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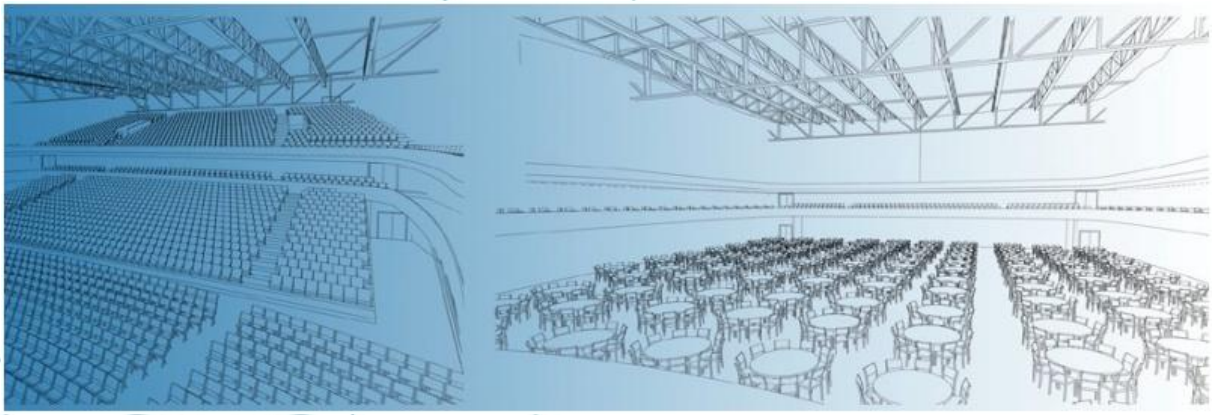
# Star City Multi Use Entertainment Facility

## Ecological Sustainable Development Statement



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The success and realisation of the proposed initiatives will be dependent 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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# Ecological Sustainable Development Statement

## General

The Director General's Requirements for the new proposed development at the Star City Casino with regards to Ecologically Sustainable Development (ESD) requests that we identify ***"how the development will incorporate ESD principles in the design, construction and on going operation phases of the modifications"***. The DGR also notes that we address ***water quality management for the site including an "Integrated Water Management Plan" to include any proposed alterative water supply, proposed end uses of potable and non-portable water, demonstration of water sensitive urban design and any water conservation measures***.

Unlike commercial buildings currently there is no approved energy or environmental rating tool such as NABERS or Green Star for benchmarking the overall environmental performance of an entertainment facility. However there is a Green Star Pilot tool for Convention Centres which can be used as a framework to develop ESD initiatives for the design and construction of the new facility.

The fabric and building services for the new facility will be developed to meet the requirements for the BCA 2010 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.

**During the detailed design process the following ESD initiatives will be considered for inclusion in the design of the facility:**

## ESD Strategies

The key strategies to be developed for improving the building's environmental performance include:

1. Energy consumption reduction by optimising the building fabric, façade and HVAC(Heating Ventilation Air Conditioning) systems
2. Encouraging responsible energy management and waste management practices
3. Minimising Greenhouse gas emissions
4. Avoiding the use of ozone depleting substances
5. Minimising mains potable water consumption through use of the existing grey water recycling system and possibly harvesting rainwater from the multi use entertainment roof for non-potable applications such as toilet flushing – please see section on Water Management for further details.
6. Provision of a high quality of indoor environmental quality for guests, a thermally comfortable environment with good air quality and low levels of indoor pollutants
7. Environmentally responsible material selection

**To develop the ESD strategies further the following ESD targets and initiatives will be considered:**

## ESD Targets

The design of the new multi use entertainment facility will aim to achieve the following targets:

**Energy:**

1. Significant reduction in energy consumption i.e. 30% in relation to a “base case” conventional design approach (the “base case” will be derived either from existing metering data from a similar facility such as the lyric theatre or an estimation of energy use for an existing typical facility). This will be achieved by targeting a low energy design approach to the building fabric and HVAC (Heating Ventilation Air Conditioning) design.

2. A metering and sub metering strategy to monitor and track energy consumption. Provision for the sub-metering of lighting power, small power, HVAC power, Comms power and any other significant building system power consumption. The metering strategy is to incorporate the development of an Energy Management Plan (EMP) to continuously track and monitor the building energy usage and aim to carry out annual energy audits to target energy saving measures.

3. Utilisation of energy efficient light bulbs for the base build lighting systems.

**Waste and Materials:**

4. 80% of construction waste is to be recycled or reused.

5. Utilisation of recycled steel, concrete, sustainable timber and materials with low embedded energy.

6. A Waste Management Plan targeting a reduction in operational waste per annum with a dedicated waste recycling program for the facility to be able to recycle 100% of recyclable waste.

**Comfort:**

7. Improve indoor environmental air quality by increasing BCA minimum out-door air ventilation rates to be achieved without increasing annual energy consumption. This can be targeted by utilising energy efficient ventilation design and control systems to avoid running HVAC plant at full capacity during low occupancy periods and utilising waste energy rejected from the building to pre-condition out-door air.

**Emissions:**

8. 100% of all refrigerants will have an ozone depletion potential of zero.

**Water Conservation:**

9. Please refer to the Water Management Section for details on the Integrated Water Management Plan.

## Water Management Plan[i]

### Stormwater Harvesting

Use of the existing stormwater harvesting and recycled water system is proposed for the development. The recycled water from the system is being considered to supplement the Greywater recycled system (currently under construction for Project Star) for toilet flushing & urinal flushing.

The 225 m3 existing stormwater harvesting tank that is located within the car park and receives rainwater run-off from the approximately 35% of the site was decommissioned 10 years ago due to occupational health and safety issues in maintaining the tank.

The reuse of the stormwater harvesting tank shall be investigated to supplement the recycled grey water system. It is proposed that the existing stormwater harvesting tank shall be used as a collection tank with harvested water transferred via water treatment plant to the treated Greywater storage tank. This will result in reduced power consumption when stormwater is available instead of the power consuming Greywater filtration plant.

Water shall be treated to Grade A+ quality for flushing and has been discounted for surface irrigation due to the potential health risks. This treatment would consist of multi-medium filtration using zeolite and UV disinfection.

### Greywater Treatment Plant

A Greywater treatment plant is currently under construction as part of Project Star. The system consists of a Membrane Bio-Reactor (MBR) biological system which will be configured to reduce total nitrogen through intermittent aeration. Aerobic treatment will occur in an aeration tank fitted with fine pore aerators. The membranes will be located in a single cell outside the biological system, Membrane Operating Systems (MOS). The membranes in the MOS will be completely isolated from the biological system, to enable a clean, maintenance-friendly and odour-free membrane cleaning process.

The filtrate from the MOS will be further treated with chlorine dosing or equal approved alternative. The treated water will be monitored for authority compliance and will not be delivered for re-use if outside the water quality specifications. The treated water will flow to a break tank where it will be used for toilet & urinal flushing.

The recycled grey water shall be extended to the Multi Use Entertainment Facility for toilet and urinal flushing.

### Water Efficient Tapware

Potable cold water consumption for the proposed development can be further reduced via the installation of water more efficient fixtures and tapware. Fixtures and tapware selections for the proposed development will be selected to meet the following criteria:

- WELS 4 Star rated toilets, having an average volume per flush not more than 3.3 litres.
- WELS 5 Star rated urinals, having an average volume per flush not more than 1.0 litre.
- WELS 5 star rated tapware, having a flow rate of not more than 6.0 litres per minute.
- WELS 3 star rated showers, having a flow rate of not more than 9.0 litres per minute

[i] The water management plan section has been written by the hydraulic consultant from SPP Group engaged on the Star City project to provide information on the water management strategy for the site and the new proposal.