JBA planning

# Environmental Assessment Report
# Project Application

## Australian Hearing Hub

University Avenue, Macquarie University

Submitted to
Department of Planning
On Behalf of Macquarie University

July 2010 ▪ 10070

JBA Urban Planning Consultants Pty Ltd ABN 84 060 735 104 ACN 060 735 104 w jbaplanning.com.au
Level 7, 77 Berry Street North Sydney NSW 2060 t 02 9956 6962 ▪ 29 Beach Street Wollongong NSW 2500 t 02 4225 7680

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This report has been prepared by: Kim Shmuel

Signature Date 19/07/10

This report has been reviewed by: Oliver Klein

Signature Date 19/07/10

# Statement of Validity

This Environmental Assessment has been prepared and submitted under Part 3A of the *Environmental Planning and Assessment Act* 1979 (as amended) by:

## Environmental Assessment

| | |
|---|---|
| Name | Kim Shmuel |
| Qualifications | BA MURP MIEL MPIA CPP |
| Company | JBA Urban Planning Consultants Pty Ltd |
| Address | Level 7, 77 Berry Street<br>North Sydney NSW 2060 |
| In respect of | Project Application |

## Project Application

| | |
|---|---|
| Applicant name | Macquarie University |
| Applicant address | Macquarie University Campus |
| Land to be developed | Hearing Hub Development site on Macquarie University Campus |
| Proposed development | Research, training, teaching and learning facility in hearing and hearing-related speech, language and reading disorders. |
| Environmental Assessment | An Environmental Assessment (EA) is attached |
| Certificate | I certify that I have prepared the content of this Environmental Assessment and to the best of my knowledge:<br>▪ It is in accordance with the Environmental Planning and Assessment Act and Regulation.<br>▪ It is true in all material particulars and does not, by its presentation or omission of information, materially mislead. |
| Signature | |
| Name | Kim Shmuel |
| Date | 19 July 2010 |

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# Executive Summary

## Purpose of this Report

This submission to the Department of Planning (the Department) comprises an Environmental Assessment for a Project Application under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act). It relates to the development of a new purpose-built research, training, teaching and learning facility (with associated commercial activities) in hearing and hearing-related speech, language, and reading disorders on the Macquarie University Campus at North Ryde. The proposed development is to be known as the Australian Hearing Hub (Hearing Hub).

A request for consideration of the proposal under Part 3A was made to the Minister for Planning (the Minister) on 3 March 2010. On 10 March 2010, the Minister issued his declaration that the proposal was considered a Major Development to be assessed under Part 3A of the EP&A Act 1979. The Director General's Requirements (DGRs) for the proposal were provided to the proponent, Macquarie University, on 1 April 2010.

This submission is in accordance with the Department's guidelines for Project Applications lodged under Part 3A, and addresses the issues raised in the DGRs.

## Overview of Project

This Project Application for the Hearing Hub presents an opportunity to provide a unique, world-class facility for research, training, teaching and learning in hearing, hearing-related speech, language, and reading disorders. It will bring together key University groups and major organisations involved with hearing technology and services to allow collaboration in local and extended global partnerships in hearing and cognitive sciences, special education, and electronic engineering.

The Project Application is seeking approval for site preparation works including excavation and road re-alignment and the construction of a 6-storey building with two levels of basement parking for 339 vehicles (including four temporary accessible at-grade spaces to be provided in the north-west of the site) and a total gross floor area (GFA) of 23,182m$^2$.

The project predominantly consists of research and academic uses, with space allocated to a number of commercial and research organisations, including Australian Hearing Services (a Commonwealth Government owned agency), and a number of not-for-profit organisations, as well as Macquarie University academic departments. A small amount of space will be allocated for commercial purposes associated with hearing and hearing-related research and activities.

## The Site

The Hearing Hub development site is to be located at the current junction of University Avenue and Macquarie Drive. The development site has an area of 7,203m$^2$ and is irregular in shape.

The proposed development site is located to the south-west of the new Macquarie University library (currently under construction) and to the north-west of the new Cochlear Global Headquarters (also currently under construction). It sits within Precinct E of the University Campus as identified under the approved Macquarie University Concept Plan (Concept Plan).

## Existing Use & Development

The site is currently occupied by multi-deck carparks. These carparking facilities are proposed to be removed from the site and consolidated (together with other existing multi-deck carparks in the immediate area) and re-established peripherally around the Academic Core. The demolition works and relocation of the carparks on the site forms part of separate planning application processes.

## Planning Context

The Minister approved the Concept Plan for Macquarie University on 13 August 2009. The State Significant Site listing of the Campus under Schedule 3 of the *State Environmental Planning Policy (Major Development) 2005* (Major Development SEPP) was subsequently gazetted on 11 September 2009.

The Concept Plan provides planning controls for development on the Macquarie University Campus, particularly those precincts in which commercial development is proposed. The Hearing Hub is proposed to be located in Precinct E under the Concept Plan.

The conditions of approval for the Concept Plan require the preparation of detailed design documentation to guide development within the Campus precinct. Urban Design Guidelines (the Guidelines) for Precinct E have been prepared by Cox Richardson Architects (Cox) and others and have been submitted to the Department as a separate post-approval process for the Concept Plan approval. A Landscape Management Plan for the Precinct has been prepared by Context.

## Environmental impacts

The proposed development site is located in the south-western portion of the Macquarie University Campus. It is not expected that the project would result in any significant off-Campus impacts on nearby residential properties to the south-west.

Transport, traffic and access are significant issues at the University, particularly through the need to effectively and progressively decant parking to other parts of the Campus. Similarly, the project will bring new operational traffic onto the site, whilst the staging of construction around the University calendar will be a further issue requiring resolution. Traffic issues associated with the Hearing Hub development are addressed in detail in this Environmental Assessment Report (EAR).

Urban design and public domain aspects of the project, and its integration with the development of the Campus, as envisaged under the Concept Plan and associated Guidelines for Precinct E, have been important considerations in the design of the Hearing Hub development.

# 1.0 Introduction

This EAR is submitted to the Minister pursuant to Part 3A of the EP&A Act to fulfil the Environmental Assessment Requirements issued by the Director General (DGRs) for the preparation of an Environmental Assessment of a Project Application for a new purpose-built research, training, teaching and learning facility in hearing, hearing related speech, language, and reading disorders (the Hearing Hub) at Macquarie University Campus at North Ryde.

The project involves site preparation works including excavation and road re-alignment and the construction (and fitout) of a six-storey building with two levels of basement parking for 335 vehicles and four temporary accessible at-grade car spaces accessed off University Avenue.

The planning and design concept for the Project Application includes:

- a gateway building at the western entrance to the University Campus with a southern wing aligned with University Avenue and the northern wing aligned with Macquarie Drive;
- a gateway landscaped area at the western frontage of the development site;
- a western extension to the development extending into the landscaped area at the western edge of the building which will provide a three-storey through-site access;
- vehicle access off the secondary road to the east of the site; and
- pedestrian entries to the west and east of the site.

The design of the development gives consideration to the Guidelines prepared by Cox for Precinct E.

This report has been prepared by JBA Urban Planning Consultants Pty Ltd (JBA), for the proponent, Macquarie University, and is based on design information provided by Perumal Pedavoli Architects and supporting technical documents provided by the expert consultant team. These studies address the DGRs for the environmental assessment. They provide a technical assessment of the environmental impact of the proposed development, and recommend proposed mitigation measures to manage potential environmental impacts associated with the proposal.

This EAR describes the site, its environs and the proposed development, and includes an assessment of the proposal in accordance with the DGRs under Part 3A of the EP&A Act. It should be read in conjunction with the information contained within and appended to this report.

This report:

- Provides a brief background to the project as well as the development of the Macquarie University Campus;
- Describes the site and its environs;
- Describes the proposed development of the Hearing Hub;
- Provides an assessment of the environmental impacts of the proposed Project Application against relevant environmental planning instruments (EPIs), controls and guidelines, as well as the DGRs; and
- Sets out the Draft Statement of Commitments for the project to ensure that potential amenity impacts of the Hearing Hub development can be mitigated.

The report is structured as follows:

**Section 1**: Introduction, overview of the project, background, project team and approvals process.

**Section 2**: Site analysis, overview of existing site conditions, and summary of opportunities and constraints.

**Section 3**: The current strategic and statutory planning framework and context applying to the site.

**Section 4**: Project Description.

**Section 5**: Environmental Assessment of the Project Application.

**Section 7**: Draft Statement of Commitments.

**Section 8**: Conclusion

## 1.1 Background

In 2006, a request was made to the Minister to amend Schedule 3 of the Major Development SEPP to include the Macquarie University Campus as a State Significant Site. A Planning Study to support this listing was lodged with the Department in May 2006.

In April 2008, a Concept Plan was lodged with the Department which sought to establish the parameters for the strategic development of the Macquarie University Academic Core and student housing area, as well as allow for the development, for mixed use purposes of excess land outside of the Academic Core in proximity to the new Macquarie University rail station.

The Minister approved the Macquarie University Concept Plan on 13 August 2009, subject to conditions. A number of these conditions are required to be satisfied ahead of submission of the first Project Application for Precinct. These conditions are being addressed as part of a separate post-approval process (further detail is provided in Section 6.3 below).

The State Significant Site listing (SSS listing) of the Campus under Schedule 3 of the Major Development SEPP was subsequently gazetted on 11 September 2009. The SSS listing establishes a statutory framework for the development of the Campus and applies controls that are consistent with the layout, design criteria and planning controls in the approved Concept Plan.

The Concept Plan establishes the general layout, urban design criteria and development controls for the Campus. The proposed Hearing Hub will be located within Precinct E under the Concept Plan. The SSS listing also establishes maximum heights, maximum GFA and carparking rates for precincts within the Campus.

In November 2007, a Project Application was lodged for the development of the new Macquarie University library building just to the north of the proposed development site on the northern side of Macquarie Drive. The Project Application was approved in April 2008 and was the subject of minor modifications following approval. The new library is currently under construction.

In July 2008, a Project Application was lodged for the development of the new Cochlear Global Headquarters at the Macquarie University Campus to the south-east of the proposed development site for the Hearing Hub (on the southern side of University Avenue). The site of the new Cochlear Global Headquarters is also within Precinct E. The Project Application for the Cochlear Headquarters was approved in January 2009 and the building is currently under construction.

A Review of Environmental Factors (REF) is being prepared for the demolition of the existing multi-deck carparks on the development site (carparks W1, W2 and C1). In accordance with *State Environmental Planning Policy (Infrastructure) 2007* (Infrastructure SEPP), the demolition of these carparks can be undertaken as Development without Consent by the University subject to the appropriate environmental assessment and certification procedures being carried out by Macquarie University.

A Development Application (DA) for a temporary carpark (at vacant University land at Culloden Road) to accommodate parking lost to the demolition of these structures was approved by Ryde City Council in late May 2010.

## 1.2 Environmental Assessment and Approvals Process

The Major Developments SEPP identifies development to which Part 3A of the EP&A Act applies, and for which the Minister is the consent authority.

Clause 6 of the Major Developments SEPP states that development, which in the opinion of the Minister is development of a kind referred to in Schedule 1 (Classes of development or Schedule 3 (State significant development) of the SEPP, is declared to be a project to which Part 3A applies.

Clause 19 of Schedule 1 of the Major Developments SEPP identifies the following development as being a Part 3A Major Development:

> ***19 Medical research and development facility***
>
> *Development for the purpose of health, medical or related research (which may also be associated with the facilities or research activities of a NSW Government Area Health Service, a University or an independent medical research institute) and that:*
>
> *(a) has a capital investment value of more than $15 million, or*
>
> *(b) employs 100 or more people.*

In addition, Part 21 of Schedule 3 of the Major Developments SEPP identifies the development of land on the Macquarie University Campus as being of State Significance.

In accordance with Section 75B of the EP&A Act, and Clause 6 of the Major Developments SEPP, on 3 March 2010, JBA on behalf of Macquarie University requested that the Minister:

- declare the Hearing Hub project to be a Major Development subject to Part 3A of the EP&A Act; and
- issue environmental assessment requirements for the Project Application.

On 10 March 2010, the delegate of the Minister issued his declaration that the proposed Hearing Hub project is a Major Development to be assessed under Part 3A of the EP&A Act.

In accordance with Section 75F of the EP&A Act, the Director-General of the Department issued the requirements for the preparation of an Environmental Assessment to accompany the Project Application on 1 April 2010.

A copy of the DGRs (and associated submissions received from public agencies) and the project declaration is included in **Appendix A**.

## 1.3 Project Team

An expert project team has been formed to deliver the project and includes:

| | |
|---|---|
| **Proponent** | Macquarie University |
| **Project Manager** | Coffey Projects |
| **Architecture** | Perumal Pedavoli |
| **Urban Planning** | JBA Urban Planning Consultants |
| **Landscape** | Lorna Harrison Pty Ltd |
| **Quantity Surveyors** | Slattery Australia Pty Ltd |
| **Geotechnical and Contamination** | Douglas Partners |
| **Civil and Structural Engineering** | Woolacotts Consulting Engineers |
| **Mechanical Engineering** | Erbas and Associates |
| **Stormwater** | Woolacotts Consulting Engineers |
| **Hydraulics** | Steve Paul & Partners |
| **Electrical & Communications** | JHA Consulting Engineers |
| **ESD** | Cundall |
| **BCA/OCA** | City Plan Services |
| **Interior Design** | Geyer |
| **Traffic and Transport** | Arup |
| **Noise and Vibration** | Acoustic Logic |
| **Access** | Morris Goding Access Consultants |
| **Facade** | Taylor Thompson Whitting |
| **Commissioning Agent** | Thwaite Consulting Group |

# 2.0 Site Analysis

## 2.1 Site Location and Context

### Macquarie University Campus

Macquarie University Campus is located 17km to the north-west of the Sydney CBD (refer to **Figure 1**) at the western end of the Macquarie Park Corridor. To the north of the main University Campus is the M2 Motorway with the Lane Cove River / National Park beyond. Areas to the south and west of the site and across Epping Road are largely residential. To the west is the suburb of Marsfield. The Macquarie Shopping Centre is located immediately east of the Campus across Herring Road, with the majority of the Macquarie Park Corridor further to the south east.

The Campus, which currently has a student population of approximately 30,000, covers an area of some 126ha and is owned by Macquarie University.

A photograph of the University Campus is provided at **Figure 2**.

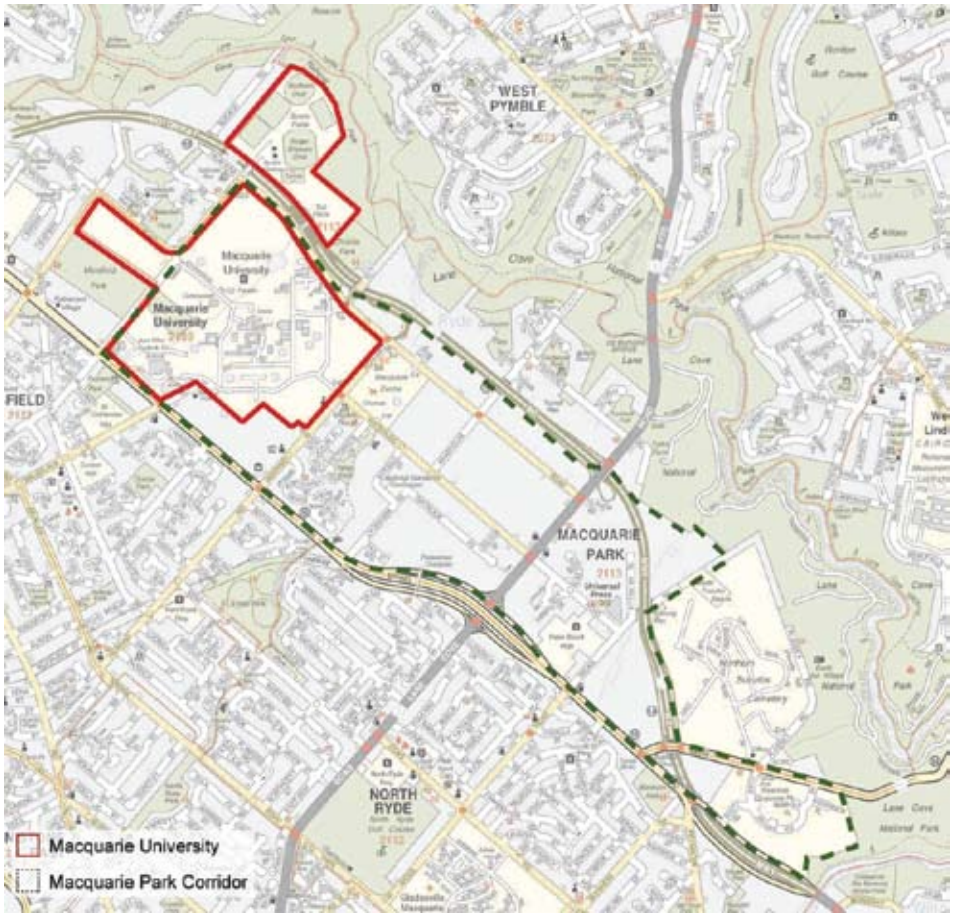



**Figure 1** – Locality Plan

**Figure 2** – Photograph of the Macquarie University Campus from the north-west

The University accommodates a range of uses including traditional University uses (eg. classrooms, research laboratories, academic offices, library, student housing, sports field and open space), as well as associated commercial activities. The Macquarie University Research Park is located in the eastern corner of the Campus fronting Herring Road and Talavera Road. Commercial tenants include Nortel, Siemens and Dow Corning in modern buildings typically eight storeys in height.

The Macquarie University train station is located in the south-east section of the Campus.

Recently, the southern portion of the Campus (Precinct E) has begun to be developed for commercial development (including commercial uses with links to University activities). The Cochlear Global Headquarters is currently under construction within Precinct E and is located to the south-east of the development site for the Hearing Hub.

## Precinct E

Precinct E is approximately 17.6 hectares in area and occupies the south-eastern portion of the Campus (see **Figure 3** below). It is accessed from Balaclava Road to the south-west and Waterloo and Herring Roads to the south-east. The Macquarie University Station which forms part of the Chatswood to Epping rail line, is located at the Precinct's south-eastern boundary adjoining the Waterloo/Herring Road intersection.

The Precinct is separated from the University Academic Core by Macquarie Drive, which forms a crescent shape running from west to east linking the Balaclava Road access to the Waterloo/Herring Road intersection. At its south-western boundary, the Precinct adjoins residential and aged-care development, as well as a creek corridor and surrounding open space. Adjoining the Precinct at its north-eastern boundary is the Macquarie University Research Park.

Existing development within the Precinct includes the Robert Menzies and Dunmore Lang Colleges, a child care centre, and Gumnut Cottage. North of University Avenue is a number of multi-level car parks which provide parking spaces for University staff and students.

Due to its close proximity to the new rail station and its interface with the remainder of the Macquarie Park Corridor, the Precinct will become the focus of new commercial and research-related development. All existing development within the precinct will be demolished over time.

## Development site

The proposed development site for the Hearing Hub is located at the current junction of University Avenue and Macquarie Drive within the north-western extremity of Precinct E as shown in the approved Concept Plan (see **Figure 3**). The site is irregular in shape and covers part of Lot 114 in DP1129623. It has an area of 7,203m$^2$. A survey plan of the site is attached at **Appendix B**.

The site has a frontage to Macquarie Drive to the north and University Avenue to the south. A secondary road is to be constructed at the eastern boundary of the site (in accordance with the Concept Plan) from which vehicle access to the basement carpark will be provided.

The site is owned by Macquarie University, with future users/occupiers of the building being tenants under lease to Macquarie University and Macquarie University academic departments.

It is located in a gentle, east and south-east facing hill which slopes at approximately 3 degrees. A local high spot/mound is located on the western end of the site and rises to approximately RL76m relative to Australian Height Datum (AHD), however, the ground surface on the majority of the site typically varies from between RL74 to RL72m.

**Figure 3** – Hearing Hub development site within the context of the Macquarie University Concept Plan

## Existing Development

The site is currently occupied by existing multi-deck carparks W1, W2 and C1. These carparks (and other similar multi-deck parking structures within Precinct E and elsewhere) are proposed to be removed from this part of the University and be consolidated to three to four locations peripherally around the Academic Core. A REF is being prepared for the demolition of the carparking structures in accordance with the Development without Consent provisions of SEPP Infrastructure.

## Surrounding Development

The Academic Core is located to the north of the development site on the northern side of Macquarie Drive. Directly to the south of the site on the southern side of University Avenue is Gumnut Cottage childcare facility and to the south-east is the new Cochlear Global Headquarters building which is currently under construction.

To the south-west of the development site, outside of the Macquarie University Campus and on the southern side of University Avenue, is an aged-care facility. Another aged-care facility (Willandra Village) lies to the south and south-west behind the Gumnut Cottage Childcare Centre. Directly to the east of the development site are existing carparking structures which are to be demolished to facilitate future development on the Macquarie University Campus (ie. not necessarily required for Hearing Hub development).

The site's locational context is shown at **Figure 4** below and photographs of the site and surrounds are provided at **Figures 5** to **8**.

Hearing Hub Development Site
Macquarie University Campus
1 Cochlear Global Headquarters (under construction)
2 Childcare (Gumnut Cottage)
3 Aged-care Facility (Dorothy Henderson Lodge)
Macquarie University Station

**Figure 4** – Locality Plan

**Figure 5** – View of carpark C1 from University Avenue

**Figure 6** – View of carparks W1 and W2 looking north-west

**Figure 7** – View of aged-care facility to the south-west of the Hearing Hub development site

**Figure 8** – View of carpark W1 between Macquarie Drive and University Avenue looking south-west

## Summary of Site Opportunities and Constraints

The following constraints affect the site:

- The site is currently occupied by three carpark structures which will need to be removed to accommodate the proposed development (this will be done as a separate REF process in accordance with the provisions of SEPP Infrastructure);
- The site is located in proximity to an aged-care facility and childcare centre. Potential amenity impacts, particularly during construction, on these sensitive uses need to be minimised; and
- The site is located on the University Campus which will continue to operate during construction. Construction impacts needed to be minimised to ensure that existing University operations can continue.

As demonstrated above, the majority of site constraints relate to potential construction impacts and potential amenity impacts on nearby residential and aged-care development. These impacts can be managed through appropriate mitigation measures.

The site benefits from the following opportunities:

- The site is located at the junction between the Academic Core and the Commercial Precinct E under the Macquarie University Concept Plan. This makes it suitable for a mix of academic, commercial and not-for-profit uses that will further the University's vision for the integration and sharing of knowledge between commercial and academic activities;
- The site is located within the University Campus. Therefore, potential off-site impacts are minimal; and
- The proposed development site is **not** affected by any significant constraints identified on the University Campus:
  - the site is not bushfire prone;
  - no identified items of European or indigenous heritage are located in the vicinity of the site;
  - the site is not located in the vicinity of any identified areas of endangered ecological communities or threatened species; and
  - the site is not located in the vicinity of the University Creek riparian corridor which runs from the south-east to the north-west in the southern section of the University Campus.

# 3.0 Planning Framework and Context

## 3.1 Strategic Planning

### The Metropolitan Strategy

In December 2005, the NSW Government released the Metropolitan Strategy for Sydney entitled City of Cities – A Plan for Sydney's Future. The Metropolitan Strategy provides commentary and direction for the next 25-30 years at a regional level on issues such as land use, economic development, jobs, transport, innovation, centres and corridors and residential areas within Sydney.

Macquarie University is referred to directly and indirectly in the Metropolitan Strategy. Directly, as part of the Global Economic Corridor, also known as the Global Arc, and indirectly when referring to the Macquarie Park Corridor as a Specialised Centre, of which the University is an integral component.

The Global Economic Corridor is considered in the Strategy as the most important employment sector, being the home of most of Sydney's 'knowledge' jobs and innovative industries. It is intended for the Corridor to grow by an additional 150,000 jobs on top of the existing 800,000 (ie. 40% of total employment growth). Sydney's overall employment growth to 2031 is anticipated to be a further 500,000 jobs. The Macquarie Park Corridor is expected to contribute about 23,000 new jobs (or 70% growth) within the same timeframe under the Metropolitan Strategy. It is clear that the Macquarie Park Corridor is a key component of Sydney's employment growth, particularly as part of growth of the Global Economic Corridor.

Macquarie University has been a major catalyst for the northern half of the Global Economic Corridor during the past 40 years and is expected to continue to play a pivotal role in positioning Sydney as one of Asia Pacific's important global cities.

The Concept Plan for the University provides for the redevelopment of the Campus consistent with State planning objectives by accommodating a significant increase in employment-generating uses and research-orientated activities within the Macquarie Park Corridor. The proposed Hearing Hub will provide an important link between the knowledge-based activities and associated commercial and not-for-profit organisations.

### Draft Inner North Subregional Strategy

The Draft Inner North Subregional Strategy (Draft Strategy) provides more detailed strategic planning goals and objectives for the Inner North region consistent with the directions set by the Metropolitan Strategy.

The subregion includes the Ryde local government area (LGA), Macquarie Park Corridor, and Macquarie University. The Draft Strategy identifies the Macquarie Park Corridor as a key specialised centre, with a strong emphasis on the strengthening of the Global Economic Corridor from North Sydney to Macquarie Park (of which the University is a major land holder and contributor), and reinforcement of the subregion's knowledge assets.

The subregion is anticipated to provide up to 60,100 new jobs by 2031. Of this employment growth target, Ryde is expected to contribute in the order of 21,000 to 23,100 jobs. These jobs are generally all expected to be absorbed within the Macquarie Park Corridor.

The combination of research-orientated and commercial uses in the Hearing Hub is consistent with the vision outlined in the Draft Strategy. the proposed development will also provide increased employment capacity in the region.

### NSW State Plan

The NSW State Plan 2010 is a long-term plan to deliver services in NSW and sets clear priorities to guide Government decision-making and resource allocation.

The 2010 State Plan sets out 10 new priorities including a new priority to speed up planning decisions to support business investment in NSW and a new approach to integrated transport and land use planning and delivery. The State Plan also aims to focus growth around existing transport hubs.

The State Plan aims to increase access to knowledge and skills in partnership with universities by facilitating the transfer of knowledge to the business sector for commercial applications. This aim is strongly supported by the development of the Hearing Hub which will combine knowledge-based activities with associated commercial and not-for-profit organisations.

## 3.2 Statutory Planning

The following EPIs apply to the Hearing Hub project:

- The EP&A Act (specifically the objects of the Act);
- The Major Development SEPP; and
- *State Environmental Planning Policy 55 - Remediation of Land* (SEPP 55).

**Table 1** below outlines the provisions of the above EPIs.

**Table 1** – Provision of relevant EPIs

| EPI | Provision |
|---|---|
| Objects of the EP&A Act | The EP&A Act sets out the following relevant objectives applicable to the Hearing Hub project:<br>5 (a) to encourage:<br>(i) the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment,<br>(ii) the promotion and co-ordination of the orderly and economic use and development of land,<br>(vii) ecologically sustainable development. |
| SEPP Major Development | The SEPP indentifies the types of development to which Part 3A of the EP&A Act applies and establishes a framework for the declaration and assessment of Major Developments. Part 21 of Schedule 3 of the Major Development SEPP applies specifically to land on the Macquarie University Campus. Part 21 of Schedule 3 provides the following controls for development within Precinct E and for the Hearing Hub development site:<br>- Zoning - Mixed Use B4 in which the following relevant uses are permitted: business premises; educational establishments; information and education facilities; health services facility; office premises; and retail premises (see **Figure 9a** below).<br>- Maximum GFA - maximum GFA permitted for the portion of Precinct E in which the Hearing Hub development site is located (Station South) is 155,000m$^2$ (see **Figure 9b** below).<br>- Maximum height - 36m in the portion of Precinct E in which the development site is located (see **Figure 9c** below).<br>- Maximum 1 car parking per 80m$^2$ of GFA. |
| SEPP 55 | SEPP 55 applies to all land in NSW and requires the consent authority to consider whether land which is the subject of a development proposal is contaminated, and if so, whether appropriate remediation measures are to be implemented to ensure that the land can accommodate the proposed use. |

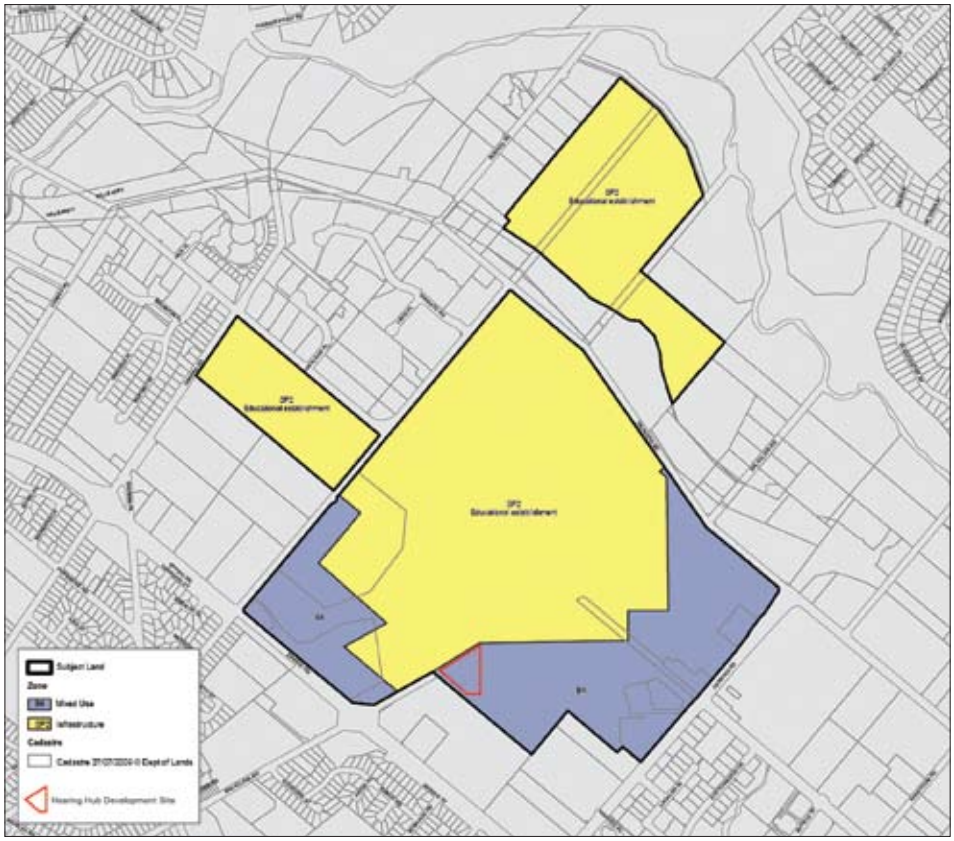



**Figure 9a** – *State Environmental Planning Policy (Major Development) Amendment (Macquarie University) 2009 Land Zoning Map*

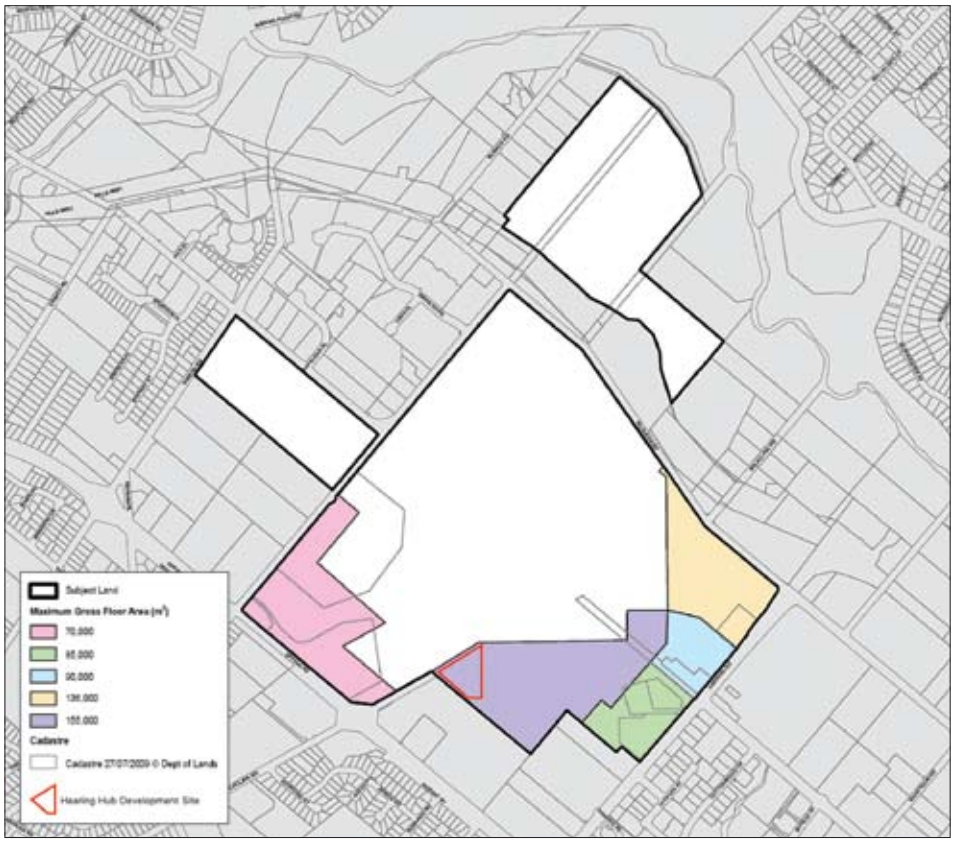



**Figure 9b** – *State Environmental Planning Policy (Major Development) Amendment (Macquarie University) 2009 Gross Floor Area Map*

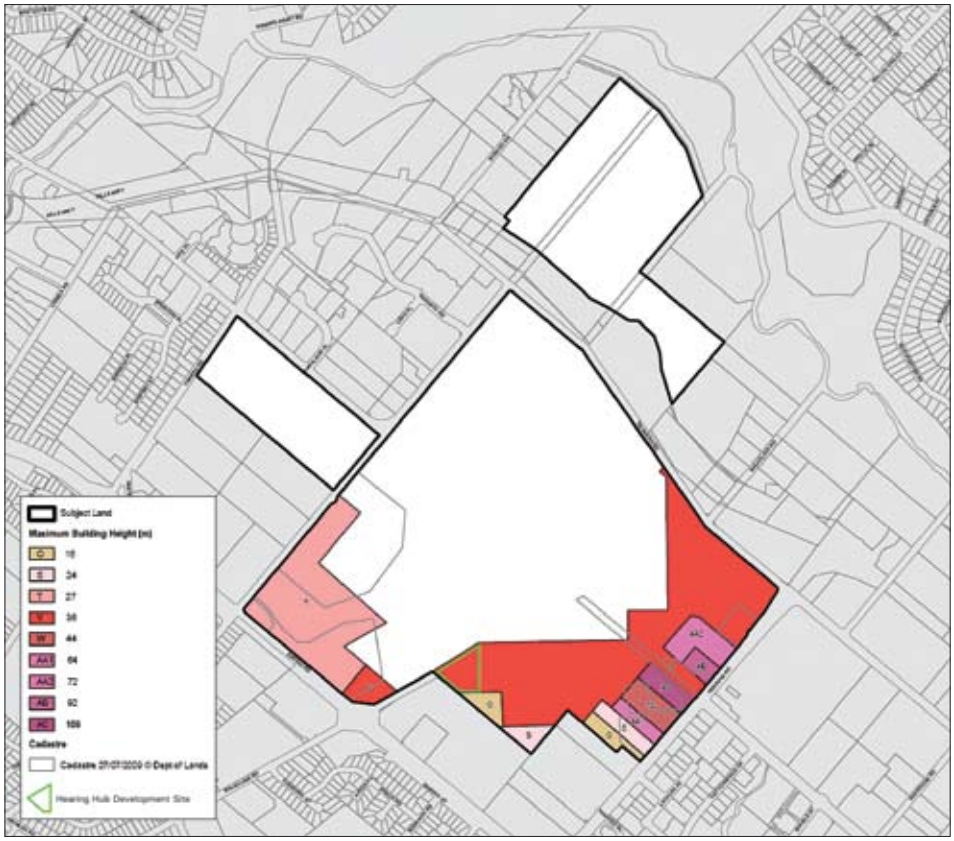



**Figure 9c** – *State Environmental Planning Policy (Major Development) Amendment (Macquarie University) 2009 Height of Buildings Map*

The DGRs for the Hearing Hub project requires the following local EPIs to be addressed:

- *Ryde Planning Scheme Ordinance 1979* (RPSO); and
- *Draft Ryde Local Environmental Plan 2008* (Draft Ryde LEP).

Prior to approval of the Concept Plan and gazettal of the State Significant listing for the Campus in the Major Developments SEPP, the RPSO provided the planning framework for development on most of the Macquarie University Campus site. However, Clause 4 in Part 21 of Schedule 3 of the Major Development SEPP states that the only EPIs that apply 'according to their terms' to the Campus, is the Major Development and *State Environmental Planning Policy No 1—Development Standards*.

Therefore, the provisions of the RPSO no longer apply to the development on the Macquarie University Campus. However, the heritage items identified in the RPSO have been taken into account for development on the Campus. The RPSO identifies the Macquarie University Ruins at 192 Balaclava Road as a local heritage item. This heritage item is located well outside of the Hearing Hub development site in the northern portion of the Campus and is not a relevant consideration for the project.

The Draft Ryde LEP establishes the future planning framework for development in the Ryde local government area (LGA). The Draft LEP provides zoning, floor space ratio (FSR) and height controls for part of the Campus. These controls are inconsistent with the provisions of Part 21 of Schedule 3 of the Major Developments SEPP and, in accordance with Clause 4 in Part 21 of Schedule 3 of the SEPP, do not apply to the Campus.

## Concept Plan

The approved Concept Plan provides a variety of precinct-specific objectives and general controls with respect to access and circulation, vistas, planting and landscaping, setbacks and street activation. The Concept Plan guidelines and controls relating to Precinct E are relevant to the proposal (further detail is provided in Section 6.3 below).

## Urban Design Guidelines for Precinct E

Cox, in collaboration with Macquarie University, has prepared Urban Design Guidelines for Precinct E to satisfy Condition B4 of the Concept Plan approval. These Guidelines provide more detailed planning and design guidelines for development within the Precinct including site-specific lot controls for the Hearing Hub development site (further detail is provided in Section 6.4 below)

# 4.0 Consultation

In accordance with Part 3A of the EP&A Act consultation is required to occur at the following stages:

- the Director General of the Department of Planning is required to consult with relevant public authorities in preparing the environmental assessment requirements for the Project Application; and
- the Director-General is required to advertise and exhibit the Environmental Assessment and appended reports and documentation.

In preparing the DGRs for the Environmental Assessment, the Director-General consulted with the following authorities and groups:

- Department of Environment and Climate Change;
- Roads and Traffic Authority;
- Sydney Water;
- NSW Transport & Infrastructure; and
- City of Ryde Council (Ryde Council).

Comments and issues raised by these authorities and groups were considered in preparing the DGRs and are included in **Appendix A**.

## 4.1 Consultation with Ryde Council

On 11 May 2010, the traffic engineer for the Hearing Hub project (Arup) met with Council's traffic engineers at which the modelling approach for the purposes of the Traffic Report were discussed. Key outcomes of the meeting were as follows:

- Use of the Macquarie Park 2007 Base Paramics Model, partially updated to 2010 conditions by Cardno for the temporary carpark DA assessment, was appropriate for the traffic modelling for the Hearing Hub development;
- The adopted 2012 base and development scenarios for the traffic modelling (see Transport and Accessibility Impacts Report at **Appendix G** and Section 6.10 below) prepare by Arup were appropriate; and
- There were no other major road network changes or major developments to be included in the modelling process.

On 12 May 2010 a briefing meeting was held with Ryde Council which focussed on the precinct-specific guidelines being developed for Precinct E. The key statistics for the Hearing Hub development were outlined for Council's information. Council did not raise any specific concerns or objections in relation to these Guidelines. It is our understanding that traffic and transport issues are Council's main areas for resolution.

# 5.0 Project Description

The Hearing Hub is to be a unique, world-class facility purpose-designed for research, research training, teaching and learning in hearing, and hearing-related speech, language and reading disorders, as well as associated commercial activities. It will bring together key University research groups in hearing and cognitive sciences, neurosurgery, special education and electronic engineering with major organisations involved in developing hearing technologies and services.

The building has been designed to give consideration to the Guidelines for Precinct E. Further discussion is provided in Section 6.4 below.

The project involves site preparation works including excavation, road re-alignment, and the construction (and fitout) of a six-storey building with two levels of basement parking for 335 vehicles (60 of the parking spaces are to be allocated as visitor parking). A number of the tenant parking spaces will be in the form of tandem parking. The carpark has been designed to be in accordance with relevant Australian Standards.

Vehicular access to the basement carpark is to be provided off the proposed north-south secondary road to the east of the site which will links University Avenue and Macquarie Drive. The construction of this north-south access link will be undertaken as part of the Stage 1 infrastructure works associated with the Concept Plan and will be completed at the same time or prior to the construction of the Hearing Hub development (see Section 6.4 for further detail).

Four accessible, temporary at-grade parking spaces will be provided at the north-western end of the site. Access to this parking area will be provided from Macquarie Drive. Once Macquarie Drive has been developed in accordance with the alignment described in the Concept Plan and Urban Design Guidelines. It is proposed that these car spaces will be transferred to the on-street parking along Macquarie Drive.

Architectural plans for the development have been prepared by Perumal Pedavoli Architects (**Attachment C**).

The proposed development is designed as a V-shape building at an angle. It will include two 'wings'. The northern wing will align with Macquarie Drive and the southern wing will align with University Avenue to the south. A ground floor central foyer will link the two wings. Amenities such as toilets as well as the lift cores will be provided within the northern wing. A generous setback (approximately 10 metres) is generally provided from the Macquarie Drive corridor alignment to the north in which street tree planting is proposed (consistent with the Precinct E Guidelines).

The proposed development includes an extension at the western edge of the building which will extend along the axis of the northern wing. The extension will provide an approximately three-storey view corridor from Western Road and pedestrian thoroughfare through the lower levels.

The main pedestrian access to the building will be provided at the western end of the building. However, a secondary pedestrian access will be provided at the eastern end.

The building will provide a wind tunnel and anechoic chamber at basement level 2. A double-height, 150-seat lecture will be accommodated at levels 1 & 2.

A level-by-level description of the proposal is provided in **Table 2** below:

**Table 2** – Level by level description of proposed development

| Level | Proposed |
|---|---|
| Basement level 2 | - 185 parking spaces;<br>- 16 motorcycle parking spaces;<br>- Wind tunnel and anechoic chamber;<br>- Nano Fabrication Area;<br>- Rainwater Detention Tank; and<br>- Plant room and storage space. |
| Basement level 1 | - 150 parking spaces (including 8 disabled spaces);<br>- 160 bicycle parking spaces;<br>- Female and male toilets, showers and change rooms;<br>- Anechoic chamber;<br>- Garbage and recycling area:<br>- Delivery area; and<br>- Storage space. |
| Ground floor | - Four temporary accessible at-grade parking spaces;<br>- Reception area;<br>- Laboratory, academic/research and office space;<br>- Cafe within the central foyer area;<br>- Play area at the eastern edge of the southern wing; and<br>- Female and male toilets, accessible toilets and shower. |
| Level 1 | - Laboratory, academic/research and office space;<br>- Double-height lecture theatre; and<br>- Female and male toilets, accessible toilets and shower. |
| Level 2 | - Laboratory, academic/research and office space;<br>- Double-height lecture theatre;<br>- Break-out space; and<br>- Female and male toilets, accessible toilets and shower. |
| Level 3 | - Laboratory, academic/research and office space;<br>- Recreation space over western extension;<br>- External deck over lecture theatre below; and<br>- Female and male toilets, accessible toilets and shower. |
| Level 4 | - Laboratory, academic/research and office space; and<br>- Female and male toilets, accessible toilets and shower. |
| Level 5 | - Laboratory, academic/research and office space; and<br>- Female and male toilets, accessible toilets and shower. |
| Roof | Plant room |

A summary of the key development statistics associate with the project is provided in **Table 3** below:

**Table 3** – Summary of Project

| | **Australian Hearing Hub** |
|---|---|
| Land use | Principally educational (research / training/ teaching / learning) with ancillary commercial and retail uses |
| Height | Approx. 27m/6 storeys |
| GFA | Approx. 23,182m$^2$ (excluding GFA allocated to carparking that exceeds the permitted carparking rate - see Section 6.2 below). |
| Car Parking | - 339 spaces including:<br>- 12 accessible spaces, 4 of which will be provided as temporary at-grade spaces which will eventually be relocated off-site but within the vicinity of the site; and<br>- 60 visitor spaces. |

## 5.1 Uses and Tenancies

At present, prospective key tenants and occupiers of space include:

- Australian Hearing Services, incorporating the National Acoustics Laboratory;
- Cochlear;
- Macquarie University Faculty of Human Sciences, including areas concerned with Audiology, Linguistics, Speech Pathology, Centre for Cognitive Sciences, Micro-Neuro Surgery, Nano-Fabrication and Electrical Engineering; and
- Not-for-profit organisations such as the Royal Institute for Deaf and Blind Children, Sydney Cochlear Implant Centre and the Shepherd Centre.

As detailed above, the majority of floor space on the site will be associated with research and education activities, as well as not-for-profit hearing and medical organisations and government agencies. For this reason, the proposed development is not considered a commercial project.

The proposed development will have an overall gross floor area (GFA) **23,182**m$^2$ divided as follows:

- Approximately 4,330m$^2$ of shared space (including the anechoic chambers, wind tunnel, toilets, lift lobbies, reception and foyer areas, auditorium, library, conference room, breakout spaces and corridors). This space will be shared equally by all users with the main user of the building being University uses;
- Approximately 9,200m$^2$ allocated to University uses;
- Approximately 4,535m$^2$ allocated to Government agencies (Australian Hearing);
- Approximately 1,340m$^2$ allocated to commercial uses (specifically Cochlear and Sydney Cochlear Implant Centre); and
- Approximately 415m$^2$ allocated to not-for-profit organisations.

Some 3,362m$^2$ of GFA has not yet been allocated to a specific tenant. However, it is expected that this excess space will be used for University purposes.

## 5.2 Fitout

The project also seeks approval of the design (and general fit-out) of the Hearing Hub development with details to be provided at the Construction Certificate stage.

## 5.3 Infrastructure

Approval for the following road infrastructure works is sought as part of the Hearing Hub Project Application:

- Macquarie Drive reconfiguration at Balaclava Road; and
- Access road to the east of the Hearing Hub development site.

It is also proposed to demolish the part of Western Road which runs through the site, as well as the demolish and re-align parts of University Avenue at the connection to Western Road and Balaclava Road to facilitate appropriate access to the proposed development as part of the Hearing Hub Project Application.

## 5.4 Landscaping

A Landscape Plan has been prepared for the project by Lorna Harrison Pty Ltd (**Appendix D**). The design of landscaping for the site has considered the guidelines outlined in Landscape Management Plan for Precinct E (prepared by Context as part of the part-approval process for the Concept Plan). Further detail is provided in Section 6.5 below.

The landscaped area at the western edge of the site has been designed to provide a gateway landscaped element at the western entry to the University Campus. A mix of drip irrigation turf and native grasses (which requires no irrigation) will be planted within the landscaped area as this will reduce the water consumption for the development. Spotted Gum trees will be planted in the westernmost corner of the development site which will link in with the Spotted Gum street tree planting proposed at the frontage to Macquarie Drive.

Native shrub, hedge and flower planting will be planted in the north-west of the site at the frontage to Macquarie Drive and will screen an outdoor seating and passive recreation area at this frontage. North-south pedestrian access is provided along the western edge of the building through the link at the lower three levels of the western extension of the building.

Appropriate paving designs have been incorporated into the outdoor area which will integrate with the public domain within the rest of the Precinct and Campus and will emphasise the alignment of the building. Indicative paving designs are outlined in the Landscape Plan and include stone coloured concrete with aggregate along the pedestrian pathway at the western facade of the building and coloured concrete with aggregate in part of the passive outdoor recreation area at the western frontage. Indicative stone unit paving in contrasting colour bands is proposed at the outdoor base of the building in the eastern forecourt and below the western extension of the building. This paving design will differentiate the Hearing Hub development from the rest of the Campus at the same time as ensuring that it integrates with the public domain around the site. These paving designs are indicative only at this stage, and will be refined following approval.

## 5.5 Materials and Colours

An Exteriors Finishes Board is included at **Appendix C**. The project will be constructed from pre-cast concrete with face brick walls and metal window and door frames. A colorbond metal roof, largely concealed by parapets, is proposed.

## 5.6 Signage

The location, size and general layout of proposed building identification signage on the proposed Hearing Hub building is shown on the elevations at **Attachment C** with signage proposed at the upper levels of the eastern and western facades. However, a Signage Strategy will be prepared for the project following approval which will detail the exact location, size, design and lighting for signage on and around the building. This has been included in the Draft Statement of Commitments at Section 7.0.

## 5.7 Public Art

The development site provides a number of opportunities for public art at both the eastern entry forecourt to the site and within the landscaped area to the west. These opportunities will be explored further as part of a Public Art Strategy to be prepared for the development following approval. This has been included in the Draft Statement of Commitments.

## 5.8 ESD Measures

The building will be designed to achieve a minimum 5-star Green Star Office v3 rating for Design and for As Built, and a minimum 4.5-star NABERS rating for the base building. The following strategies have been incorporated into the design of the development to ensure that the proposed Hearing Hub project achieves a high level of ESD performance:

- Providing premium indoor environment quality by optimising air quality, natural daylight, thermal comfort and glare control;
- Reducing energy consumption and thus greenhouse gas (GHG) emissions;
- Reducing the use of mains potable water;
- Reducing embodied energy within the development;
- Reducing the environmental impact of harmful emissions to the air, land and water;
- Allowing for adaptation to regulations and costs associated with climate change; and
- Ensuring building occupants understand the ESD strategies within the building so that it can function as designed.

A number of mechanisms have been incorporated into the design to ensure that the above strategies can be achieved. Details are provided in the ESD Report prepared by Cundall and included at **Appendix E**. See Section 6.12 below for further details.

## 5.9 Servicing and Waste Management

A recycling and waste storage area is provided in Basements 1. Appropriate waste and recycling mechanism for the operation of the Hearing Hub development will be implemented in accordance with the Operational Waste Management Plan which is to be developed following approval (this is included in the Draft Statement of Commitments).

A delivery area will be provided in Basement 1.

## 5.10 Operating Hours

The Hearing Hub will generally operate according to normal office hours ie. 8:30am to 5:30pm but will be accessible of a 24 hour basis to tenants. The Hearing Hub carpark will operate on a 24-hour basis. The carpark will be subject to assess control to prevent access by non-Hearing Hub users. Access by visitors will be subject to concierge control.

## 5.11 Capital Investment Value

The Capital Investment Value (CIV) of the project is $108,401,000. See Quantity Surveyors Report at **Appendix F**.

## 5.12 Funding and Timing

The proposal is in part funded by the Commonwealth Government under the Education Investment Fund (EIF) program, and funding allocation is strictly tied to a demonstrated achievement of project milestones. The currently envisaged commencement of construction is beginning of January 2011 (pending approval) with construction to occur over 2011 and the majority of 2012. The building is proposed to be operational in late 2012.

# 6.0 Environmental Assessment

This section of the report assesses and responds to the environmental impacts of the Concept Plan proposal. It addresses the matters for consideration set out in the DGRs.

The Draft Statement of Commitments at Section 7.0 complements the findings of this section.

## 6.1 Director General's Environmental Assessment Requirements

**Table 4** provides a detailed summary of the individual matters listed in the DGRs and identifies where each of these requirements has been addressed in this report and the accompanying technical studies.

**Table 4** – Director General's Environmental Assessment Requirements

| Director General's Requirements | Location in Report / Application |
|---|---|
| Key Issues | |
| **Relevant EPI's, Policies and Guidelines**<br>The EA shall address planning provisions applying to the site, including permissibility and the provisions of all plans and policies including:<br>- Objects of the EP&A Act;<br>- State Environmental Planning Policy (Major Development) 2005;<br>- State Environmental Planning Policy 55 - Remediation of Land;<br>- NSW State Plan;<br>- Sydney Metropolitan Strategy and the Draft Inner North Subregional Strategy;<br>- Ryde Planning Scheme Ordinance;<br>- Draft Ryde Local Environmental Plan 2008; and<br>- Nature and extent of any non-compliance with relevant environmental planning instruments, plans and guidelines and justification for any non-compliance. | Sections 3.1, 3.2 and 6.2 of EAR. |
| **Concept Plan**<br>The EA shall demonstrate consistency with Concept Plan approval MP 06_0016 dated 13 August 2009 (including relevant modifications), Statement of Commitments and justification for any areas of inconsistency. | Sections 6.2, 6.3, 6.4 and 6.5 of EAR |
| **Built Form and Urban Design**<br>- The EA shall address the height, bulk and scale of the proposed development within the context of the locality including the University Avenue streetscape and the Macquarie University Campus site.<br>- The EA shall address design quality with specific consideration of the façade, massing, setbacks, building articulation, use of appropriate colours, materials/finishes, landscaping, safety by design and public domain in accordance with the Concept Plan approval (MP06_0016) and the Macquarie Park Public Domain Technical Manual.<br>- The EA shall address the provision of public art in accordance with City of Ryde Council's DCP 2006. | Sections 5.0, 6.4, 6.5, 6.7 and 6.8, and Architectural Plans at **Appendix C** and Landscape Plan at **Appendix D**. |
| **Environmental and Residential Amenity**<br>The EA must address solar access, acoustic privacy, visual privacy, view loss and wind impacts and achieve a high level of environmental and residential amenity. | Sections 6.9, 6.11, 6.15, 6.16 and 6.22. |

| Director General's Requirements | Location in Report / Application |
|---|---|
| **Transport & Accessibility Impacts (Construction and Operational)**<br>The EA shall provide a Transport & Accessibility Impact Assessment prepared in accordance with the RTA's Guide to Traffic Generating Developments and utilising City of Ryde Council's Macquarie Park 2007 Base Paramics Model whilst making reference to the NSW Planning Guidelines for Walking and Cycling and the Integrated Land Use and Transport Policy, considering the following issues:<br>- Traffic generation including daily and peak traffic movements likely to be generated by the proposed development, the impact on nearby intersections (internal and external to the Macquarie University campus) and the need for funding or upgrading or road improvement works (if required);<br>- Car parking arrangements, having regard to the Concept Plan approval (MP06_0016), local planning controls and RTA guidelines whilst also considering accessibility of the site to public transport and campus wide parking provisions;<br>- Measures to promote sustainable means of transport including public transport usage, car sharing, car pooling and pedestrian and bicycle linkages in addition to addressing the potential for implementing a Workplace Travel Plan or a location-specific sustainable travel plan;<br>- Detail the provision of facilities to increase the non-car mode share for travel to and from the site as per the 40% non-car mode share target specified in Condition B2(1) of the Concept Plan approval (MP 06_0016);<br>- Demonstrate how users of the development will be able to make travel choices that support the achievement of relevant State Plan targets;<br>- Detail the existing pedestrian and cycle movements within the vicinity of the site and determine the adequacy of the proposal to meet the likely future demand for increased public transport and pedestrian and cycle access with consideration to the Ryde Bicycle Strategy and Master Plan 2007;<br>- Identify measures to mitigate potential impacts for pedestrians and cyclists during the construction stage of the project;<br>- Details of proposed accesses and parking provisions including compliance with the relevant Australian Standards; and<br>- Details of service vehicle movements. | Section 6.10 and Transport and Accessibility Impacts Report at **Appendix G** |
| **Ecologically Sustainable Development Report**<br>The EA shall detail how the development will incorporate ESD principles in the design, construction and ongoing operation phases of the development.<br>The EA must demonstrate that the development can achieve a minimum 4 Green Star rating, or any other suitably accredited rating scheme. | Section 6.12 and ESD Report at **Appendix E** |
| **Drainage, Stormwater and Groundwater Management**<br>- The stormwater design is to address any drainage, stormwater and groundwater management issues and/or impacts on City of Ryde Council's stormwater system likely to result from development on the site including on-site stormwater detention and drainage infrastructure in accordance with City of Ryde Council's DCP 2006;<br>- Provide an Integrated Water Management Plan including any proposed water sensitive urban design measures; and<br>- The EA shall address how recycled water from any nearby water recycling plants (Macquarie Park Recycled Water Scheme) could be provided to the development. | Sections 6.13 and 6.14 of EAR and Stormwater Management Report and Plans at **Appendix H**, Rainwater Harvesting Report at **Appendix I** and Geotechnical Investigation at **Appendix J**. |
| **Noise and Vibration Assessment**<br>The EA shall address the issue of noise and vibration impact from nearby roads and railway and provide detail of how this will be managed through the design of the proposed building, in compliance with relevant Australian Standards and the Department's Interim Guidelines for Development near Rail Corridors and Busy Roads | Section 6.11 of EAR and Noise and Vibration Intrusion and Environmental Noise Assessment at **Appendix K.** |

| Director General's Requirements | | Location in Report / Application |
|---|---|---|
| **Flora and Fauna**<br>The EA shall address impacts on flora and fauna, including threatened species, populations and endangered ecological communities and their habitats and steps taken to mitigate any identified impacts to protect the environment. | | Section 6.20 of EAR. |
| **Heritage**<br>The EA shall consider any potential impacts on heritage. | | Section 6.18 and 6.19 of EAR. |
| **Construction**<br>The EA shall identify measures to ameliorate potential construction impacts including vehicular/pedestrian access, noise and vibration, air quality, water quality and waste management. | | Section 6.21 of EAR and Preliminary Construction Management Plan at **Appendix L** and Construction Noise and Vibration Management Plan at **Appendix K**. |
| **Contribution**<br>The EA shall address Council's Section 94 Contribution Plan and/or details of any Voluntary Planning Agreement / Concept Plan Schedule of Contributions and Condition C15(5) of the Concept Plan approval MP 06_0016 | | Section 6.25 of EAR. |
| **Contamination**<br>The EA is to demonstrate compliance that the site is suitable for the proposed use in accordance with SEPP 55. | | Section 6.14 of EAR and Targeted Phase 2 Contamination Assessment at **Appendix M**. |
| **Consultation**<br>The EA is to demonstrate how the proponent has undertaken or will undertake an appropriate and justified level of consultation in accordance with the Department's Major Project Community Consultation Guidelines October 2007. | | Section 4.0 of EAR |
| Plans and Documents to accompany Application | | |
| **General** | 1. An executive summary. | Page ii of EAR |
| | 2. A thorough site analysis including site plans, aerial photographs and a description of the existing and surrounding environment. | Section 2.0 of EAR and Site Analysis Plan at **Appendix C**. |
| | 3. A thorough description of the proposed development. | Section 5.0 of EAR and Architectural Plans at **Appendix C**. |
| | 4. An assessment of the key issues specified above and a table outlining how these key issues have been addressed. | This table (**Table 4**) specifies where the issues identified in the DGRs have been addressed. Refer to relevant Sections and Appendices for more detail. |
| | 5. An assessment of the potential impacts of the project and a draft Statement of Commitments, outlining environmental management, mitigation and monitoring measures to be implemented to minimise any potential impacts of the project | Sections 6.0 and 7.0 of EAR. |
| | 6. The plans and documents outlined below . | Appendices |
| | 7. A signed statement from the author of the Environmental Assessment certifying that the information contained in the report is neither false nor misleading. | Page i of EAR |

| Director General's Requirements | | Location in Report / Application |
|---|---|---|
| **General** | 8. A Quantity Surveyor's Certificate of Cost to verify the capital investment value of the project (in accordance with the definition contained in the Major Development SEPP. | **Appendix F** |
| | 9. A conclusion justifying the project, taking into consideration the environmental impacts of the proposal, the suitability of the site, and whether or not the project is in the public interest | Section 8.0 of EAR |
| **Existing Site Survey Plan**<br>Illustrate:<br>- the location of the land, boundary measurements, area ($m^2$) and north point;<br>- the existing levels of the land in relation to buildings and roads;<br>- location and height of existing structures on the site; and<br>- location and height of adjacent buildings and private open space.<br>all levels to be to Australian Height Datum. | | **Appendix B** |
| **Site Analysis Plan**<br>Must identify existing natural elements of the site (including all hazards and constraints), existing vegetation, footpath crossing levels and alignments, existing pedestrian and vehicular access points and other facilities, slope and topography, utility services, boundaries, orientation, view corridors and all structures on neighbouring properties where relevant to the application (including windows, driveways, private open space etc). | | **Appendix C** |
| **Locality / Context Plan**<br>Illustrate:<br>- significant local features such as parks, community facilities and open space and heritage items;<br>- the location and uses of existing buildings, shopping and employment areas;<br>- traffic and road patterns, pedestrian routes and public transport nodes. | | **Appendix C** |
| **Architectural Drawings**<br>Illustrate:<br>- the location of any existing building envelopes or structures on the land in relation to the boundaries of the land and any development on adjoining land;<br>- detailed floor plans, sections and elevations of the proposed buildings;<br>- elevation plans providing details of external building materials and colours proposed;<br>- fenestrations, balconies and other features;<br>- accessibility requirements of the Building Code of Australia and the Disability<br>- Discrimination Act;<br>- the height (AHD) of the proposed development in relation to the land;<br>- the level of the lowest floor, the level of any unbuilt area and the level of the ground;<br>- any changes that will be made to the level of the land by excavation, filling or otherwise. | | **Appendix C** |
| **Stormwater Concept Plan**<br>Illustrate the concept for stormwater management and include DRAINS modelling to determine total amount of on-site detention required. | | **Appendix H** |

| Director General's Requirements | Location in Report / Application |
|---|---|
| **Erosion and Sediment Control Plan**<br>Plan or drawing that shows the nature and location of all erosion and sedimentation control measures to be utilised on the site. | **Appendix H** |
| **Geotechnical Report**<br>To be prepared by a recognised professional which assesses the risk of Geotechnical failure on the site and identifies design solutions and works to be carried out to ensure the stability of the land and structures and safety of persons. | **Appendix J** |
| **View Analysis**<br>Visual aids such as a photomontage must be used to demonstrate visual impacts of the proposed building envelopes in particular having regard to the siting, bulk and scale relationships from key areas; | **Appendix N** |
| **Landscape Plan**<br>Must illustrate treatment of open space areas on the site, screen planting along common boundaries and tree protection measures both on and off the site. | **Appendix D** |
| **Shadow Diagrams**<br>To show solar access to the site and adjacent properties at summer solstice (Dec 21), winter solstice (June 21) and the equinox (March 21 and September 21) at 9.00 am, 12.00 midday and 3.00 pm. | **Appendix C** |

## 6.2 Consistency with Planning Controls

**Table 5** – Provision of relevant EPIs

| EPI | Provision |
|---|---|
| Objects of the EP&A Act | - The proposed development of the Hearing Hub at Macquarie University is consistent with the objects of the EP&A Act. It will encourage the proper management and development of land as it will allow for the development of underutilised space on the Campus within proximity to the Macquarie University Station for an appropriate mix of education, research and development and business incubation activities consistent with the Concept Plan and the provisions of the gazetted State Significant Site listing for the site. In this regard it promotes the orderly and economic use of land by locating an appropriate development (a mix of educational and associated commercial-orientated uses) within a commercial precinct of the University Campus.<br>- The proposal will achieve a high level of ESD including a 5 Star Green Star office rating and a minimum 4.5 Star NABERS Energy rating. It will meet the ESD objectives of the EP&A Act. |
| Major Development SEPP | The proposed Hearing Hub project will be consistent with the planning controls established for Macquarie University under Part 21 Schedule 3 of the Major Development SEPP:<br>- Zoning - The project includes uses permissible within the B4 Mixed Use zoning for the site and is consistent with the objectives for the zone (see details below).<br>- Maximum GFA - the proposal will have a maximum GFA of 23,182m$^2$ plus 647m$^2$ of GFA for the area of carparking that exceeds permissible controls (see discussion on GFA below). Combined with the Cochlear Global Headquarters approved GFA of 24,343m$^2$ allows for more than 105,000m$^2$ of additional GFA within this portion of Precinct E (generally referred to as the Station South sub-precinct) before the maximum threshold of 155,000m$^2$ of GFA is reached.<br>- Maximum height - the proposal will have a maximum height of 27m which is well below the 36m permitted on the site. |

| EPI | Provision |
|---|---|
| Major Development SEPP | - The proposal exceeds the maximum carparking rate of 1 per 80m$^2$. However, in accordance with the Concept Plan conditions of approval, a flexible approach to car parking allocation is permitted in Precinct E provided the overall parking numbers for the Precinct (and associated Precinct F) are not exceeded once fully developed. |
| SEPP 55 | A targeted Phase 2 Contamination Assessment has been prepared for the proposal by Douglas Partners (see **Appendix M**). The report concludes that the site can be made compatible for the proposed development subject to removal of fill material from underneath the asphalt-paved car parks that have recorded total petroleum hydrocarbons (TPH) levels above the site assessment criteria (SAC) values for commercial development (Note: although the proposed development is not considered a commercial development, the application of SAC values for commercial development for the purposes of contamination assessment is considered appropriate). Further detail is provided in Section 6.14 below. |

## Calculating Gross Floor Area

In accordance with Part 21 Schedule 3 of the Major Development SEPP, GFA on the site is required to be calculated in accordance with the definition under the Standard Local Environmental Plan (LEP) Template where:

*gross floor area means the sum of the floor area of each floor of a building measured from the internal face of external walls, or from the internal face of walls separating the building from any other building, measured at a height of 1.4 metres above the floor, and includes:*

*(a) the area of a mezzanine, and*

*(b) habitable rooms in a basement or an attic, and*

*(c) any shop, auditorium, cinema, and the like, in a basement or attic,*

*but excludes:*

*(d) any area for common vertical circulation, such as lifts and stairs, and*

*(e) any basement:*

*(i) storage, and*

*(ii) vehicular access, loading areas, garbage and services, and*

*(f) plant rooms, lift towers and other areas used exclusively for mechanical services or ducting, and*

*(g) car parking to meet any requirements of the consent authority (including access to that car parking), and*

*(h) any space used for the loading or unloading of goods (including access to it), and*

*(i) terraces and balconies with outer walls less than 1.4 metres high, and*

*(j) voids above a floor at the level of a storey or storey above.*

In accordance with the above definition, the GFA of the development is required to include any part of the development where the carparking provision exceeds the permitted carparking control. As the proposed development will exceed the permitted carparking rate of 1 space per 80m$^2$ GFA under the Concept Plan (an exceedence of 49 spaces is proposed) an additional 647m$^2$ of GFA should technically be incorporated into the total GFA provision on the site.

This results in a **total GFA of 23,829m$^2$ of GFA on the site when calculated in accordance with the definition under the Standard LEP Template**. However, for the purpose of calculating traffic generation (Section 6.10), developer contributions (Section 6.25) etc on the site, GFA has been calculated to exclude the area allocated to the carparking exceedence ie. **an actual GFA of 23,182m$^2$**.

The total GFA of 23,829m$^2$ is only relevant when considering the overall GFA permitted in the part of Precinct E in which the site is located (155,000m$^2$). Assuming the Hearing Hub development is approved and proceeds to construction, a total of 47,172m$^2$ of GFA will be located in this part of Precinct E (taking into consideration the 23,343m$^2$ of GFA already approved for the Cochlear Stage 1 development.

## Permissibility and Consistency with Zone Objectives

Under the B4 zone, 'educational establishments' are permissible with consent. The proposal falls within the definition of an educational establishment as it is a development undertaken by a university constituted under an Act that, amongst other things, provides for formal education. The project would also qualify as a 'health services facility' (also permitted in the B4 zone with consent), as it will be a building *'used as a facility to provide medical or other services relating to the maintenance or improvement of the health, or the restoration to health, of persons or the prevention of disease in or treatment of injury to persons, and includes the following:*

*(a) day surgeries and medical centres,*

*(b) community health service facilities,*

*(c) health consulting rooms,*

*(d) facilities for the transport of patients, including helipads and ambulance facilities,*

*(e) hospitals.*

The proposal is permitted with consent in the B4 Mixed Use zone under the Macquarie University listing under Part 21 of Schedule 3 of the Major Developments SEPP.

The objectives of Zone B4 Mixed Use are as follows:

*(a) to provide a mixture of compatible land uses,*

*(b) to integrate suitable business, office, residential, retail and other development in accessible locations so as to maximise public transport patronage and encourage walking and cycling,*

*(c) to ensure employment and educational activities within the Macquarie University campus are integrated with other businesses and activities,*

*(d) to promote strong links between Macquarie University and research institutions and businesses within the Macquarie Park corridor,*

*(e) to promote the principles of ecologically sustainable development,*

*(f) to ensure an appropriate density, form, range, height and distribution of land uses and development.*

The proposed Hearing Hub development meets the objectives for the B4 Mixed Use zone. It provides for a compatible mix of educational uses and health-related uses within a single purpose-built facility. It will promote links between the University and commercial health-related businesses and will achieve a high level of ESD performance. The proposal is generally consistent with the planning controls for the site under the Major Developments SEPP and is consistent with the urban design objectives under the Concept Plan (see Section 6.4 below).

# 6.3 Compliance and Consistency with Concept Plan

## Compliance with Conditions of Approval and Statement of Commitments

In approving the Concept Plan, the Minister imposed a variety of conditions which require further action by Macquarie University either prior to, or with the submission of the first academic or commercial project application within the Campus and/or Precinct E.

The Hearing Hub is the first Major Development submitted since the approval of the Concept Plan, and accordingly Macquarie University has prepared a number of strategies, studies and reports to address a range of environmental issues. The Hearing Hub development is not considered a commercial development as the majority of the floor space is allocated to research and educational uses, as well as not-for-profit uses associated with the hearing and hearing-related industry.

Only those conditions relevant to the first non-commercial Project Application in Precinct E have been considered (see **Table 6** below). The relevant conditions of approval are consistent with the Statement of Commitments approved as part of the Concept Plan.

**Table 6** – Compliance with Conditions of Consent in Concept Plan

| Concept Plan Condition | Compliance |
|---|---|
| **B1 Car Parking**<br>(2) The maximum car parking across the campus is 10,800 spaces and is distributed for each precinct as follows:<br>(d) Precinct E and F (total) - 5,000 spaces<br>(3) New car parking for commercial buildings within Precinct D, E and F shall be located within basements (part of which may be above ground due to the slope of the site) and is generally contained within the footprint of the building above. The design of any above ground car parking shall include architectural treatment of the elevations to reduce their visual impact and dominance.<br>(4) The existing at-grade and above ground car parking areas within the site shall be consolidated into four car parks around the perimeter of the Academic Core (Precincts A and B). | - The proposal will provide 335 new car parking spaces within the basement car park and four temporary, accessible, at-grade spaces resulting a total of 339 spaces. The new Cochlear Global Headquarters building (currently under construction) will accommodate 539 car space. Assuming the Hearing Hub development is approved and constructed, a total of 878 new car spaces will be accommodated within Precinct E. This is well below the maximum of 5,000 car space permitted within Precincts E and F combined and will allow for an additional 4,122 carparking spaces within the Precincts before the maximum is reached;<br>- The majority of carparking spaces will be provided within the basement. Only four temporary above ground car spaces are proposed at the western frontage of the development. These will be screened from Macquarie Drive by appropriate landscape treatment (see Landscape Plan at **Appendix D**) and are proposed to be relocated to carparking along Macquarie Drive when the road is developed in accordance with the Concept Plan and Urban Design Guidelines.<br>- The proposed Hearing Hub development will facilitate the relocation of the existing car park structures on the Campus and within Precinct E in general. The relocation of carparks C1, W1 and W2 on the development site forms part of separate planning approval processes. |
| **B2 Transport and Pedestrian Management**<br>(1) A 40% non-car mode share target shall be adopted for the academic and commercial uses on the site. | The Transport and Accessibility Impacts Report at **Appendix G** details how a 40% non-car mode share target will be achieved for the proposed Hearing Hub development. |

| Concept Plan Condition | Compliance |
|---|---|
| **B3 Road Works**<br>(2) The Concept Plan approval includes the following road intersection upgrades identified within Section 4.4 of the "Macquarie University Concept Plan TMAP" dated March 2009 and prepared by Cardno Eppell Olsen:<br>(a) Epping Road/Balaclava Road intersection - additional through lane on the Balaclava Road (south) and additional right turn land on Balaclava Road (north)<br>(b) Epping Road/Herring Road intersection - additional through lane on Herring Road (south), additional right turn on Epping Road (east), two through lanes and two right turn lanes on Herring Road (north) and adjusted signal phasing.<br>(c) Waterloo Road/Herring Road intersection - left/through lane on Waterloo Road (east) and adjusted signal phasing.<br>(d) Waterloo Road/Culloden Road intersection - realign Gymnasium Road to make fourth leg at roundabout and provide two lane circulating roundabout.<br>(e) Talavera Road/Christie Road intersection - additional left turn slip land, through lane/ right turn land on Talavera Road (east), departure lane becomes full traffic lane on Talavera Road (west) and adjusted signal phasing.<br>(f) Talavera Road/Herring Road intersection - adjusted signal phasing...<br>...As part of any application that generates the need to undertake the above intersection works, detailed design plans for the relevant intersection upgrade(s) and a commitment to enter into a Works Authorisation Deed (or similar type of agreement) with the RTA, shall be submitted to the Department. | The Transport and Accessibility Impacts Report at **Appendix G** demonstrates that the proposed development of the Hearing Hub will not generate the need to undertake any of the intersection upgrades identified within the Concept Plan. |
| **B4 Design Excellence and Urban Design Guidelines**<br>(1) The Design Excellence Strategy and Urban Design Guidelines to be prepared (as referred to on page 5 of the Statement of Commitments) are to have regard to the Macquarie park Corridor DCP.<br>(2) The Design Excellence Strategy and Urban Design Guidelines are to be prepared in consultation with Council and include provision for the accommodation of car parking in the basement of new buildings, including details in relation to the achievement of activated frontages, and details related to the provision of bicycle paths and associated facilities. | A Design Excellence Strategy and Urban Design Guidelines has been separately prepared by Cox and submitted to the Department for consideration and approval. The proposed Hearing Hub development is consistent with the provisions in the Strategy and Guidelines. Further detail is provided in Section 6.4 below. |

| Concept Plan Condition | Compliance |
|---|---|
| (4) The Design Excellence Strategy and Urban Design Guidelines are to indicate the extent of setbacks required by the RTA. Such guidelines to be prepared in liaison with the RTA, having regard to the micro simulation modelling and the extent of setback required to achieve additional capacity improvements and bus priority.<br>(5) The Design Excellence Strategy and Urban Design Guidelines are to be submitted for approval by the Department of Planning prior to the or with the first application for new building works within each precinct. | |
| **B5 Setbacks**<br>(1) An amendment to the Concept Plan is to be prepared in consultation with Council and the RTA, and approved by the Department of Planning, which makes provision for adequate setbacks along Balaclava Road (from Epping Road to University Avenue) and Waterloo Road (from Herring Road to Research Park Drive), to facilitate additional capacity improvements and bus priority, prior to or with the lodgement of the first application for new building works within Precinct E. | As detailed in the Transport and Accessibility Impacts Report at **Appendix G**, the proposed Hearing Hub development will not result in a substantial increase in traffic generation from the Campus and will not necessitate the upgrade of any intersections. The proposed development will not necessitate an amendment to the setbacks along Balaclava and Waterloo Roads. The design of appropriate setbacks to these roads will be detailed at such time as a Project Application is lodged for development within Precinct E that triggers need to upgrade the intersections at the vehicle entry points to the University Campus. |
| **C1 Staging of Development**<br>(1) The Proponent shall demonstrate with each application for building works that the proposed development represents the orderly and coordinates development such that:<br>(a) it may be serviced by existing infrastructure, by infrastructure approved by this Concept Plan, or is capable of being serviced; and<br>(b) access for vehicles and pedestrian is available and can be made available. | - As detailed in the Indicative Development Staging Plan submitted with the Concept Plan the Hearing Hub development site falls within the area earmarked for development between 2009 and 2014.<br>- A finer-grained Staging Plan has been prepared as part of the Urban Design Guidelines for Precinct E. Staging of future sites will mean upgrades of roads and services and on some sites the demolition of existing carpark structures. A programme of upgrades along University Creek and crossings is also to be undertaken. The first stage of development on the Campus is anticipated to facilitate the development of the Hearing Hub. Works to undertaken in Stage 1 include:<br>- University Creek works including pedestrian bridge renewal;<br>- Macquarie Drive upgrade (new culverts and raised road levels);<br>- Demolition of carparks;<br>- Macquarie Drive reconfiguration at Balaclava Road;<br>- Entry gateway landscaping;<br>- Access road at the eastern boundary of the Hearing Hub site; and<br>- University Avenue upgrade adjoining Hearing Hub development site. |

| Concept Plan Condition | Compliance |
|---|---|
| **C1 Staging of Development** | Stage 2 of the works will be focused around the Station and the upgrade of Research Park Drive.<br>- Appropriate vehicle access to the site can be provided from the north-south secondary road at the eastern boundary of the site. Pedestrian access will also be available from this access road, as well as from the western facade of the site.<br>- Appropriate infrastructure and utilities are available within the vicinity of the site to support the proposed Hearing Hub development. See Section 6.17 below for details. |
| **C3 Landscaping**<br>(1) The Landscape Management Plan referred to on Page 4 of the Statement of Commitments is to be integrated with the Design Excellence Strategy and Urban Design Guidelines referred to in B4 of this approval and is to demonstrate.<br>(a) Maintenance of the bush land setting of the site.<br>(b) Achievement of the landscape principles articulated in the Statement of Commitments, and is shown in Figure 26 to the Environmental Assessment Report.<br>(2) The Landscape Management Plan is to be prepared for each precinct, and submitted for approval prior to or with the first application for new building works with each precinct. | A Landscape Management Plan has been prepared by Context for Precinct E and was submitted to the Department as part of the detailed Precinct E response package. The landscape design for the proposed Hearing Hub development has considered the provisions of the Landscape Management Plan. See section 6.6 below for more details. |
| **C4 Riparian Zone, Flooding and Storm water**<br>(1) The Stormwater Management Plan and other various planes referred to on page 6 of the Statement of Commitments are to be:<br>(a) Integrated with the Vegetation Management Plan and Threatened Species Plan referred to on page 4 of the revised Statement of Commitments.<br>(b) Revised in accordance with any modifications undertaken as part of this approval.<br>(2) The Stormwater Management Plan is to be submitted for approval with each application for new building works, as relevant. | - A Stormwater Management Plan has been prepared by TTW for Precinct E which integrates with the Vegetation Management Plan and Threatened Species Plan for Precinct E and was submitted to the Department as part of the detailed Precinct E response package.<br>- The project-specific Stormwater Management Plan for the Hearing Hub (prepared by Woolacotts at attached at **Appendix H**) is consistent with the Precinct E Stormwater Management Plan. The project-specific Stormwater Management Plan meets the one-site detention (OSD) requirements for the Precinct and ensures that stormwater inlet and outlet locations correspond to the locations identified on the Precinct-wide Stormwater Management Plan. |
| **C6 Flora and Fauna**<br>(1) The Vegetation Management Plans, The Threatened Species Plan, and the Weed Management Plan referred to on page 4 of the Statement of Commitments shall detail and responsibility for each action, and shall include ongoing measures. | - A Vegetation Management Plan, Threatened Species Plan and Weed Management Plan has been prepared for Precinct E and was submitted to the Department as part of the detailed Precinct E response package. The proposed Hearing Hub development is not directly affected by the above Plans. However, to assist the Department in assessing the Hearing Hub development, a copy of the Vegetation management Plan is included at **Appendix Q** (the Threatened Species Plan is included as an appendix to the Vegetation Management Plan and the Weed Management Plan forms part of the Vegetation Management Plan). |

| Concept Plan Condition | Compliance |
|---|---|
| (2) A copy of the Plans shall be submitted with each application for building works.<br>(3) All future development is to be undertaken in accordance with the *'Guidelines for Development Adjoining Department of Environment and Conservation Land'* by DECC dated August 2006. | - No threatened species or endangered ecological communities have been identified on or within the vicinity of the site. The site is not located within the vicinity of the University Creek riparian corridor. Further detail is provided in Section 6.20 below. |
| **C7 Environmentally Sustainable Development**<br>(1) The requirements in respect of environmentally sustainable development as set out at page 1 of the Statement of Commitments is to be submitted for approval with each new application for building work on the site, as relevant. | The ESD Report at **Appendix E** demonstrates how the proposed development achieves consistency with the ESD requirements under Condition C7 of the Concept Plan including:<br>- Commercial buildings to achieve a minimum 4 Star Green Star Office rating. *This requirement applies to commercial development. Although the Hearing Hub is not considered a commercial building for the purposes of the Concept Plan conditions of approval, the Hearing Hub base building will achieve a 5 Star Green Star Office rating.*<br>- Buildings should achieve a minimum 4.5-star NABERS rating.<br>- The base building for the proposed Hearing Hub will achieve a minimum 4.5 Star NABERS Energy rating<br>- Retail development to comply with any reasonable future rating tool provided by the Australia Greenhouse Rating Scheme.<br>- There is not existing retail rating tool available.<br>- Each development to provide measures to capture, retain, and minimise litter, oil, sediment, nutrients and pollutants prior to stormwater runoff discharge to the receiving creeks.<br>*An erosion and sediment control plan has been prepared for the proposal to ensure that pollutants in run-off from the site are minimised during the excavation and construction stage of the project. The Stormwater Management Plan for the proposal provides for the appropriate capture and treatment of stormwater runoff. Details regarding water recycling for the site are also provided (see Section 6.13 below)* |
| **C8 Environmental Management and Contamination**<br>(1) The hazardous material audit, and a targeted Phase 2 intrusive contamination assessment referred to on page 2 of the Statement of Commitments is to be prepared be submitted (sic) for approval with each application for building works based on an assessment on a precinct by precinct basis. | A Hazmat report has been prepared to accompany the REF for demolish the carparking structures on the development site and is included at **Appendix R**. A Targeted Phase 2 Contamination Assessment has been prepared by Douglas Partners for the Hearing Hub project. Further detail is provided at Section 6.14 below. |
| **C9 Heritage/Archaeology**<br>(1) The Aboriginal Archaeology Strategy referred to on page 5 of the Statement of Commitments is to be prepared in liaison with the Metropolitan Local Aboriginal Land Council, and is to be submitted for approval prior to or with the first application for new building works within each precinct. | An Aboriginal Archaeology Strategy has not yet been prepared for the Campus. However, given the limited likelihood of aboriginal heritage being discovered on the development site, a site-specific strategy has been prepared for the proposed Hearing Hub development. See Section 6.14 below. |

| Concept Plan Condition | Compliance |
|---|---|
| **C11 Child Care Strategy**<br>(1) The Child Care Strategy referred to on page 7 of the revised Statement of Commitments is to be prepared in consultation with Council, and submitted for approval prior to or with the first application for new floor space. | A Child Care Strategy has been prepared in consultation with Council. A copy of the Strategy has been submitted to the Department by Macquarie University to satisfy this condition. |
| **C13 Construction Staging**<br>(1) A Staging Plan including details of proposed bulk earth works must be submitted for approval with the first application for new building works within each precinct.<br>(3) A Construction Management Plan, an Erosion and Sedimentation Plan, and a report detailing the existing geological conditions of each development site (within the relevant precinct), and any potential geological impacts of development consistent with the Concept Plan must be submitted with any application for the development of the particular precinct or site and is to be integrated with any Vegetation Management Plan and Threatened Species Management Plan referred to on page 3 and 4 of the revised Statement of Commitments; and integrated with the Staging Plan referred to in **C1** of this approval. | - A Staging Plan has been prepared by Cox as part of the Urban Design Guidelines for Precinct E.<br>- Whilst the above does not address bulk earthworks, a Construction Management Plan (**Appendix L**) and an Erosion and Sedimentation Plan (**Appendix H**) has been prepared for the Hearing Hub Project Application.<br>- The provisions of the Vegetation Management Plan and Threatened Species Management Plan (for Precinct E) do not directly affect the Hearing Hub development site. |
| **C14 Utilities**<br>(1) The following plans are to be prepared and approved by the relevant agencies prior to the submission of the first application for building works:<br>(a) A detailed water supply infrastructure needs analysis is to be undertaken as indicated at page 5 of the Statement of Commitments.<br>(b) A detailed service master plan is to be prepared.<br>(c) The water supply needs analysis and detailed service master plan to be prepared to the satisfaction of the relevant agency.<br>(2) All electricity and other relevant services shall be accommodated underground, where ecological or landscape outcomes are not compromised. | A Utilities Management Plan for Precinct E Station South has been prepared by Taylor Thomson Whitting (TTW) which addresses the water, sewer, gas, electricity, communication and stormwater infrastructure requirements for Precinct E and was submitted to the Department as part of the detailed Precinct E response package.<br>The provisions of the Utilities Management Plan have been considered in the design of the development. See Section 6.17 below for more detail. |
| **C15 Agency and Council Agreements**<br>(5) An Agreement is to be made with Council for the provision of development contributions and/or agreed works in kind required for the development of the site, prior to, or with the first application for new floor space on the site. | A development contributions and works-in-kind framework is currently being prepared for the Campus in consultation with Council. At this stage an Agreement with Council is pending. See further discussion on contributions at Section 6.25. |

## Compliance with Concept Plan

Under the approved Concept Plan, there are a variety of precinct-specific objectives and general controls with respect to access and circulation, vistas, planting and landscaping, setbacks and street activation. The Concept Plan guidelines and controls relating to Precinct E are relevant to the proposal.

**Objectives for Precinct E**

The objectives for Precinct E are as follows:

- To maximise the commercial and research opportunities created by the new rail station and the interface with the Macquarie Park Corridor;
- To enhance synergies between the commercial sector and the academic function of the University;
- To strengthen pedestrian connections between the new station and the academic core;
- To protect and enhance the environmental qualities and water management function of the associated area with University Creek;
- To promote delivery flexibility having regard to existing site facilities and infrastructure which will be relocated through the life of the Concept Plan; and
- To allow precise locations and sizes of open space areas to be determined having regard to its role in the development through the life of the Concept Plan.

The proposed Hearing Hub project will provide a mix of educational, research and development and commercial uses within a single building. The co-location of academic research activities and associated commercial and not-for profit organisations will facilitate the connections between academic and commercial activities envisaged for Precinct E under the Concept Plan.

The siting and design of the Hearing Hub building will maintain and enhance pedestrian connections and patterns of open space linkages throughout Precinct E. The Staging Plan provided in the Guidelines for Precinct E will facilitate the development of the Hearing Hub site.

**Building Height**

In accordance with the Concept Plan, a maximum height limit of 36 metres applies to the Hearing Hub site (see **Figure 10** below). The height of the proposed Hearing Hub building (27 metres) is well below the maximum permissible height under the Concept Plan.

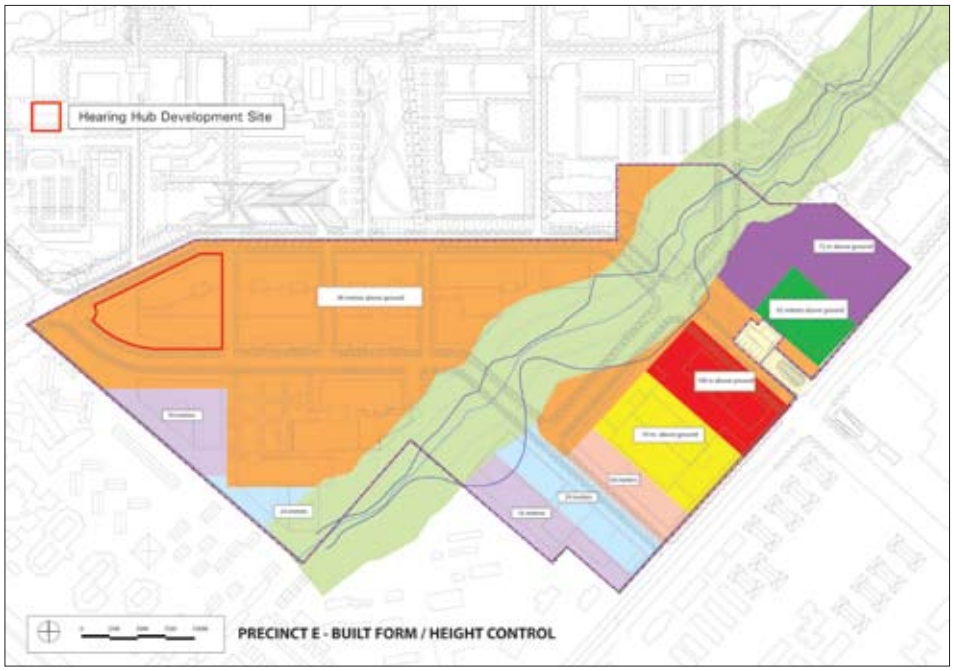



**Figure 10** – Height Control Map for Precinct E (Macquarie University Concept Plan)

### Road Network and Road Hierarchy

Internal road network and vehicular access and circulation are to be in accordance with the Concept Plan. The Concept Plan indentifies both University Avenue and Macquarie Drive as primary roadways and provides for a secondary north-south roadway at the development site's eastern boundary (see **Figure 11** below). The proposed Hearing Hub development will sit within the established road network pattern which has been further refined under the Urban Design Guidelines (see Section 6.4 below). Vehicle access to the site will be provided from the secondary north-south roadway at the eastern boundary of the site.

The northernmost tip of the Hearing Hub building will extend approximately 3 metres into the corridor for Macquarie Drive. This minor extension is not considered significant and is addressed in further detail in relation to the Urban Design Guidelines for Precinct E (see Section 6.4 below).

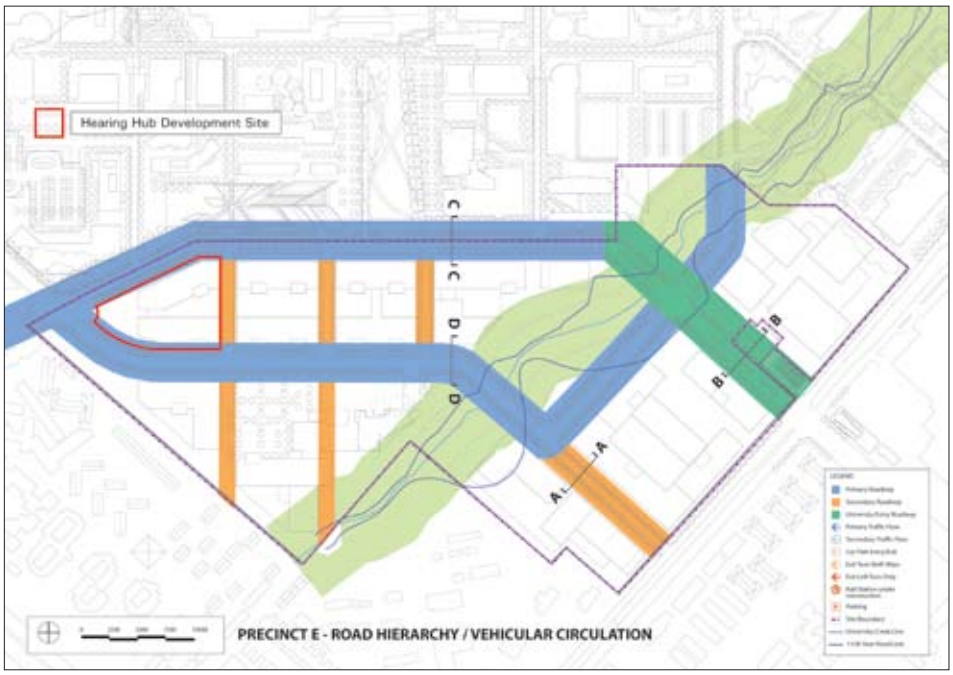



**Figure 11** – Road layout and hierarchy in Precinct E (Macquarie University Concept Plan)

### Street Activation and View Corridors

The Concept Plan also establishes a number of design guidelines for view corridors and activation of street frontages within Precinct E. In relation to the development site, it provides for a potential ground floor street activation use at the north-east corner of the development site (see **Figure 12** below). In addition, the Concept Plan provides for north-south view corridors to the west and east of the site including one along the secondary roadway to the east of the site. East-west view corridors are proposed along Macquarie Drive and University Avenue and the western edge of the development site is identified as an entry marker to the western portion of Precinct E (see **Figure 13**). The Concept Plan also provides for active edges along the development site's northern, southern and western boundaries (see **Figure 14** below).

**Figure 12** – Indicative Ground Level Street Activation Precinct E (Macquarie University Concept Plan)

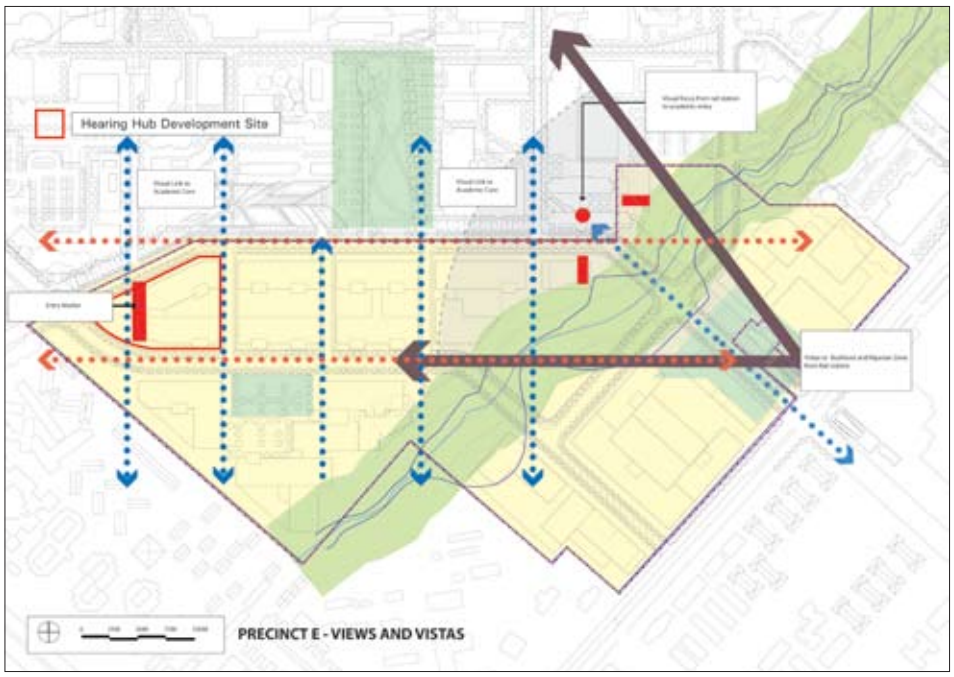



**Figure 13** – Views and Vistas Precinct E (Macquarie University Concept Plan)

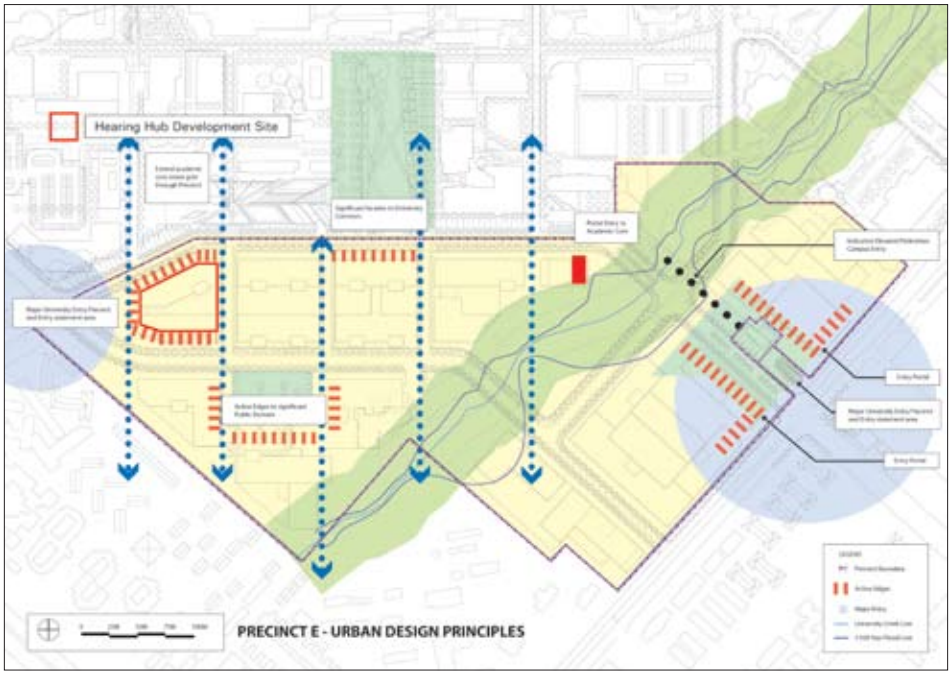



**Figure 14** – Active edges to development site within Precinct E (Macquarie University Concept Plan)

The Guidelines for Precinct E provide a further refinement of the street activation requirements for the Precinct. Consistent with the Guidelines, the emphasis on ground floor street activating uses has been transferred to more central locations within the Precinct and along frontages to open space. No ground floor street activation requirements apply to the Hearing Hub development site (see extract from Urban Design Guidelines at **Figure 15** below).

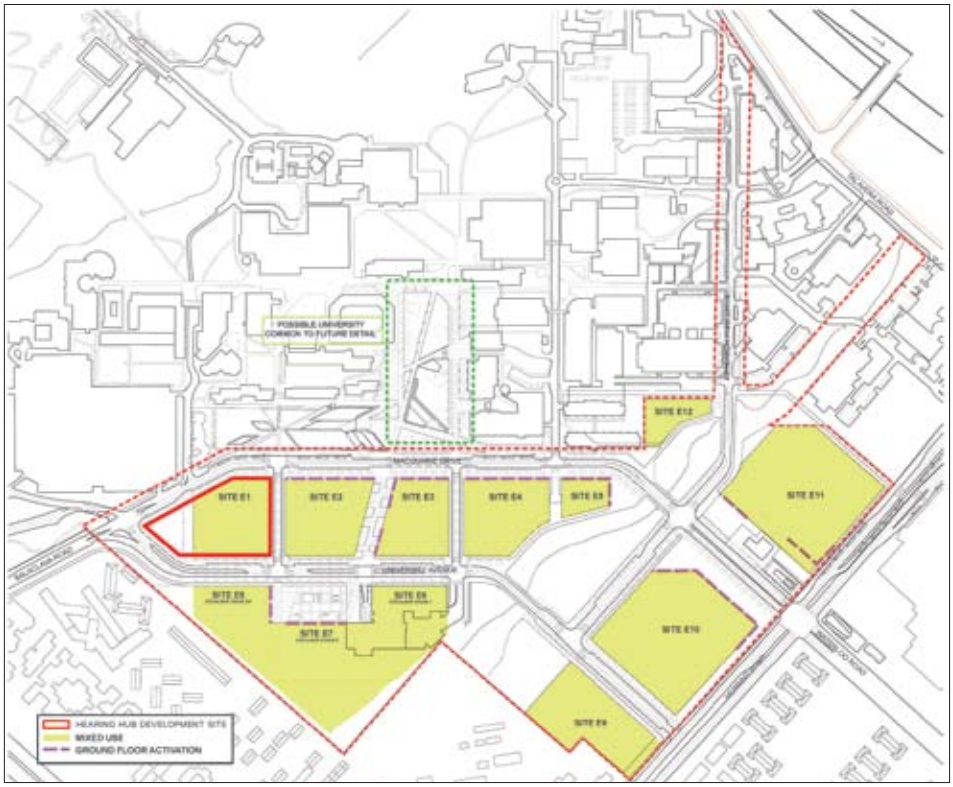



**Figure 15** – Ground floor street activation uses proposed in the Urban Design Guidelines

In terms of views, the proposed development will accommodate view corridors along the western and eastern edges of the site and will not impact on view corridors along Macquarie Drive and University Avenue. An extension is proposed at the western edge of the building which will accommodate a 'view corridor gap' at the lower three levels of the extension. This will ensure that the view corridor at this frontage is maintained.

**Carparking**

Under the Concept Plan, a carparking rate of 1 space per 80m$^2$ of applies to Precinct E. However, in accordance with the conditions of approval for the Concept Plan a maximum of 5,000 car spaces are permitted in Precinct E and F combined. Thus, some flexibility in the car parking rate is permitted as long as the overall maximum for the Precinct is not exceeded once the Precinct is fully developed.

The proposal will provide 339 new car parking spaces within the basement car park and at-grade. The new Cochlear Global Headquarters building (currently under construction) will accommodate 539 car space. Assuming the Hearing Hub development is approved and constructed, a total of 878 new car spaces will be accommodated within Precinct E. This is well below the maximum of 5,000 car space permitted within Precincts E and F combined and will allow for an additional 4,122 car parking spaces within the Precincts before the maximum is reached.

Although the Hearing Hub development exceeds the car parking control for Precinct E of 1 car space per 80m$^2$, it will not result in an exceedence of the overall number of parking spaces permitted in Precinct E and F combined.

**Building footprint and landscaping**

The Concept Plan establishes indicative building footprints for buildings within Precinct E (see **Figure 16** below). The proposed Hearing Hub development will be generally consistent with the indicative building footprint established for the development site under the Concept Plan. However, the design of the development will extend the development footprint outside of the indicative building footprint at the western and northern edges of the development site. The Guidelines for the Precinct further refine the building footprint controls. See Section 6.4 below.

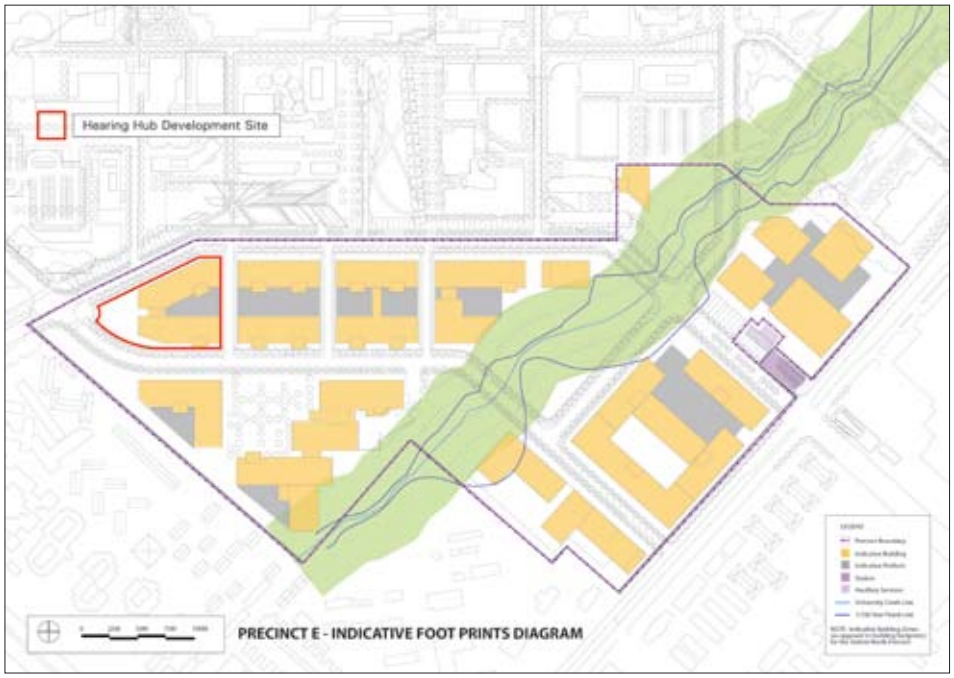



**Figure 16** – Indicative building footprints for Precinct E (Macquarie University Concept Plan)

The indicative landscape plan for the Concept Plan identifies the landscaped area to the west of the site as a location for deciduous tree planting. Street tree planting is identified along University Avenue and Macquarie Drive (see **Figure 17** below). A Landscape Plan has been prepared by Lorna Harrison (see **Appendix D**) which provides for landscaping consistent with the Concept Plan. Further detail is provided in Section 5.2 above.

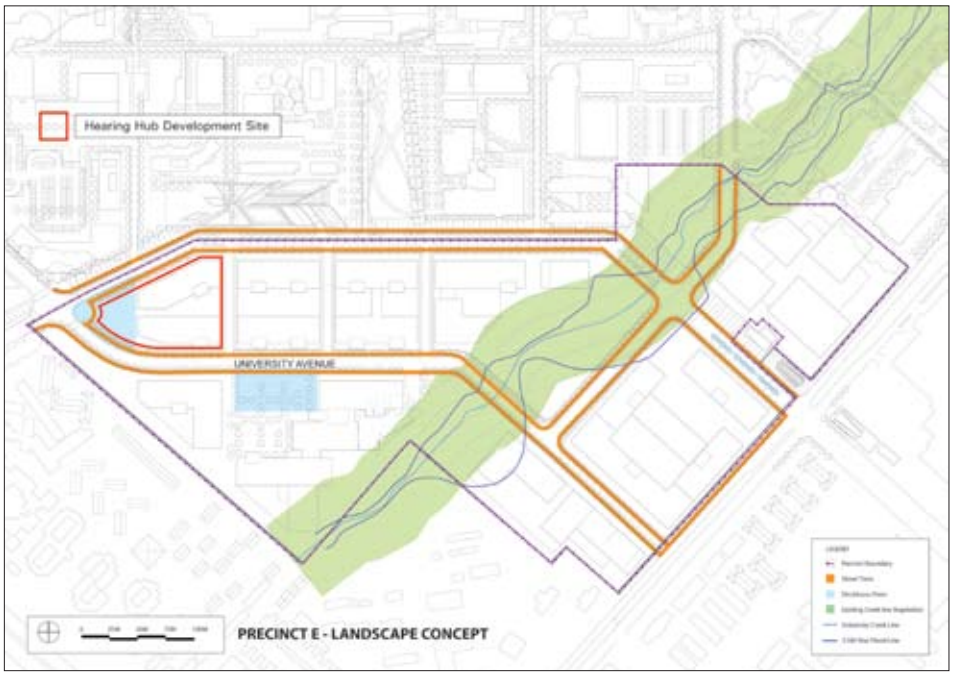



**Figure 17** – Landscape Concept for Precinct E (Macquarie University Concept Plan)

### Additional Planning Guidelines

Other relevant design principles that apply in Precinct E are detailed in **Table 7** below:

**Table 7** – Relevant design principles for Precinct E under the Concept Plan

| Principle | Hearing Hub Development |
|---|---|
| Allow for the progressive demolition of existing buildings and parking structures. | As detailed above, the proposed development of the Hearing Hub will facilitate the staggered relocation of car parking structures. These car parking structures (car parks C1, W1 and W2) will be demolished as part of a separate REF process. New car parking will be accommodated on the temporary car park (at vacant University land at Culloden Road) to accommodate parking lost to demolition of these car parks. The DA for the temporary car park was approved by Council in May 2010. |
| New buildings are to demonstrate a high level of architectural design quality and energy efficiency. | As detailed in Section 5.4 above, the proposed development will achieve a high level of ESD performance. The design of the building will also provide a high level of design quality. Further detail is provided in Section 6.7 below. |
| Incorporate Water Sensitive Urban Design (WSUD) principles within new development. | WSUD measures have been incorporated into the stormwater design for the development. Further detail is provided in the Stormwater Management Report and Plans at **Appendix H** and in Section 6.14 below. |

# 6.4 Consistency with Urban Design Guidelines for Precinct E

Cox, in collaboration with Macquarie University has prepared Urban Design Guidelines for Precinct E to satisfy Condition B4 of the Concept Plan approval. These Guidelines have been submitted to the Department as part of a separate post-approval process from the Concept Plan in late May 2010.

The proposed Hearing Hub development has been designed generally in accordance with the Guidelines. Where inconsistencies occur, they are minor and will not have a significant impact on the rest of the Campus. Details and justification of any inconsistency are provided below.

## Structure Plan and Lot Controls

Consistent with the Concept Plan approval, the Guidelines set out a Structure Plan for the Precinct which provides for open space at the western frontage of the Hearing Hub development site and identifies this location as a 'Gateway Landscape Element'. A 'Green Link' is identified from the landscaped area at the western frontage of the Hearing Hub development site to the Academic Core on the northern side of Macquarie Drive. The Structure Plan identifies Macquarie Drive as a primary pedestrian route and emphasises the provision of a street definition element along the University Avenue frontage (see **Figure 18** below).

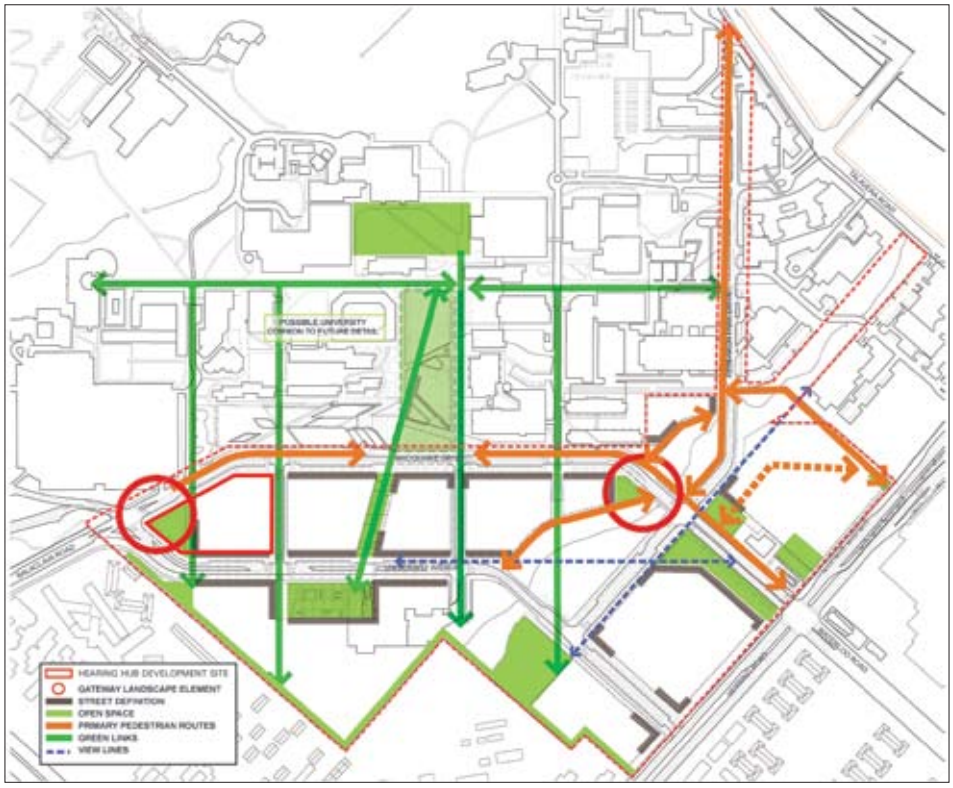



**Figure 18** – Structure Plan for Precinct E

The proposed Hearing Hub development responds to the Structure Plan for the Precinct. It provides for a landscaped area at the western frontage of the building that will integrate with the western extension of the building and will provide a landmark entry statement at the western entry to the Campus. The proposed development will be consistent with the alignment of University Avenue and provide street definition along this roadway.

The Hearing Hub development site is identified as development parcel E1 under the Guidelines. A detailed Lot Control diagram has been prepared by Cox for the development parcel. The lot controls for E1 are outlined in **Figure 19** below.

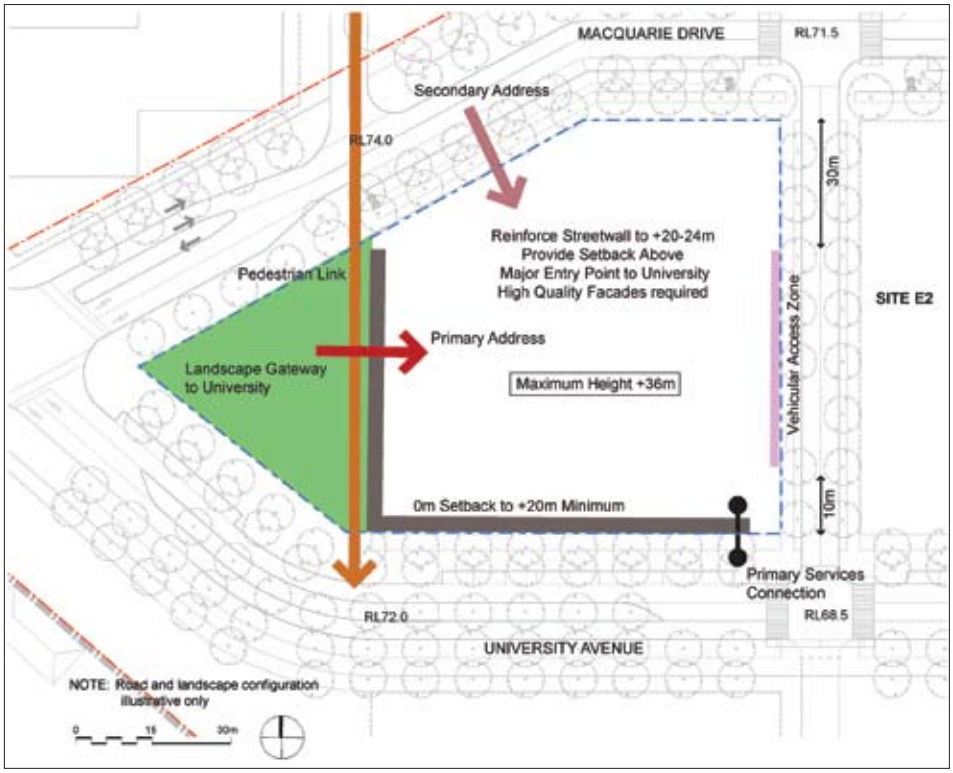



**Figure 19** – Lot Control diagram for Hearing Hub development site

The proposed development will sit within the E1 development parcel apart from a small extension at the north-eastern edge of the building which will extend approximately 3 metres beyond the northern boundary of the development parcel (and the western extension to the building).

The extension at the northern boundary is necessary to provide an efficient floor plate for the building, as well as ensure adequate floor space is provided for the proposed uses within the Hearing Hub. The part of the building footprint that extends beyond the development parcel boundary represents only the tip of the northern wing of the building (approximately 8m$^2$). A significant amount of floor space would be lost if the building were required to be shortened or set back to ensure that this tip did not extend beyond the boundary. Angling the northern wing at a different angle would result in an inappropriate design solution and would reduce the functionality of the building. This would necessitate an increase in the height of the building which is considered inappropriate due to overshadowing impacts. The addition of another storey to the building would also have adverse implications for the functionality of internal office and academic space within the development.

This minor extension is not expected to affect the flow of pedestrian, cyclist or vehicle traffic along the existing or proposed re-aligned Macquarie Drive and will not impact on landscaping or tree planting along the road corridor. Furthermore, as the Hearing Hub Development site fronts a portion of Macquarie Drive which sits as a 45 degree angle to the east-west axis, the minor extension of the Hearing Hub development outside of the development parcel will not adversely affect the vista along Macquarie Drive or set an unacceptable precedent for future development along Macquarie Drive. It is noted that a generous setback of some 10 metres is provided at the Macquarie Drive frontage within which a double-avenue of street tree planting is proposed.

At the site's western boundary, the extension of the building into the landscaped area will not impact on identified pedestrian or view corridors. These will be maintained through the through-site link at the lower three levels of the extension. The extension element will enhance the entry statement at this boundary.

The design for the proposed Hearing Hub development will be generally consistent with other lot controls for E1. A setback of some 10m will be provided for the Macquarie Drive development parcel boundary. A height of 27 metres is provided at this boundary which is only 3 metres higher that the street wall height requirement of 20 metres to 24 metres. No further setback is required as the building is not proposed to reach the maximum permissible height of 36 metres and this gateway into the University.

At the frontage to University Avenue, a height of 27 metres is proposed with a zero setback to this development parcel boundary.

The extension of the building at the western edge will provide a two-storey pedestrian gateway which will accommodate views and pedestrian flow in a north south direction.

## Road Corridors and Vehicle Access

Macquarie Drive and University Avenue are identified as primary roads with 30 metre road corridors. The secondary road at the eastern boundary of the site will have a 20 metre road corridor. These road corridor widths have been accommodated in the design and siting of the Hearing Hub building.

In accordance with the Guidelines, University Avenue will operate as a primary car and through route, with Macquarie Drive generally providing a more passive corridor for vehicle access for traffic associated with the University. Consistent with the Lot Control diagram, a vehicle access zone will be provided along the secondary road from which vehicle access to the basement carpark is proposed. The vehicle access for the accessible temporary at-grade parking spaces will be provided from Macquarie Drive. Although a vehicle access is not identified in this location in the Guidelines, the limited number of parking spaces to be provided off this vehicle access means that it will not have significant implications for vehicle access and traffic flow within Precinct E. Furthermore, these spaces are proposed to be relocated to Macquarie Drive once the road is developed in accordance with the Concept Plan and Guidelines. A cycle way will be provided along Macquarie Drive.

The design of the development, with a generous setback to Macquarie Drive, and street tree planting along this boundary, acknowledges the desired pedestrian environment along Macquarie Drive. A zero setback is proposed to University Avenue which is identified as a vehicle-orientated roadway.

## Staging

The staging for Precinct E aims to deliver services, roads and sites incrementally to minimise both costs and disruption to the Campus. The development of the Hearing Hub site (development parcel E1) is identified as the first stage of development within Precinct E.

Works to be undertaken in Stage 1 include:

- University Creek works including pedestrian bridge renewal;
- Macquarie Drive upgrade (new culverts and raised road level);
- Demolition of carparks;
- Macquarie Drive reconfiguration at Balaclava Road;
- Entry gateway landscaping ;
- Access road to the east of the Hearing Hub development site;
- University Avenue upgrade adjoining the Hearing Hub development site; and
- Research Park Drive upgrade.

Approval for the following infrastructure works (identified above) is sought as part of the Project Application:

- Macquarie Drive reconfiguration at Balaclava Road;
- Access road to the east of the Hearing Hub development site; and
- Entry gateway landscaping .

It is also proposed to demolish the part of Western Road which runs through the site, as well as the demolish and re-align of parts of University Avenue at the connection to Western Road and Balaclava Road to facilitate appropriate access to the proposed development as part of the Hearing Hub Project Application.

All other infrastructure works, as well as the demolition of the carparks, will be undertaken through separate application processes.

## Design Excellence Strategy

As part of the Urban Design Guidelines, Cox has prepared a Design Excellence Strategy for the Precinct which provides strategies in relation to:

- Urban Form;
- Building Heights;
- Articulation;
- Materials and Finishes;
- Building Lighting;
- Building Signage;
- Sustainability; and
- Site Landscaping.

**Urban Form**

The relevant principles underpinning the Urban Form strategy are as follows:

- Definition of major spaces by built form;
- Reinforcement of main circulation spines with buildings that overlook the spaces;
- Activation of ground levels on major spaces with retail, cafes or student services;
- Buildings to have a clear address to either a road or a main open space;
- Highest development at the Station;
- Preservation of solar access to key open spaces; and
- Lower buildings located furthest from the Station.

The proposed Hearing Hub development responds to these Urban Form principles. It provides definition to the vehicle-orientated road corridor along University Avenue and provides clear addresses to both Macquarie Drive and the landscaped area to the west. The height of the building is well below the maximum permitted in this location and the proposed development will not have any unacceptable overshadowing impacts (see Shadow Diagrams at **Appendix C** and discussion in Section 6.9 below).

**Building Heights**

The proposed Hearing Hub development will have a maximum height of 27 metres (including roof top elements) which is well below the maximum height limit of 36 metres permitted in this location.

**Articulation**

The Design Excellence Strategy provides the following principles in relation to Articulation:

- Building articulation is to be generated through the expression of overall massing as well as separate parts of a building, such as entries, access stairs, walkways, sun shading and balconies. Elements that are required to moderate environmental conditions, such as sunlight, breezes and screening, are to be designed to enliven a building's facade.
- Buildings must demonstrate contemporary expression and environmental responsiveness and function must respond to place, environment and the urban character of Precinct E.
- Historical styles are not permitted.
- Building entries must be clearly articulated and be visible from the public domain.
- Elements such as balconies and sun shading that create a sense of scale or rhythm on the facades are to be employed to add to the richness of the architectural expression.
- To mediate the level changes across a number of the sites, a masonry base (brick, stone or terracotta) will be required on all sites The design of the proposal provides for the articulation of the built form into a northern and southern wing with an extension to the west. Both the western and eastern pedestrian entries will be clearly defined and visible from the public domain.

The design of the proposed development provides for the articulation of the building into two separate wings which will straddle a central forecourt in the eastern part of the site. At the western frontage, an extension of the building with a two-storey view/access gap will contribute to the articulation of the building and visual interest on the site. The proposed building entries will be clearly identified.

**Materials and Finishes**

The Guidelines provide the following principles for Materials and Finishes:

- A common materials palette is required for the Precinct, with a clear distinction between low rise and high rise areas expressed.
- Predominantly white or off-white/ silver or grey base colours and a series of accent colours with emphasis given to key locations including important corners and vistas.
- Western facades should be predominantly solid.
- Northern facades should be predominantly glazed with sun shading.
- Reflective glass (reflectivity greater than 30%) is not permitted
- Low glare roof materials must be used.
- Develop a contemporary architectural expression that creates a human scale to the public domain enlivened by smaller scale articulation elements such as louvres, balconies, roof overhangs.
- Use a range of materials that are appropriate to function, maintenance, and scale.
    - low rise podium facades that can easily be seen by the pedestrian should comprise high quality durable materials with developed architectural details.
    - Materials for higher elements that are more difficult to service and maintain should be low maintenance, while less detail may be required.

An exterior finishes board has been prepared for the proposed development (**Appendix** C) which demonstrates general consistency with the above guidelines for materials and finishes and provides a neutral colour palette that will integrate with the overall colour palette envisaged for the Campus. No applied paint finishes are proposed; the walls will be made up of pre-cast concrete panels with facebrick finishes. The neutral colour palette is consistent with the desired future character for the precinct. A large portion of the north-west facade will include glazing which will allow sunlight access to the building. As detailed in the elevations (**Appendix C**) the facades will be divided into linear bands of material which will provide articulation and visual interest and relate to pedestrians at the lower levels of the building.

**Building Lighting**

The following principles are provided in relation to Building Lighting:

- Lighting should integrate fixture style with the building's architectural character.
- Investigate opportunities to utilise solar (photovoltaic) technology, high efficiency fixtures or alternative energy sources as energy saving measures.
- Buildings must have a strong night-time building presence and entries be visible from their primary vehicular and pedestrian access points.
- Across the site, white metal halide light must be used for external lighting rather than yellow sodium vapour lamps.
- Visible point sources of building illumination must be minimised.

No lighting design has been prepared for the proposed Hearing Hub development. However, to ensure consistency with the above principles can be achieved, it proposed that a Lighting Strategy be prepared for the development following approval which will take into account the above principles. This has been included in the Draft Statement of Commitments at Section 7.0.

**Building Signage**

The Design Excellence Strategy provides the following principles in relation to Building Signage:

- Building identification signage must relate only to tenants within the building.
- Building identification signage is to be a maximum size of 25m$^2$ and must not be on any frontage facing the Academic Core.
- Signage lighting shall is to be arranged and maintained so that the light source is not directly visible from a public right-of-way or adjacent property.
- As part of the detailed proposal submission, a plan is to be submitted for approval by Macquarie University showing the location of the proposed signage and detailing dimensions, proposed colour, material, copy, and method of illumination.
- Buildings must have street numbers prominently displayed on the main street elevation. Numbers must be 500 millimetres in height, non-illuminated and mounted 3 metres above the ground floor level.

Approximate locations, size and general design for the building identification signage is provided on the elevations. The proposed signage will be no more than 25m$^2$ in area per sign.

A Signage Strategy will be prepared following approval which will detail the location, size, design and lighting of signage associated with the development. As Macquarie University is the applicant, the Signage Strategy will be processed through internal Macquarie University processes. It is expected that the Signage Strategy will be signed off by the Department following approval of the Project Application. This has been detailed in the Draft Statement of Commitments.

**Sustainability**

In relation to Sustainability, new development within Precinct E is to:

- Maintain, respect and restore biodiversity.
- Create quality, comfortable, healthy and safe environments.
- Ensure responsible resource use (especially non-renewable resources).
- Explore energy collection, energy conservation and waste re-use.
- Consider adaptation, recycling, and deconstruction of buildings and materials.
- Minimise pollution and environmental impacts.
- Balance capital, efficiency and building lifecycle costs.

The Hearing Hub development site is not located in proximity to University Creek or any other environmentally sensitive locations. Nevertheless, native planting is proposed on the development site to ensure that the richness of biodiversity on the Campus can be maintained. The ESD Report for the project (**Appendix E**) explores a number of ESD measures to assist in energy conservation. These measures will add additional expense to the overall development cost but will result in a more efficient building in the long-term. The ESD Report also provides a number of mechanisms to accommodate climate change adaptation in the future. An Operational Waste Management plan will be prepared for the Building following approval which will ensure that the maximum amount of waste within the development can be recycled. This is included in the Draft Statement of Commitments at Section 7.0.

**Site Landscaping**

The Design Excellence Strategy provides the following principles in relation to Site Landscaping:

- Landscape within the plots must complement the public domain character through the selection of plant species, materials and finishes.
- All development sites must be suitably landscaped and contribute towards the overall character and quality of the precinct.
- The landscape is to be maintained to a high level, including the proper pruning, weeding, removal of litter, fertilisation and replacement of plants to ensure that the intended character and quality is retained.
- All landscape materials and finishes shall be selected with consideration to the whole of life costs, maintenance requirements and longevity.
- Landscaping is to be designed to enhance water quality and conservation. Particular attention shall be given to the prevention of nutrients entering any water body via run-off or ground water.
- No landscaping will be permitted, which in any way endangers health or public safety by creating a traffic or fire hazard, obstructing vision, or which is detrimental to the use of surrounding private property or the public domain.
- Landscaping is to be completed prior to building occupation.
- A landscaping plan prepared by a suitably qualified landscape architect must be prepared and describe:
  - Landscape design rationale and concept.
  - Location, extent and type of all materials and finishes including all hardscape, softscape and feature elements.
  - Plant species, numbers, installation, mature sizes and positions of all trees, shrubs, ground covers and turf areas.

- Finished levels.
- Irrigation system specifications.
- Location and type of all structures and amenities within the landscape.

- Where there is planting on slabs, the structural load must accommodate a minimum of 800 millimetres depth for tree planting, 450 millimetres depth for shrub and 150mm for ground cover planting and turf.
- A maintenance schedule is to be prepared and implemented for all developments ensuring that the intended character and quality is retained. The plan should detail the schedule and method of pruning, weed and litter removal, fertilization, plant replacement and irrigation.

A Landscape Plan has been prepared for the project (**Appendix D**) which addresses the requirements of the principles relating to Site Landscaping. Consideration has been given the Urban Design Guidelines and Landscape Management Plan for the Precinct. It provides for native landscaping on the site that will be easy to maintain and will minimise the extent of irrigation required. Further detail is provided in Section 5.2 above and in Section 6.5 below.

## 6.5 Consistency with Landscape Management Plan

In response to Condition C3 of the Concept Plan approval, a Landscape Management Plan has been prepared by Context for Precinct E. The Landscape Management Plan provides a tree removal strategy (including offset planting) for the Precinct, as well as principles for landscaping of open space.

In relation to the landscaped gateway element at the western frontage of the Hearing Hub development site, the Landscape Management Plan provides the following guidelines:

> *The landscape solution for this area will need to be sympathetic to architectural expression of the building as well as allowing for the framing of the view corridor. To increase the impact form the adjacent roads, the area may require to be raised through mounding with the use of landscape structures such as blade walls.*

The proposed landscaping at the western frontage will integrate with the western extension element to the building and will frame the view corridor and pedestrian thoroughfare through the lower two levels of the extension. The raising of the landscaped area is considered unnecessary.

The Landscape Management Plan also provides landscape design objectives for Macquarie Drive and University Avenue. Macquarie Drive has been designed for mainly pedestrian use. A double avenue of street trees are proposed to define and frame the street creating a green corridor and provide shade and seasonal variation. The trees have been appropriately spaced to allow for the touching of canopies, which will create suitable shade patterns, softening the extents of the required paving and other hardworks.

The planting palette proposed for Macquarie Drive will consist mainly of robust native grasses, shrubs and groundcovers that will be low water use and require little maintenance, complimentary to the existing landscape aesthetic currently expressed throughout the campus. The street trees proposed are *Corymbia maculata* (Spotted Gum) and *Corymbia citriodora* (Lemon Scented Gum) and have been chosen for their height, habit and feature bark. Both tree species are present on Campus and currently used as informal street trees throughout the Campus.

The design and siting of the Hearing Hub development will accommodate the landscape design for Macquarie Drive. The minor extension of the northernmost tip of the Hearing Hub building into the Macquarie Drive corridor will not have a significant impact on planting along the southern side of Macquarie Drive.

Spotted Gum street tree planting will be provided within the northern setback to the building which will integrate with the street planting along Macquarie Drive. The planting of native grasses and shrubbery in the western landscaped area will also integrate with the landscaping proposed along Macquarie Drive.

University Avenue has been designed as the main vehicular corridor through the precinct. An avenue of street trees is proposed to define and frame the street, creating a green corridor and providing shade and seasonal variation. Tree planting is also proposed for the median strips where possible. The trees have been spaced at 10m centres, allowing for the touching of canopies, which will create suitable shade patterns, softening the extents of the required paving and other hardworks.

The design of the University Avenue roadway has allowed for the increase of use by vehicular traffic, compared to that of Macquarie Drive, as a result, less generous landscape setbacks have been allocated. The landscape setbacks on both the northern southern sides will consist of mainly low maintenance native planting strips that will define building entrances and soften the impact of future building works. The planting zones will also aid in solving any level change issues that may arise in the future.

The north-south street proposed to run from University Avenue to Macquarie Drive and has been designed to be a tertiary pedestrian thoroughfare whilst still providing vehicle access for development. A single avenue of street trees is proposed to define and frame the street, providing shade and some seasonal variation. The trees have been spaced at 10m centres, allowing for the touching of canopies, which will create suitable shade patterns, softening the extents of the required paving and other hardworks.

The proposed Hearing Hub development will not impact on the landscaping design for University Avenue or the north-south secondary road to the east.

The Landscape Management Plan provides a number of landscaping controls and remediation works for the University Creek corridor and areas identified as accommodating threatened species or endangered ecological communities. These provisions do not impact the Hearing Hub development site.

## 6.6 Site Suitability

The site is considered suitable for the proposed development. It sits at the northern edge of Precinct E with a direct frontage to the Academic Core. Thus, it provides an appropriate link between commercial uses within Precinct E and academic and research activities within the Academic Core to the north. The co-location of these uses within a single building will enhance the integration of commercial and research uses as envisaged under the Concept Plan.

The site has been zoned under the Major Development SEPP for a range of educational and commercial uses with which the proposed development is consistent. The proposal is also consistent with the objectives for the zone.

The site has frontages to both Macquarie Drive and University and the north-south secondary road to the east of the site (from which direct vehicle access is proposed to be provided) will be constructed as part of Stage 1 under the Urban Design Guidelines for the Precinct.

The proposed uses within the development are not expected to result in unacceptable amenity impacts and sensitive uses (such as the childcare and aged-care developments to the south and south-west) are separated from the site by University Avenue.

The site is considered suitable for the proposed development.

## 6.7 Built Form

The design for the proposed development has given consideration to the following factors:

- The location of the site in proximity to sensitive uses such as the childcare and aged care facilities to the south;
- The design and landscaping of Macquarie Drive and University Avenue, as well as that of the secondary road to the east;
- The principles and design guidelines set out in the Urban Design Guidelines and Design Excellence Strategy for Precinct E;
- The design guidelines provided in the approved Concept Plan and associated conditions of approval; and
- The integration of the proposed development with existing and future buildings on the Campus.

The proposed development has been designed to respond to the irregular shape of the site. It provides for a V-shape building (at an angle) accommodating a northern wing which will align with the northern boundary of the site and a southern wing which will align with the southern boundary. In this way, the proposed development will frame the development site and provide definition to the streetscape at the junction of Macquarie Drive and University Avenue in the west of the Campus.

The building entry statement at this junction will be enhanced by the provision of a high-quality landscaped area at the western frontage to the site and the western extension of the building. The extension of the building will not only add visual interest and articulation at this important western elevation, but will provide for an innovative response to ensuring that a through-site pedestrian link and view corridor can be maintained at the western facade of the building.

In addition, the arrangement of space, floor plates and GFA relative to the functional needs of future tenants has been a key consideration in the overall design of the development.

The height of the proposed development is consistent with the height permitted in this location, as well as the setbacks identified for the Hearing Hub development site.

## 6.8 Urban Design and Public Domain

Details regarding the project's integration with the Urban Design Guidelines and Landscape Management Plan for Precinct E are provided in Sections 6.4 and 6.5 above. The project's consistency with the Guidelines will ensure that it integrates with the design of the public domain established for the Precinct.

The Landscape Plan (**Appendix D**) will provide a landscape design for the site that responds to proposed street tree planting along Macquarie Drive. The landscaped area at the western frontage to the site will provide a visual entry and focal point not only to the Hearing Hub, but to the western entry to the Campus as a whole.

Appropriate paving design has been selected (see indicative paving in Landscape Plan at **Appendix D**) for the site which will integrate with the surrounding public domain at the same time as differentiating the site from the rest of the Campus.

As detailed in Section 5.4 above, a Public Art Strategy will be prepared following approval which will detail the location and design of public art on the site and the contribution it will make to the public domain.

The design of the proposal accommodates a green link from the Academic Core to the north through to the green space as the western frontage of the site. This is consistent with the Structure Plan for the Precinct as outlined in the Urban Design Guidelines.

Compliance with the Macquarie Park Public Domain Technical Manual is not required as Campus-specific public domain designs are being developed between Macquarie University and Council. Furthermore, the design of paving and landscaping on development sites within the Campus will not be set by the Campus-wide public domain document provided integration with the broader public domain is achieved.

## 6.9 Solar Access & Overshadowing

Shadow diagrams for the Hearing Hub development have been prepared by Perumal Pedavoli Architects (**Appendix C**). The shadow diagrams for the summer solstice and equinox demonstrate that the Hearing Hub building will have no significant impact on existing or proposed buildings and open space within the Campus. During mid-winter, minor overshadowing of the aged-care facility will occur in the morning. However, the facility will retain full solar access during the afternoon. At 3pm in mid-winter the proposed Hearing Hub development will partly overshadow the childcare facility to the south and the proposed open space area adjoining the new Cochlear Global Headquarters building. However, as these areas will receive good solar access during the morning, this minor overshadowing is not significant. It is also noted that the height of the Hearing Hub development has been minimised to ensure that overshadowing impacts are lessened and are not significant.

## 6.10 Traffic and Transport

ARUP has prepared a Transport and Accessibility Impact Report (**Attachment G**) for the proposed Hearing Hub development which addresses the traffic-related issues raised in the DGRs, as well as the compliance of the Hearing Hub development with relevant conditions in the Concept Plan approval for the Campus. In particular, the Report addresses the following aspects of the proposed development:

- the traffic generation expected from the proposed development taking into consideration existing and future development on the Campus;
- the implications of the traffic generation, particularly, in relation to intersection upgrades on the Campus;
- the proposed provision of carparking for the development and its consistency with relevant controls;
- pedestrian and bicycle parking provisions;
- sustainability measures to be incorporated as part of the development;
- servicing aspects of the proposal; and
- construction impacts on pedestrian and cyclist movements (see Section 6.21 below)

### Traffic

Daily and peak traffic generation forecasts for the development have been generally calculated on the basis of RTA's *Guide for Traffic Generating Developments*. For the purpose of the potential **traffic generation assessment** it has been assumed that all of the GFA in the development (23,182m$^2$) will be used for office and commercial purposes. However, it is noted that the majority of the GFA will, in fact, be made up of academic floor space which has different characteristics and traffic generation impacts to commercial premises. accordingly, the results of the assessment can be assumed as a worst case scenario.

The peak activity time of the Hearing Hub development and the peak activity time of the adjacent road network are likely to coincide due to the commercial nature of the development with a strong commuter profile. The peak periods adopted were selected to coincide with the City of Ryde Council's Macquarie Park 2007 base Paramics Mode peak periods:

- 7:45am to 8:45am; and
- 4:45pm to 5:45pm.

Based on the RTA's unrestrained vehicle peak trip rate of 2 trips per 100m$^2$ GFA, the development would generate 455 peak hour vehicle trips. However, as traffic generation on the site will be restrained by the provision of carparking spaces (at a rate of 1 space per 82m$^2$) excluding visitor spaces, a traffic generation rate of 1 trip per 100m$^2$ has been assumed.

The RTA guide states that daily vehicle trips for office and commercial premises can be estimated as five times the peak hour rate, equating to 5 trips per 100m$^2$ of GFA.

Thus forecast traffic generation used for the Hearing Hub traffic generation assessment is as follows:

- AM Peak Hour - 228 two-way vehicle trips;
- PM Peak Hour - 228 two way vehicle trips; and
- Daily - 1140 two-way vehicle trips.

The forecast traffic impact of the development has been assessed on the basis of guidance contained in the City of Ryde Council's *Macquarie Park 2007 Base Paramics Model* (the Model). The Model was partially updated to 2010 conditions in the vicinity of Macquarie University as part of the Temporary Car Park development application. This updated model has been used as the basis for traffic modelling impacts of the Hearing Hub and was supplemented by SIDRA, a software package used to assess the performance of intersections.

The forecast opening date of the development is 2012. A number of other University developments, currently in planning or construction phases, will be operation by 2012. It has been assumed that the proposed M2 upgrade would not be operational by 2012 and therefore any traffic impacts of the upgrade have not been included in the assessment.

The modelled scenarios were:

- Base - 2010 AM/PM
- 2012 Base - 2012 AM/PM with temporary carpark, Cochlear Stage 1, Library and Macquarie University Private Hospital.
- 2012 Project Case - 2012 AM/PM Base + Australia Hearing Hub

The 2012 cases included an upgraded Waterloo Road/Herring Road intersection. This intersection is required to be upgraded as a condition of consent of the Cochlear development. The works, expected to be completed by the end of 2010, include an additional lane on the Waterloo Road east approach and an additional lane on the Herring Road north approach.

As detailed above, the existing carparking structures on the site (and adjoining the site) will be demolished as part of a separate REF process and a new temporary carpark will be constructed adjacent to Culloden Road. It has been assumed that the temporary carpark would generate traffic at the same rate per space as the demolished carpark resulting in a slight net reduction in traffic.

The forecast traffic generation of the 2012 base and Project Cases are summarised in **Table 8** below:

**Table 8** – Traffic Generation Summary

| Development | Traffic Generation (Vehicles per hour) | | | | | |
|---|---|---|---|---|---|---|
| | AM Peak (7:45am - 8:45am) | | | PM Peak (4:45pm - 5:45pm) | | |
| | In | Out | Total | In | Out | Total |
| 2012 Base | | | | | | |
| Demolished Car Park + Temporary Car Park (net change) | -33 | -9 | -42 | -10 | -26 | -36 |
| Cochlear Stage 1 | 244 | 61 | 305 | 61 | 244 | 305 |
| Private Hospital | 135 | 40 | 175 | 50 | 170 | 220 |
| 2012 Project Case | | | | | | |
| Hearing Hub | 182 | 46 | 228 | 46 | 182 | 228 |

Traffic data suggests that approximately 70% and 80% of vehicular trips to/from Macquarie University use the Waterloo Road/Herring Road and Epping Road/Balaclava Road access points, with a relatively even split between these two intersections.

This traffic impact assessment is therefore focused on these two key intersections and it has been assumed that the additional traffic included in the 2012 base and project cases is equally distributed between the two key intersections.

The results of the SIDRA intersection analysis show that, as a result of the development, the key intersections will continue to perform at an acceptable level of capacity. This assumes that the Waterloo Road/Herring Road intersection improvement (required as part of the Cochlear Stage 1 approval) will have occurred by the time the Hearing Hub development is operational.

Importantly, the difference in the performance of key intersections between the 2012 Project Case and 2012 Base Case is, in fact relatively small, with no change in the Level of Service index (according to the SIDRA intersection analysis model) at either the Waterloo/Herring Road or Epping Road/Balaclava Road intersection.

The results of the intersection analysis demonstrate that no road improvement works are required as part of the development, aside from the realignment of Macquarie Drive, and that the proposed development will not have an unacceptable impact on the operation of the road networks around the site.

## Parking

There are currently approximately 5,300 on-site parking spaces across the campus in a mixture of multi-storey and at-grade car parking areas. Approximately 70% of these spaces are available for students and staff with the remainder reserved or leased out to other tenants. Within the wider Precinct E, there are currently approximately 2,200 parking spaces.

The development includes 339 carparking spaces in two basement parking levels - 150 in basement 1,185 in basement 2 and four temporary on-grade accessible carparking spaces. Sixty of the spaces will be provided as visitor parking.

The primary control relating to the total supply of parking within the development is the Concept Plan. The Plan stipulates that each new development within Precinct E will generally be self-sufficient in terms of parking with parking to be contained within the basement of each development.

The Concept Plan permits a maximum of 10,800 spaces across the Campus including 5,000 spaces within Precinct E and F (condition B1). Parking for commercial uses within Precinct E will generally be provided at a rate of no more than 1 space per 80m$^2$ GFA.

There is, however, some flexibility in the provision of parking across Precinct E. In other words, some development could have a higher rate of parking and others a lower rate of parking, as long as the overall maximum number of spaces for the Precinct is not exceeded once the Precinct is fully developed.

Based on a GFA of 23,182m$^2$ and total parking provision of 339 spaces, parking for the development will be provided at a rate of 1 space per 68m$^2$. This rate of parking is permitted under the Concept Plan conditions and will not significantly affect the parking rate that can be adopted for subsequent developments within Precinct E.

It is noted that the only approved commercial development within the Precinct, Cochlear (currently under construction) includes 538 parking spaces which equates to a rate of approximately 1 space per 46m$^2$ GFA. The Cochlear development approval preceded the Concept Plan approval and this rate (1 per 46m$^2$) was applicable at the time of the draft Concept Plan.

The City of Ryde Parking controls do not apply to the development because it falls under the conditions of the Concept Plan. However, the City of Ryde Development Control Plan 2006 specifies a parking rate for the Macquarie Park Employment Area of not more than 1 space per 46m$^2$ of nett usable floor area. The proposed parking provision for the development does not exceed this rate.

Although the provision of eight at-grade accessible parking spaces would be consistent with BCA requirements, the accessibility consultant has recommended that twelve accessible space be provided which is accommodated by the proposed development (see Section 6.23 below and the Access Review Report at **Appendix P**).

The carpark will be controlled by boom gates although they may be left open during typical work hours will vehicular access monitored by security. At peak periods some queuing for entering traffic may occur on the north-south secondary road although this would be acceptable due to the non-through traffic nature of this road. A boom gate controlled exit can accommodate up to 300 vehicles/hour/lane and therefore the single lane exit would be acceptable assuming maximum flows of 180 vehicles/hour.

The development provides parking for 16 motorcycles and 160 bicycles as well as shower facilities for cyclists. The latter exceeds the minimum requirement specified in the *Planning Guidelines for Walking and Cycling* (bicycle parking for up to 5% of staff and up to 10% of visitors) based on current occupancy estimates.

## Servicing

The design of the building incorporates a delivery area within basement 1. The area will be accessed by the carpark driveway and involves a straight path between the driveway and delivery area.

The development is commercial in nature and most of the service vehicle movements will relate to waste, small deliveries and general maintenance of the building. Tenant deliveries and service vehicle access for maintenance would generally occur within working hours using small vans or small rigid vehicles. Service vehicle movements for waste would involve vehicles up to the size of 10.8 metres extended, medium rigid vehicles. Appropriate service vehicle manoeuvring area is provided for such vehicles.

The delivery area location and the single space provided is suitable to the types of delivery service vehicles likely to be accessing the development.

## Pedestrians and Cyclists

The development includes parking for up to 160 bicycle spaces, as well as showers and locker facilities. The total bicycle parking provision exceeds the minimum requirement specified in the *Planning Guidelines for Walking and Cycling*.

The transport policy for the University assumes a hierarchy where priority is given to non-motorised forms of transport - walking and cycling, in addition to public transport - with the lowest priority given to private car and parking.

The Hearing Hub development is centrally located on the Campus within a good network of walking connections and close to bus stops and the rail station. A key pedestrian route will be along Macquarie Drive to the rail station. The Precinct E Guidelines also include provisions to substantially upgrade this walking route. The condition of this route and the parallel route on University Avenue will also improve significantly following the completion of the Cochlear and new library development.

The design of the Hearing Hub is in accordance with the guidelines contained in the *Planning Guidelines for Walking and Cycling* regarding the integration of walking and cycling at the planning stage of a development.

Completion of key links in the University, City of Ryde and NSW BikePlan strategies is likely to result in a significant increase in cycling, including to developments such as the Hearing Hub. Macquarie University also has a bicycle user group (the purpose of which is to promote bicycle usage by lobbying for better facilities and also providing advice to new cyclists) which could incorporate staff at the Hearing Hub.

## Sustainable Transport Measures

The Concept Plan sets a 40% non-car mode share target for travel to and from Macquarie University and this applies to both academic and commercial land uses. It is noted that this is a long term target to be achieved over time, well beyond the opening date of the Hearing Hub, and represents a considerable increase in the current mode share.

The NSW State Plan 2010 includes the following transport targets:

- Increase the proportion of total journeys to work by public transport in the Sydney Metropolitan Region to 28% by 2016; and
- Increase the mode share of bicycle trips made in the Greater Sydney region, at a local and district level, to 5% by 2016.

These targets will be met by measures to promote sustainable means of transport including public transport usage, car sharing, car pooling and pedestrian and bicycle linkages.

Measures to promote increased bicycle use are described above. Public transport use will also increase with the implementation of pedestrian linkages envisaged under the Concept Plan.

The University is also currently reviewing its parking policy and fee structure in particular. A significant increase in parking fees would be likely to lead to an increase in the non-car mode share level and could also lead to more car pooling. A revised parking fee structure could also be developed to provide incentives to car pooling such as priority parking for vehicles with two or more occupants.

Other measures that could be introduced to increase the non-car mode share across the Campus, including the Hearing Hub, include:

- Introduction of a formal car pooling system for students and staff including Hearing Hub workers (the University already has a system in place for its students and academic staff which could be extended to include occupants of commercial premises on the Campus);

- Introduction of a car share scheme by allowing convenient and dedicated car share parking spaces within the campus.;
- Introduction of a university shuttle bus service, especially at night, with links to key transport nodes;
- Promotion of flexible working practices for the commercial developments;
- Investigation of a travel pass scheme to provide for reduced cost annual public transport tickets;
- Provision of visitors to the Hearing Hub and other developments with public transport and cycling transport information;
- Preparation of a University Transport and Access Guide;
- Incorporation of Hearing Hub representatives into the existing University Transport Action Group;

Although some of the above measures rely on a Campus-wide approach to sustainable transport measures, the above mechanisms (as well as other relevant mechanisms) will be explored in relation to the implementation of a Workplace Travel Plan for the Hearing Hub. This has been included in the draft Statement of Commitments at Section 7.0.

## 6.11 Noise & Vibration Impact

Acoustic Logic has prepared a Noise and Vibration Intrusion and Environmental Noise Assessment (Noise and Vibration Assessment) for the operation of the proposed Hearing Hub development (see **Appendix K**).

The Noise and Vibration Assessment examines the potential impact associated with vibration generated on the Northern Railway corridor and noise generated by car movements on surrounding streets to determine the potential adverse impacts on future tenants of the Hearing Hub and required mitigation measures.

In addition, noise intrusion through the building facade has also been assessed in accordance with internal noise levels presented in Indoor Environment Quality of the Green Building Council of Australia Office Design Guidelines.

Potential noise impacts on surrounding development from operation of the development have been assessed based on the requirements of DGRs, Ryde City Council and the Department of Environment Climate Change and Water (DECCW) guidelines as well as ambient noise measurements obtained from long-term unattended monitoring and manned measurements at the site.

Noise goals have also been set for the development and future plant and equipment will be designed and selected so that noise levels at the nearest affected receivers comply with the criteria nominated in this report.

### Traffic Noise Impacts on the Hearing Hub development

Testing indicated that a traffic noise level of 64dB(a)$_{Leq\ (9hour)}$. Internal noise impacts will be primarily be as a result of noise transfer through the glass facade as it is a relatively light building element that offers less resistance to the transmission of sound. All other external elements of the facade and roof are proposed to be heavy masonry elements that will not require upgrading.

Acoustic Logic recommends transmission loss ratings for the glass facade to ensure that appropriate internal noise levels can be achieved. These ratings are detailed in **Table 9** below:

**Table 9** – Recommended Transmission Loss Ratings of Glass

| Frequency | 63Hz | 125Hz | 250Hz | 500Hz | 1000Hz | 2000Hz | 4000Hz | 8000Hz |
|---|---|---|---|---|---|---|---|---|
| TL | 25 | 27 | 33 | 36 | 38 | 39 | 51 | 54 |

In addition to meeting the minimum glazing thickness requirements, the design of the facade mullions, perimeter seals and the installation of facade shall not reduce the transmission loss rating of glazing below the values nominated in **Table 9** above. Commitments to ensure that glazing to the glass facade is provided in accordance with these recommendations are included in the Draft Statement of Commitments at Section 7.0.

## Rail Vibration Impacts on the Hearing Hub development

Vibration measurements were taken in line with the potentially worst affected north-eastern facade. The attended measurements were carried out from 6:00am to 9:00am on 16 March 2010 and 20 April 2010 between 6:00om and 8:00pm. The results of the vibration investigation indicate that internal Vibration Dose Values will comply with project requirements without treatment.

## Noise Emissions from the Hearing Hub development

Background noise measurements were conducted in order to characterise the existing acoustic environment. The measurement locations were selected as being representative of the existing acoustic environment currently experienced by the nearest potentially-affected residential receivers in the absence of noise generated by the proposed development.

Unattended noise monitoring was conducted during the period of 14 and 22 April 2010. In the absence of criteria within the City of Ryde Council's Development Control Plan 2006 (Ryde DCP), potential noise impacts were assessed against the DECCW's *Industrial Noise Policy*. The assessment also used the EPA's *Environmental Criteria for Road Traffic Noise (1999)* for the purpose of assessing noise emissions from vehicle movements arriving and departing from the site.

The intrusiveness[1] and amenity[2] criteria for this Hearing Hub project have been determined using the guidelines presented in the DECCW *Industrial Noise Policy* and the unattended noise monitoring data. The relevant noise objectives for nearest residential receivers are outlined in **Table 10** below:

**Table 10** – Noise Objectives

| Location | Day Time Noise Objective dB(A) LAeq | Evening Time Noise Objective dB(A) LAeq | Night Time Noise Objective dB(A) LAeq | Sleep Arousal Objective (internal) dB(A) LAmax |
|---|---|---|---|---|
| Residential receivers | 55[3] | 45 | 40 | 55 |

The following criteria for traffic noise apply to the Hearing Hub project:

**Table 11** – Criteria for Traffic Noise

| Location | Recommended Traffic Noise Levels | |
|---|---|---|
| | Day (7am to 10pm) | Night (10pm to 7am) |
| Macquarie Drive (Local Road) | 55dB(A)LAeq(1hr) | 50dB(A)LAeq(1hr) |
| University Avenue (Local Road) | 55dB(A)LAeq(1hr) | 50dB(A)LAeq(1hr) |

1 Intrusiveness Criterion - requires that noise emissions measured using the Leq descriptor not exceed the existing background noise level by more than 5dB(A) Where applicable, the intrusive noise level should be increased to account for any annoying characteristics such as tonality.

2 Amenity Criterion - limits the absolute noise level from all noise sources to a level that is consistent with the general environment.

3 The amenity criterion is applied when noise events are steady throughout the four hour period. For intermittent events, the intrusiveness criterion is still subject to application.

Noise emissions compliance certification testing will be conducted during the occupation certificate stage of the project to certify compliance with the noise goals presented above are achieved. This has been included in the Draft Statement of Commitments.

### Plant Noise and Vibration

A detailed design for the services plant is not available at this stage. To ensure that amenity levels are maintained, noise emissions from all services plant to any adjacent properties should comply with the following requirements from the City of Ryde Council's general conditions.

**Condition 1** – All noise emission from the mechanical plant shall comply with DECC NSW Industry Noise Policy requirements.

**Condition 2** – External noise levels at the property boundaries should not exceed the levels given in AS 1055. AS 1055 nominates typical background noise levels that would occur, considering the general activities in the vicinity. Given the levels of road traffic and the existence of commercial activities in the area, the appropriate ambient noise category given in AS 1055 applying to the development would be R4. The corresponding night-time background noise levels for the R4 category are 45 dB(A) at night and 55 dB(A) during the day.

**Condition 3** – Use of the premises shall not create an offensive noise as defined in the *Protection of the Environment Operations Act 1997*.

**Condition 4** – Vibration from plant should not be perceptible within an adjacent property.

The required treatment in the form of enclosures, silencers, lined ducting, etc would be determined during the design process to meet the stated noise objectives. The above conditions have been included in the Draft Statement of Commitments at Section 7.0.

## 6.12 Ecologically Sustainable Development

An ESD Report has been prepared by Cundall for the project. The Report provides a summary of the proposed ESD strategies for the Hearing Hub development to achieve:

- A 5 Star Green Star Office v3 rating (Design & As-Built) for the base building;
- A (minimum) 4.5 Star NABERS Energy rating for the base building; and
- Future proofing against rising utility costs.

The ESD Report sets out a number of requirements for the following aspects of the development:

- facade treatment;
- architectural treatment;
- electrical treatment;
- mechanical treatment;
- hydraulic treatment; and
- structural/civil treatment.

All of the requirements in relation to the above aspects have been included in the Draft Statement of Commitments at Section 7.0.

## Innovation and Future Proofing and Design for Climate Change Adaptation

Cundall has developed a long-term greenhouse gas emissions reduction strategy for the Hearing Hub building to allow it to respond to adaptation to regulations and costs associated with climate change.

The Hearing Hub is targeting a reduction in GHG emissions which will be achieved though strong passive design, efficient building services and a connection to the new library Thermal Energy Storage (TES) system.

Cost-benefit analysis has shown that other on-site energy generation systems such as solar cooling or photovoltaic electricity generation are not cost effective and have thus been omitted from the design. It is expected that technologies such as these will become cost-effective during the lifetime of this building and as such the building has been designed with the potential to accommodate a future photovoltaic electricity generation system.

Additionally, the facade has been designed as demountable and the mechanical system controls have been designed to allow future mixed-mode operation when conditions permit. Furthermore, the operations and maintenance manual will include requirements to source energy efficient equipment as replacements become necessary. This has been included in the Draft Statement of Commitments.

In addition to the GHG reduction approach, a number of other future-proofing strategies have been developed. **Table 12** below summarises all future-proofing strategies associated with the Hearing Hub development.

**Table 12** – Future proofing initiatives for the hearing Hub development

| Future Proofing Initiative | Description & Benefits |
|---|---|
| Shared Thermal Energy Storage for Peak Demand Reduction | A connection will be made to the Library Thermal Energy Storage (TES) system such that the Hearing Hub electric chillers will assist in charging the TES during off-peak times and draw chilled water during peak times to achieve a 15% peak demand reduction |
| Photovoltaic Electricity Generation | Provision has been made within the electrical distribution board to allow future connection of photovoltaic panels. |
| Natural Ventilation Mode | A demountable facade has been designed such that a replacement facade with openable windows can be provided quickly and cost effectively so that the building can operate in natural ventilation mode when conditions permit. Mechanical system controls have been designed to allow for this mode of operation. |
| Electric Car Charging | Provision of electrical infrastructure has been made to allow for future car charging bays in the basement. |
| Sustainable Equipment Replacement Policy | Requirements for an improvement in the environmental performance of replacement equipment compared to components being replaced have been included in the operation and maintenance manual. |
| Recycled Water for Nonpotable Demands | Provision has been made to allow cooling towers and sanitary flushing to connect to a future district recycled water main. |

# 6.13 Integrated Water Management Plan

## Stormwater Control

A Stormwater Management Report and Stormwater Plans (including an Erosion and Sediment Control Plan) has been prepared by Woolacotts for the proposed Hearing Hub development (see **Appendix H**). This forms part of the Integrated Water Management Plan for the site.

A piped stormwater drainage system currently drains stormwater from the development site towards the south-west and eventually into University Creek. Analysis of flood levels in University Creek were completed in January 2009 and the results published in the 'Flood Assessment Report for the University and Mars Creeks - Macquarie University' dated 30 January 2009.

In general, all of the work associated with the Hearing Hub project is above the probably maximum flood (PMF) level and therefore no impact on flood levels in anticipated. The minimum existing finished floor level for the lowest basement of 65.5 metres is well above the PMF level adjacent the site of RL60.83 metres.

The stormwater drainage and on site detention (OSD) system for the project has been designed in accordance with requirements of Ryde City Council Development Control Plan 2006 Section 8.2 Stormwater Management and the relevant Australian Standard. The system elements are summarised as follows:

- Roof drainage via external downpipes and suspended pipework under ground floor to the OSD tank;
- Central paved courtyard draining via pits and suspended pipework below Ground Floor to the OSD tank;
- External landscaped and paved areas draining via grassed swales to pits and in ground pipework which bypass the OSD tank; and
- basement subsoil drainage and inlet pits which drain via in ground pipework to a pump pit which discharges through a rising main to external in ground pipework.

## Water Sensitive Urban Design

A number of WSUD initiatives have been incorporated into the design. Landscaped areas and pavements within the site will generally fall to grass swales which provide primary treatment of stormwater runoff and maximise infiltration. These grass swales fall to pits where required and have a subsoil drain to control ground water levels.

All clean rainwater from the roofs and central courtyard is collected in a rainwater tank for reuse in flushing of toilets and irrigation of landscaped areas. This rainwater tank is combined with the onsite detention tank and thereby ensures that maximum clean rainwater is made available for re-use.

Stormwater runoff from external landscaped and paved areas to the north and west of the site will drain via in ground pipework and be treated by a gross pollutant trap (GPT) located on the southern side of the site prior to discharge into the existing piped stormwater drainage system. Stormwater runoff from external landscaped and paved areas to the north and east of the site will drain via in ground pipework and will be treated by a GPT located in the south-east corner of the site prior to discharge into the existing piped stormwater drainage system.

Subsoil drainage and minor surface water collected in the basement will drain via in ground pipework to a pump pit located in Basement 2. All drainage from basement inlet pits is treated by an oil and grease separator prior to discharge into the pump pit. From the pump pit a rising main transfers the water to an external pit on the southern side of the building where it can drain via gravity to the GPT located on the southern side of the site. All clean rainwater overflow from the detention tank bypasses the GPT located in the south-east corner of the site and drains directly into the existing piped stormwater drainage system.

### Erosion and Sediment Control

Erosion and sediment control measures proposed for the development, both during construction and in the final development, will generally be designed and implemented in accordance with 'Managing Urban Stormwater - Soils and Construction' published by Landcom (The Blue Book). An Erosion and Sediment Control Plan is provided at **Appendix H**.

Other measures to be provided on site during construction include construction exits for all vehicles leaving the site, silt traps at stormwater pits when constructed and revegetation of the site as soon as practicable. Erosion control measures will be inspected and maintained after each rain event and at intervals not exceeding 2 weeks. These measures have been included in the Draft Statement of Commitments.

### Water Recycling

Steve Paul & Partners have prepared a Rainwater Harvesting Report (**Appendix I**) for the Hearing Hub development. It analyses the water demands of the proposed Hearing Hub development and details the mechanisms and requirements for rainwater harvesting for the development. The Report details the advantages of providing a rainwater collection system for the purposes of cooling tower make up water supply, toilet flushing and spray irrigation systems and points to the ESD and cost benefits resulting from the system.

The Report provides a rainwater harvesting option for the development which it recommends be adopted in the development design. This is included in the Draft Statement of Commitments at Section 7.0

### Sewage Management

The sewage system on the site will be connected to existing sewer connections on the Campus. Further detail is provided in Section 6.17 below.

## 6.14 Geotechnical and Contamination

Douglas Partners has prepared a Geotechnical Investigations Report and Targeted Phase 2 Contamination Assessment for the Hearing Hub project (see **Appendix J** and **Appendix M** respectively). The findings and recommendations of these reports are detailed below.

### Geotechnical Investigations

Geotechnical investigations were undertaken by Douglas Partners for nearby development sites including the new Macquarie University library building and the new Cochlear Global Headquarters building. Relevant information from Douglas Partner's involvement in these works has informed their geotechnical findings for the Hearing Hub site.

Douglas Partners undertook borehole testing including groundwater monitoring wells on the development site to obtain continuous core samples of the bedrock and to allow for the measurement of groundwater levels. The boreholes encountered subsurface profile typically comprising pavements and/or shallow filling over stiff to hard residual clay to depths of 0.2m to 2.2m over weathered bedrock.

The investigation indicates that excavation for the basements will require the removal of soil and extremely low to low strength rock to depths of approximately 3 to 6 metres followed by low to medium strength then medium and high strength rock in the lower half of the basement.

Excavation of soil and extremely low to low strength rock should be achievable using conventional earthmoving equipment, however the assistance of rock hammering or ripping may be required for effective removal of medium to high strength bands within the weathered rock. Excavation of low to medium strength rock will require heavy ripping with a large bulldozer. Large hydraulic rock breakers will be required for slightly fractured or unbroken rock.

During construction, it is anticipated that groundwater seepage will be relatively minor and would be readily controlled by perimeter drains connected to a 'sump-and-pump' dewatering system. A drained basement will require permanent subfloor drainage below the basement floor slab connected to sump and pump dewatering system. These requirements have been included in the draft Statement of Commitments in Section 7.0.

The Geotechnical Investigations Report notes that the proposed rock excavation will result in the vibration of the surrounding ground. However, given that the adjacent buildings are generally set back 10 metres or more from the basement footprint and are generally well constructed, it is anticipated that the risk of damage resulting from vibrations would be low. Despite the low risk, Douglas Partners makes a number of recommendations to ensure that potential impacts on surrounding properties are minimised (these are included in the Draft Statement of Commitments).

The Geotechnical Investigations Report makes a number of additional recommendations for excavation and structural support of the proposed Hearing Hub development which have been included in the draft Statement of Commitments.

### Contamination Assessment

As part of the Phase 2 Contamination Assessment a review of historical information was undertaken for the site. The main potential of soil contaminants on the subject site are likely to be associated with the former orchard and market garden uses which includes the 'surficial application' of pesticides and petroleum hydrocarbons associated with the storage of fuels for the use of plant and equipment. However, the disturbance of the site and the time since market gardens were present is likely to have reduced any potential impact.

The demolition of the former structures (houses, sheds) also has the potential to have impacted the site. As the majority of the site is covered by asphalt-paved car parks, petroleum hydrocarbons from motor vehicles and PAHs from asphalt are also considered to be potential source of contamination. In addition, the use of filling from unknown sources for the low landscaped mounds around car parks W1 and W2.

Soil samples were taken at strategic locations throughout the site (details are provided in the Contamination Assessment at **Appendix M**). The analytics results for the soil samples indicated that concentrations of contaminants in most samples were well below the health-based site assessment criteria for commercial/industrial land uses. Although nickel and arsenic levels in some samples were above photo-toxicity-based investigation levels[4] they were well within the health-based investigation levels provided under the *Guidelines for NSW Site Auditors Scheme 2006*.

Four samples within the subject site recorded TPH levels above the adopted site assessment criteria. These samples were taken from locations within the asphalt-paved car parks of W1 and W2. The levels of contamination from the sample taken within car park W2 classify the sample as a hotspot. Normally delineation and removal of the soil within the area of the hotspot is required. However, as the site will be excavated to a maximum depth of 6 metres, the material classified as a hotspot will be removed as part of the excavation.

A groundwater assessment was also carried out. The concentrations of most contaminants within the groundwater samples were less than practical quantitation limits (PQL). However, toulene was detected in low levels in one sample and arsenic was detected above PQL in another samples. Cadmiums, copper, nickel, zinc and copper concentrations were also detected at levels over the groundwater investigation level values in some samples.

**4** Exceedences of above photo-toxicity-based investigation levels may affect plant and vegetation growth.

The Contamination Assessment concludes that the detected levels are not considered significant as the copper and cadmium exceedences area only marginal. Zinc, nickel and copper are commonly detected at levels above the ANZECC Guidelines for groundwater, particularly in urban areas in Sydney, and it is likely that the resulting concentrations represent background concentration levels.

Although asbestos material was not observed during fieldwork or detected by laboratory analysis, the Contamination Assessment recommends that precaution should be taken if asbestos-containing materials are uncovered during excavation and site development and that, if encountered, management and disposal of asbestos material is to be undertaken by an ASA licensed contractor. This is included in the Draft Statement of Commitments.

A preliminary waste classification was conducted based on the samples collected for the Contamination Assessment, on which basis the filling materials has been provisionally classified as General Solid Waste. The Contamination Assessment recommends that a full waste classification assessment be undertaken at the time of stockpiling the excavated material from the subject site. This has been included in the Draft Statement of Commitments at Section 7.0.

Based on the review of the available site history, site observations and laboratory results, Douglas Partners considers that the site can be made compatible with the proposed commercial development subject to the removal of the filling material from underneath the asphalt-paved carpark that has recorded TPH levels above the site assessment criteria values for commercial land uses. In light of the understanding that this material will be part of the excavated area from within the subject site, the Contamination Assessment concludes that the site will be compatible for the proposed commercial development once the contaminated material has been appropriately removed.

## 6.15 View Analysis

View Analysis diagrams (**Appendix N**) have been prepared for the proposed development which provides the expected views of the proposed development from the east and north. The view from the north takes into consideration the proposed north-south view corridor and pedestrian access that will be provided through the lower two levels of the western extension of the building and demonstrates the visual interest that this building element will contribute to the visual richness of architecture and design on the Campus. It also demonstrates that no significant views will be lost as a result of the proposed development.

The view from the east demonstrates that the proposed development will provide a landmark structure at the western entry point to the Campus and will achieve a high level of design quality.

## 6.16 Visual Privacy

The proposed Hearing Hub development is not expected to have any visual privacy impacts. The nearest residential development is the aged-care facility which is located some 50 metres to the south-west of the site.

# 6.17 Infrastructure and Utilities

## Stormwater Management

In accordance with the Utilities Management Plan prepared for Precinct E by TTW the proposed stormwater system requirements are as follows:

- Stormwater detention storage for each development site in accordance with Council's DCP requirements.
- Stormwater re-use storage treatment and reticulation for each site in accordance with Council's DCP.
- Stormwater connection points for each site through the University drainage network.

The Stormwater Management Report and Plans for the Hearing Hub development site (**Appendix H**) meet the above requirements.

The proposed stormwater drainage system for the University consists of:

- Stormwater connections from the proposed sites through the road stormwater network to existing connections on University creek. Any work in University creek will be carried out with reference to the University Creek Vegetation Management Plan and the Threatened Species Management Plan.
- Low flow stormwater treatment filters for the road drainage system to follow the intentions of best practice water sensitive urban design.
- Gross pollutant traps for the road drainage system to ensure the impact of the Precinct E development is as low as possible on University Creek.

In the short term (0 - 5 years) the following upgrades to the stormwater system are proposed:

> *Design and construct drainage works to service the development Precinct and to maintain a connection to sites E01* [Hearing Hub]*, E06, E07, E08 and the Library.*

This upgrade work will be undertaken prior to or concurrent with the construction of the Hearing Hub development.

## Water Supply

The Utilities Management Plan provides a detailed water supply needs analysis for Precinct E. It considers the daily consumption and peak simultaneous design loads of future development within the Precinct including those resulting from the Hearing Hub development which is forecast to be developed as part of the short term infrastructure works (0-5 years).

The Utilities Management Plan notes that the existing water supply system is inadequate for the proposed demand and that amplification of the water supply system inside and outside the University is required.

The following works are required immediately:

> *Upgrade of Herring Road Water Main, depending on Sydney Water assessment, new internal connection mains.*

These works will be undertaken at the same time or prior to the Hearing Hub development.

## Sewerage Services

According to the Utilities Management Plan, the existing sewer system is inadequate for the existing load and amplification of the existing line has been recommended in the University Creek and Mars Creek carriers.

The following immediate works are requires (0 - 5 years):

*Partial or complete upgrade of University creek carrier, depending on Sydney water assessment.*

These works will be undertaken at the same time or prior to the Hearing Hub development. As detailed in Section 6.13 above, the sewer system in the Hearing Hub development will be connected to existing sewer infrastructure on the Campus which is to be upgraded as detailed above.

### Electrical Services

In accordance with Concept Plan Condition of Approval C1 (a) the existing 11kV from Macquarie Park Zone Substation (MPZS) is capable of supplying sites E1 (Hearing Hub), E2, E3, E6, E7 and E12.

All existing and new services will be run underground in accordance with Concept Plan Condition of Approval C14 (2).

Some augmentation of the electricity supply inside the University is required to serve the demands anticipated in Precinct E. Immediate works required (0-5 years) include securing an additional 2 off HV distribution feeders from Energy Australia (EA) by undertaking additional augmentation works with approval of EA. These works will occur approximately at the same time as the Hearing Hub development although it is noted that the Hearing Hub development can be accommodated by existing electricity supply.

### Communication Services

A TelstraSmartCommunity project registration has been lodged for Precinct E pending specific development commitment by Lessees.

### Gas Services

The existing University is supplied with Natural Gas from a Jemena secondary gas main in Waterloo Road to a below ground pressure reduction and metering station near the frontage to Herring Road.

From this metering station a network of University owned distribution pipes deliver gas around the site at a pressure of 100 kPa to supply local gas loads as required via local pressure reduction and sub metering sets.

It appears that this network has the ability to support the proposed Precinct E loads if they match normal commercial space gas load profiles. No gas infrastructure upgrade works are required or planned at this stage.

## 6.18 European Heritage

Buildings on the Campus fall into two historic groups – those that pre-date the University (pre-1964) and those that have been built as part of the University's development. The pre-1964 buildings consist of a number of residual residential

buildings in the west of the Campus. These are not considered as being architecturally, socially or historically significant and none appear on Commonwealth or State lists.

The only heritage item identified on the Campus is a local heritage item listed under the RPSO. The Macquarie University Ruins located at 192 Balaclava Road comprises the ruins of a stone cottage and are located in the northern portion of the Campus well away from the Hearing Hub development site.

The proposed development is not expected to have an impact on European heritage.

## 6.19 Indigenous Heritage

A search of the DECCW's Aboriginal Heritage Information Management System (AHIMS) was undertaken for the site on 27 April 2010. The results of the search are included at **Appendix O** and are shown in **Figure 20** below.

**Figure 20** – Results of AHIMS database search for Macquarie University

As demonstrated in **Figure 20** above, only a single aboriginal relic has been identified on the Macquarie University Campus (in Precinct F in the north-western section of the Campus) and no aboriginal relics have been identified on or within the vicinity of the Hearing Hub development site. Thus no potential impacts on aboriginal heritage values are expected to result from the development.

To ensure that no adverse impacts on indigenous heritage during excavation and construction, a commitment has been included in the Draft Statement of Commitments which states that DECCW will be notified immediately should an aboriginal relic be uncovered during excavation or construction, and work within the immediate vicinity of the relic will cease until advice from DECCW has been received.

## 6.20 Biodiversity, Flora and Fauna

A Preliminary Ecological Assessment of the Campus was undertaken by EDAW in May 2006. EDAW identified that the Campus had been largely cleared when Macquarie University Campus was established in 1964. Today five stands of non-contiguous remnant vegetation remain (identified in **Figure 21**) and parts of these include the following ecological communities:

- Sydney Turpentine Ironbark Forest (STIF);
- Sandstone Ridgetop Woodland; and
- Western Sandstone Gully Forest.

STIF is listed under the *Threatened Species Conservation Act 1995* as an endangered ecological community. STIF is also protected under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

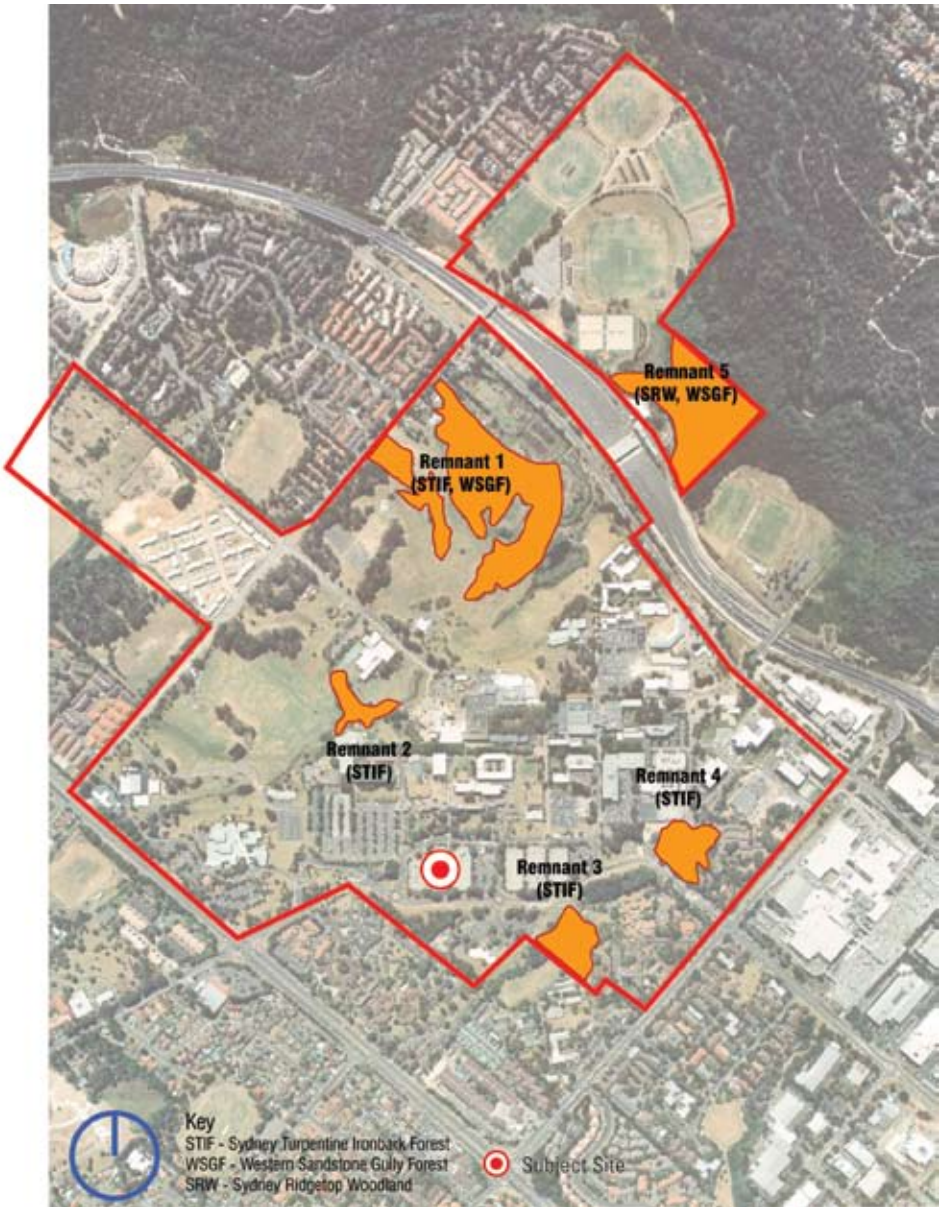



**Figure 21** – Identified ecological communities on the Macquarie University Campus

As demonstrated in **Figure 21** above, no ecological communities have been identified within the vicinity of the Hearing Hub development site. In addition, the site is set well back from the University creek riparian corridor and will not impact on riparian vegetation. Existing trees located on the site will be removed as part of the REF process for demolition of the existing carparks on the site. The impact of this tree removal and provision of replacement planting is being addressed as part of the REF. The proposed Hearing Hub development is not expected to have any adverse impact on flora and fauna.

## 6.21 Construction and Waste Management

The site is located in the vicinity of a number of other construction sites including the new Macquarie University library building and the new Cochlear Global Headquarters building. Construction on these site is expected to be complete, or almost complete by the time construction on the Hearing Hub development site commences. Therefore cumulative construction impacts are expected to be minimal or non-existent.

A Preliminary Construction Management Plan (Preliminary CMP) has been prepared for Coffey Projects for the Hearing Hub development (**Appendix L**).

The Preliminary CMP outlines the processes to be employed during construction of the Hearing Hub. It sets out a number of mechanisms to ensure that minimal amenity impacts will result from the construction activity for the proposed Hearing Hub development. It sets out mechanisms for:

- site establishment works;
- parking and traffic control during construction;
- hoarding and fences of the development site;
- the protection of existing buildings, built elements and landscaping around the site during construction;
- the control of major plant and equipment particularly during excavation;
- site notices, signage boards and notification of commencement of works;
- handling of hazardous materials and decontamination;
- environmental management systems to be implemented during construction including:
  - stormwater and waste water management;
  - waste management;
  - air quality management;
  - dust vibration and noise control.

Recommendations that have been made in the Preliminary CMP in relation to the above mechanisms have been included in the Draft Statement of Commitments at Section 7.0.

In addition to the construction control mechanisms outlined in the Preliminary CMP, an Erosion and Sediment Control Plan (**Appendix H**) has been prepared for the excavation and construction works. A Construction Noise and Vibration Management Plan has been prepared by Acoustic Logic (**Appendix K**) to address potential noise impacts from the construction activity. Further detail is provided below.

The implementation of the recommendations made in the Preliminary CMP, as well as supporting documentation addressing construction impacts, will ensure that potential adverse impacts from the construction activity associated with the Hearing Hub development will be minimised or eliminated.

Furthermore, Prior to site activities commencing a Detailed Construction Management Plan will be prepared by the Head Contractor to address the following:

- Project Management Plan;
- OH&S Management Plan;
- Environmental Management Plan; and
- Pedestrian and Traffic Management Plan.

This has been included in the Draft Statement of Commitments at Section 7.0.

Construction hours will be limited to 7:00am to 7:00pm Monday to Friday and 8:00am to 4:00pm on Saturdays consistent with Section 8.1.4.6 of Ryde Development Control Plan 2006 (Ryde DCP 2006). No construction work will be undertaken on Sundays or Public Holidays.

There are currently no proposed activities to occur outside of the standard constructions hours specified by Ryde City Council, however, there may be instances where it is unavoidable that a concrete pour may take place outside standard construction hours.

## Construction Noise and Vibration Management

A Construction Noise and Vibration Management Plan (**Appendix K**) has been prepared by Acoustic Logic to minimise noise and vibration emissions from excavation and construction work associated with this project and assist in maintaining a satisfactory environment around the development site.
The principal issues that have been addressed in the Construction Noise and Vibration Management Plan are:

- Identification of the noise and vibration standards which will be applicable to the Hearing Hub project;
- Formulation of a strategy for construction to comply with relevant standards; and
- Development of a monitoring programme to measure and regulate noise and vibration at all potentially affected locations.

The nearest potentially-affected residential receiver is the aged-care facility to the south-west. To the south of the site, lies the Gumnut Cottage childcare centre. Existing background noise levels in the absence of noise generated from construction on the development site are based on long-term noise monitoring undertaken by Acoustic Logic Consultancy in the vicinity of the development site and are as follows:

**Table 13** – Existing Rating Background Noise Levels

| Time of Day | Existing Rating Background Noise level dB9A) L90 |
|---|---|
| Daytime (7:00am to 6:00om) | 51[5] |
| Evening (6:00pm to 10:00pm) | 47 |
| Night (10:00pm to 7:00am) | 39 |

The assessment criteria applicable to the project obtained from AS2436:1981 *'Guide to noise control on construction, maintenance and demolition sites'* for construction noise stipulates particular requirements in Section 3 of the Standard that are to be followed. Section 3 of AS2436:1981 states that care shall be taken in applying criteria that would normally be used to regulate noise emitted from industrial, commercial and residential premises to construction, particularly for those activities which are transitory and of short duration.
For the control and regulation of noise from construction sites, AS2436:1981 nominates the following guidelines:

- That reasonable suitable noise criterion is established,
- That all practicable measures be taken on the building site to regulate noise emissions, including the siting of noisy static processes to locations of the site where they can be shielded, selecting less noisy processes, and if required regulating construction hours; and
- The undertaking of noise monitoring where non-compliance occurs to assist in the management and control of noise emission from the demolition, excavation and construction site.

5 This noise level has been determined using noise levels obtained that were unaffected by construction noise from the surrounding sites (the Cochlear Global Headquarters building and the new Macquarie University Library.

To ensure consistency with the Australian Standard, Acoustic Logic recommend the following criteria for construction noise levels:

- **Potentially affected residential receivers** - the $L_{A10}$ noise level to not exceed 20dB(a) above the existing $L_{A90}$ background noise level; and
- **Potentially affected retail and commercial receivers** - the $L_{A10}$ noise level to not exceed 25dB(A) above existing $L_{A90}$ background noise level.

These criteria for resultant noise from excavation and construction activities are aimed at maintaining comfort levels within the surrounding commercial, retail and residential buildings.

In the absence of specific vibration criteria from Ryde City Council in its DCP, it is proposed to adopt two sets of vibration criteria, namely:

- German Standard DIN 4150-3 (1999-02): *'Structural Vibration – Effects of Vibration on Structures'*; and
- British Standard BS 6472:1992: *'Guide to Evaluation of Human Exposure to Vibration in Buildings (1Hz to 80Hz)'*.

The Construction Noise and Vibration Management Plan states that detailed study will be undertaken of each of the proposed activities which will occur as part of the excavation and construction works on the site. This has been included in the Draft Statement of Commitments at Section 7.0.

An assessment of the principal sources of noise emission has been undertaken by Acoustic Logic to identify the activities that may produce noise and/or vibration impacts so that appropriate ameliorative measures can be formulated.

**Excavation Phase**

Once the surface layer of soil and existing man made materials is removed, the remainder of the excavation will be in rock. The loudest activity would be the excavation of rock. These alternative rock excavation methods have been investigated:

- Hydraulic hammering - Hydraulic hammering generates the highest noise and vibration levels but is generally the quickest method of rock extraction.
- Rock sawing and ripping - Rock sawing would produce lower noise levels and much lower vibration levels than hammering.
- Line drilling and using rock splitting - Line drilling is an untried technology in general excavation and can therefore not be adopted.

Excavation will be undertaken primarily by ripping. Noise levels produced by the excavation equipment may exceed the noise goals at adjacent commercial or residential premises when works are undertaken near the boundary of the site, even when quieter excavation methods such as ripping are used.

The site measurements will establish noise/vibration levels at sensitive receivers. If noise levels exceed the criteria then the possibility of reducing noise emission should be investigated and all practical methods should be employed to reduce noise to the target levels in order to preserve the amenity of the nearby residences. This has been included in the Draft Statement of Commitments at Section 7.0.

**Construction Phase**

Noise levels generated during the construction phase will be significantly lower than during excavation. Significant vibration is not anticipated to be produced during this phase. The main noise producing activities will be that attributed to the forming and pouring of the concrete floor slabs, and crane operation. These would be managed by placing the plant as far as practicable from the sensitive receivers. It is expected that the adopted noise guidelines will generally be achieved during this phase except during louder activities such as stripping out of formwork which will occur from time to time.

The Construction Noise and Vibration Management Plan also establishes mechanisms for community interaction and complaints handling including the establishment of regular schedule meetings with affected parties for a finite period and production of a newsletter informing surrounding residents of upcoming activities that are likely to generate higher/noise vibration levels. Mechanisms for dealing with ongoing complaints are also established. These mechanisms are included in the Draft Statement of Commitments at Section 7.0.

### Pedestrian and Cyclist Impacts during Construction

The potential impacts on cyclists and pedestrians has also been considered in the Transport and Accessibility Impacts Report at **Appendix G**. In accordance with the draft Statement of Commitments, a detailed construction traffic management plan will be prepared at the construction stage of the project. Measures to mitigate potential impacts for pedestrian and cyclists during construction will include the following:

- Provisions will be made for pedestrians and cyclists to pass the worksite safely;
- A minimum footpath width of 2 metres will be maintained at all times;
- Suitable pedestrian road crossing points will be maintained;
- At times it may be necessary to direct pedestrians and cyclists onto the road carriageway and adequate warning signs and barricades will be provided;
- Traffic controllers or other traffic devices to direct traffic would be provided in accordance with AS 1742.3: 1996;
- The construction schedule for the development will also aim to minimise:
  - disruption to traffic movements particularly at peak periods; and
  - interference with public transport services;
- Adequate fencing will be installed around the perimeter of the construction site to restrict unauthorised public access;
- All demolition and construction related vehicles would comply with the University's traffic and parking rules; and
- Vehicular access points to the construction site will be selected to avoid conflict with high volume pedestrian desire lines that exist on Macquarie Drive and University Avenue.

These measures have been incorporated into the draft Statement of Commitments at Section7.0.

## 6.22 Wind Impact

The proposed development will have a maximum height of 27 metres and does not include any extremely tall or narrow elements. No existing adverse wind conditions have been identified on the Macquarie University Campus at present. It is not expected that wind amelioration measures will be required for development on the Campus until substantially more development occurs. In any case, wind impacts are likely to be concentrated around the Macquarie University Station where taller buildings are proposed. It is not expected that the proposed development will result in adverse wind impact.

## 6.23 Access and Mobility

An Access Review Report has been prepared by Morris-Goding Accessibility Consulting (**Appendix P**). The Hearing Hub development has been reviewed to ensure that ingress and egress, paths of travel, circulation areas and toilets comply with relevant statutory guidelines.

In general, the development has accessible paths of travel that are continuous throughout. Morris-Goding Accessibility Consulting concludes that, subject to application of the Access Review Report's recommendations, the proposed development will achieve an appropriate degree of accessibility and compliance with statutory requirements pertaining to site access, common area access, accessible parking and accessible sanitary facilities can be readily achieved.

The recommendations made in the Access Review Report have been included in the Draft Statement of Commitments at Section7.0. Eight accessible car spaces will be provided within the basement carpark and four accessible car spaces will be provided at-grade consistent with Ryde DCP 2006 and the recommendations of the Access Review Report.

## 6.24 Social and Economic Issues

The proposed development will have a number of social and economic benefits. Most notable of these is the collaboration of academic, research, not-for-profit and commercial organisations related to the hearing industry and the potential improvements in hearing technology that will result. The innovative technology that will result from this partnership will not only have positive social outcomes for people suffering from hearing related disorders in Australia but will result in the development of new products and services (for potential export) that will have positive economic implications.

The provision of new premises for a number of not-for-profit organisations will also result in positive social outcomes.

## 6.25 Contributions

A Contributions Schedule was approved as part of the Concept Plan approval. At December 2008, the following contribution rates were provided for the following types of development on the University Campus (contributions will be indexed to current CPI):

- No contribution for 'Academic Medical Scientific' development;
- $28.33 per $m^2$ of GFA for 'Research and Development Business Incubation' development;
- $57.82 per $m^2$ for 'Other Commercial' development

'Academic Medical Scientific' development is defined as follows:

- *Teaching;*
- *Learning;*
- *Academic research by Macquarie University;*
- *Hospital;*
- *Clinics;*
- *Laboratory serving medical support services for all of the above; and*
- *Administration services for all of the above.*

'Research & Development and Business Incubation' development is defined as follows:

- *Joint ventures between Macquarie University and commercial enterprise;*
- *Development that will assist the University in delivering its objectives under the Macquarie University Charter and academic pursuits;*
- *Research for commercialisation;*
- *Commercialisation of research;*
- *Research and development; and*
- *Business incubation.*

As detailed in Section 5.1 above, the Hearing Hub development will be made up of the following uses:

- Approximately 4,330m$^2$ of shared space (including the anechoic chambers, wind tunnel, toilets, lift lobbies, reception and foyer areas, auditorium, conference room, breakout spaces and corridors). This space will be shared equally by all users with the main user of the building being University uses. For the purposes of calculating the appropriate contribution for the development this shared space is expected to be predominantly used for 'Academic Medical Scientific' purposes;
- Approximately 9,200m$^2$ allocated to University uses;
- Approximately 4,535m$^2$ allocated to Government agencies (Australian Hearing);
- Approximately 1,340m$^2$ allocated to commercial uses (specifically Cochlear and Sydney Cochlear Implant Centre); and
- Approximately 415m$^2$ allocated to not-for-profit organisations.

Some 3,362m$^2$ of GFA has not yet been allocated to a specific tenant. However, it is expected that this excess space will be used for University purposes.

In other words, some 16,892m$^2$ of the GFA in the building (including the shared space and unallocated space) is considered 'Academic Medical Scientific' development for the purposes of calculating developer contributions for which no developer contribution levy should be charged. Based on the above, 1,340m$^2$ of the GFA in the development should be levied at the rate of $57.82 per m$^2$ for commercial development.

It is considered inappropriate to levy a full commercial contribution rate on the government agency and not-for-profit organisations which will occupy floor space within the development as these organisations and agencies are involved in 'research and development' and 'will assist the University in delivering its objectives under the Macquarie University Charter and academic pursuits'. It is therefore considered appropriate to levy the contribution rate of $28.33 per m$^2$ for 'Research and Development Business Incubation' to these uses. In other words a contribution rate of $28.33 will apply to 4,550m$^2$ of the GFA within the development.

According to the above, the following development contributions will be payable for the Hearing Hub development:

- 1,340m$^2$ @ $57.82; and
- 4,550m$^2$ @$28.33.

The above rates will be updated according to CPI at the time of payment. The above contributions will be paid to Ryde Council prior to issue of the occupation certificated. This has been included in the Draft Statement of Commitments at Section 7.0.

# 7.0 Draft Statement of Commitments

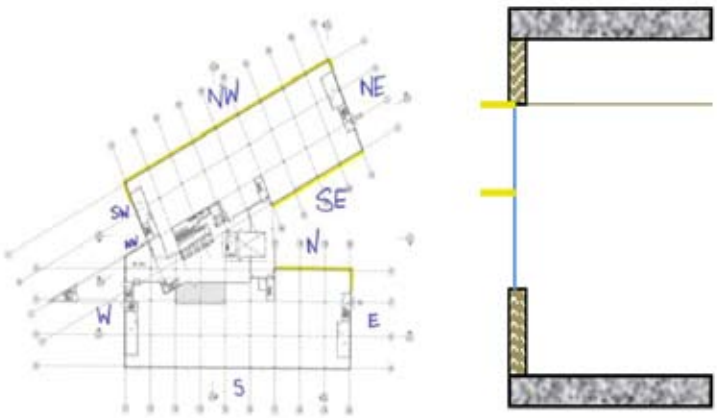
**Table 14** – Draft Statement of Commitments – Australian Hearing Hub

| Subject | Commitments | Timing |
|---|---|---|
| Public Art Strategy | A Public Art Strategy will be prepared for the hearing Hub development following approval which will provide details regarding the potential location and design of public art on the site. | Detailed Design Stage |
| Lighting Strategy | A Lighting Strategy will be prepared which will address the following principles:<br>- Lighting should integrate fixture style with the building's architectural character.<br>- Investigate opportunities to utilise solar (photovoltaic) technology, high efficiency fixtures or alternative energy sources as energy saving measures.<br>- Buildings must have a strong night-time building presence and entries be visible from their primary vehicular and pedestrian access points.<br>- Across the site, white metal halide light must be used for external lighting rather than yellow sodium vapour lamps.<br>- Visible point sources of building illumination must be minimised.<br>- Wall lighting may be installed to illuminate entrance features, however no other lighting of walls visible from outside the plot is permitted, including mounting of light fixtures to the top of boundary walls. | Detailed Design Stage |
| Signage Strategy | A Signage Strategy will be prepared which will address the following principles:<br>- Building identification signage must relate only to tenants within the building.<br>- Building identification signage is to be a maximum size of 25m$^2$ and must not be on any frontage facing the Academic Core.<br>- Signage lighting is to be arranged and maintained so that the light source is not directly visible from a public right-of-way or adjacent property.<br>- As part of the detailed proposal submission, a plan is to be submitted for approval by Macquarie University showing the location of the proposed signage and detailing dimensions, proposed colour, material, copy, and method of illumination.<br>- Buildings must have street numbers prominently displayed on the main street elevation. Numbers must be 500 millimetres in height, non-illuminated and mounted 3 metres above the ground floor level. | Detailed Design Stage |
| Rainwater Harvesting | The Rainwater Harvesting Option detailed in the Rainwater Harvesting Report prepared by Steve Paul and Partners and dated 29 April 2010 is to be included within the design of the development. | Detailed Design Stage and Construction. |
| Noise | - The transmission loss (TL) factors presented in **Table 15** will be applied to glass facade. These do not take into account other requirements such as structural, safety or other considerations. These additional considerations may require the glazing thickness to be increased beyond the acoustic requirement.<br>**Table 15** – Recommended Transmission Loss Ratings of Glass<br>- In addition to meeting the minimum glazing thickness requirements, the design of the facade mullions, perimeter seals and the installation of facade shall not reduce the transmission loss rating of glazing below the values nominated in **Table 15** above.<br>- The glass suppliers shall provide evidence that the systems proposed have been tested in a registered laboratory and comply with the minimum listed TL requirements. Also, the glazing installer should certify that the glass has been constructed and installed in a manner equivalent to the tested samples.<br>- All noise emission from the mechanical plant shall comply with DECC NSW Industry Noise Policy requirements. | Detailed Design Stage, Construction and Operation |

| Frequency | 63Hz | 125Hz | 250Hz | 500Hz | 1000Hz | 2000Hz | 4000Hz | 8000Hz |
|---|---|---|---|---|---|---|---|---|
| TL | 25 | 27 | 33 | 36 | 38 | 39 | 51 | 54 |

<table>
<tr><th>Subject</th><th>Commitments</th><th>Timing</th></tr>
<tr><td>Noise</td><td>
- External noise levels at the property boundaries shall not exceed the levels given in AS 1055. AS 1055 nominates typical background noise levels that would occur, considering the general activities in the vicinity. Given the levels of road traffic and the existence of commercial activities in the area, the appropriate ambient noise category given in AS 1055 applying to the development would be R4. The corresponding night-time background noise levels for the R4 category are 45 dB(A) at night and 55 dB(A) during the day.<br>
- Use of the premises shall not create an offensive noise as defined in the *Protection of the Environment Operations Act 1997*.<br>
- Vibration from plant shall not be perceptible within an adjacent property.<br>
- Noise emissions compliance certification testing will be conducted during the occupation certificate stage of the project to certify compliance with the noise goals presented in Section 5.5 of the Noise and Vibration Intrusion and Environmental Noise Assessment prepared by Acoustic Logic and dated 3 May 2010. These are summarised in **Tables 16 and 17** below:<br>
<br>
**Table 16** – Noise Objectives
<table>
<tr><th>Location</th><th>Day Time Noise Objective db(A) LAeq</th><th>Evening Time Noise Objective db(A) LAeq</th><th>Night Time Noise Objective db(A) LAeq</th><th>Sleep Arousal Objective (Internal) dB(A) LAmax</th></tr>
<tr><td>Residential Receivers</td><td>55[6]</td><td>45</td><td>40</td><td>55</td></tr>
</table>
<br>
**Table 17** – Criteria for Traffic Noise
<table>
<tr><th rowspan="2">Location</th><th colspan="2">Recommended Traffic Noise Levels</th></tr>
<tr><th>Day (7am to 10pm)</th><th>Night (10pm to 7am)</th></tr>
<tr><td>Macquarie Drive (Local Road)</td><td>55dB(A)LAeq(1hr)</td><td>50dB(A)LAeq(1hr)</td></tr>
<tr><td>University Avenue (Local Road)</td><td>55dB(A)LAeq(1hr)</td><td>50dB(A)LAeq(1hr)</td></tr>
</table>
</td><td>Detailed Design Stage, Construction and Operation</td></tr>
<tr><td>Access</td><td>
The following measures will be implemented to ensure that appropriate disabled access is provided on the site:<br>
- Ensure there is an accessible path of travel from the site boundary to the entry doors of the Hearing Hub for a person in a wheelchair, compliant with AS1428.1 & the Ryde DCP 2006-9.2, Clause 3.<br>
- Consideration is needed for all fire stair doors to have 850mm clear widths (920mm door leaf). Consider the use of increased fire stair landing size to cater for fire refuge.<br>
- Consider at least 1 passenger lifts is operable in event of emergency.<br>
- Emergency alarm systems shall include audible and visual warnings indicators in assisting people with sensory disabilities, compliant with Ryde DCP 2006 9.2 Clause 28 & Clause 29.<br>
- Ensure all internal common use doors to have 850mm clear widths (920mm door leaf), which will allow for larger wheelchairs & 510mm latch side clearances, compliant with AS1428.2 & the Ryde DCP 2006 9.2, Clause 10.<br>
- Ensure there are handrails provided on both sides of the stairs, compliant with AS1428.1.<br>
- Provide tactile ground surface indicators (TGSIs) at the start/finish of the stairs, compliant with AS1428.4.<br>
- Ensure passenger lift cars have 1400mm (W) x 1700mm (L) internal dimensions, compliant with AS1428.2, AS1735.12 & the Ryde DCP 2006 9.2 Clause 28.
</td><td>Detailed Design Stage, Construction and Operation</td></tr>
</table>

6 The amenity criterion is applied when noise events are steady throughout the four hour period. For intermittent events, the intrusiveness criterion is still subject to application.

| Subject | Commitments | Timing |
|---|---|---|
| Access | - Ensure that components in the lift car (control panels, audio/visual indicators, handrails and light levels) comply with AS1735.12.<br>- In line with the Draft DDA Access Code Clause D3.7, a hearing augmentation system is required in the Lecture Theatre/Auditorium.<br>- In line with Council DCP, clause 17, accessible toilet pans shall be positioned to allow for a right or left hand transfer on each subsequent floor<br>- Provide ambulant cubicles in each male and female bank of toilets<br>- Ensure the two sets of dual hinged entry doors to the café to have 850mm clear widths (920mm door leaf), which will allow for larger wheelchairs & 470mm latch side clearances, compliant with AS1428.2 & the Ryde DCP 2006 9.2, Clause 10.<br>- Ensure the entry threshold is level at the level 6 breakout area to assist wheelchair users compliant with AS1428.1.<br>- Provide 3% (11) of total car bays to be designated as accessible car bays, compliant with Ryde DCP 2006.<br>- In general the maintenance illumination levels should be 150 lux for paths of travel, corridors and stairs. Ensure all lighting levels comply with AS1680 and AS1428.2<br>- Signage to comply with draft DDA Premises Standards. | Detailed Design Stage, Construction and Operation |
| ESD | **Facade**<br>Facades will have the following attributes:<br>- Non-glazed external walls: R2.8 insulation<br>- Roof fabric: R3.2 insulation<br>- 2 x 450mm horizontal shades on the NW and N facades indicated in yellow in **Figure 22** below (single shade only for SE facade)<br>  <br><br>**Figure 22** – Required shading on NW and N facades<br>- U Value (including framing): 2.7W/m2K<br>- Solar Heat Gain Coefficient: 0.35<br>- Visual Light Transmission: 62%<br>- Demountable facade panels for ease of disassembly and reuse as well as ease of replacement by openable windows for natural ventilation or other panel typologies to significantly reduce the future cost of improving energy efficiency | Detailed Design Stage, Construction and Operation |

| Subject | Commitments | Timing |
|---|---|---|
| ESD | **Architectural**<br>Paints and Coatings must comply with the following table:<br>**Table 18** – Standard for Paints and Coating | Detailed Design Stage, Construction and Operation |

| **Paints & Coatings must Comply with ASTMD3960** | |
|---|---|
| **Product Type** | **Compliant VOC Content (g/litre)** |
| Interior Semi Gloss | 16 |
| Interior Low Sheen | 16 |
| Interior Flat Washable | 16 |
| Ceilings Interior | 14 |
| Exterior Gloss | 75 |
| Trim - gloss, semi gloss, satin, varnishes & wood stains | 75 |
| Timber and binding primers | 30 |
| Latex primer for galvanised iron and zincalume | 60 |
| Interior Latex Undercoat | 65 |
| Interior Sealer | 65 |
| Interior Sealer | 65 |
| One and two pack performance coatings for floors | 140 |
| Other solvent based coatings | 200 |

Sealants and Adhesives must comply with the following table:

**Table 19** – Standards for Sealants and Adhesives

| **Adhesives & Sealants must comply with South Coast Air Quality Management District Rule 1168** | |
|---|---|
| **Product Type** | **Compliant VOC Content (g/litre)** |
| Indoor carpet adhesive | 50 |
| Carpet pad adhesive | 50 |
| Wood flooring and laminate adhesive | 100 |
| Rubber flooring adhesive | 60 |
| Sub-floor adhesive | 50 |
| Ceramic tile adhesive | 65 |
| Cove base adhesive | 50 |
| Dry wall & panel adhesive | 50 |
| Multipurpose construction adhesive | 70 |
| Structural glazing adhesive | 100 |
| Architectural sealants | 250 |

| Subject | Commitments | Timing |
|---|---|---|
| ESD | Carpets must comply with the following table:<br>**Table 20** – Standards for Carpets | Detailed Design Stage, Construction and Operation |

| Carpets must comply with Carpet & Rug Institute Green Label or ASTM D5116 | | |
|---|---|---|
| **Product Type** | **Compliant VOC Emission (mg/m²/hr)** | **Compliant 4-PC Emission (mg/m²/hr)** |
| All carpet products | 0.5 | 0.05 |

Engineered wood products must comply with the following table:

**Table 21** – Standards for Engineered Wood Products

| Engineered Wood Products | | | | |
|---|---|---|---|---|
| **Product Type** | **Formaidehyde Emission Limit (E1)** | **Formaidehyde Emission Limit (E0)** | **Formaidehyde Emission Limit (Super E0)** | **Applicable Testing Method** |
| Plywood | 1.0 mg/L | 0.5 mg/L | 0.3 mg/L | AS 2098.11 |
| Particle Board | 1.0 mg/L | 0.5 mg/L | 0.3 mg/L | AS 4266.16 |
| MDF | 1.5 mg/L | 0.5 mg/L | 0.3 mg/L | AS 4266.16 |
| Plywood | 6 mg / 100 g | 4 mg / 100 g | 2.4 mg / 100 g | EN 120 |
| Particle Board | 9 mg / 100 g | 6 mg / 100 g | 2.8 mg / 100 g | EN 120 |
| MDF | 9 mg / 100 g | 6 mg / 100 g | 2.8 mg / 100 g | EN 120 |
| Plywood | 0.12 mg / m3h | 0.08 mg / m3h | 0.04 mg / m3h | DIN EN 717-1 |
| Particle Board | 0.12 mg / m3h | 0.08 mg / m3h | 0.04 mg / m3h | DIN EN 717-1 |
| MDF | 0.12 mg / m3h | 0.08 mg / m3h | NA | DIN EN 717-1 |

- A minimum of 80% of all preferred parking spaces will be dedicated solely for use by car-pool participants, small cars, hybrid or other alternative fuel vehicles;
- Of the total parking spaces on the site, a minimum of 10% of parking spaces are to be designed and labelled for small vehicles (in accordance with AS/NZS2890.1:2004) and a minimum of 5% are to be designed and labelled for mopeds and/or motorbikes, in accordance with AS/NZS2890.1:2004.
- One staff cycle rack per 150m2 NLA will be provided (136 for 20,230m2 NLA), including a locker for clothes per rack and a shower and changing room per ten racks (14 for 20,230m2 NLA)
- One visitor cycle rack will be provided per 750m2 NLA (27 for 20,230m2 NLA) in a covered location
- Efficient tapware has been specified as follows, resulting in a 35% reduction in potable water consumption compared to the current commercial benchmark
  - Minimum 6 Star WELS rated urinals (max. 0.8L/flush)
  - Minimum 5 Star WELS rated taps (max. 5L/min)
  - Minimum 4 Star WELS rated toilets (max. 3.5L/flush)
  - Minimum 3 Star WELS rated showerheads (max. 9L/min)
- A dedicated storage area of over 40m² for the separation and collection of office recyclables will be provided that is located in the same level as the delivery area with clearly marked, sign-posted and within 20m of the lift core serving all floors. The storage area will have the following attributes:

| Subject | Commitments | Timing |
|---|---|---|
| ESD | - The area is adequately sized to accommodate the storage equipment for the following as a minimum: cardboard, glass, used cooking oil, organic (compost) materials, plastics (mixed containers, soft plastics and polystyrene) and metals;<br>- The area meets the access requirements of 'Policy for Waste Minimisation in New Developments' (NSW, 2004): Section A, points A-12 through A-17, and Section C, points C6 and C7.<br>- All timber used in the design will be sourced from sustainable sources such as plantations (FSC certified) or reused from post-consumer recyclers.<br>- 100% of insulants will have an Ozone Depletion Potential (ODP) of zero<br>- 95% of the NLA will not exceed the "Satisfactory" ambient internal noise levels in accordance with AS/NZS 2107:2000, as follows:<br>- Within the entire base building general office space, noise from the building services will not exceed 40dBAeq.<br>- Within the base building office space, the sound level will not exceed 40dBAeq (measured in open plan offices). | Detailed Design Stage, Construction and Operation |
| | **Electrical**<br>- High frequency ballasts will be installed in fluorescent luminaries for 95% NLA as measured at the working plane (720mm AFFL)<br>- Office lighting design will maintain an illuminance level of no more than 400 Lux for 95% NLA as measured at the working plane (720mm AFFL)<br>- Sub-metering and monitoring of the following will be provided:<br>- Lighting for each tenancy<br>- Power for each tenancy<br>- Power uses over 100kVA<br>- Maximum lighting power density of 1.5W/m2 per 100 lux across 95% of NLA (720mm AFFL)<br>- Lighting zones to remain less than 100m2 with switches accessible to occupants and individually addressable switching circuits<br>- Daylight sensors for dimming will be provided<br>- A connection will be made to the Library Thermal Energy Storage (TES) system such that the Hearing Hub electric chillers will assist in charging the TES during off-peak times and draw chilled water during peak times to achieve a 15% peak demand reduction.<br>- External lighting will be designed to avoid light being directed upwards such that no light beam, generated from within the building or outside of the building boundary, is directed at any point in the sky hemisphere without falling directly onto a non-transparent surface.<br>- The design will comply with AS4282 "Control of the Obtrusive Effects of Outdoor Lighting" and 95% of outdoor spaces will not exceed the minimum requirements of AS1158 for illuminance levels.<br>- Infrastructure capacity for future connection to a roof-mounted PV system will be provided to allow the building to increase its onsite energy generation potential when funding allows. Electrical infrastructure will also be provided for future electric car charging bays. | |
| | **Mechanical**<br>- 50% improvement on AS1668.2-2002 for ventilation rates<br>- A CO2 monitoring and control system will be provided with a minimum of one CO2 sensor at all return points on each floor, to facilitate continuous monitoring and adjustment of outside air ventilation rates to each level and independent control of ventilation rates to achieve outside air requirements. | |

| Subject | Commitments | Timing |
|---|---|---|
| ESD | - Dedicated tenant exhaust risers will be provided with the following characteristics:<br>  - Compliant with section 5.7 of AS1668.2-2002;<br>  - Providing no less than 0.2 L/s/m$^2$ for 100% of the NLA;<br>  - Capacity of 0.35 L/s/m$^2$ for 100% of NLA on any individual floor; and<br>  - Exhaust will not be recycled to other enclosures of different use.<br>- In contribution to ENE-1 (Greenhouse Gas Emission Reduction), consideration will be given to maximising the energy efficiency of ancillary components of the mechanical system such as fans, pumps and all chillers.<br>- 100% of refrigerants will have an Ozone Depletion Potential (ODP) of zero<br>- HVAC Systems containing refrigerants are to be contained in a moderately air tight enclosure and a refrigerant leak detection system is to be installed to cover high risk parts of the plant; and<br>- A refrigerant recovery system will be equipped with an automated pump-down system sized to effectively and safely capture, isolate, and store 95% (by weight) of the maximum refrigerant charge.<br>- The HVAC system will allow for:<br>  - An economy cycle operation where outside air will be brought to the space without any active conditioning;<br>  - A future mixed mode operation to allow the air conditioning system to switch off when the facade is replaced with openable windows and the outside temperature permits natural ventilation; and<br>  - Consideration for a future high efficiency replacement system. | Detailed Design Stage, Construction and Operation |
| | **Hydraulics**<br>- Rainwater will be captured from the roof and stored in a tank to supply irrigation and toilet flushing, resulting in a 65% reduction in potable water consumption compared to the current commercial benchmark<br>- Sub-metering and monitoring of water will be provided for each tenancy<br>- Sub-metering and monitoring of water will be provided for major water uses within the base building<br>- Rainwater will be captured from the roof and stored in a tank to supply over 90% of water demand for irrigation<br>- Sufficient temporary storage will be provided for a minimum of 80% of the routine fire protection system test water and maintenance drain-downs, for reuse on-site<br>- The reduction in potable water consumption due to water efficiency measures will result in a 50% reduction in discharge to sewer compared to the current commercial benchmark<br>- Infrastructure provision will be made to allow the cooling towers to be fed from a future district recycled water main and as part of the O&M manual, consideration will be given to best practice water efficient replacement fittings in future. | |
| | **Structural / Civil**<br>- A proportion of cement will be replaced with an industrial waste product (at least 30% for in-situ concrete, 20% for precast concrete and 15% for stressed concrete), reducing the embodied energy impacts of Portland cement production<br>- 20% of all aggregate used for structural purposes will be recycled (Class 1 RCA in accordance with HB155-2002) or slag aggregate; and no natural aggregates will be used in non-structural uses (e.g. building base course, sub-grade to any car parks and footpaths, backfilling to service trenches, kerb and gutter)<br>- Stormwater will be detained such that the development does not increase peak stormwater flows compared to the pre-development site for rainfall events of up to a 1-in 2 year storm; | |

| Subject | Commitments | Timing |
|---|---|---|
| ESD | - All stormwater leaving the site, at any time up to a 1-in-20 year storm event, will be treated or filtered in accordance with either:<br>- CSIRO Urban Stormwater: Best Practice Environmental Management Guidelines; or<br>- Australian and New Zealand Environment Conservation Council (ANZECC)'s Guidelines for Urban Stormwater Management. | Detailed Design Stage, Construction and Operation |
| | **Construction and Operational Management**<br>- Comprehensive pre-commissioning, commissioning, and quality monitoring are to be contractually required to be performed for all building services (BMS, mechanical, electrical and hydraulic); and the works completed in exact accordance with CIBSE Commissioning Codes or ASHRAE Commissioning Guideline 1-1996 (for mechanical services only);<br>- The design team and contractor are required to transfer project knowledge to the building owner/manager through all of the following:<br>- Documented design intent<br>- As-built drawings<br>- Operations and Maintenance Manual<br>- Commissioning Report; and<br>- Training of building management staff<br>- Building Tuning:<br>- After handover, the building owner must implement tuning of all building systems and ensure that a relevant member of the design team is involved in the tuning process.<br>- Monthly monitoring must be undertaken and the outcomes are reported to the building owner quarterly<br>- Full re-commissioning is to be undertaken 12 months after practical completion<br>- A Building Tuning Report on the outcomes of the tuning process is to be provided to the building owner and made available to the design team.<br>- An independent commissioning agent, Graeme Thwaite, will provide commissioning advice to the building owner and the design team as well as monitor and verify the commissioning of all building systems.<br>- A simple and easy-to-use Building Users' Guide, which includes information relevant for the building users, occupants and tenants' representatives, will be developed and made available to the building owner.<br>- The head contractor is to implement a comprehensive, project-specific Environmental Management Plan (EMP) for the works in accordance with Section 4 of the NSW Environmental Management System guidelines 1998 or 2007; and<br>- The head contractor must have valid ISO 140001 Environmental Management System (EMS) accreditation prior to and throughout the project.<br>- More than 80% of demolition and construction waste will be recycled. | |
| Aboriginal Heritage | DECCW will be notified immediately should an aboriginal relic be uncovered during excavation or construction, and work within the immediate vicinity of the relic will cease until advice from DECCW has been received. | Excavation and Construction |
| Geotechnical | **Disposal of Excavated Material**<br>- All excavated materials will be disposed of in accordance with the current Waste Classification Guidelines (DECCW, April 2008). | Excavation and Construction |
| | **Groundwater Seepage**<br>- During construction, it is anticipated that groundwater seepage will be controlled by perimeter drains connected to a 'sump-and-pump' dewatering system. Permanent subfloor drainage below the basement floor slab connected to a sump and pump dewatering system will be provided for the basement. | |

| Subject | Commitments | Timing |
|---|---|---|
| Geotechnical | **Dilapidation Surveys**<br>- Dilapidation surveys will be undertaken on surrounding buildings and pavements before the commencement of any excavation work in order to document any existing defects so that any claims for damage due to construction related activities can be accurately assessed. | Excavation and Construction |
| | **Vibrations**<br>- Where impact breakers are required in the vicinity of adjacent structures monitoring will be undertaken to limit vibrations on these structures. Generally, a maximum peak particle velocity of 8 mm/sec (in any component direction) at the foundation level of adjacent structures will be imposed for both structural and human comfort considerations. | |
| | **Excavation Support**<br>- Vertical excavations within the soils and extremely low to low strength rock and also highly fractured medium to high strength rock will be undertaken with both temporary and permanent lateral support during and after excavation. Due to the deeply weathered rock profile and the close proximity of the excavation to the site boundaries, shoring/support over the full depth of the excavation will be provided. Some unsupported vertical excavation in medium to high strength rock may be possible towards the base of the excavation on the western part of the site. | |
| | **Batter Slopes and Vertical Rock Faces**<br>- Temporary batter slopes for unsupported excavation will be installed in accordance with Table below . These batters will be subject to assessment of jointing in the rock by a geotechnical engineer. If adverse jointing is present in the rock then flatter batters or stabilisation will be required. | |
| | **Table 22** – Standards for temporary Batter Slopes<br>Material: Filing or natural clay soils — Temporary Batter Slope (H:V): 1.5:1<br>Material: Shale/Siltstone: Extremely low to very low strength — Temporary Batter Slope (H:V): 1:1<br>Material: Siltstone/Laminate: Low to Medium Strength — Temporary Batter Slope (H:V): 0.5:1<br>Material: Laminate: Medium to High Strength — Temporary Batter Slope (H:V): Vertical*<br>Notes: *Vertical excavation is subject to jointing and geotechnical inspection | |
| | - The extent of vertical rock excavation will be assessed as the excavation proceeds. All vertical rock faces will be progressively inspected by a geotechnical engineer at 1.5m depth intervals to check for adversely inclined joints and to assess whether additional stabilisation measures are required. Stabilisation of vertical rock faces will include shotcrete of fractured or highly weathered zones or rock bolts/soil nails where adverse joints form potentially unstable wedges of rock. All rock faces will be provided with shotcrete protection in the long term to prevent weathering and fretting. | |
| | **Soil Nail Support System**<br>- The design of the soil nail system will consider both the internal and external stability of the reinforced volume.<br>- The soil nail and shotcrete wall will be progressively constructed with bench heights of no more than 1.5m in soil and 2m in weak rock. Excavation will not proceed below the upper bench level until the soil nails and shotcrete are installed and the grout/ shotcrete has been given sufficient time to reach the design strength.<br>- Permanent soil nails will require adequate corrosion protection. As a minimum, corrosion protection will include allowance for galvanised bars within a fully grouted drill hole and also corrugated sheathing along the full length of the soil nail.<br>- The design of the soil nail and shotcrete wall will include 4m to 6m long, galvanised N20 to N24 bars, which are installed on a vertical and horizontal grid spacing of 1m to 1.3m. Drilled holes typically vary from 100 mm to 150 mm in diameter. Reinforced shotcrete facing will vary from 150 mm to 200mm thick. | |

| Subject | Commitments | Timing |
|---|---|---|
| Geotechnical | **Design**<br>- The design of the soil nail support system will be based on the parameters provided in the Table below. Active earth pressures (Ka) will be used where some wall movement is acceptable, and at rest earth pressures (Ko) will be used where wall movement is to be minimised. | Excavation and Construction |

**Table 23** – Standards for Soil Nail Supports

| Material | Unit Weight (kN/m³) | Earth Pressure Coefficient | | Effective Cohesion | Effective Fricton Angle |
|---|---|---|---|---|---|
| | | Active (Ka) | At Rest (Ko) | c' (kPa) | |
| Filling | 20 | 0.4 | 0.6 | 2 | 25 |
| Residual Clay | 20 | 0.3 | 0.5 | 5 | 20 |
| Shale/Siltstone: Extremely low to very low strength | 20 | 0.25 | 0.4 | 10 | 25 |
| Siltstone/laminate: Low to medium strength | 22 | 0.2 | 0.3 | 30 | 25 |
| Laminate: Medium to high strength | 22 | 0.1 | 0.2 | 50 | 25 |

- All surcharge loads will be allowed for in the soil nail design including building footings, inclined slopes behind the wall, traffic and construction related activities. The design of the permanent support will consider the possibility that 45° joints in the rock will daylight near the base of the shoring wall leading to wedges of rock which need to be supported by the permanent soil nail support system. Soil nails with their bond lengths formed in rock behind a line projected up at 45° from the base of the shoring will be provided. As a guide, the support system will be designed to withstand a horizontal force per unit width of 4.2H2 (kN) where H is the height of the excavation in metres. This approximation of the horizontal force required to support a 45 degree wedge is based on a soil nail/ anchor inclination of 10° below horizontal, an average bulk weight of 21 kN/m3, and friction angle of 25° and cohesion of 0 kPa along the failure plane. Given that there is a low probability that a joint would run the full length and height of the excavation this design will be carried out using a factor of safety of 1.1.
- Shoring walls will be designed for full hydrostatic pressures unless drainage of the ground behind impermeable walls can be provided. Drainage will comprise 150 mm wide strip drains pinned to the face at 2-3m centres behind the shotcrete facing. The base of the strip drains will extend out from the shotcrete wall to allow any seepage to flow into a perimeter toe drain which is connected to a sump dewatering system.
- The design of permanent soil nails will be carried out on the basis of the maximum allowable bond stresses given in the Table below.

**Table 24** – Maximum Allowable Bond Stress

| Material Description | Maximum Allowable Bond Stress (kPa) |
|---|---|
| Residual Clay | 50 |
| Shale/Siltstone: Extremely low to very low strength | 100 |
| Siltstone/Laminate: Low to medium strength | 200 |
| Laminate: Medium to high strength | 600 |

The parameters given in the Table above assume that drilled holes are clean and adequately flushed. Lift-off tests will be carried out to confirm the bond capacities. Higher bond stress values will be adopted if trial anchors are used to prove higher capacities.

<table>
<tr><th>Subject</th><th>Commitments</th><th>Timing</th></tr>
<tr><td rowspan="4">Geotechnical</td><td>Foundations<br>- Recommended maximum allowable pressures and modulus values for the various foundation materials are presented in the Table below. These parameters will apply to the design of spread foundations, such as pads or strip footings, and rock socketed bored piles.</td><td rowspan="4">Excavation and Construction</td></tr>
<tr><td>Table 25 – Maximum Allowable Pressure for Foundation Materials
<table>
<tr><th rowspan="2">Foundation Stratum</th><th colspan="2">Maximum Allowable Pressure</th><th rowspan="2">Elastic Modulus (MPa)</th></tr>
<tr><th>End Bearing (kPa)</th><th>Shaft Adhesion (kPa)</th></tr>
<tr><td>Siltstone/laminate: medium to high strength</td><td>3500</td><td>350</td><td>500</td></tr>
<tr><td>Laminate: high strength</td><td>6000</td><td>600</td><td>1000</td></tr>
</table></td></tr>
<tr><td>- All footings will be inspected by a geotechnical engineer to confirm that foundation conditions are suitable for the design parameters.<br>- Spoon testing will be undertaken in at least one-third of high level footings which are proportioned on the basis of allowable bearing pressures of greater than 3500 kPa. For spread footings designed using allowable bearing pressures of 6000 kPa, spoon testing will be undertaken in at least half of all footing locations. The purpose of spoon testing is to check that no significant weak seams exist below the base of the footing within a depth equal to 1.5 times the least footing dimension. If the testing identifies the presence of weak seams then the footing will either be deepened or widened to reduce the actual bearing pressure.</td></tr>
<tr><td>Pavement and Floor Slabs<br>- During construction of pavements and access roads outside the basement area all topsoil, organic and deleterious material will be stripped and stockpiled separately for disposal or use in landscaping areas. Proof rolling of the exposed subgrade will be carried out under the supervision of a geotechnical engineer to detect any soft or heaving areas. Any soft spots detected during proof rolling will be stripped to a stiff base and replaced with engineered filling.<br>- Engineered filling will be placed in maximum 200 mm thick loose layers and compacted to a minimum dry density ratio of 98% Standard compaction with moisture contents within 2% of optimum moisture content (OMC). The compaction will be increased to a dry density ratio of 100% Standard compaction within 0.3m of the subgrade surface. The existing filling, clay and excavated rock on site will generally be suitable for re-use as engineered filling provided it has a maximum particle size of 70 mm and moisture content within 2% of OMC (where possible, preference will be given to the use of granular material).<br>- The design of pavements on engineered filling or clay subgrade will be based on a CBR value of 2%. Design of pavements on weathered rock will be based on a CBR value of 5% for extremely low to very low strength rock and 10% for low strength rock or better.</td></tr>
<tr><td>Contamination</td><td>- If encountered, management and disposal of asbestos material by an ASA licensed contractor is to be undertaken.<br>- A full waste classification assessment be undertaken at the time of stockpiling the excavated material from the subject site.</td><td>Excavation and Construction</td></tr>
<tr><td>Erosion and Sediment Control during Construction</td><td>The following measures will be implemented during construction to assist with erosion and sediments control during construction:<br>- construction exits for all vehicles leaving the site<br>- silt traps at stormwater pits when constructed<br>- revegetation of the site as soon as practicable.<br>Erosion control measures will be inspected and maintained after each rain event and at intervals not exceeding 2 weeks.</td><td>Excavation and Construction</td></tr>
</table>

| Subject | Commitments | Timing |
|---|---|---|
| Construction | Construction Traffic Management Plan<br>- The contractor will prepare a construction traffic management plan and ensure the appropriate allocation of resources to manage vehicle and pedestrian traffic around the site, ensuring the safety and security all persons moving in proximity of the Hearing Hub site.<br>- Construction traffic will enter the construction zone at the Eastern end of the site after entering the Campus via Herring Road. The construction site will be delineated by means of concrete jersey kerb with screened fencing; lockable gates at the entry and departure points. Construction traffic will enter the University Campus from Balaclava Road or Herring Road and approach the site on University Avenue.<br>- Delivery trucks will enter as per above, park outside the site on University Avenue where the truck will be unloaded. Once construction advances, the loading dock will be utilised as a loading and staging area as much as possible to avoid parking and loading on the roadway.<br>- Spoil from the excavation will be loaded, within the site boundary then leave the site at the centre of the southern boundary and head onto University Avenue.<br>- The Contractor will submit a Traffic Management Plan in line with existing Office of Major Projects campus Traffic Management Plan.<br>- The Principal will supply 12 parking permits for parking area adjacent to the Y3A building to the Head Contractor. Contractors shall be responsible for creating safe areas of parking on the Site and pay particular attention to pedestrian access and safety at the entrances. All construction related vehicles entering the site will be at the Principal Contractor's risk at all times and will be properly insured in accordance with the Contract. | Construction |
| | **Hoarding**<br>- A hoarding is to be provided around the perimeter of the site, in accordance with the requirements of the Occupational Health and Safety Act, and NSW Workcover. | |
| | **Protection of Existing Building Elements**<br>- The Contractor is to provide protection to existing building elements potentially impacted by the works, including off form concrete, glazing, balconies, paving, access ways, landscaping. Protection should be in the form of drop sheets (taped as required), hoardings, fencing and the like. All temporary protection is to be installed and maintained to the satisfaction of the Superintendent. | |
| | **Construction Signage**<br>- The Contractor shall provide sign-boards as required to comply with Workcover and OH&S requirements | |
| | **Environmental Management Plan**<br>- Stormwater and waste water management will be included in the Environmental Management Plan (EMP) and the control measures documented in the plan will be implemented during the construction of the project. The EMP will be developed in detail but will include:<br>  - Silt Control on the Roads;<br>  - Water from Dewatering systems;<br>  - Rainwater within the site, during excavation and before final pavements are installed;<br>  - Diversion of clean water;<br>  - Waste Water, from general cleanup of tools and equipment; and<br>  - Spills control.<br>  - Implemented procedures will be in compliance with the Dept of Environment and Protection, Local Council and Sydney Water requirements. | |

| Subject | Commitments | Timing |
|---|---|---|
| Construction | - The EMP controls will include items such as:<br>- All construction plant, equipment and vehicles are to be properly maintained and operated so as to alleviate excessive exhaust emissions;<br>- Good "House Keeping" on site with regular removal of loose material;<br>- Waste loads leaving the site are to be covered at all times;<br>- All dust generating construction activities are to cease during high wind conditions unless operations can be controlled by localized watering or other control means;<br>- The burning of waste materials and the lighting of fires will be strictly prohibited on the site at all times;<br>- Continual visual monitoring of the site will be undertaken by site management to ensure that works do not generate unacceptably high levels of dust;<br>- Wherever practical, materials and processes that are non-toxic will be employed to minimize possible harmful affects to air quality;<br>- Scaffolding to include mesh and shade cloth to reduce wind velocity and also to trap any wind born objects; and<br>- Activities which produce airborne particles are to be done in enclosed spaces e.g. spray painting. | Construction |
| | **Construction Waste Management Plan**<br>- The contractor will implement a Construction Waste Management Plan.<br>- Materials and rubbish shall, where possible be transported to / from the loading dock around the perimeter of the building | |
| | **Work Wash Out Zones and Site Cleaning**<br>- The contractor will provide locations and methodology for washout zones and management plans for Macquarie University review as part of their Site Management Plan. Macquarie University will provide access to an existing paint dilution sink connected to a sewered dilution pit located in Y3A back of house and accessed via the loading dock.<br>- The site of the works shall be cleaned daily or more often as required to ensure minimal impact on building operations. Any soiling of common areas finishes the loading dock and surrounds shall be cleaned immediately. | |
| | **Notification of Construction Activities**<br>- The Contractor shall provide a methodology for the notification of disruptive activities for the approval of the Superintendent, prior commencement of the works.<br>- Dust from the works is to be dampened and contained within the site, in accordance with OH&S and Workcover requirements.<br>- If works are planned that will exceed the construction noise objective, all sensitive receivers will be notified in writing at least 48hrs prior to the commencement of those works.<br>- The operators of the Childcare centres and aged care facility will be notified of commencement of construction works one week prior to commencement. | |
| | **Construction Hours**<br>- The hours of construction, including the delivery of materials to and from the site, shall be as follows, unless approved by the Director, Strategic Assessments, Department of Planning:<br>- Between 7:00am and 7:00pm, Monday to Fridays inclusive;<br>- Between 8:00am and 4:00pm, Saturdays; and<br>- No work on Sundays and public holidays. | |

| Subject | Commitments | Timing |
|---|---|---|
| Construction | **Pedestrian and Cyclists**<br>- Provisions will be made for pedestrians and cyclists to pass the worksite safely.<br>- A minimum footpath width of 2m will be maintained at all times.<br>- Suitable pedestrian road crossing points will be maintained.<br>- At times it may be necessary to direct pedestrians and cyclists onto the road carriageway and adequate warning signs and barricades will be provided.<br>- Traffic controllers or other traffic devices to direct traffic would be provided in accordance with AS 1742.3: 1996.<br>- The construction schedule for the development will also aim to minimise:<br>- disruption to traffic movements particularly at peak periods; and<br>- interference with public transport services<br>- Adequate fencing will be installed around the perimeter of the construction site to restrict unauthorised public access.<br>- All demolition and construction related vehicles would comply with the University's traffic and parking rules.<br>- Vehicular access points to the construction site will be selected to avoid conflict with high volume pedestrian desire lines that exist on Macquarie Drive and University Avenue. | Construction |
| Noise Criteria for Construction | - The following noise criteria shall apply to potentially affected residential receivers - the LA10 noise level to not exceed 20dB(a) above the existing LA90 background noise level; and<br>- The following noise criteria shall apply to potentially affected retail and commercial receivers - the LA10 noise level to not exceed 25dB(A) above existing LA90 background noise level. | Construction |
| Construction Vibration | - A detailed study of construction vibration impacts will be undertaken of each of the proposed activities which will occur as part of the excavation and construction works on the site. Appropriate vibration mitigation methods for construction will be selected on this basis.<br>- Excavation - the site measurements will establish noise/vibration levels at sensitive receivers. If noise levels exceed the criteria then the possibility of reducing noise emission shall be investigated and all practical methods shall be employed to reduce noise to the target levels in order to preserve the amenity of the nearby residences.<br>- Construction - the main noise producing activities are attributed to the forming and pouring of the concrete floor slabs, and crane operation. These activities will be managed by placing the plant as far as practicable from the sensitive receivers. | Construction |
| Complaints Handling mechanisms for Construction Noise | - Regular scheduled meetings will be held with affected stakeholders for a finite period, until all issues have been addressed and the evidence of successful implementation is embraced by all parties.<br>- A newsletter informing nearby residents of upcoming activities that are likely to generate higher noise/vibration levels will be produced.<br>- Should ongoing complaints of excessive noise or vibration criteria occur immediate measures shall be undertaken to investigate the complaint, the cause of the exceedences and identify the required changes to work practices. In the case of exceedences of the vibration limits all work potentially producing vibration shall cease until the exceedence is investigated. The effectiveness of any changes shall be verified before continuing. Documentation and training of site staff shall occur to ensure the practices that produced the exceedences are not repeated. | Construction |

| Subject | Commitments | Timing |
|---|---|---|
| Complaints Handling mechanisms for Construction Noise | - If a noise complaint is received the complaint shall be recorded on a Noise Complaint Form. The complaint form shall list:<br>  - The name and address of the complainant (if provided);<br>  - The time and date the complaint was received;<br>  - The nature of the complaint and the time and date the noise was heard;<br>  - The name of the employee who received the complaint;<br>  - Actions taken to investigate the complaint, and a summary of the results of the investigation;<br>  - Required remedial action, if required;<br>  - Validation of the remedial action; and<br>  - Summary of feedback to the complainant.<br>- A permanent register of complaints shall be held. All complaints received shall be fully investigated and reported to management. The complainant shall also be notified of the results and actions arising from the investigation.<br>- The investigation of a complaint shall involve where applicable:<br>  - noise measurements at the affected receiver;<br>  - an investigation of the activities occurring at the time of the incident;<br>  - inspection of the activity to determine whether any undue noise is being emitted by equipment; and<br>  - Whether work practices were being carried out either within established guidelines or outside these guidelines.<br>- Where an item of plant is found to be emitting excessive noise, the cause will be rectified as soon as possible. Where work practices within established guidelines are found to result in excessive noise being generated then the guidelines shall be modified so as to reduce noise emissions to acceptable levels. Where guidelines are not being followed, the additional training and counselling of employees shall be carried out. Measurement or other methods shall validate the results of any corrective actions arising from a complaint where applicable. | Construction |
| Contributions | The following development contributions will be payable for the Hearing Hub development:<br>- 1,340m$^2$ @ $57.82; and<br>- 4,550m$^2$ @$28.33.<br>The above rates will be updated according to CPI at the time of payment. The above contributions will be paid to Ryde Council prior to issue of the occupation certificated. | Prior to the Occupation Certificate being issued. |
| Workplace Travel Plan | A Workplace Travel Plan will be prepared and implemented for the Hearing Hub development. | Prior to the Occupation Certificate being issued and during Operation. |
| Operational Waste Management | An Operational Waste Management will be prepared for the Hearing Hub development following approval which will detail how waste and recycling will be managed on the site during operation. | Operation |
| Energy Efficient Equipment | The operations and maintenance manual for the building will include requirements to source energy efficient equipment as replacements become necessary. | Operation |

# 8.0 Conclusion

The proposed Hearing Hub development will provide for the integration of academic and commercial uses associated with the hearing and hearing-related industry within a single location on the Macquarie University Campus. The development will also provide space for Australian Hearing Services and not-for-profit organisations associated with the hearing industry within the same building. A number of social and economic benefits will result from the co-location of these related uses including the sharing of knowledge and the advancement of innovation in hearing technology. This is consistent with the vision for the Campus under the Macquarie University Concept Plan and will ensure that the University continues to provide world-class education at the same time as achieving the objectives for Macquarie Park identified in the Draft Inner North Subregional Strategy.

The location for the development site, at the intersection of the Academic Core and the commercially-orientated Precinct E is well suited to the integration of commercial, academic, government agency and not-for-profit uses proposed on the Campus.

The Hearing Hub development has been designed to be consistent with the key development controls for the Campus under the Major Development SEPP and the approved Macquarie University Concept Plan. It will be generally consistent with the specific lot controls and precinct-wide controls established under the Urban Design Guidelines for Precinct E.

A number of specialist consultant reports have been prepared for the project which demonstrate that the proposal will achieve a high level of ESD performance, good disabled access, satisfactory acoustic performance and will not result in any unacceptable adverse impacts on surrounding development on and within the vicinity of the Campus.

The proposed development will achieve a high-level of design excellence and will provide an innovative and exciting built form at the western gateway entrance to the Campus. This will be complemented by the landscape design for the proposal which will integrate native planting and appropriate street tree planting with the overall landscape design for Precinct E.

The Draft Statement of Commitments for the project provides for the mitigation of any potential adverse impacts that may result from the development and operation of the Hearing Hub project. The proposal will result in significant benefits for the Campus and the wider area by creating additional jobs, expanding research and development opportunities and providing space for government agencies and not-for-profit organisations working within the hearing industry.

The proposed Hearing Hub development is considered worthy of the Department's approval.