



# ESD REPORT

## LINDFIELD LEARNING VILLAGE

Lindfield, NSW

---

Report No: S.DOE-0104-R01

Report Date: 20/03/2017



**Umow Lai**

engineering sustainable environments

## REPORT AUTHORISATION

**PROJECT:** Lindfield Learning Village  
Lindfield, NSW

Date	Rev	Comment	Prepared by	Checked by	Authorised by
14/03/17	A	Draft Issue	JAD	NJM	PE
17/03/17	B	Final Issue	JAD		PE
20/03/17	C	Updated Final Issue	JAD		PE

*This document contains commercial information which has been prepared for the attention of the Client on this project. It is confidential and no information contained in this document shall be released in part or whole to any third party without the approval of Umow Lai.*

**Melbourne Office**  
10 Yarra Street  
South Yarra VIC 3141  
Australia  
Tel: +61 3 9249 0288  
Fax: + 61 3 9249 0299  
Email: [ulmelb@umowlai.com.au](mailto:ulmelb@umowlai.com.au)  
Web: [www.umowlai.com.au](http://www.umowlai.com.au)

**Sydney Office**  
Level 7 657 Pacific Highway  
St Leonards NSW 2065  
Australia  
Tel: +61 2 9431 9431  
Fax: +61 2 9437 3120  
Email: [ulsyd@umowlai.com.au](mailto:ulsyd@umowlai.com.au)  
Web: [www.umowlai.com.au](http://www.umowlai.com.au)

**Brisbane Office**  
123 Charlotte Street  
Brisbane QLD 4000  
Australia  
Tel: +61 7 3210 1800  
Fax: +61 7 3210 1799  
Email: [ulbris@umowlai.com.au](mailto:ulbris@umowlai.com.au)  
Web: [www.umowlai.com.au](http://www.umowlai.com.au)



## CONTENTS

<b>1.0</b>	<b>INTRODUCTION</b>	<b>2</b>
<b>2.0</b>	<b>PRINCIPLES OF ECOLOGICALLY SUSTAINABLE DEVELOPMENT</b>	<b>5</b>
<b>3.0</b>	<b>RESOURCES, ENERGY AND WATER</b>	<b>7</b>
<b>4.0</b>	<b>ADDITIONAL ESD INITIATIVES</b>	<b>8</b>



## 1.0 INTRODUCTION

### 1.1 GENERAL

This ESD Report has been prepared by Umow Lai on behalf of the New South Wales Department of Education (the 'Applicant'). It accompanies an Environmental Impact Statement (EIS) prepared in support of State Significant Development Application SSD 8114 for the development of 'Lindfield Learning Village' in the former UTS Ku-ring-gai Campus building at 100 Eton Road, Lindfield (the 'site').

The purpose of this ESD Report is to outline the measures that are proposed to be implemented to minimise consumption of resources, energy and water, and detail how ESD principles will be incorporated in the design and ongoing operational phases of the development.

### 1.2 PROJECT DESCRIPTION

The site is located within the Ku-ring-gai Council Local Government Area. The proposed redevelopment works consist of internal reconfiguration and refurbishment, and minor changes to the former UTS Ku-ring-gai external building shell to allow for the adaptive reuse. Landscaping and pedestrian improvements throughout the site are also included.

Lindfield Learning Village (the 'School') is proposed to facilitate up-to 2100 students from Kindergarten to Year 12 and 200 teachers in order to take enrolment pressure off surrounding primary schools exceeding student capacity.

The School will contain high quality classrooms, collaborative learning spaces, open play spaces, sports courts and associated facilities including a gymnasium, main auditorium, 2 lecture theatres, science laboratories, a cafeteria, hospitality kitchens, visual arts and wood work areas.

In addition, a dedicated Childcare Centre is proposed with an enrolment of 100 children 0-6 years. There will be staggered start times for students across the site to minimise traffic congestion.

### 1.3 REFERENCED STANDARDS

This report has been undertaken with reference to the following:

- Clause 7(4) Schedule 2 of the Environmental Planning and Assessment Regulation 2000 (EP&A Regulations)

### 1.4 SOURCE DOCUMENTATION

Table 1 outlines a summary of the documentation used as the basis of this compliance analysis. Inputs in this report have been coordinated with all relevant consultants.

<i>Discipline</i>	<i>Documentation Type</i>	<i>Issue</i>	<i>Date</i>	<i>Custodian</i>
<i>Architectural</i>	Architectural Drawings	For Review	17/02/2017	Design Inc
<i>Acoustic</i>	Noise Impact Assessment	Final	03/02/2017	Acoustic Logic
<i>Environmental</i>	Operational Waste Management Plan	Draft	06/03/2017	Foresight Environmental
<i>Transport</i>	Traffic and Transport Assessment	Draft	20/01/2017	Arup
<i>Environmental</i>	Advice (Asset Protection Zone, Ecology and Landscaping)	Final	21/01/2017	Alphitonia Environmental Construction Services



<i>Discipline</i>	<i>Documentation Type</i>	<i>Issue</i>	<i>Date</i>	<i>Custodian</i>
<i>Environmental/ Contamination</i>	Preliminary Environmental Site Assessment	Draft	15/03/2017	Environmental Investigation Services (EIS)

**Table 1** Summary of basis documentation



## 1.5 LIMITATIONS OF THIS REPORT

Due care and skill has been exercised in the preparation of this report.

The purpose of this ESD Report is to outline the measures that are proposed to be implemented to minimise consumption of resources, energy and water, and to demonstrate that the project has been assessed against a suitable accredited rating scheme, as detailed within the EIS. It should be read in conjunction with the current project documentation and specific applications may vary during the design development of the project.

No responsibility or liability to any third party is accepted for any loss or damage arising out of the use of this report by any third party. Any third party wishing to act upon any material contained in this report should first contact Umow Lai for detailed advice which will take into account that party's particular requirements.



## 2.0 PRINCIPLES OF ECOLOGICALLY SUSTAINABLE DEVELOPMENT

The following section details how the proposed Lindfield Learning Village incorporates the principles of ecologically sustainable development (ESD) in accordance with Clause 7(4) Schedule 2 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulations).

### 2.1 THE PRECAUTIONARY PRINCIPLE

(a) the "**precautionary principle**", namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:

(i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and

(ii) an assessment of the risk-weighted consequences of various options.

#### 2.1.1 PROJECT RESPONSE

The precautionary principle has been adopted and all potential impacts have been considered and mitigated where a risk is present, as outlined in supporting Biodiversity assessments and conclusions.

The design places particular emphasis on low energy demand through extensive daylighting, energy efficient lighting, and where possible natural ventilation, and therefore directly addresses Greenhouse Gas Emissions (GHG Emissions) and their impact on climate change.

### 2.2 INTER-GENERATIONAL EQUITY

(b) "**inter-generational equity**", namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.

#### 2.2.1 PROJECT RESPONSE

The proposed design has been developed to reuse much of the existing building structure and facade, thereby minimising the consumption of resources required for the early works and construction of the building.

The extensive harnessing of daylight will also have a measurable reduction in energy consumption and associated GHG Emissions by reducing demand for artificial lighting. GHG Emissions are a known key contributor to human-caused climate change, considered one of the most critical inter-generational issue of our time.

The proposed site conditions in combination with the proposed landscape design will result in the project actively engaging its occupants with their surroundings, considered a key factor in the link between building design and occupant wellbeing – commonly referred to as our 'biophilic response'.



## 2.3 CONSERVATION OF BIOLOGICAL DIVERSITY AND ECOLOGICAL INTEGRITY

*(c) "conservation of biological diversity and ecological integrity", namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration.*

### 2.3.1 PROJECT RESPONSE

Refer to the supporting Advice from Alphitonia Environmental Construction Services for assessment results and conclusions relating to the significant ecology, biological diversity and ecological integrity of the site.

Due to the nature of the development involving the adaptive reuse of an existing building, there will be minimal impact on the surrounding environment when compared to a typical new construction.

## 2.4 IMPROVED VALUATION, PRICING AND INCENTIVE MECHANISMS

*(d) "improved valuation, pricing and incentive mechanisms", namely, that environmental factors should be included in the valuation of assets and services, such as:*

*(i) polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,*

*(ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,*

*(iii) environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.*

### 2.4.1 PROJECT RESPONSE

The environmental targets for the project have largely been embedded in the nature of the development rather than as additional 'add-on' items. For example, adaptively reusing the structure and shell of an existing building significantly reduces embodied energy in the building materials, reduces the use of natural resources and saves on construction costs that are associated with demolishing a structure and constructing a new building. Builders and developers save on energy and costs involved in procuring new raw materials, manufacturing new supplies and transporting all of these to site. Using fewer raw materials also minimises the generation and disposal of construction waste. All of these factors translate to large financial savings and reduced environmental impacts.





## 3.0 RESOURCES, ENERGY AND WATER

As described above, the project has adopted multiple initiatives that combine to reduce the consumption of resources during construction and operation, and also to support the adoption of more sustainable resources.

### 3.1 RESOURCES

- The project aims to minimise the consumption of resources required for construction, through the adaptive reuse of major structural materials such as concrete, steel and timber.

### 3.2 ENERGY

- The adaptive reuse of major structural materials such as concrete, steel and timber minimises earth works and embodied energy in the structure, contributing to reduced energy consumption when compared to a typical building construction involving demolition and construction of a new building.
- The proposal also includes PV arrays to further reduce ongoing energy costs for the school.

### 3.3 WATER

- The proposal includes rainwater tanks and re-use of rainwater for irrigating mass-planted areas of landscape.
- The proposed landscape will be low water demand, and any irrigation will be via sub-soil drip irrigation in order to further minimise water consumption and costs.



## 4.0 ADDITIONAL ESD INITIATIVES

The assumptions made within are considered 'typical' for new buildings and will without exception contribute to better environmental and financial performance of the completed school.

### 4.1.1 MANAGEMENT

The Project will include the following initiatives;

1. The School will establish ongoing environmental performance targets relating to its consumption of energy and water, production and recycling of waste, and to the ongoing maintenance and improvement of good indoor environmental quality.
2. During Tender documentation and documentation for construction, the design will be reviewed for its ease of maintenance for all building services and building fabric.
3. Building services will be fine-tuned during the first 12 months of operation, covering all four seasons, and providing monthly reviews, quarterly tuning and a final re-commissioning after 12 months. The purpose of this process is to tune the buildings to suit the way they are being used.
4. Comprehensive pre-commissioning and commissioning activities will be performed for all nominated building systems.
5. Building user guides will be produced to help users interact effectively with the buildings, optimising building performance and user comfort. The Guides will include guidance on all sustainability attributes of the site, e.g. cyclist facilities, public transport, waste recycling etc., and also information on maintenance requirements;
6. Building services will include metering on all major energy and water-consuming equipment, providing the facility manager with live information on system performance and allowing them to closely manage efficient use of resources on site;
7. The proposal includes facilities for the separation and recycling of waste streams.

### 4.1.2 INDOOR ENVIRONMENTAL QUALITY

The Project will include the following initiatives;

1. All HVAC systems will mitigate the entry of outdoor pollutants and be designed for ease of maintenance and cleaning.
2. Outdoor air will be provided at a rate 50% greater than the minimum required by AS 1668.2.2012.
3. Indoor noise levels will provide a high level of acoustic comfort, with internal noise levels being no higher than 5db(A) above the 'satisfactory' sound levels in Table 1 of AS/NZS 2107:2000;



4. The project will address noise transmission in enclosed spaces through acoustic separation, whereby fixed solid partitions between teaching spaces or private offices will be constructed to achieve a weighted sound reduction index of at least 45. The design includes some sliding glass partitions and areas open to adjacent common learning spaces, however, the acoustic qualities of the dividing walls will enable this planning. The design also envisages acoustic clouds to float above the teaching areas to reduce sound transfer, and waffle foam on the underside of the floor slab above to assist in breaking up the sound.
5. Teaching and learning spaces are also extensively daylight, delivering high quality daylight.
6. Occupants have extensive views to the surrounding landscape, a key factor in a building's connection to occupants' health and wellbeing;
7. All paints, sealants, adhesives, floor coverings and composite timbers used internally will meet low VOC (Volatile Organic Compound) emissions limits

#### **4.1.3 ENERGY**

The Project will include the following initiatives;

1. The building envelope will exceed NCC BCA Section J Parts J1 and J2 by at least 15% as demonstrated through the DTS or JV3 pathway;
2. All habitable rooms will be naturally ventilated where possible. However, due to the nature of the existing building, many spaces will not be able to achieve effective natural cross-flow ventilation and so mechanical ventilation and air conditioning will be required in these instances (i.e. the use of fans and ducting to supply outside air).
3. The domestic hot water system (DHW) will be low-emission, utilising one or any combination of the following technologies (to be selected during detailed design):
  - a. Natural gas with solar pre-heat
  - b. Waste heat (e.g. from cogeneration or other processes)
  - c. Heat-pump technology (with COP of not less than 3.5). Heat-pumps utilising natural refrigerants (e.g. CO<sub>2</sub>) will be preferred over those using conventional refrigerants.
4. The project will include solar photovoltaic (PV) arrays to supplement energy consumption and reduce ongoing operating costs.

#### **4.1.4 TRANSPORT**

The Project will include the following initiatives;

1. The proposal includes cyclist facilities for students and staff

#### **4.1.5 WATER**

The Project will include the following initiatives;

1. The proposal includes rainwater harvest and re-use for landscape irrigation



2. All bathroom fixtures (toilet pans, urinals, hand basin taps and showers) will meet minimum WELS ratings in accordance with the most recent EFSG Design Guidelines, e.g.,
  - a. Basin taps to be more than 4.5 but not more than 6.0L/s
  - b. Showers more than 7.5 but not more than 9.0L/minute
  - c. WCs more than 3.5 but not more than 4.0 litres average flush volume
3. Areas with mass planting will be irrigated using sub-soil drippers and soil moisture sensors to limit unnecessary irrigation

#### **4.1.6 MATERIALS**

The Project will include the following initiatives;

1. A significant amount of construction waste going to landfill will be diverted

#### **4.1.7 LAND USE AND ECOLOGY**

The Project addresses this category through the following;

1. There will be no negative impacts on the site's current ecological value due to retaining and reusing the existing building on site.
2. Current landscape will be improved through the addition of new landscaped vegetation, including rooftop gardens.
3. Landscaped rooftop terraces will contribute to a cooler microclimate and therefore improved user comfort – known as reducing the Heat Island Effect.

#### **4.1.8 EMISSIONS**

The Project will include the following initiatives;

1. Exterior and landscape lighting shall be carefully selected to ensure there has been a reduction in light pollution through either the control of upward light output ratio (ULOR) or control of direct illuminance.
2. A gross pollutant trap will assist in the treatment of stormwater prior to discharge from the site.

