PERUMAL PEDAVOLI ARCHITECTS

TAFE NSW , Western Sydney Institute
KINGSWOOD CAMPUS – New Building and Refurbishments

ESD Statement

Thermal efficiency

High thermal performance glazing has been selected to reduce heat loss in winter and help maintain indoor comfort all year round. Insulation will be provided to the walls and ceiling of the building to help reduce heating demand in winter and cooling demand in summer. Glazing and building fabric have been designed in accordance with the Energy Efficiency requirements of NCC Volume 1 Section J.

With heat repellent blinds, the amount of heat absorbed and penetrating windows will be significantly reduced thus increasing the efficiency of Air conditioning.

The Svensson Marskpelle "Mood 270" internal Roller blinds can reduce Air conditioning costs by up to 50% according to the software program PARASOL. The latter is a computer software program developed in 1999 by Lund University's Department of Construction and Architecture to predict the impact of shading devices on energy use in buildings. www.parasol.se

Light coloured roofing metal and gloss masonry has been selected to reduce heat absorption in summer for the New Block. During winter the external masonry and internal concrete slab will act as heat sinks that then re radiate heat at night keeping the building at a more even temperature and therefore reducing electricity costs.

Embodied energy in materials

The majority of the materials used for this building are considered low energy embodied according to "Cradle to Gate" material survey as compiled by Prof. Geoff Hammond and Craig Jones, 2011. The full detailed survey, complete with original data, methodology and notes, is available from www.bath.ac.uk/mech-eng/sert/embodied/

Material	Energy MJ/kg	Carbon kgCO2/kg	Density kg/m3
Aggregate	0.083	0.0048	2240
Bricks	3.0	0.24	1700
Concrete, in situ	1.11	0.159	2400
Plasterboard	6.75	0.38	600
Vinyl flooring	65.64	2.92	1200
Ceramic Tiles	12.00	0.74	2000
Glass	15.00	0.85	2500
Steel	20.10	1.37	7800
Timber	10	0.72	480-720
Carpet Tiles	279 MJ/m2	13.7/m2	4.6/m2

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Energy Efficiency

Light fittings specified throughout the project are Energy Efficient long life type (T5, compact fluorescent, LED) with low loss electric ballasts.

Lighting control has included motion, light and time activated switches to suit individual areas of the building.

Lighting lamp power densities have been designed to minimize energy consumption in accordance with the requirements of the Building Code of Australia, in accordance with Section J6, whilst maintaining lighting levels to the requirements of AS 1680.

Appliances have been specified to ensure minimum energy usage and costs during the lifespan of the Building.

Time switches have been specified to control boiling water units in accordance with the Building Code of Australia, Section J6.

An Airlock at the Main entry foyer will ensure that there is a reduction in energy loss particularly in extreme weather.

Toilet exhaust systems operation connected to 10 minute run on adjustable timer with operation of lights to ensure fan system is not running 24/7.

The new building will provide heating and cooling via a VRF heat recovery air conditioning system. This system is more efficient than a standard split air conditioning system and will entail a lower operating cost.

Water saving technologies

- WELS 5 star rated instantaneous gas hot water heaters will be used on-site
- Caroma Liano Basin Mixer (toilet basins) - WELS 5 star rated water saving rating
- Caroma Liano Sink Mixer (kitchenettes) - WELS 4 star rated water saving rating
- Caroma Caravelle 2000 (wc) – WELS 4 star rated water saving rating.

Natural light

E-glass has been specified to reduce heat absorption by windows.

Air Conditioning Systems

A centralized VRF system has been employed to prevent unnecessary energy usage from separated split a/c units. One of the biggest advantages of this system is its ability to provide air conditioning to small areas without the need to operate the entire system. The system will modulate the capacity to only provide cooling for only that area. This equates to a huge energy saving and provides comfort to the users. This equates to lower running costs and energy consumption along with power usage easily being able to be monitored.

Heat exchangers have been utilised in areas to supply pre-conditioned outdoor air to air conditioned spaces to allow the indoor units to conserve load and energy usage.

Photovoltaic System

A 20 KW photovoltaic system will be installed on the building roof. The system will be interconnected with the incoming supply to allow feeding any excess power produced by the system back into the electricity supply grid.

Rainwater tanks

3 x 30,000 lt in-ground polyethylene rainwater tanks will be installed. The system will be feed from roof rainwater. From the tanks, variable speed drive pumps, pump through a filtration and UV system for WC and urinal flushing throughout the new building.