	Drawings A – 1510 & 1511
• Ancillary works	Pedestrian walkway and site landscaping

4.3 Description of Development

The Australian Institute of Nanoscience (AIN) project involves the development of a major science research and education facility in a purpose designed building. The new AIN Building and its connection to the existing Physics Buildings are shown in the accompanying Architectural Drawing Set and visually illustrated in Figure 7.

The development will integrate a shared student common and lecture theatre across three faculties. The associated office spaces, seminar rooms, postgraduate teaching facilities and share facilities will be positioned within an area that also contains undergraduate teaching theatres. This common area runs through the campus linking the medical faculties, Physics and the University's medical research precinct.

The new building will be integrated with the existing heritage-protected Physics Building by two new linkages and will contain multiple floors and zones whose conditions span a range of functions and very specific technical requirements on cleanliness, vibration, electromagnetic environment and temperature control.

A contemporary palette of material will be used to clad the building comprising various materials comprising metals and glasses which reflect the forward looking nature of the research and teaching that will be conducted in the facility.

Environmental sustainability will be an integral consideration from the commencement of the design phase, not an add-on after construction. The AIN will embody innovative design practices and comprehensive utility

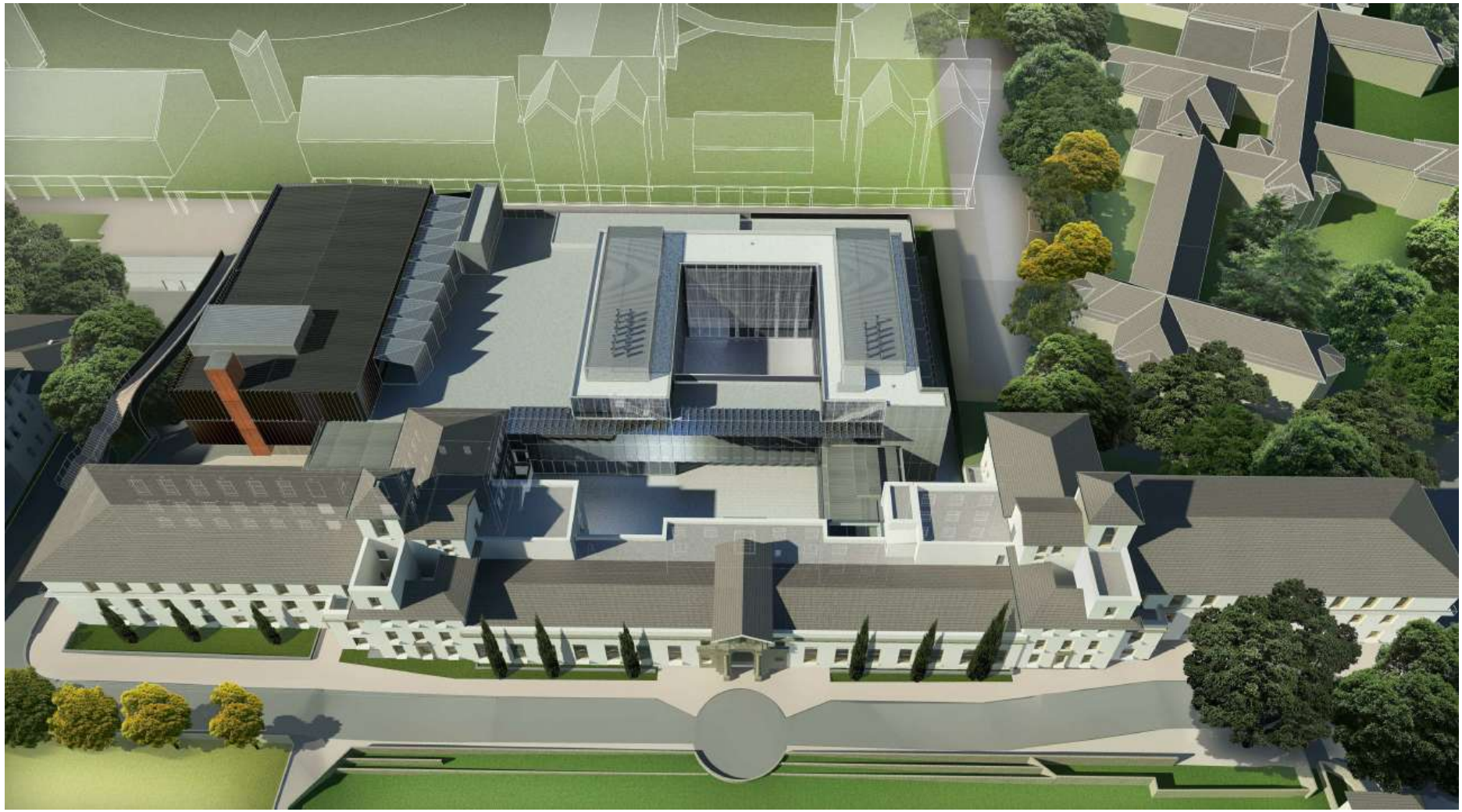

Figure 7 Visual Impact of the proposed AIN Building.

and waste monitoring linked to key performance indicators (KPIs) that inform management targets. The clean rooms at the heart of the AIN require particular levels of energy and resource use.

The functional relationship between the activities in the new AIN Building are summarised in Figure 8.

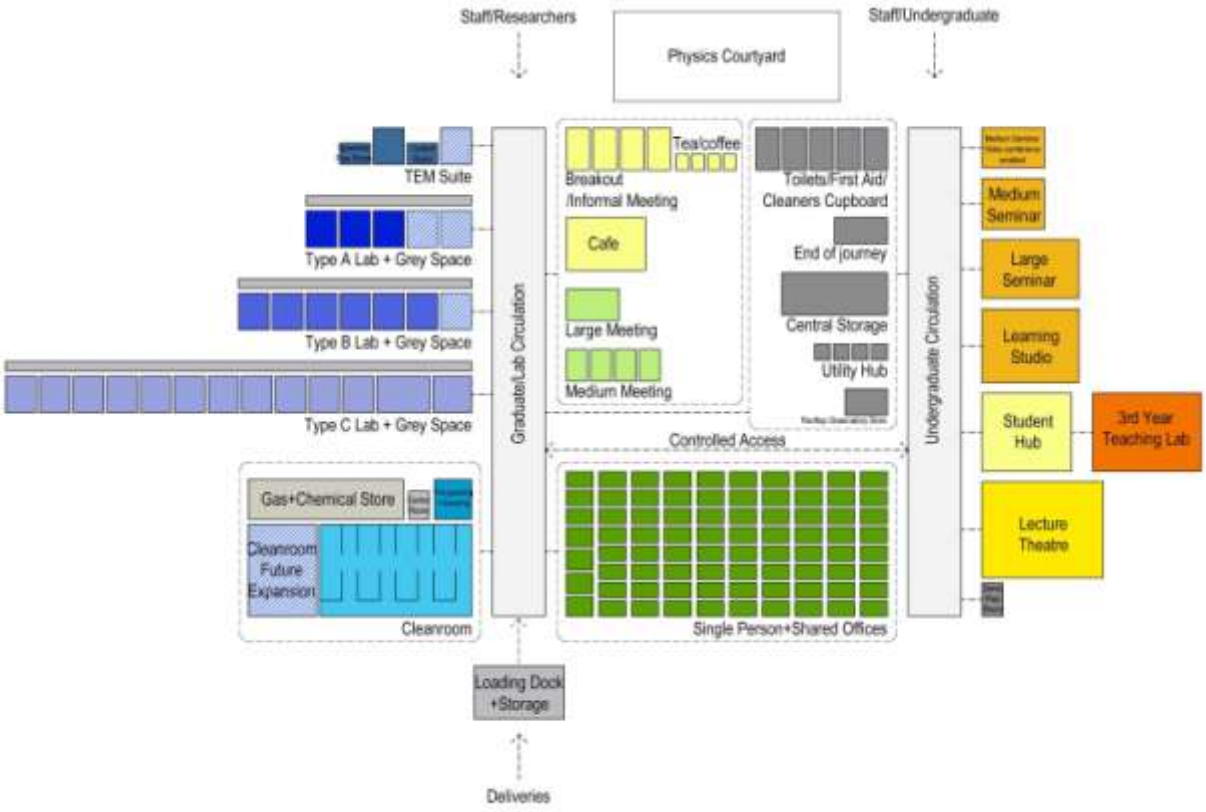

Figure 8 **Adjacency Diagram**
(source: Architectural Performance Brief, Architectus, 2012 p 23)

The building is organised in two basic zones which reflect the desired functional arrangement: research and teaching, each arranged around a major central space as shown in Figure 7.

The research wing comprises the laboratories, clean rooms and offices grouped around the central courtyard towards the western half of the site. Given its proximity to surrounding buildings and the large fig trees that have been retained at both ends, the external facades of this aspect of the development will be difficult to observe as a whole. The outer skin of the research wing will be relatively solid, clad in acid washed light grey precast concrete with limited openings to the laboratories which require a high level of environmental control.

The teaching wing is located to the east and grouped around an internal double height atrium. The upper levels are clad in panels of zinc which are treated to give it an anthracite colour. These panels are angled around the level 4 plant room to provide air intake and ventilation to plant equipment and also to reflect noise away from the future St Paul's development.

The centrepiece of the AIN project is the provision of clean rooms, rated from ISO grade 4 to grade 7 according to ISO standard 14644-1 housing 'tools' capable of sculpting nano-scale features into advanced materials using lithography and plasma etching, depositing atomically thin layers of other materials, attaching electrical or optical connectors using robotically operated alignment tools, and performing sophisticated measurements that will elucidate fundamental physical concepts or evaluate fitness for purpose for applications in communications, medicine and astronomy. Much of this equipment will be provided by funding agencies for

collaborative access, and the clean rooms will have provision for training, levels of access, and observation corridors for information tours.

The clean rooms and associated discipline-defined laboratories will be underground to ensure maximal control over vibration and temperature with dust control achieved by a purpose-built air conditioning system with high grade (HEPA) air filters.

The ground floor will contain flexible research training spaces and research seminar rooms to suit varying pedagogies from traditional research seminars to collaborative training, arranged along either side of the new pedestrian thoroughfare. Offices for over 200 research staff and postgraduate student on the first floor will be modular and reconfigurable, to promote collaboration and cross-disciplinary research, allowing for expansion of academic and research staff and teams, and with the capacity to accommodate more than 50 visiting academics and students.

A two storey stores utility building will be constructed on the south side of the service yard is constructed in exposed in-situ concrete with a series of vertical stainless steel wires over the face of the wall and associated walkway. This provides a frame for climbing plants that will soften the appearance of this building.

The internal facades that open onto the Physics and Central Court yards are visually open. The facades have been designed to suit the functional needs of each internal space with flush structurally bonded glazed curtain walls in a combination of transparent panels and opaque spandrel sections. Offices will have open able windows to allow for natural ventilation. The northern facade that faces onto the Physics courtyard will be clad in angled glass shingles with air gaps between. The overlapping arrangement allows outside air to naturally ventilate the circulation corridors behind. A projecting stainless steel canopy provides shade to the areas below. The canopy will be perforated with a Feynman pattern which provides a pictorial representation of the mathematical expressions governing the behaviour of subatomic particles which provides a reference to the work going on in the building.

The AIN Building will meet a minimum 5 green star rating in line with the University's Policy on environmental sustainability. The low profile ensures compliance with heritage constraints and with best practice examples internationally.

The total gross floor area of the development is approximately 11,600 m^2 comprising:

- Approximately 3,073m^2 of specialist laboratories for research groups with stringent vibration, temperature control and cleanliness requirements;
- Approximately 2,596m^2 of teaching spaces, including: lecture theatre space comprising a traditional tiered space, a flexible flat floored seminar space for up to 90 people; smaller seminar rooms for 45-50 people each; and a collection of teaching laboratories;
- Approximately 2,358m^2 of workspace for staff and research students in a mixture of open and private work setting; and
- Approximately 3,567m^2 of shared support services including plant room, storage areas and loading dock and a full service cafe and a concierge/security point.

The distribution of functions within the building is given in **Table 5.**

Table 5 Activities by level in the AIN Building

Level	Uses
Level 1 (RL 25.0) Drawing A-1100	Northern Link to Physics Building including cafe
	Labs - Nos. 1- 5, & 13- 24
	11 Offices and 10 grey spaces
	Breakout space and amenities
	Clean Room and Clean Storage Room
	Plant, Loading dock and Garbage Rooms
	Hazardous and other storage rooms (External Plant Room)
	Substation and Water Tanks (External Plant Room).
Level 2 (RL 29.0) Drawing A-1101	Upper Level of the Northern Link to Physics Building
	Southern Link to Physics Building
	Labs - Nos. 6 – 12
	11 Offices and 4 grey spaces
	3 Meeting Rooms
	Breakout space and amenities
	Lecture Theatre
	Clean Room Plenum
	Plant and Storage Rooms
	Switch room and emergency generator (external plant room)
Level 3 (RL 32.5) Drawing A-1102	Upper Level Southern Link to Physics Building
	20 Offices
	Amenities
	Meeting Room
	Case Study Lecture Theatre
	Storage and Plant Rooms
	Learning Studio
	2 Seminar Rooms
Level 4 (RL 36.0) Drawing A-1103	12 Offices
	Meeting Room
	Plant Room
	3rd Year Teaching Space
	Plant Room

The key features of the proposed development are described in Table 6.

Table 6 Key features of proposed development

Feature	Proposed
Gross floor area	11,600m^2
Storeys	4
No. Laboratories	24
No of Grey Spaces	
No. Offices	54
No. Seminar Rooms	5 plus informal breakout spaces.
Car parking	12 Spaces
Loading Bays	1
Bicycle Storage	16

Sections and elevations of the proposed development are provided in Drawings A-1201- A-1203 and Drawings A-1204/5 respectively. These drawing show that the highest point of the development are the exhaust stacks in the North West corner of the building at 46.0m. The southern and western parapet of the Teaching and Learning Wing is set at 41.95 while the parapet of the Offices is 39.9. This compares to building heights in the proposed St Pauls College development of 58.0m and 53.85m for the Academic and Graduate Houses respectively.

The proposed multi level linkages between the proposed AIN Building and the existing Physics Building are shown in drawings A-1517 (east link) and A- 1519 (west link).

Figure 9 Cafe Concept Sketch

The cafe will be the social heart of the facility and providing a prominent space linked to the adjoining courtyards for staff, students and visitors. Food and beverage facilities to be provided by the cafe will be limited to coffee and other beverages and light snack food although visitors can bring their own food. The cafe space is intended to operate 24/7. A description of the functional elements of the Cafe is contained in Section 3.6.17 of the Architectural Design Specification in Appendix G.

4.4 Description of Operations

The operation of the AIN Building is best understood by the activities that will occur in specially designed research, teaching, administration and service delivery spaces:

- **Research spaces** will contain approximately 30 individual laboratories for general research and a clean room for environment sensitive experiments particularly experiments where interference from the following sources must be removed or accurately controlled: temperature, humidity, dust, mechanical vibration and electromagnetic interference.

- **Teaching spaces** will be a traditional 320 seat lecture theatre, a 90 person learning studio, on large and two medium sized seminar rooms and a 40 person teaching laboratory. Brake out spaces are also provided.

- **Administration areas** are comprised of over 50 offices and break-out spaces will accommodate both staff and undergraduate students.

- **Service Areas** include grey spaces, clean room gas store and miscellaneous rooms with dangerous goods and chemical store/dispensing area. The Grey Spaces identified in **Table 5** will contain equipment to service the adjoining laboratories that requires substantial infrastructure – egg chilled water, compressors, vacuum pumps, deionised water etc. A description of the dangerous good storage is provided in Appendix N.

A description of the operational features of the building in terms of the movement of goods and services, security, waste management is contained in Section 4 of the Architectural Design Specification in Appendix G.

There are three points of pedestrian access to the proposed building:

- **Main entrance of the existing Physics Building (A28)**
  The double height Ceremonial Entry of the existing Physics Building (A28) provides entry to the proposed development via a connecting link that contains a cafe. The adjoining new physics courtyard intended to be the gathering point of the School of Physics community. Controlled access to the Laboratories and upper floors is enabled via the lift and stairs.

- **Teaching & Learning Atrium – Northern Entry**
  The Northern entry from the Physics Building is located on Level 1 is located at the north end of the atrium to serve the Teaching and Learning wing. A vertical circulation core gives access up to the Atrium and to all levels of the new building as well as connecting to the existing Physics Building.

- **Teaching & Learning Atrium – Southern Entry**
  The Southern Entry is located at the south end of the atrium on level 3 and can be reached with the provision of a new pedestrian route on the southern boundary of the site providing access for students to the teaching facilities directly from Fisher Road. The large number of students that will utilise these teaching and learning spaces, many of whom are not School of Physics students may access these facilities directly with minimal disruption to the operation of the other components of the AIN Building and the existing Physics Building.

The Entry Forecourt on the south east corner of the AIN building shown on Drawing A-1102 is set at RL 32.5 and is partially below the third year teaching laboratory. This Forecourt also provides a convent pedestrian linkage between Physics Road and the adjoining St Paul's development top the south.

In terms of vehicular access, the existing entrance from Physics Road will provide adequate access for service and supply vehicles to access the loading dock and external plant areas as described in the Transport Impact Assessment in Appendix K.

The usage of the building for research purposes will be approximately 24/7 with staff and students working generally long hours. For environmental control purposes the laboratories require doors that are always closed except for entry/exit of personnel. In addition, only approved users and facility staff with entry privileges will have access to the clean rooms. The University's Security Service utilises a centralised computerised monitoring systems in tandem with patrol surveillance to monitor building access.

4.5 Landscaping and Public Domain

Landscape and Public Domain improvements will be undertaken in accordance with the principles of the Physics Building Conservation management Plan. The proposed landscape design and landscape Masterplan is contained in Appendix I. The Masterplan also recognises and provides for the recommendations contained in the arboricultural assessment prepared by treeIQ contained in Appendix C.

5 Consultation

During the life of the project there are has been ongoing consultation with relevant government authorities, service providers and project stakeholders. There has been general support for the proposed scheme from the relevant authorities. Guidance has been provided in terms of the most appropriate way to facilitate the proposal.

The following table provides a summary of the meetings and other correspondence undertaken with authorities. The discussions focussed on the requirements of the University and compliance with the relevant planning controls and the design merits of the proposal.

Prior to each meeting a package of drawings and background information was provided to participants. The meetings were attended where appropriate by members responsible for the design of the building and key external consultants.

Table 7 Stakeholder Consultation and Issues Raised

Agency	Main Consultation Forum/s	Key Issues
Department of Planning	• Pre-lodgement meeting • Director-General's Requirements • Emails on the Planning Pathway & Policy Requirements • Progress Meeting and Review of Project Scope	• General Planning and Environmental Issues • Traffic and Transport • Heritage • Sustainability Issues • Site Contamination • Infrastructure Services • Building Design • Construction Management • Relationship to the adjoining St Paul's College Development
City of Sydney	• Pre-DA meeting for Enabling Works • Presentation of Proposed Development	• General Planning and environmental Issues • Proposed Building Design • Ecologically Sustainable development • Heritage • Flooding and Stormwater drainage • Site Contamination • Removal of Trees • Traffic and Parking • Relationship to the adjoining St Paul's College Development
Roads and Maritime Services	• Presentation of Proposed Development	• Site access and pedestrian management • Definition of work zone • Parking for construction workers • Provision of lay-bys
Office of Environment and Heritage	• Presentation of Proposed Development	• Heritage Significance • Significant Vegetation • Landscaping

Agency	Main Consultation Forum/s	Key Issues
		• Vistas across Campus • Linkages between AIN Building and existing Physics Building
St Pauls College	• Project Meetings on Joint Project Co-ordination	• All aspects of the proposed development

Further consultation with Sydney Airport Corporation was not required because the proposed development does not exceed 46.3m above Australian Height Datum.

The DGR's requirements in relation to environmental assessment for the project (Appendix A) have also been addressed. The key issues identified for assessment include:

- Built Form and Urban Design
- Ecologically Sustainable Development
- Amenity
- Noise and Vibration
- Transport and Accessibility
- Heritage
- Infrastructure and utilities.
- Sediment erosion and dust control
- Drainage Waste
- Impact on Trees
- Hazards
- Operational Management
- Public Domain
- Accessibility
- Building Height
- Staging

These issues are addressed in Section 4 and 6 of this Environmental Assessment.

6 Environmental Impacts

6.1 Introduction

In this section of the report the environmental impacts of the proposal are considered, and where appropriate, mitigating measures are proposed.

Where appropriate, reference is also made to the results of investigations undertaken for the adjoining development by St Paul's College particular in relation to issues associated with archaeology, site conditions and contamination, and heritage.

6.2 Consistency with LEP Objectives and General Zone Restrictions

As indicated previously in this report, the proposed development of the site as proposed in the application is permissible with consent.

The intent of the objectives for the zoned 5 Special Uses (University) - under the South Sydney Local Environmental Plan 1998 (SSLEP) is to discourage development that would prejudice the future of urban land. The proposed development will make a positive contribution to achieving these objectives as can be seen from the assessment of compliance to the LEP objectives.

Table 8 Compliance with Zone Objectives

SSLEP Objectives for the 5 - Special Uses Zone	Compliance
(a) to facilitate certain development on land which is, or is proposed to be, used by public authorities, institutions, organisations or the Council to provide community facilities, services, utilities or transport facilities, and	**Complies**. The proposed development is for core university research and teaching purposes.
(b) to allow other ancillary development which is incidental to the primary use specified on the map, and	**Not Applicable**
(c) to provide flexibility in the development of sites identified for special uses by allowing development which is permissible on adjoining or adjacent land, and	**Not Applicable**
(d) for land in the zone and within Green Square, in addition to the above: (i) to reflect and reinforce the need for proper recognition of community land and facilities as part of a robust public domain in the Green Square locality, and (ii) to recognise that protecting and improving the quality, accessibility and impact of the public domain makes a fundamental contribution to the social, economic, environmental and urban design outcomes for the area, and (iii) to ensure that development contributes to a sustainable, vibrant	**Not Applicable.**

SSLEP Objectives for the 5 - Special Uses Zone	Compliance
community, and reflects equal and integrated consideration of social, economic and environmental design issues.	

6.3 Archaeological

A preliminary Aboriginal heritage and historical archaeology assessment of the proposed development has been undertaken by AHMS in accordance with the relevant guidelines for investigating sites prior to development. A copy of this assessment is contained in Appendix B.

The conclusion of the investigation was that the proposed development is unlikely to involve harm to aboriginal objects and that further investigation is not warranted.

6.4 Site Conditions and Contamination

The geotechnical investigation, included at Appendix F concluded that *"Foundation conditions should not be particularly problematic, though the quality of the shale just below bulk excavation level is quite variable... The site classification, if applicable, would be Class P in accordance with Clause 1.3.3 of AS2870-2011 not only because uncontrolled fill is present on the site but also due to abnormal moisture conditions which may occur due to the removal of trees and existing building within the proposed building footprint"*

Sydney University commissioned EIS, a division of Jeffrey and & Katauskas Pty Ltd, to undertake a Stage 1 and preliminary Stage 2 environmental assessment to assess the potential risk for significant soil contamination for the proposed AIN building close to St Paul's College, Sydney University, NSW. This assessment report which is contained in Appendix D describes the investigation procedures used and presents the results of the assessment, together with comments, discussion and recommendations. The work undertaken was prepared in accordance with the requirements of SEPP 55, relevant guidelines and the City of Sydney Contaminated Land Development Control Plan 2004.

Copy of the site assessment is contained in Appendix D. The results of the assessment are:

- The land was used up to 1855 for agricultural purpose and for University purposes thereafter – including recreational uses;
- Potential contamination of the site could be anticipated primarily due to imported fill material;
- Soil samples revealed fill material in all boreholes drilled ranging in depth from 0.05m to 1.9m. The material below is natural silty clay soils followed by shale bedrock. The boundary between fill material and natural material is clearly differentiated.
- Samples of the fill and natural material from each borehole were analysed. The results with reference to appropriate guidelines and regulations were all below the relevant site assessment criteria (SAC);
- Based on site investigations it was concluded that the risk of widespread soil contamination is relatively low; and
- In terms of the waste classification the following was concluded:

Fill Soils – likely to be classified as 'General Solid Waste' (non-putrescibles).

Natural Soil and Bedrock – the natural silty clay and underlying shale bedrock at the site is considered to be virgin excavated natural material (VENM).

Based on the results of the investigations it is evident that the site does not pose a significant threat to human health or the environment because the risk of contamination has been assessed as low and the site can be made suitable for its intended use.

Development consent has been sought from Sydney City Council for the removal of both the fill and the natural soil and bedrock from the site for disposal and recycling respectively. The removal of any potentially contaminated material obviates the need for the preparation of a separate remedial action plan.

The site will also be suitable for its intended use in terms of vibration. The Site vibration survey presented in Appendix P concluded that the site would be suitable for 'high end' microscopy.

6.5 Flooding and Stormwater Drainage

Consent for a suitable building platform and associated retaining walls for the development of the AIN building was obtained under a separate development application to Sydney City Council[2]. This consent also addressed issues associated with the replacement of the existing stormwater drainage system.

Advice on the flood behaviour of the site based on modelling undertaken by WMAwater is contained in Appendix J. The advice indicates that St Paul's land and the development site is located in the Johnstons Creek Catchment and is susceptible to flooding. Based on the analysis that has been undertaken, it is concluded that the proposed AIN development has no off-site detrimental impacts (>10 mm) on the 1% AEP peak flood levels and the development satisfies Sydney City Council's flood policies. This conclusion is based on the physical design of the proposed AIN building and the movement of stormwater around the site.

The proposal ensures that the site will be properly protected from flooding and protect the adjoining lands and its future development.

6.6 BCA Assessment

A BCA assessment of the proposed AIN Building, its relationship to the existing Physics Building, and with regard to the Deemed to Satisfy (DTS) provisions of the BCA 2012 has been prepared by AECOM. A copy of AECOM's report is contained in Appendix L and a summary of all relevant clauses of the BCA is included in Section 4. In terms of the buildings description the following applies:

Building Use	Education (Assembly), Laboratory, & Office
Class of Occupancy	9b,8 & 5
Type of Construction	Type A
Rise in Storeys	4
Levels Contained	4
Effective Height	16m approximately (less than 25)

[2] Development Consent D/2012/1633 determined by Sydney City Council 24th December 2012.

Based on the recommendations compliance with the relevant DTS provisions and performance requirements of the deign are achievable subject to full specification in the construction certificate documentation.

In relation to energy efficiency, compliance with the requirements of Section J of the BCA will be demonstrated prior to the issue of a construction certificate.

6.7 Built Form

As indicated in sections 2.3 and 2.4 of the Architectural Performance Brief in Appendix G, there are no prescriptive requirements for the architectural of the building or the proposed materials and finishes which are described in Section 4.3 and **Table 9** of this report. However, the proposed building responds to the Conservation Management Plan for the existing Physics Building (see section 6.10 of this Report), the AIN Building's function and intended use, and the proposed St Paul's College development.

The development envelop is constrained by a number of considerations:

1. The scale and proportion of the new building is to respect the existing heritage values of the School of Physics building;

2. The design is to respond to the Wilkinson Axis;

3. The central height of the development should not exceed RL 40; and

4. The new building should touch the existing Physics Building as lightly as possible but provide a high degree of connectivity between these buildings.

Figure 10 **View of the Physics Building from Physics Road** (Drawing – A 1602)

The bulk and scale of the proposed AIN Building has been designed to respect the existing scale and proportion of the existing Physics building. Figures 10 and 11 show that from Physics Road and Hocky Square only minor

elements of the new development will be visible and that these visible elements are symmetrical about the Wilkinson Axis. Figure 11 illustrates the relationship between the AIN Building and the existing Physics Building, while the proposed linkages between these building is illustrated in Figures 9 and 12.

As evident from the site context (Drawing A-1050) the proposed AIN building is not symmetrical around the Wilkinson Axis. This objective cannot be achieved because of the location of Wesley College to the west of the development site. However, the separation of the building into two wings by a central courtyard centred on the Wilkinson Axis serves to reinforce the Axis.

Visually the bulk and scale of the proposed development will not be apparent from most view points because of the recessed nature of the site and its placement between existing and proposed buildings – the Physics Building, the proposed St Pauls College development, the Edward Ford Building and Wesley College buildings. As indicated on in Drawings A-1201 to A-1203 and other plans, the highest point of the development is the exhaust stacks in the north west corner of the building at 46.0m and these elements are obscured by the eastern wing and tower of the Physics building. Based on advice from Sydney Airport Corporation to the Director-General on height limits (contained in Appendix A) further referral to the Corporation was not required.

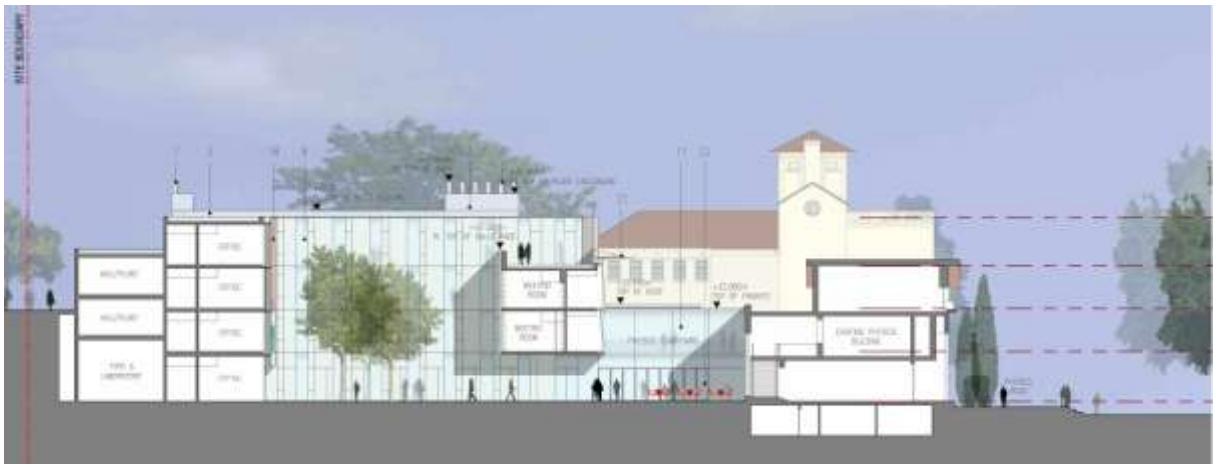

Figure 11 **Section Through Courtyard Looking West** (Drawing A-1201)

The proposed linkages between the AIN and Physics Buildings are designed to be functional while respecting the heritage values as required by the CMP. Figure 12 illustrates the visual impact of new western link and the amenity of the courtyards between the AIN Building and the Physics building. The linkages have been designed to provide a high degree of transparency.

Some changes are also required to the Physics Building to satisfy the requirements for fire separation between the two buildings. The works involved in the construction of the two links are shown in drawings A-1510 & A-1511 and in sections of the development. The heritage implications of the proposed alliterations to the Physics Building are considered in the Heritage assessment contained in Appendix H.

Figure 12 **Link between Physics Building and AIN Building** (Drawing A-1606)

6.8 Relationship to the St Paul's College Development

The AIN building has an commercial/industrial character which is appropriate to it location within a campus dedicated to higher education and research; the adjoining development proposed by St Pauls College, which is residential in purpose and scale, is within a residential/open space precinct of the University. The main built form and urban design issues relate to the separation of the proposed buildings, the height of the respective developments, and permeability.

The separation between the two building is illustrated in the sectional elevation through the courtyard looking east in Figure 13 (see Drawing A-1201).

The separation between the buildings is variable between 8m (minimum) and approximately 12m. At ground level provision is made for pedestrian movement between the two developments via a Colonnade on the northern boundary of the St Paul's development. In terms of visual privacy 12 m is an acceptable separation between non habitable and habitable uses[3]. The separation also provides opportunities for northern solar access and ventilation to the St Paul's development.

The height relationship between the developments is also shown in Figure 13. The AIN building platform is set at a lower level to the proposed St Paul's development - a difference of approximately 6m – and each of the buildings in the St Paul's development rise above the AIN building. Consequently, the AIN building will not dominate the adjoining development and is visually isolated by it from St Paul's Oval and City Road.

[3] Better Urban Living, Department of Urban Affairs and Planning and the NSW Government Architect, 1998, p 31.

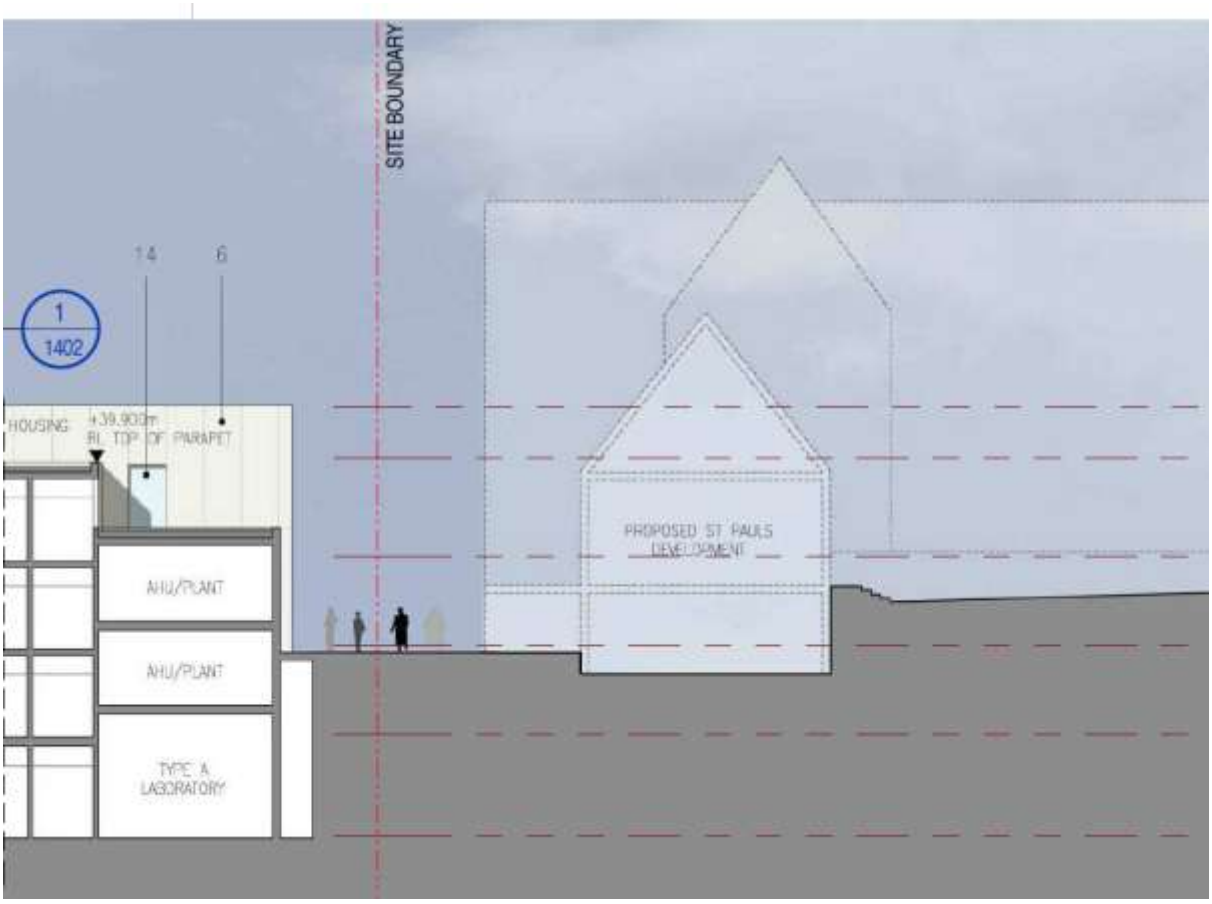

Figure 13 Separation between the proposed AIN Building and the St Paul's College Developments.

An analysis of shadows cast by the proposed development given in drawing A-1051 indicates that the AIN Building will have minimal impacts during the summer solstice on adjoining buildings while the internal courtyards will receive extended periods of solar access. During the winter period there will be some additional impact on adjoining buildings including St Paul's development and apart from the spaces been the AIN Building and the Edward Ford Building.

Provision has also been made to facilitate pedestrian access from the St Pauls development to Physics Road via the Entry Forecourt to the south east corner of the AIN building and a pedestrian walkway on the western side of the Edward Ford Building. The Entry Forecourt has been set at R.L. 32.5m which is consistent with the ground level on the adjoining site.

In summary and as illustrated in the accompanying drawing set, the proposed AIN building will not have an advise impact on the amenity of residents of the future St Pauls College development and provision has been made to ensure adequate permeability through both sites.

6.9 External Finishes

The external finishes are illustrated on the sectional and elevation drawings of the proposed development and summarised in **Table 9**. An effort has been made to ensure that in the choice of materials, the palette chosen will be sympathetic to the textures and colours found on the rendered Physics building and its roof and that of the adjoining Edward Ford Building. For example, Drawing A-1201 shows the details of the exhaust stack, which is the highest element of the development, and its relationship to the roof elements of the Physics building.

Table 9 Proposed External Finishes

Material	Description
Zinc Cladding (Colour: Anthracite)	Product to be equivalent to "VMZ Composite Panels - ANTHRA-ZINC". A proprietary system inclusive of all accessories and framing components. Light gauge steel frame to be clad with metal faced insulated sandwich panel cladding system (Kingspan Benchmark Karrier Panel or equal approved), thickness to meet required U-Value. Rain screen over cladding to comprise of "VMZ Composite Panels" fixed to the insulated sandwich panels via vertical cassette joints. All fixing to be concealed. Window reveals and cills to be in matching ANTHRA-ZINC where required.
Zinc Cladding (Colour: Mid Grey)	Product to be equivalent to "VMZ Composite Panels". A proprietary system inclusive of all accessories and framing components. Light gauge steel frame to be clad with metal faced insulated sandwich panel cladding system (Kingspan Benchmark Karrier Panel or equal approved), thickness to meet required U-Value. Rainscreen over cladding to comprise of "VMZ Composite Panels" fixed to the insulated sandwich panels via vertical cassette joints. All fixing to be concealed. Window reveals and cills to be in matching ANTHRA-ZINC where required.
Expanded Galvanised Steel mesh	Light gauge steel frame to be clad with "KME TECU Mesh or equal approved" expanded galvanised steel mesh. Minimal visual joints to be achieved.
Corten Steel Cladding	Product to be equivalent to "Corten Steel". A proprietary system inclusive of all accessories and framing components. Light gauge steel frame to be clad with metal faced insulated sandwich panel cladding system (Kingspan Benchmark Karrier Panel or equal approved), thickness to meet required U-Value. Rainscreen over cladding to comprise of "Corten Steel" fixed to the insulated sandwich panels via vertical fixing rails and horizontal top-hat sections. All fixing to be concealed. Window reveals and cills to be in matching Corten Steel where required.
Corten Steel Louvers	"Corten Steel" or equivalent louvers to plant areas with acoustic baffles internally where required.
Precast Concrete Cladding	Pre-cast concrete panelling with high quality fine-smooth grade appearance. High quality plywood shuttering with phenolic resin film facing to exposed face.
Stainless Steel Ducts	Stainless steel ductwork required to external fuels, refer to M+E Engineers specification for grade of stainless steel required.

Powder Coated Aluminium Ventilation Louvers	Power coated aluminium louvers to plant areas with acoustic baffles internally where required.
Structurally Glazed Curtain Walling system	**Cleanroom:** Structurally glazed curtain walling system with natural anodised extruded aluminium framing, 100% glazed vision panels to cleanroom, plenum to be insulated spandrel panel comprising 100% single glazing with ceramic frit with mineral wool insulation in sealed aluminium sheet back-pan, with galvanised sheet steel backing. **Office:** Structurally glazed curtain walling system with natural anodised extruded aluminium framing comprising 50% glazed vision panels, remainder to be insulated spandrel panel comprising single glazing with mineral wool insulation in sealed aluminium sheet back-pan, with independent plasterboard dry lining internally.
U-Profile Glazing System	Product to be equivalent to "Profilit "U-profile glass system. Double sided "U-Profile Glass" panels to achieve flush surface inside and out, the self-supporting glass channels are to be fitted into a fully concealed extruded metal perimeter frame.
Frameless Clear Glass Façade	Provide full height silicon jointed clear double glazed units. Glass specification and thickness is to be determined by the works contractor. Allow for low emissivity coating and solar control coating throughout. Mullions are to be avoided. If required due to wind loads, these are to be in structural toughened laminated glass to specialist contractor's design. Digitally printed removable opaque film to windows to cleanroom expansion area
Open jointed Glass Shingles	Frameless toughened glazed open jointed shingles with stainless steel patch fixings clamped to the slab edge. Allow for screen printing to glazing.
Clear Glazed Opening Windows	Clear glazed operable windows, controlled by the BMS with local user override. Purpose made hardwood timber or perforated powder coated aluminium brise-soleil to windows on north, east and west facing facades (horizontal on north facing and vertical on east and west facing), including powder coated support frame fixed back to building structure.
Clear Glazed Fixed Windows	Clear glazed fixed windows with natural anodised extruded aluminium frames. Where specified, allow for purpose made hardwood timber or perforated powder coated aluminium brise-soleil to windows on north, east and west facing facades (horizontal on north facing and vertical on east and west facing), including powder coated support frame fixed back to building structure.

Glass Canopy to Entrance	Clear laminated structural glass canopy to ground floor entrance. Glass specification and thickness to be determined by works contractor. Glass panels to be supported via stainless steel planar countersunk bolt fixings. Support structure to comprise satin finish stainless steel T-sections supported via stainless steel diagonal rods fixed back to building fabric
Clear Glazed Sliding Doors	"Schuco" or equal approved thermally broken silver anodised aluminium framed sliding doors. Double glazed units to be stepped and structurally silicone glazed to frame to achieve frameless appearance externally.
Glazed Balustrade	Balustrades to be frameless toughened laminated glass, clamp fixed to the slab edge with continuous satin finish stainless steel cover plate, no handrail.
Powder Coated Aluminium Vertical Solar Shading	Provide ppc extruded aluminium aerofoil fin solar shading. Fixing brackets, support arms and structure to be manufactured from extruded aluminium, allow for bespoke polyester powder coated graphic printed on both sides on the fins.
Structurally Glazed Façade	Full height silicon jointed clear double glazed units. Glass specification and thickness is to be determined by the works contractor. Low emissivity coating and solar control coating will be provided throughout. Diagonal Aluminium transoms to be anodised aluminium finish, silicon joints between glazing and no external caps are permitted.
Planted Wall (Green Wall)	Installation of diagonal grid of marine grade Stainless steel wires at approx. 1 metre centres for training of climbing plants. Continuous planter box to be positioned at base of climbing wall, allow for adequate drainage.
Perforated Stainless Steel Sheet Solar Shading	Allow for purpose made horizontal perforated stainless steel sheet solar shading to north facing façade, including stainless steel support frame fixed back to building structure. Bespoke laser cut perforation to horizontal stainless steel sheet.
Clear Glazed Sliding Folding Doors	Top hung natural/silver anodised aluminium framed bi-fold / stacking doors with large clear glazed vision panels.
Roof Lights	Roof lights to atrium and student hub roof: Laminated and toughened glass roof light with natural anodised extruded aluminium framing. Opening lights with external louvers/solar shading devices in powder coated aluminium, linked to BMS for controlled natural ventilation, night time cooling etc. Roof lights to 2nd & 3rd year teaching laboratory: Allow for 'saw tooth' arrangement to avoid direct sunlight comprising glazed south facing windows with natural anodised extruded aluminium framing, pitched sections of roof in steel framing with profiled aluminium decking, mineral wool insulation and upstand seam aluminium profiled roof sheet.

In-Situ Concrete	Exposed in-situ concrete to have high quality fine smooth grade appearance. High quality plywood shuttering with phenolic resin film facing to exposed face. If cast in-situ, regular grid of recessed shutter joints and bolt holes and external grade diluted silicate paint finish.

6.10 Ecologically Sustainable Development

The proposed development has been assessed as consistent with the principles of ecologically sustainable development (SSD) as defined in Clause 7(4) of Schedule 2 of the Environmental Planning and Assessment Regulation 2000 as shown in **Table 10**.

The University of Sydney has a vision to be ***"committed to environmental best practice, and to the continual improvement of its environmental performance, recognising its obligations both locally and globally, to present and future generations."*** This vision is managed using the principles of Ecologically Sustainable Development (ESD) and is described for this project in Section of the Architectural Performance Brief (Appendix G). In practice this means the adoption of an integrated approach to ensure minimised resource consumption and impacts caused by the daily operations and capital works development of the University.

The ESD performance of the proposed AIN Building and its use has been undertaken by Steensen Varming and a copy of this report is contained in Appendix E. The development has been assessed in accordance with the DGR's for ESD. The AIN Buildings has been designed to be sustainable, achieving high benchmarks of energy efficiency, water efficiency and indoor environmental quality.

Table 10 Assessment of the Project against the Principles of Ecologically Sustainable Development

Principles of ecologically sustainable development	Assessment
(a) the ***precautionary principle***, namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by: (i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and (ii) an assessment of the risk-weighted consequences of various options,	The potential environmental impacts on the environment have been identified and assessed through the preparation of this EIS. It is considered that through the adoption of the ESD initiatives outlined in Table 11 the proposal will not result in serious impact to the environment.
(b) ***inter-generational equity***, namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations,	The EIS confirms that the proposed development can proceed without significantly impacting the health, diversity and productivity of the environment.
(c) ***conservation of biological diversity and ecological integrity***, namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration,	The EIS has considered the Biodiversity Principle in the design of the development. The location of the proposed development is within an educational complex which has been subject to significant development over past decades. Careful consideration has been given to retaining the

	significant vegetation on the site.
(d) ***improved valuation, pricing and incentive mechanisms***, namely, that environmental factors should be included in the valuation of assets and services, such as: (i) polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement, (ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste, (iii) environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.	The EIS confirms that the University will be able to manage waste generated by the proposal. The proposal incorporates environmental goals in its design through the ESD measures detailed in **Table 11.**

The key ESD initiatives proposed include the measures listed in Table 11.

Table 11 Proposed ESD Initiatives

Passive Design Initiatives	**Daylight Harvesting** **Mixed Mode Ventilation** **Night Purging**
Service Strategies	**Energy Efficient Mechanical Services:** • Variable speed drives on pumps and fans; • "Aircuity" type lab air quality sensing for demand control to reduce laboratory airflow rates and hence fan power; • Manifolded laboratory exhaust system to be considered; • Variable flow fume hoods with auto sash closing; • Optimising close-controlled laboratory and clean room air change rates with computational fluid dynamics (CFD) modelling; • Right sizing laboratory plant based on actual equipment and process loads; • Optimising laboratory exhaust airflow rates and associated make-up air conditioning energy; • EC motor fan filter units for clean room re-circulation air, combined with a particle sensing system to reduce airflows wherever possible (including night setback); • Low-pressure drop air distribution system for clean rooms; • High efficiency water-cooled chillers; • Dual temperature chilled water systems for space and process/sensible cooling; • Cooling tower water-side free cooling to be considered; • Mixed mode ventilation in office, meeting and teaching areas; • Outside air economy cycle and night purge for meeting rooms, lecture theatres etc.; • Air-side heat recovery (pre-conditioning of outside air) to be considered for teaching, lecture theatre and laboratory areas; • Automatic shutdown of plant when spaces are unoccupied; • "Smart" sub-metering of building electrical and lighting systems for energy monitoring; • CO_2 and VOC monitoring and control of outside airflow rates in office, meeting

	and teaching areas; • Low VOC paints, adhesives and sealantsZero ODP refrigerants and insulants; • Refrigerant leak detection system; • Low NO_x emissions from heating plant; • PVC minimalisation.
	Energy Efficient Electrical Services • Long life, low energy lighting to circulation, toilets and external accent lighting • High frequency fluorescent luminaires with high efficiency T5 lamps or LEDs • Fully programmable lighting control system to internal and external lighting • Lighting control 'absence detection' as opposed to 'presence detection' • Daylight dimming to atrium and perimeter lighting • Energy management, monitoring and metering system at the sub distribution level
	Water Efficient Hydraulic Services • Reducing potable water consumption; • Reuse of fire test drain water, • Harvesting rain water for reuse, • Reducing water usage in toilet amenities by providing: • Low flush WCs • Low flow urinals; • Reducing water usage in basins, sinks, showers etc by utilising low flow tapware and outlets; • Consideration of Gas boosted solar hot water system • Consideration/review of the viability of using waste heat from chillers (24hr load) to preheat the domestic hot water in lieu of solar pre heat. • Consideration of heatpump hot water units • Maximising runs of flow return loops there-by reducing dead legs, thereby reducing water wasted while awaiting the arrival of hot water. • Variable speed drives on pumps; • Automatic shutdown of plant out of hours and during times of no occupancy; • "Smart" sub-metering of building; • Low VOC paints, adhesives and sealantsZero ODP insulants; • Low NO_x emissions from water heating plant; • PVC minimisation.
Sustainable Materials	**Low VOC Materials**
	Low Formaldehyde Products
	Waste Minimisation and Reuse Initiatives

6.11 Amenity

The proposed development is set within the Camperdown Campus of Sydney University and will not have significant environmental amenity impacts beyond the university grounds.

In context, the AIN development provides a considerable degree of environmental amenity through its internal design for users of the facility, through improvements to the setting of the building through the provision of external courtyards, and by minimising adverse impacts on adjoining landuses and activities.

The potential amenity impacts of the AIN building relate mainly to the proposed St Pauls development. Both developments have been designed in close consultation to minimise environmental impacts on each with

respect to visual impacts, solar access, circulation requirements, noise, and privacy. Particular attention has been given to ensure that services to both developments can be delivered in an efficient and timely manner.

As demonstrated in the accompanying technical reports and architectural drawings the facility has been designed to a high standard without significant loss of environmental amenity for existing and future staff, students and visitors to the university. The respective impacts between this development and the proposed St Paul's development is also seen as acceptable.

6.12 Safety and Security

ARUP was engaged to undertake a performance based life safety strategy for the AIN project. A copy of the Schematic Fire Safety Design Report (DtS), contained in Appendix M, outlines the proposed fire safety strategy and design requirements for the development. In-principle support for the proposed strategy has been provided by the FRNSW as indicated in meeting notes attached to ARUP's report.

A central aspect of the proposed design is that is that fire separation is not required between individual laboratories, with the exception of the Cleanroom, and the remainder of the building.

In terms of the relationship between the AIN Building and the existing Physics Building number of fire separation works are proposed as illustrated in drawing A-1530. These works have been developed taking into account the heritage values of the Physics Building as expressed in the CMP.

6.13 Operational Noise & Vibration

A preliminary acoustic impact assessment of the proposed development was undertaken by AECOM and a copy of this assessment is contained in Appendix O. This assessment specifically addresses the DGR requirements for noise impacts an vibration on nearby noise sensitive receivers during the operational phase of the AIN development.

The applicable policy for this development is the *NSW Industrial Noise Policy* (INP) and has been used to asses noise emission from this development. The assessment procedure for assessing industrial noise sources has two components:

- Controlling intrusive noise impacts in the short term for residences an;
- Maintaining noise level for current and future landuses, including residences

Based on an acoustic study of the environment and the modelling undertaken it was concluded that with the acoustic treatment identified in the report the development complies with the operational criteria at all times.

Issues of noise and vibration in relation to excavation and site preparation works were adequately addressed in an earlier development application to Sydney City Council.

6.14 Traffic and Accessibility

The proposed development will accommodation an additional 117 staff and students (see Table 1),which is a small nett addition to the Campus population.

An assessment of the likely traffic impacts during construction and operation of the proposed AIN Building has been undertaken by ARUP and a copy of this assessment is contained in Appendix K. The assessment examines traffic generation, park and traffic management issues during construction

In summary, the study concludes that:

- The proposed development is not likely to result in a significant number of students and there is a focus on sustainable transport with pedestrians being the primary mode. Accordingly, negligible increases in traffic will result.

- Vehicle access of Physics Road (one way west to east) for deliveries to facilitate the development during construction and operation will need to be co-ordinated, however, during operations less than one deliver per day is anticipated.

- In terms of parking, the 12 existing car spaces will be reinstated (including spaces for mobility impairment) and this conforms to the requirements of Sydney City Council. The design of the car spaces conforms to AS/NZ 2890.2004.

- Construction access for medium rigid vehicles (MRV) to the site is proposed via McLeod Road and Western Avenue within the university. A turning area is to be provided in the site to allow vehicles to enter and exit in a forward direction. Construction parking will be provided within the universities existing parking areas.

A Construction Traffic Management Plan will be prepared by the construction manager and submitted to the Department of Planning and Infrastructure.

6.15 Heritage

The following controls and guidelines have been considered in the preparation of the Statement of Heritage Impact for the proposed development:

- South Sydney LEP 1998
- Draft Sydney LEP 2011
- City of Sydney Heritage DCP 2006
- University of Sydney Grounds Conservation Plan
- School of Physics Conservation Management Plan
- Edward Ford Conservation Management Plan
- New South Wales Heritage Council Guidelines, Altering Heritage Assets and Statements of Heritage Impact

A statement of heritage impact prepared by Graham Brooks and Associates has been prepared to assess the proposed development against the above planning controls and policies. A copy of this assessment is included in Appendix H.

The assessment considers the heritage significance of the existing buildings, the proposed works, and the impact on the heritage values on the surrounding buildings and Camperdown Campus generally. The assessment concludes

- *The subject site, immediately south of The University of Sydney Physics Building (A28) is located within the Sydney University Conservation Area (CA47) which is listed as a heritage item of local significance in Schedule 2A of the South Sydney Local Environmental Plan (LEP) 1998 and the Draft Sydney LEP 2011.*

- *Part of the site is also included in the Sydney University Site Landscaping and St Paul's College which are locally listed heritage item in Schedule 2 of the South Sydney LEP 1998 and the Draft Sydney LEP 2011.*

- *The proposed works are in the vicinity of a number of individually identified heritage items, within and adjacent to the University of Sydney Campus. These include the Physics Building (A28), Edward Ford Building (A27), Animal House (A27A) and St Paul's College.*

- *As no part of the subject site is included on the NSW State Heritage Register (SHR), or has been nominated for inclusion of the SHR, there is no requirement under the NSW Heritage Act to seek approval from the NSW Heritage Council for this application.*

- *The specialised facilities that are to be provided in the proposed AIN Building will ensure the continued use of the adjacent Physics Building for the teaching of Physics which is considered essential to the retention of its significance.*

- *The proposed building will reinforce the historic significance of the university which has continually expanded the institutional uses on the site since its establishment in the 1850s.*

- *It has been designed to respect the historic planning axes within the university and to retain the series of identified significant axial views.*

- *There will be no adverse impact on the evolving cultural landscape of the university or the aesthetic significance of the buildings within it.*
- *The modifications to the original fabric of the Physics Building have been minimised and the heritage impacts identified are considered to be within acceptable limits.*

- *The proposed development is consistent with the heritage requirements and guidelines of the South Sydney LEP 1998, the Draft Sydney LEP 2011, the City of Sydney Heritage DCP 2006 and the policies of the applicable Conservation Management Plans.*

The assessment also includes a range of conservation and mitigation measures that are summarised in Section 7 of this Report.

6.16 Waste

The proposed facility has internal areas that amount to approximately 10,000 m^2 which includes areas for the function space, kitchen, canteen, offices, laboratories, gym, and storage areas. Different areas will generate different types and volumes of waste. Within the spaces allocated there is also a significant floor space allocated to general circulation – egg the atrium on level 3. The areas allocated to the key activities are:

- Office Areas (1,080 m^2)
- Teaching space (2,596 m^2)
- Laboratory space (3,070 m^2) ;

- Cafe (135 m^2); and
- Support services (3,567m^2).

The waste stream generated by the development is described in section 4.6 of the Architectural Design Brief in Appendix G. This waste stream will include waste that was formerly generated by the former Physics Annex prior to its decommissioning.

Collection and source separation of waste will be undertaken at source. Individual storage bins for general waste, specialist waste and for recycling will be provided throughout the building before transport to the purpose designed Garbage room (Room 109J) located adjacent to the loading dock as shown in Drawing A-1100. The waste stream generated will then be managed within the University's overall waste management program.

6.17 Flora and Fauna

A survey of the trees on site was under taken by TreeiQ as part of an arboriculture impact assessment. A copy of this assessment is contained in Appendix C including plans of the location of the trees surveyed, and the resulting recommendations. The trees are covered by the provisions of Sydney City Council's tree preservation order (TPO).

Of the trees surveyed thirty (30) needed to be removed to facilitate the this development and some pruning work is also required. Development consent has already been sought from Council for the removal of the nominated trees and accordingly consent for this aspect of the development is not required under this application.

There are no impacts on fauna, including threatened species, populations and endangered communities and their habitats.

6.18 Hazardous Substances and Dangerous Goods

The AIN building has been designed to separate areas where dangerous goods are stored from laboratories and other teaching and administrative areas. An analysis of dangerous goods storage within the building has been prepared by AECOM. The purpose of the report contained in Appendix N was to:

- Define the limits of dangerous goods that can be stored in the facility; and

- Detail the safety requirements/features for the storage of dangerous goods on site in accordance with the relevant Australian Standards.

The report identified the requirement for a number of different stores within the AIN building: grey spaces, clean room, gas store, bulk cryogenic nitrogen, and miscellaneous rooms with dangerous goods, and a chemical store/dispensing area. Providing the individual storage areas hold less than the amounts by class and by combinations of good identified in Section 4 of the report they may be classified as a minor store under the provisions of ASA4332 (Ref.2). The report also details the required precautions to be followed for storage and handling of dangerous goods.

In terms of the requirements of SEPP 33 to determine whether the proposed development is a potentially hazardous storage facility, the amount of individual chemicals stored, singularly and in combination would appear to be below the general screening threshold quantities specified in Table 3 of Schedule 4 of the Policy.

It is considered that the project is unlikely to result in any significant risk and is able to be conducted in a manner that is consistent with the aims and objectives of the Policy provided the amounts of dangerous goods stored do not exceed the relevant thresholds of any given class of good for an individual storage space and that these spaces are designed to the relevant Australian Standards as specified in Appendix N. However, consideration should be given to the completion of a preliminary hazard analysis based on actual storage requirements prior to the commencement of construction.

6.19 Landscape and Public Domain Improvements

The Landscape Masterplan prepared by Site Image is contained in Appendix I. The plan identifies four landscape open space areas in the AIN Precinct:

1. The Central Courtyard, providing an interface between the existing Physics Building and the new AIN Building;

2. The Eastern Entry Courtyard and the parking and loading dock area. This area included the Edward Ford interface and new elevated walkway;

3. The Southern Entry Courtyard and Terrace . This links to the proposed St Paul's colonnade and open space corridor; and

4. The Western Cafe Courtyard, incorporating and existing an existing external stair of the Physics Building.

The landscape plan provides a comprehensive framework for both soft and hard landscaping of the open space and public domain associated with the proposed development. In the architectural treatment of the services building provision has also been made to introduce soft landscaping through the provision of a vertical stainless steel frame to the wall and walkways to encourage the growth of climbing plants.

6.20 Accessibility

The AIN provides a considerable degree of accessibility through the setting of the proposed development, the internal design of the building and its linkages to the existing Physics Building and the adjoining St Paul's development.

A review of the concept design for the provision of access for people with a disability has been prepared by Access Associates Sydney to ensure compliance with the access provisions required by the relevant provisions of the Building Code of Australia. Key design features required to meet the objectives of the Access to Premises Standards include accessible:

- External paths of travel
- Principal building entry and additional building entries
- Car Parking
- Internal paths of travel
- Vertical Access
- Toilets
- Signage and Wayfinding and facilities to assist people with sensory, cognitive and mobility impairment
- Emergency Egress

Subject to the incorporation of the report's recommendations in the final design compliance with statutory requirements can be readily achieved. These matters will be addressed in a final report prior to seeking a construction certificate.

7 Mitigation Measures

The measures recommended to mitigate the impacts of the proposed development on the environment derived from the assessment and the recommendations contained in the accompanying consultants' reports are summarised in this Section of the Report.

Contamination

- During excavation for the footings or other site works the site will be inspected by experienced environmental personnel to assess for unexpected conditions or facilities.

Arboreal Impacts

In order to mitigate the impact of tree removal it is proposed in the Arboricultural Assessment in Appendix C that the following mitigation measures be implemented:

- Two significant trees should be retained (T2 and T39);
- The existing compost bins beneath Tree 39 should be removed by hand;
- The slab and footing from the brick shed at the base of Tree 39 should remain in-situ;
- The curved sandstone retaining wall at the base of Tree 40 should be retained. Columns and lintels may be removed using tree sensitive demolition methods;
- The existing building should not contact the trees' roots, trunk branches and crown;
- Identified pruning as described in the report should be carried out by an experienced and qualified arborist;
- All pruning work should be undertaken in accordance with *Australian Standard 4373: Pruning of Amenity Trees (2007)* and the *Workcover Code of Practice for the amenity Tree Industry (1998).*

Heritage

The heritage impact assessment prepared by Graham Brooks and Associates in Appendix H recommends that the following conservation and mitigation measures be included in the development approval:

- A requirement that any original fabric removed from the Physics Building be tagged and stored for future conservation purposes.
- The appointment of an experienced heritage consultant to work with the consultant team throughout the design development, contract documentation and construction stages of the project to resolve all matters that involve changes to, or removal of, existing significant fabric.
- Refinement of the landscaping design to include the selection of flowering climbers for the space at the rear of the Edward Ford Building and that consideration be given to reusing the stone pillars, removed following the collapse of the jacaranda tree, in this area.

- A requirement that the sandstone from the wall at the rear of the Edward Ford Building is salvaged and reused, with any excess to be tagged and stored for future landscaping works within the university.

- Inclusion of the protection measures to be undertaken to ensure there is no unforeseen damage to the adjacent heritage buildings and significant tree in the Construction Management Plan for the project.

- Preparation of an Archival Photographic Recording of the external and internal areas of the Physics Building that are to be impacted.

Traffic

- The construction traffic management and parking measures recommended in the accompanying traffic assessment prepared by ARUP be implement during the project delivery.

- A construction traffic management plan be prepared and submitted for approval prior to construction.

8 Project Conclusion and Justification

The Australian Institute of Nanoscience (AIN) will be a world leading research and teaching facility. It has been designed to meet the demanding requirements of nanoscience research in decades to come and it will be the only building in Australia to house such an advanced research capability alongside comprehensive facilities for undergraduate and postgraduate teaching.

The AIN Building will provide an integrated suite of research, training, laboratory, office and seminar rooms. The building will enable the institute to expand scope for industrial collaboration with emerging Australian high-tech businesses, in alignment with the NSW innovation strategy for smart manufacturing, leading to direct economic and social benefits through the uptake of these new technologies

The proposed development can be justified on environmental, social and economic grounds in that the AIN Building and its use:

- will provide New South Wales with internationally competitive laboratory and research facilities. This facility is required to maintain Australia's ability to conduct high quality research and to maintain the standing of the University of Sydney. Such facilities are presently unavailable anywhere in Australia as recognised by the Federal Government;

- will provide an innovative Centre with facilities for efficient undergraduate and high quality post graduate education; and

- will provide a national access facility for nanofabrication;

- is located on a suitable site in close proximity to existing scientific and teaching research facilities;

- has been designed in terms of its external form, internal layout and surrounding public areas to a high architectural and engineering standard as evidenced by the accompanying reports and architectural drawings;

- is permissible with consent and meets the strategic objectives and requirements of state and local planning requirements and policies; and

- will not have any adverse environmental impacts, particularly in relation to local heritage items, as indicated in this assessment.

It is concluded that the proposed development site is appropriate for the AIN Building and its intended use and is therefore in the public interest. Accordingly, it is recommended that the Minister approve the development as a State significant development.