JONES NICHOLSON PTY LTD
CONSULTING ENGINEERS

ESD REPORT

157-163 Cleveland St and 136-144 Abercrombie St, Chippendale

For Hudson Square Pty Ltd

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SYDNEY ABN 51 003 316 032
PO Box 477, SUTHERLAND NSW 1499
Suite 45, 40-44 Belmont Street, Sutherland NSW 2232
Tel: 02 9521 3088 Fax: 02 9521 3066
Email: mail@jonesnicholson.com.au www.jonesnicholson.com.au

WOLLONGONG - Tel: 02 4228 0570
PICTON - Tel: 02 4677 0441
SINGLETON - Tel: 0438 122 111
GOULBURN - Tel: 02 4822 8177
GOLD COAST - Tel: 07 5593 1844

1.0 INTRODUCTION

Jones Nicholson Pty Ltd have been engaged to assess the ESD principles proposed for the commercial and residential development at 157-163 Cleveland St and 136-144 Abercrombie St, Chippendale.

The building comprises of:

- 1 level of basement carpark,
- 3 levels of commercial space on ground, first and second levels
- 1 level of residential units on level 3 and a roof terrace

The following architectural documentation was used for this assessment;

Drawing No.	Drawing Title	Rev	Date
DA-01	Site Plan	A	04/03/2010
DA-02	Basement 1 Plan	A	04/03/2010
DA-03	Ground Floor Plan and Landscape Plan	A	04/03/2010
DA-04	First Floor	A	04/03/2010
DA-05	Second Floor Plan	A	04/03/2010
DA-06	Third Floor Plan	A	04/03/2010
DA-07	Roof Plan	A	04/03/2010
DA-08	Elevations	A	04/03/2010
DA-09	Sections	A	04/03/2010
DA-10	Shadow Diagrams	A	04/03/2010

2.0 GENERAL

As part of the Director Generals Requirements (DGR) the Environmental Assessment for the project must address the following policies;

- *Redfern-Waterloo Built Environment Plan (Stage One) August 2006 (BEP)*

2.1 REDFERN-WATERLOO BUILT ENVIRONMENT PLAN (STAGE ONE) AUGUST 2006 (BEP)

Development on Redfern Waterloo Authority (RWA) strategic sites will be required to contribute to the implementation of and Ecologically Sustainable Development Strategy.

- Energy efficiency, conservation and reduction of greenhouse gas.
- Applying passive design principles in the orientation and design of development to minimise the need for mechanical heating and cooling and artificial lighting. This includes selecting materials with appropriate thermal mass, use of insulation, provision of shading devices, installation of skylights and other approaches that achieve this principle.
- Water conservation and grey water reuse.
- Efficient waste management, including minimisation and recycling in the demolition, construction and operational phases of development.
- Reduced car dependence; promoting public transport use, cycling and walking through improved access to public transport; minimising car parking provision and providing facilities for cyclists.
- Compliance with BASIX for residential development and SEDA Building Greenhouse Ratings for non-residential buildings.

3.0 ESD PRINCIPLES ADDRESSING THE DIRECTOR GENERALS REQUIREMENTS

3.1 ENERGY EFFICIENCY, CONSERVATION AND REDUCTION OF GREENHOUSE GAS

Energy efficiency, conservation and reduction of greenhouse gas has been achieved by the implementation of the following;

3.1.1 Passive Solar Design

The following passive design principles have been implemented into the design;

The roof construction will be concrete slabs and metal deck. The walls shall be masonry blockwork or tilt up concrete. The floors shall be concrete slabs.

The wall and roof construction types will require additional insulation to comply with Section J. The insulation will reduce heat transfer through the building fabric to reduce heat loss in winter and heat gain in summer. This will also reduce the load on the air conditioning systems throughout the year which reduce the greenhouse gases produced.

The building construction has a high thermal mass. Thermal mass is able to absorb and store heat and slows down the effects that the external temperature has on the interior space. This will assist in winter by storing heat collected from the building during the day and release it back into the building at night when it is not is use. This will also reduce the load on the air conditioning system in the morning as t he building is being heated up.

The windows will be performance single glazing. Performance glass is able to restrict solar heat gain and heat transmission and also reduce heat escaping from the space. The majority of the glazing is on the north, east and south facades and has horizontal and vertical shading devices to further reduce solar heat gain. The building has no western facing glass which will significantly reduce the load on the air conditioning systems in summer.

3.1.2 Air Conditioning

3.1.2.1 Commercial and Residential

The commercial spaces shall be air conditioning via variable refrigerant volume (VRV) type systems. Each system consists of an air cooled condenser (outdoor unit) and multiple ducted ceiling concealed evaporators (indoor fan coil units). Indoor and outdoor units are joined by copper refrigerant pipework. Branch refrigerant controllers are provided between the indoor units and the outdoor unit in order to direct the refrigerant where required and to provide simultaneous heating and cooling of indoor units off the one condenser.

Air is reticulated to areas of the building from the indoor unit through concealed rigid and flexible ductwork and blown into the room through ceiling mounted or side blow air grilles.

Temperature is controlled via a wall mounted temperature sensor located within the conditioned space.

Multiple indoor units are used, in order to provide zone control of the indoor environments, ensuring areas with different cooling or heating requirements are maintained with comfortable space conditions. If particular areas require cooling, while other areas require heating simultaneously, this is possible with a single condenser.

By utilising heat rejection from areas requiring cooling, and directing this heat (through the refrigerant system) to areas requiring heating, this system can provide free heating to these areas, and vice versa with free cooling.

3.1.3 Ventilation

3.1.3.1 General
All ventilation fans shall have a minimum efficiency of 70%.
The basement carpark shall have a mechanical exhaust ventilation system with carbon monoxide monitoring and variable speed drive fans.

3.1.3.2 Commercial
The toilet exhaust system shall be controlled via time clocks. The outside air ventilation systems shall be interlocked with the air conditioning system

3.1.3.3 Residential
The toilet exhaust system shall be interlocked to the light and shall run on for 5minutes after the light is switch on.

3.1.4 Lighting

3.1.4.1 General
The carpark shall have fluorescent lighting with motion sensors.

3.1.4.2 Commercial
The general spaces shall have efficient T5 fluorescent troffer lights with time clock and perimeter daylighting control. The toilets shall have motion sensor control. The lighting shall achieve a power density not exceeding $8W/m^2$ for the open plan areas.

3.1.4.3 Residential
The residential units shall have motion sensors and off switches.

3.1.5 Domestic Hot Water

The building shall have a central solar-electric boosted hot water heating system

3.2 WATER CONSERVATION

3.2.1 Fixtures - Commercial
The hand basin and sink tap fittings will achieve a 5 star rating and the toilets shall be dual low flush WC's and sensor control urinals.

3.2.2 Fixtures - Residential
Each unit shall be fitted with 3 star Showerheads, 3 star toilets and 4-5 star kitchen and bathroom taps.

3.2.3 Rainwater tank
Roof drainage and downpipes shall discharge to the $10m^3$ stormwater detention / rainwater reuse tank located in the basement. The tank shall have a dual variable speed pump set to supply water for toilet flushing and irrigation purposes.

3.3 GREYWATER RESUSE
No greywater reuse has been incorporated into the development. Greywater reuse is not considered appropriate for this type and size of building and is more suitable for a small scale project or a residential dwelling. The additional pipework required is not only extremely costly but would also increase the embodied energy consumption of the development in the construction phase. The development has achieved a high level of water conservation through other techniques including rainwater harvesting and reuse for landscaping and toilet flushing and highly efficient fixtures and appliances.

3.4 WASTE MANAGEMENT

3.4.1 Construction

The contractor shall implement a Waste Management Plan for the construction works and 60% (by mass) of waste shall be reused or recycled.

3.4.2 Operational

There shall be a dedicated storage area for separation, collection and recycling of all waste generated. Provide a Waste and Recycling Management Plan for the commercial and residential premises.

3.5 REDUCED CAR DEPENDANCE

The dependence on the use of cars for the occupants shall be reduced by providing 22 bicycle racks in the basement carpark. There is a train station and bus service within close proximity to the development which run a regular service to further reduce the car dependence for the occupants.

3.6 SEDA BUILDING GREENHOUSE RATINGS

SEDA Building Greenhouse Ratings is the previous title for what is now the National Australian Built Environment Rating System (NABERS). NABERS is used to rate the energy consumption of office buildings by awarding a star rating from 1 star to 5 stars. The Redfern Waterloo BEP does not state what energy rating score must be achieved. A 4 star rating which is considered good practice is achievable with the proposed systems as listed in this report.