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Environmentally Sustainable Development (ESD) Report

Project Star, 24-28 Union Street Pyrmont

Prepared for

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A	Draft Issue for comment	06/06/08
B	Revised following comments	13/06/08
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D	Revised following comments	20/06/08
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F	Revised following comments	02/07/08
G	Revised following Casino redesign	03/09/08

The success and realisation of the proposed initiatives will be dependant upon the commitment of the design team, the development of the initiatives through the life of the design and also the implementation into the operation of the building. Without this undertaking the proposed targets may not be achieved.

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Executive Summary

The development proposed for Project Star is being designed to incorporate principles of environmental sustainability that will meet the Director Generals Requirements of an environmentally sustainable building.

The development is targeting a high level of environmental performance, and a strategy has been developed which encompasses the following:

- Energy efficiency to current market best practise for hotel and casino developments and report on energy saving against a benchmark development.
- A complete environmental strategy that covers the Green Star holistic approach to design reviewed against a Green Star equivalent assessment covering:
    - Management
    - Indoor Environment Quality
    - Energy
    - Transport
    - Water
    - Materials
    - Land Use & Ecology
    - Emissions
    - Innovation

This report outlines the key Ecologically Sustainable Design (ESD) initiatives proposed for this development.

Key strategies cover a broad range of environmental performance criteria, including:

- Energy conservation by optimising building façade and systems;
- Encouraging responsible energy management practices;
- Greenhouse gas emissions minimised;
- The use of ozone depleting substances avoided;
- Mains potable water conservation is ensured by minimising consumption and harvesting rainwater for non-potable applications such as toilet flushing;
- Provision of a high quality indoor environmental quality for guests and clients, with good daylight levels and external views (where suitable to the space application), a thermally comfortable environment with good air quality and low levels of indoor pollutants;
- Environmentally responsibly material selection;

The design response to sustainability is explained in more detail in the following sections.

1 Introduction

This report outlines the key Ecologically Sustainable Design (ESD) initiatives for Project Star, the proposed redevelopment of the existing Star City Casino and the addition of a new Hotel building, which is targeting a high level of environmental performance. The scope and systems described herewith cater for these performance requirements, and will be further developed through the detailed design stage.

Unlike commercial buildings there is currently no Green Building Council approved rating tool for benchmarking the overall environmental performance of a Hotel building. However the Green Star commercial building principles are still applicable to many applications in a Hotel. As such the Green Star rating tool will be considered when applying ESD initiatives to the development.

The new NABERS Energy and Water Rating for Hotels will be considered throughout the design of the new hotel development, however as the exact targets of this are not finalised yet, consideration will be given to cogeneration / trigeneration, onsite renewables, and/or blackwater recycling as means of achieving a 4 Star rating for the new hotel when the official tool is released.

The design response to sustainability is explained in the following sections according to the pertinent environmental indicators, which include management, indoor environmental quality, energy, transport, water, land use and ecology, materials and emissions to land, water and air.

2 Green Star

Green Star is a comprehensive sustainability design tool which assesses the environmental impact of a building over a range of environmental indicators, from management and ecology to energy and water use, material selection and waste production. Categories are weighted according to their environmental importance, which varies between building sectors and across states.

Points are awarded in the following categories:

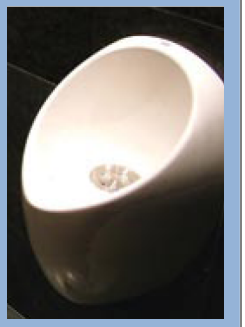
- Management
- Indoor Environmental Quality
- Energy Conservation
- Transport
- Water Conservation
- Land use & Ecology
- Materials
- Emissions

The Green Star tools currently available are all for commercial buildings. There is a Retail tool to be recently released and a Mixed Use tool is also proposed for the near future. A mixed use tool would be the most suitable for this development. However at this stage, the office and retail tools will be followed as guidance for targeting a sustainable development.

The principles outlined in the Green Star assessment tool will be incorporated where possible as an approach to achieving a development which has high ESD credentials. By achieving a strong energy and water strategy with a combination of other appropriate measures results in a well balanced environmental outcome for the development.

The following sections outline the environmental initiatives proposed, categorised according to the Green Star credit category headings.

	ESD INITIATIVES HOTEL
Management	• Environmental Management Plan during construction and operation • Building user guide
Indoor Environmental Quality	• Increased fresh air supply • Carbon dioxide sensors • Avoidance of Volatile Organic Compound emissions • High levels of daylight atrium lobby • High frequency electronic ballasts • Efficient Air conditioning • Maximise External Views
Energy Conservation	• Energy monitoring • Room air conditioning linked to point of sale system • Mixed mode ventilation • High performance facade • Consideration given to cogeneration / trigeneration and/or onsite renewables 
Transport	• Good public transport links • Transportation and Travel Guide • Provision of cyclist facilities for staff 
Water Conservation	• High Efficiency fittings • Alternative Sources – rainwater storage, grey water and black water recycling systems  
Materials	• Preference for environmentally responsible materials • Low embodied energy & high recycled content • Minimise Volatile organic compounds • Dedicated waste recycling room 
Emissions	• 100% of all refrigerants will have an Ozone Depletion potential of zero. • Integrated refrigerant leak detection • Filtered stormwater runoff

	ESD INITIATIVES CASINO
Management	• Environmental Management Plan during construction and operation • Building user guide
Indoor Environmental Quality	• Carbon dioxide sensors • Avoidance of Volatile Organic Compound emissions • High frequency electronic ballasts • Efficient Air conditioning 
Energy Conservation	• Replacement of existing lighting • Redesign of fresh air loads • Replacement of some air handling units 
Transport	• Provision of cycling facilities for staff and patrons • Encourage the use of public transport 
Water Conservation	• Alternative Sources – rainwater storage, grey water and black water recycling systems • Sub metering on major water uses  
Materials	• Preference for environmentally responsible materials • Low embodied energy & high recycled content • Minimise Volatile organic compounds • Dedicated waste recycling room
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3 Management

3.1 Environmental Design Experience

The consultant team includes the services of experienced environmental design consultants who in addition to being Green Star and NABERS Accredited Professionals have extensive experience in the delivery of environmentally responsive commercial buildings.

3.2 Commissioning & Building Tuning

Commissioning is an integral part of the project delivery process, ensuring optimum comfort control, building services performance and operational efficiency. The Green Star design tool recognises the importance of commissioning in delivering a successful building that performs as it was designed to, and therefore gives credit for good commissioning practice.

The following will be implemented for this development:

- Contractual requirement for comprehensive pre-commissioning, commissioning and quality monitoring of building services installations;
- Commitment to a 12 month commissioning / building-tuning period after handover, comprising of quarterly reviews and recommissioning at the end of the 12 months;
- Appointment of an independent commissioning agent to check commissioning practice.

3.3 Waste Minimisation & Environmental Management

An Environmental Management Plan will be developed during the design phase to regulate the environmental impacts of the development during construction and operation. This will include a Waste Management Plan, stipulating a minimum percentage of demolition and construction waste to be recycled or reused.

3.4 Handover & Education

In recognition of effective handover being critical to the success of a building in achieving its environmental aspirations, a simple and concise building users' guide will be developed to inform and educate staff and facility management staff on how to capture and promote strong on-going environmental performance. An effective management and operation strategy will be particularly important for improving the energy and operational efficiency of the Casino.

4 Indoor Environmental Quality

The proposed design will place particular emphasis on achieving a high quality environment through careful consideration of the following influencing factors on guest / visitor comfort: The indoor environmental quality is important in creating a space where guests and staff feel comfortable and relaxed. This is applicable to both the hotel and casino areas of the development.

4.1 Indoor Air Quality

Good indoor air quality is ensured by improving ventilation and reducing indoor contaminants.

In the proposed building, ventilation may be improved through the following strategies:

- Carbon dioxide sensors in large volume spaces to monitor carbon dioxide levels, and increase fresh air supply rates if carbon dioxide levels become undesirably high.

Contamination of air by common indoor pollutants will be reduced by careful material selection, for example:

- Avoidance of Volatile Organic Compound (VOC) emissions by selecting carpets and paints with a low VOC content;

4.2 Light Quality

4.2.1 Daylight

The hotel building is being designed to maximise the natural light potential through selecting a façade with high light transmission properties. The common spaces such as the atrium lobby will also be designed to achieve high levels of natural daylight to improve the quality of the space for the occupants.

4.2.2 Electric Lighting

High frequency electronic ballasts will improve space amenity by avoiding the strain caused by low frequency flicker.

High efficiency light fittings are being proposed for both the new hotel areas and the existing casino refurbishment as both a means of reducing the electricity consumption and of reducing the associated heat gain and thus the overall air conditioning loads.

4.3 Thermal Comfort

Thermal comfort is affected by air conditioning, air movement and façade performance, as well as individual occupant factors.

The hotel areas will be designed to ensure that potential occupant thermal comfort is maximised. The Casino services will be managed with thermal comfort issues considered.

4.4 External Views

All hotel rooms will be designed to maximise the occupants access to external views, which is a proven benefit to occupant well being. Similarly to daylight the principles of external views conflict with those of a Casino design and as such will not be applied to the main Casino areas.

4.5 Internal Noise Levels

Internal noise will be restricted to acceptable levels according to Australian standards, including general building and services noise. Careful consideration will be given to noise levels in all areas to ensure that privacy remains a primary focus.

5 Energy

5.1 Energy Efficiency Targets - Hotel

Energy conservation is a priority in the proposed development. The proposed Hotel will be benchmarked against existing hotels of a similar standard and energy reduction measures incorporated.

The NABERS rating scheme assesses a building's energy performance based on annual measured energy consumption. In order to ensure that the building performs as expected, the design is modelled using energy simulation software at significant stages throughout design and construction.

This proposed energy reduction will be achieved by combining a high performance façade system with energy efficient systems and services to reduce the energy use and therefore greenhouse emissions of the building.

Attention has been given to façade performance, in order to control excessive solar heat gains while maximising the availability of glare-free daylight. A combination of high performance glazing on all facades with external shading to the North facade will reduce solar heat gains and cut cooling loads considerably. Mixed mode ventilation to the hotel rooms is also being considered as a method of reducing the annual cooling loads. Individual room air conditioning will be controlled by either a key tag switching to prevent systems operating when the rooms are unoccupied or an advanced hotel booking system that will automatically switch off air conditioning when rooms are not booked and only pre-condition the rooms before a guest moves in.

In addition, the building services and fabric will be developed to meet the requirements for the BCA Section J: Energy Efficiency, which covers air-conditioning, ventilation, lighting, power and hot water, as well as building fabric considerations including thermal construction and insulation, building sealing, glazing and shading for commercial and retail development.

In order to target a 4. Star rating in the NABERS Energy for Hotels scheme, consideration will be given to cogeneration / trigeneration and/or onsite renewables.

5.2 Energy Efficiency Targets – Casino

Whilst there is not an official rating tool for targeting energy efficiency in the Casino, the principles used in the NABERS Energy rating scheme will still be applied where possible. Due to the nature of operations of a casino, i.e. 24 hour operation, constant high electrical load, high electric lighting load, the potential for energy savings is not as significant as in a hotel. As such an efficient energy strategy is to be proposed for any new fittings and fixtures, together with an efficient management and operation strategy.

It is likely that a big energy saving can be made in the Casino through targeting management principles and implementing efficient controls strategies.

The biggest energy savings to be made in the Casino refurbishment are as follows:

- Replace existing poor performance electric lighting with new high efficiency lighting – reducing both the electric lighting load and the thermal gains contributing to the cooling loads
- Rebalancing the minimum fresh air loads – the existing Casino system is designed as a smoking environment and as such has very high fresh air loads which are no longer necessary for the new non-smoking environment. Reducing these minimum loads will allow a significant reduction in the air conditioning loads.
- Replacing existing air handling units with new more efficient units and reduce the annual energy consumption of the existing system

It is proposed that the above energy improvements, together with implementing a more efficient management and operation strategy, will contribute to a reduction in annual Casino energy loads when compared to the existing energy.

5.3 Monitoring & Tracking

To enable the effective monitoring and tracking of energy consumption, sub-metering will be provided. This will help identify areas of inefficiency with potential for improvement.

6 Transport

6.1 Accessible Location

The site is in a very accessible location, and is well-serviced by an extensive public transport network, including regular bus light rail and ferry services connecting the site to both CBD and suburbs. Guests and visitors will be encouraged to use public transport in preference to private cars. Advertising the prominent public transport links and displaying public transport information will help to encourage the uptake.

6.2 Encouraging Sustainable Transport Use

To encourage staff to cycle to work, secure and accessible bicycle storage will be provided for staff, including accessible showers, lockers and changing facilities.

Small car spaces provided will be sized and labelled for small vehicles, encouraging the use of smaller, less emissions-intensive private vehicles.

A private bus service currently operates between star city and the suburbs and will be continued.

6.3 Transport Travel Guide

A workforce travel package will be developed, to inform building occupants of their sustainable transport alternatives, including:

- Shortest and safest pedestrian routes to public transport stops;
- Information on established and proposed bicycle routes serving the Darling Harbour area, as well as connections to this site;
- Information on on-site bicycle storage options and available shower, change and locker facilities;
- Information on public transport service frequency and stop locations.

7 Water Management

7.1 Mains Water Use Reduction - Hotel

Potable water use in the Hotel will be reduced by installing highly efficient fittings and fixtures, and supplementing mains water use with alternative water sources.

7.1.1 Water Efficiency

Efficient fittings and fixtures will considerably reduce potable water demand, including the following:

- Dual-flush toilets
- Hand Wash Basins
- Water efficient showers
- Efficient hotel laundry system that will incorporate water recycling

7.1.2 Alternative Sources

Rainwater storage will be provided to supply water for landscape irrigation and toilet flushing, reducing the quantity of high quality drinking water that is flushed down the toilet. Fire sprinkler test water will represent a significant volume of water which may also be recovered for reuse in toilet-flushing, rather than discharged to drain.

Blackwater recycling systems are being considered to provide recycled water for toilet flushing and cooling towers, representing a significant improvement on mains water use.

7.2 Mains Water Use Reduction - Casino

7.2.1 Water Efficiency

Where new hydraulic fittings are being introduced they will be of a high efficiency standard to reduce the potable water demand. Consideration will be given to installing new high efficiency fittings for both the public and staff amenities.

7.2.2 Alternative Sources

The use of rainwater and blackwater recycling will be explored for use to supply the back of house areas and public amenities within the Casino.

7.3 Stormwater Quality & Quantity

Quality of stormwater will be improved by filtering. Rainwater captured from the roof will be reused directly, before it can be contaminated by ground surface pollutants.

7.4 Tracking and Monitoring

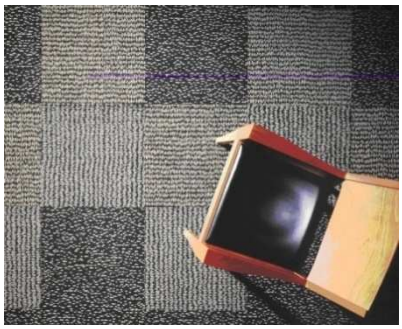
Sub-metering on major water uses will reduce the considerable water losses that occur in many buildings through leakage. .

8 Materials & Waste

8.1 Materials Selection

Preference will be given to environmentally responsible materials during the selection process, according to the following principles.

- Avoidance of environmentally sensitive products - For example, timber used in the design will be sourced from sustainable sources where possible, such as sustainable plantations or post-consumer recyclers.
- Preference given to materials with a low embodied energy & high recycled content. A proportion of cement will be replaced with an industrial waste product, reducing the huge embodied energy impacts of Portland cement production. In addition, where feasible, steel used in the design will have a post-consumer recycled content of greater than 50%
- Low impact on the indoor environment –The project will minimise the use of volatile organic compounds (VOC's) and formaldehydes in internal materials and finishes (e.g. floor coverings, furniture, paint, etc.).



8.2 Waste Minimisation

A dedicated waste recycling room will allow space for the separation and storage of recyclable waste during the building's operation.

In addition, as part of the Waste Management Plan, a percentage of construction waste will be diverted from landfill for recycling or reuse.

9 Emissions

Emissions to air, land and water will be managed using the following strategies:

- Refrigerants will have an Ozone Depletion Potential of zero; and integrated refrigerant leak detection will ensure early identification of leaks;
- All thermal insulants used in the design will have a low Ozone Depletion Potential in their manufacture and composition;
- Stormwater runoff will be filtered in accordance with Victorian EPA Best Practice Guidelines, reducing contamination of waterways by rubbish and gross pollutants;
- Estimated wastewater discharge to sewer is significantly reduced relative to a standard building through the implementation of water efficiency measures.
- External light pollution will be controlled by careful lighting design

10 Summary

The proposed strategy for this development is a high level of ESD initiatives influenced by both the Green Star and ABGR (NABERS energy) rating systems. The Hotel has the biggest potential for energy and water savings as it is a new build, however significant savings are also being targeted for the Casino refurbishment. A combined strategy where possible will be sought which will be beneficial to both Hotel and Casino.

This document has illustrated that although official ratings tools are not specifically applicable to this development, the general principles can still be applied and an equivalent high performance development can be targeted.