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03.10.2012

JBA Planning
Level 7, 77 Berry Street
NORTH SYDNEY NSW 2059

Attention: Kate Tudehope

Dear Kate,

ESD - DIRECTOR GENERAL REQUIREMENTS UNSW Material Science and Engineering Building

This document provides a summary of the proposed sustainable design initiatives for the UNSW Material Science and Engineering Building. This summary provides a response to the Director General requirements, relevant to the Ecologically Sustainable Design, for application SSD 5373 for the proposed building.

The requirement noted by the Director General refers to the ESD principles suggested in Clause 7(4) of Schedule 2 of the Environmental Planning and Assessment (EPA) Regulation 2000. These principles are required to be incorporated in the design, construction and ongoing operation phases of the development.

We note that the key objectives of Clause 7(4) of the EPA include the following:

- Careful evaluation to avoid wherever practical, serious or irreversible damage to the environment
- An assessment of the risk-weighted consequences of various options
- Ensure inter-generational equity. The present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations
- Conservation of biological diversity, and ecological integrity should be a fundamental consideration
- Polluter pays – i.e. those who generate pollution and waste should bear the cost of containment, avoidance and abatement
- Environmental goals should be established to maximise benefits and minimise costs to develop their own solutions and responses to environmental problems

The University of New South Wales (UNSW) has a commitment to sustainability in the planning, design and management of all new buildings on campus. In order to ensure a high environmental outcome for the proposed Material Science and Engineering Building, the University has chosen to develop and implement a project-specific sustainability framework.

This framework provides ESD guidance to the project team, from concept through to construction phases of the project. In our opinion, this Sustainability Framework addresses the requirements of Clause 7(4) of the

Environmental Planning and Assessment Regulation 2000. The framework consists of the following main objectives:

- Incorporate good design and management initiatives to encourage sustainable practices during the construction and operation
- Achieve a high level of Indoor Environment Quality, to promote the health and wellbeing of building occupants
- Achieve increasing levels of energy performance above the baseline standard to reduce environmental and economic impacts associated with excessive energy use
- Promote and provide facilities to encourage a shift towards sustainable transport
- Promote the reduction of demand on potable water through water conservation initiatives
- Encourage the use of environmentally preferable low-impact materials
- Encourage reduction of waste disposal to land, air and water through prevention, reuse and recycling and composting
- Encourage the protection and enhancement of biodiversity

The design as a minimum must comply with the requirements of BCA section J.

In aligning with the intent of the environmental framework, the development is considering the following ESD initiatives:

ELECTRICAL SERVICES:

1. Energy sub-metering will be implemented to separately monitor consumption of mechanical plant, general power and lighting
2. All Sub-meters to be connected to the UNSW EMACS for energy auditing, energy monitoring and troubleshooting
3. Cross-Linked Polyethylene (XLPE) and Low Smoke Zero Halogen (LSZH) cables shall be considered for the electrical distribution systems in place of traditional PVC type cabling
4. Incorporation of on-site renewables will be considered and evaluated
5. Motion sensors, timers and daylight sensors shall be used where appropriate to control the internal artificial lighting to reduce energy usage
6. Lighting circuits shall be designed to provide high flexibility, i.e. large/multiple areas not to be controlled with one switch. This facilitates turning off the lights when the zones are unoccupied
7. The lighting system shall incorporate energy efficient lamps, use of luminaires with high light output ratios, and be coupled with lighting controls to reduce energy consumption
8. External artificial lighting shall be designed to minimise light spillage and shall incorporate day light sensors
9. Emergency lighting within the building will make use of long life LED fittings

MECHANICAL SERVICES

The following mechanical services initiatives are being considered for this project:

1. Energy efficient FCU's with EC/DC motors to provide air-conditioning to lab and office spaces
2. Pre-tempering of outdoor air with relief using air to air heat exchangers.
3. The use of efficient refrigerants that have low ozone depletion potential and low global warming potential
4. Maximise efficiency of full and part load performance of HVAC systems
5. Incorporate passive conditioning techniques where applicable to reduce the overall air conditioning loads.
Techniques being considered include:
 - Shading of windows to prevent solar penetration in summer but allow passive heating in winter
 - Building thermal mass and insulation combinations
 - High performance building envelope

6. Building Management System (BMS) to schedule and optimise plant efficiency
7. The air-conditioning system is designed to either shut down or be set to a wider temperature control band, when a spaces is unoccupied
8. Minimum ventilation requirements in laboratories will be assessed on the basis of user needs, health / safety protection and energy consumption
9. Preference would be given to energy efficient laboratory equipment, with consideration of cost, suitability and maintenance
10. Control of outside air via a time clock, occupancy sensors, and CO2 sensors, to minimise outside air conditioning requirements when spaces are not fully utilised
11. Dedicated secondary CHW and HW circuits to ensure UNSW has future means to interrogate and apportion building energy use
12. Energy and infrastructure service metering will be incorporated to monitor buildings electrical, water and gas usage

HYDRAULIC SERVICES

1. Reduce potable water consumption in accordance with the UNSW Kensington Campus Water Savings Action Plan
2. Install low flow fixtures and fittings
3. Incorporate sub-metering of all major water uses within the facility
4. Aim to reduce potable water consumption of water-based heat rejection systems through the use of Bore water from the underground Botany sands aquifer
5. The treatment of bore water to a level that meets the minimum requirement of its intended use only, thus minimising the use of chemicals and energy intensive filtration processes.
6. Procure lab equipment that has limited requirements for once-through cooling
7. Install a leak detection system on the building's supply for all major water uses within the building
8. Rainwater diverted to on-site aquifer for storage and reuse

ARCHITECTURAL

1. An Intelligent building envelope will provide a balance between shading, views, natural lighting, passive heating and solar control
2. Glare control treatments such as blinds are to be included
3. Landscaping will be appropriate to site and suited to local climatic conditions
4. Where possible all timber and composite timber products will be sourced from sustainable timber supplies
5. The design team will consider and evaluate the appropriateness of using rapidly-renewable materials
6. Seek to use materials and products of recycled content
7. Encourage the separation and safe disposal of operational waste aligning with the University's principle strategy to reduce, reuse, recycle and compost waste
8. Main contractor to operate an environmental management system.
9. Recycled materials are being considered in the use of structural concrete and metals

WASTE & RECYCLING

1. Encourage the separation and safe disposal of operational waste aligning with the University's principle strategy and management procedure to reduce, reuse, recycle and compost waste
2. Contractor to operate an environmental management system and implement best practice policies to minimise construction site impacts