

Site 4B Sydney Olympic Park

ESD Report for Proposed Building on Site 4B

December 2006

1. EXECUTIVE SUMMARY

The development of Site 4B at the Sydney Olympic Park is part of a major commercial development, in keeping with the nearby proposed developments of sites 5, 6 and 7. The client and project team are committed to demonstrating the use of new technology or new applications of existing technology in order to deliver a benchmark ESD project.

The project team recognises SOPA's corporate framework for sustainability and make a commitment that the project will be consistent with the principles of sustainability as described in the Environmental Guidelines (1993), the Sustainability Policy, Sustainability Strategy and environmental design requirements of the Sydney Olympic Park Master Plan.

It is understood that the Sustainability Strategy gives a high priority to identifying and making use of new and innovative technologies to ensure that the Sydney Olympic Park remains at the forefront of environmental practice. The four key Environmental Performance Areas (Biodiversity, Resource Conservation, Site Impacts and Involving People) have been utilised through the design process and a referenced in this report in a summary table, outlining the proposal's response to the Strategy.

To ensure standards are met and if possible exceeded, a specialist ESD consultant will be included as a core member of the project team and will work closely with CFSP's in-house sustainability manager, Greg Johnson. In addition the project team recognise the need to prepare a detailed Construction Environmental Management Plan (cEMP) and an Operational Environmental Management Plan (oEMP) for the project. The above mentioned reports will be supplied to SOPA by the proponent upon the determination of the Part 3A application for the project.

There is a commitment to achieving a minimum of 4.5 Stars with a target of 5-Stars (ABGR) and a minimum 4 Star (Greenstar Rating) with a target of 5 Stars.

Extensive energy modelling will be carried out throughout the design development phase and will continue until the building is fully commissioned to ensure the building is delivered to its full environmental potential. Energy modelling is to be used to guide design development and to assist in the optimisation of strategies or options that will lead to enhanced occupant utility, lower running costs, and reduced (whole building) environmental impact.

2. TENANT ASPIRATIONAL BRIEF

The overriding brief for this project has been developed following extensive research into the world's leading work place environments. This research included a study tour of the United States and Europe during which some 30 buildings were visited. From this exercise, it was concluded that the following items were fundamental to creating a leading workplace for its employees:

- o Campus style building
- o World's best practice approach to design
- o Atriums to enhance the work place environment and provide visual connectivity across the floor plates.
- o Provision of open feature staircases to promote interfloor travel and the interfacing of work groups from different levels
- o Enhanced ground plane activation
- o Integrated retail
- o Workplace and building innovation
- o Environmental and sustainable design – passive and visual
- o Maximised building efficiencies

- o Minimum NLA of 21,000m²

3. BUILDING OVERVIEW

Building Type:	Commercial Office Building
Standard:	A-Grade suburban (generally in accordance with the PCA guidelines)
ABGR Rating:	4.5 Stars (minimum) with target of 5-Stars
Greenstar Rating:	4 Star (minimum) with target of 5-Stars

4. INNOVATION

Building Concept

The proposed building consists of 3 basement car park levels, ground level retail, commercial, main lobby and loading and six levels of commercial office space with a total lettable area of approximately 21,000sqm.

Floor plate Concept

Two 24m wide large open floor plates are located at 90 degrees to each other to accommodate the 'L' shaped site geometry.

The design results in a flexible working environment that encourages a high level of interaction.

Entrance Foyer

Each of the entries to the building lead to the main foyer which is located at the heart of the building. Dominating this space will be the central atrium of the building which will create a dramatic light filled space. From the base of the atrium, views to the skylight six levels above will be possible.

Integrated Retail

Retail space will be provided at the base of the building and positioned in key locations to activate the ground plane. The retail will be integrated with both the internal lobby and the external space to create one large public space. This will provide a seamless vibrant hub at the base of the building. The retail spaces, public open space and atrium lobbies will provide a diverse range of informal meeting places and promote activity throughout the day and enhance the community feel of the development.

Atriums

The atrium is a vital component of the building and essential to creating a campus environment.

The atrium is large and triangular in shape with the overall dimensions being approximately 17 x 17 x 24m. The glass roof will allow light to penetrate deep into the floor plates of the building and illuminate the ground floor for the most part of the day thereby reducing the dependence on artificial lighting and providing a thermal buffer space for the office areas.

On each floor the shared facilities such as meeting rooms and break out spaces will integrate with the atrium to create a central hub and animate the building.

Facade

The unencumbered floor plates are glazed on all sides emphasising the openness of the floor plate, and maximising the natural light, transparency and outlook from the working environment. To ensure that good thermal comfort and energy efficiency is achieved a system of vertical and horizontal aluminium sunshades is proposed that responds to the orientation of the building.

On all elevations the glass façade is broken by an expressed horizontal at ceiling level. This provides horizontal sun shading and an ordering device between which vertical sunshades are inserted on facades exposed to east and west sun. These vertical aluminium blades are arranged in a staggered pattern across the façade creating a sense of movement and animation.

The lift core and fire stairs are finished in a lightweight masonry cladding.

The building fabric - material selection

The selection of materials shall be carefully considered to ensure:

- o Materials such as concrete and steel will contain a proportion of post consumer recycled materials.
- o The use of PVC will be minimised throughout the design process if appropriate alternatives can be identified.
- o Timber from forests with identified sustainable management practices shall be used throughout.
- o Low VOC products will be used where practical – in particular carpet and paint to provide a healthy working environment.
- o Zero ozone depleting substances will be used for building fabric insulation and all refrigerants.
- o Less than 20% of all waste generated during construction is to end up in landfill, with at least 80% being recycled or reused..

Water Conservation

It is anticipated that, compared to similar buildings, water consumption will be reduced by approximately 50%. The following water saving initiatives will be incorporated:

- o Water minimisation and re-use – the buildings have been designed to minimise the consumption of total water consumption through the use of high efficiency fixtures and fittings, including 4.5/3 L dual flush toilets utilising recycled water, waterless urinals and 5A tapware.
- o Efficient landscape irrigation will be installed.
- o Water efficient cooling tower strategies will be incorporated.
- o Potable water consumption will be further reduced with the Water Reclamation and Management Scheme (WRAMS) system, which will provide recycled water for toilet flushing, irrigation, cooling tower supply and operational wash-down activities. The sewer mining function of WRAMS may also be utilised.

Energy Performance

An integrated approach to the building services and envelope design shall produce an extremely efficient building design that will achieve a minimum 4.5 Star ABGR rating. This shall be achieved through the use of:

- o Efficient HVAC plant – particularly chillers, boilers, fans, pump and air handling units - will be specified. The avoidance of constant speed systems will enable the building to be optimised to only consume the energy that is absolutely required to meet thermal comfort and health requirements AHU's.
- o Highly efficient façade with effective solar protection to minimise cooling and heating loads that are experienced by the building. An efficient facade also reduces the volume of air/water required to meet thermal comfort requirements which further reduces energy consumption by reducing fan/pump energy use.
- o Energy efficient vertical transportation systems will be proposed.
- o T5 lighting in office areas– Arranged effectively, T5 light fittings provide the opportunity to significantly reduce energy consumption whilst maintaining uniformity and internal environment quality.
- o A time scheduling system shall be provided to ensure lighting and HVAC equipment controlled effectively after hours.

- o A sophisticated BMCS and metering strategy will be developed to ensure energy performance can be tracked, evaluated and optimised on a frequent basis.
- o Effective daylighting of the building will reduce dependence upon artificial lighting, potentially via the installation of a daylight linked control system – this would be subject to further investigation.
- o Options to further reduce base building energy consumption and enhance the ABGR rating will be investigated during the design process.

Construction process

The impact of the construction process upon the local environment and the long term environmental performance of the building is significant. As such, the following measures will be undertaken to ensure that environmental performance is maximised:

- o A specialist ESD consultant will be employed during the design process. The input from this consultant will inform the design and ensure that environmental performance requirements are achieved
- o The building will be comprehensively commissioned in line with ASHRAE/CIBSE standards to ensure that the energy performance is optimised prior to handover. A building tuning period is also proposed to optimise seasonal efficiencies and ensure the building is operating effectively when fully tenanted.
- o Comprehensive Environmental and Waste Management Plans will be generated for the project. A target of 80% of waste leaving the site will be reused or recycled and thus diverted from landfill.

Integrated Fit-out

The tenancy fit-out of the building will occur concurrently with the construction of the base building. By fully integrating the fit-out, a more sustainable outcome can be achieved. This efficient use of labour and materials results in significant reductions in waste, abortive design, and construction works.

Internal environment quality

Providing an excellent environment for employees will enhance the lifespan of the building, reduce sick building syndrome and minimise employee absenteeism. A number of initiatives will be included, such as:

- o Enhanced fresh air supply to office spaces
- o Daylight availability and connection to the external environment
- o Thermal comfort assessment during the design process to optimise design
- o Effective glare control
- o Well designed acoustic environment
- o Local exhausts for air pollution associated with photocopiers etc.
- o Materials with low off gassing potential

Transport

Reducing the dependence upon the use of private cars for transport to work will not only dramatically reduce the overall environmental performance of the company building but will also reduce air and water borne emissions local to the building.

This combined with the array of recreation facilities within and in close proximity of the precinct, makes facilities for bikes essential. Provision of bicycle parking, showers and change rooms is to be provided for approximately 5% of staff.

These features will enable employees to seek alternative forms of transport to private motor cars.

SOPA'S SUSTAINABILITY STRATEGY: KEY ENVIRONMENTAL PERFORMANCE AREAS			
Key Performance Area	Integrated ESD Initiative	Targeted Outcome of ESD Initiative	Opportunities for Innovation/ Resources Conservation
Biodiversity			
Species & ecosystems	- All efforts will be made to retain existing trees and to incorporate them into the public domain solution. - Site tours and inductions will be carried out educating building users of the biological diversity of the SOP	- To inform all employees of SOPA's biological diversity. - To take all efforts to incorporate any identified items as part of the development.	
Resource Conservation			
Water	- The development will be connected to the SOPA WRAMS - All landscaping water supplied from WRAMS via dual pipe - Waterless urinals throughout - Efficient landscape irrigation and water efficient landscape design - Direction of stormwater into WRAMS - AAAA rated water efficient fittings - Dual flush toilets utilising recycled water - Cooling towers with 6 cycles of concentration to minimise water use - Use WRAMS water supply to cooling towers	- Minimise overall water consumption - Substitute potable water for recycled water from the WRAMS system - Significantly reduce dependence upon potable water	- Consider Sustainable Urban Drainage for external areas to provide retention and treatment prior to collection by the stormwater system - Investigate options for onsite black water and rainwater treatment
Energy	- Deliver a building with a 4.5 star ABGR base building rating in operation which exceeds current best practice - Install energy efficient lighting with a power density not exceeding 2W/m²/100Lux - Effective lighting controls for car park and public spaces to reduce unnecessary lighting energy use during unoccupied periods	- Minimise energy consumption and associated energy costs - Minimise Greenhouse gas emissions - Promote the use of cleaner fuels such as natural gas	Consider the potential for on-site energy generation via natural gas or renewable energy sources

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Key Performance Area	Integrated ESD Initiative	Targeted Outcome of ESD Initiative	Opportunities for Innovation/ Resources Conservation
Energy cont'd	• High efficiency HVAC system delivering appropriate air volumes and minimising the requirement for local re-heat • Energy efficient façade with effective solar protection via sun shading and glazing with low shading coefficient • Ensure that natural gas is used for the majority of heating requirements Provide energy efficient vertical transportation systems	-	• Use ABGR analysis as a tool to optimise energy performance, remove inefficiencies and identify alternative options
Materials Selection	• Concrete with a recycled component will be specified for all in-situ and pre-cast requirements; • Steel with a recycled content will be used for all reinforcement; • Refrigerants with an Ozone Depleting Potential of zero will be specified throughout • Sustainable timber will be used where feasible • Local materials will be sourced where available • No Ozone depleting substances will be used • Only timbers from forests with identified sustainable management practices are used • Low VOC products will be used where practical – in particular carpet and paint • Materials with a level of recycled content are used where practical • An eco materials matrix will be developed for the project to help tenants identify the options for making environmental savings in the material selection of finishes	• Minimise the buildings impact on the ozone layer and the greater environment • Promote sustainable use of timber • Reduce the impact of resource intensive materials • Minimise environmental issues associated with transport • Less than 20% of all waste generated during construction is to be sent to landfill	• Investigate opportunities for efficient construction techniques including off site construction and pre-fabrication • Consideration of design for disassembly, change of use and recycling of the building in the future

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Key Performance Area	Integrated ESD Initiative	Targeted Outcome of ESD Initiative	Opportunities for Innovation/ Resources Conservation
Parklands & Open Space	- Public open space will separate the proposed commercial building from the approved Sofitel Hotel - Hard and soft landscaping will integrate the space with the two adjacent sites and landscaping treatment will be in accordance with the SOPA Public Domain Guidelines - Colonnades and retail space define the edges and will serve to activate the open space	To include open space as outlined in the SOPA guidelines	-
Site Impacts			
Air	- Minimisation of ozone depleting or high greenhouse gas producing products. - Refrigerant leak detection will be provided to limit refrigerant gas leaking to atmosphere - Effective construction processes will limit impact of air borne pollutants such as dust - The use of public transport to SOPA will be encouraged to reduce greenhouse gas emissions.	Ensure no net increase in air pollution arising as a result of the development	-
Noise	Adverse noise impacts from the development will be minimised both during construction and during the building's occupation.	Ensure that plant noise does not impact local area	-
Light	- The proposal will minimise the adverse impact of the night lighting on Sydney's air quality through the environment minimisation of ozone depleting or high greenhouse gas producing products. - Unencumbered floor plates are glazed on all sides emphasising the openness of the floor plate, and maximising the natural light, transparency and outlook from the working environment.	Minimise light pollution	-

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Key Performance Area	Integrated ESD Initiative	Targeted Outcome of ESD Initiative	Opportunities for Innovation/ Resources Conservation
Water Quality	- The site Environmental Management Plan will minimise pollution generated and prevent polluted run-off entering the stormwater system or local water courses - The proposal will minimise the adverse impact of the night lighting on the environment.	Minimise water pollution entering stormwater system and local watercourses	-
Remediation	- The site will be monitored and managed during any excavation works. - Works will be carried out in accordance with a Remediation Action Plan if required. NB: An initial study has been prepared. - The site Environmental Management Plan will minimise pollution generated and prevent polluted run-off entering the stormwater system or local water courses.	Remediate site without creating environmental problems elsewhere	-
Waste Management	- The site will be monitored and managed during any excavation works. - EMP enforces the waste management strategies requiring the contractor to have facilities to provide effective source separation of recyclable materials - Minimisation of waste during construction - Operational plan will be developed to ensure a maximum amount of recycling is achieved. - Provide suitable facilities for the effective source separation of recyclable materials	Minimise waste and achieve substantial recycling of waste during construction and during operation	-

SOPA'S SUSTAINABILITY STRATEGY: KEY ENVIRONMENTAL PERFORMANCE AREAS			
Key Performance Area	Integrated ESD Initiative	Targeted Outcome of ESD Initiative	Opportunities for Innovation/ Resources Conservation
Involving People			
An Enriched Experience	The creation of a high quality work environment has been fundamental during the concept development, and will continue as part of the design resolution process	- Create a sustainable office environment - Ensure that building lifespan is maximised	-
Raising Environmental Awareness	- The environmental initiatives will be expressed in the built form/ architecture - The creation of a high quality work environment has been fundamental during the concept development, and will continue as part of the design resolution process	By educating building users, more sustainable outcomes shall be achieved in operation	-