Hans Centre Sydney Pty Ltd

338 Pitt Street, Sydney

ESD SSDA Report

ESD01

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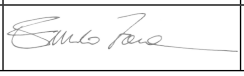
		Signature			
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Appendices

1 Introduction

Arup has been commissioned by Hans Centre Sydney Pty Ltd to prepare an ESD report as part of the SSDA application for the proposed mixed-use development located at 338 Pitt Street, Sydney.

1.1 Project Overview

This report supports a Stage Significant Development Application (SSDA) for the mixed use redevelopment of 338 Pitt Street, Sydney, which is submitted to the City of Sydney pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act). China Centre Development Pty Ltd is the proponent of the SSDA.

The site is located at the corner of Pitt Street and Liverpool Street, within the 'Mid Town' precinct of Sydney's Central Business District (CBD). The site is approximately 150m west of Museum Station and Hyde Park, and approximately 350m from Town Hall Station. The site includes several allotments and constitutes nearly one third of the city block between Bathurst Street, Pitt Street and Liverpool Street. The site is an irregular shape and has a combined area of approximately 5,900m².

The proposed development comprises of hotel, residential, commercial and retail uses and will include:

- demolition of all existing structures;
- excavation and site preparation, including any required remediation;
- construction and use of a mixed-use development, with an iconic 258m two-tower built form above a podium and internal courtyard;
- four (4) basement levels and a lower ground level accommodating residential, retail and hotel car parking, motorcycle parking, bicycle parking, loading dock, storage and relevant building services;
- improvements to the public domain, including landscaping, pedestrian thoroughfares/connections, and landscaping; and
- augmentation and extension of utilities and services.

A detailed description of development is provided by Ethos Urban within the EIS.

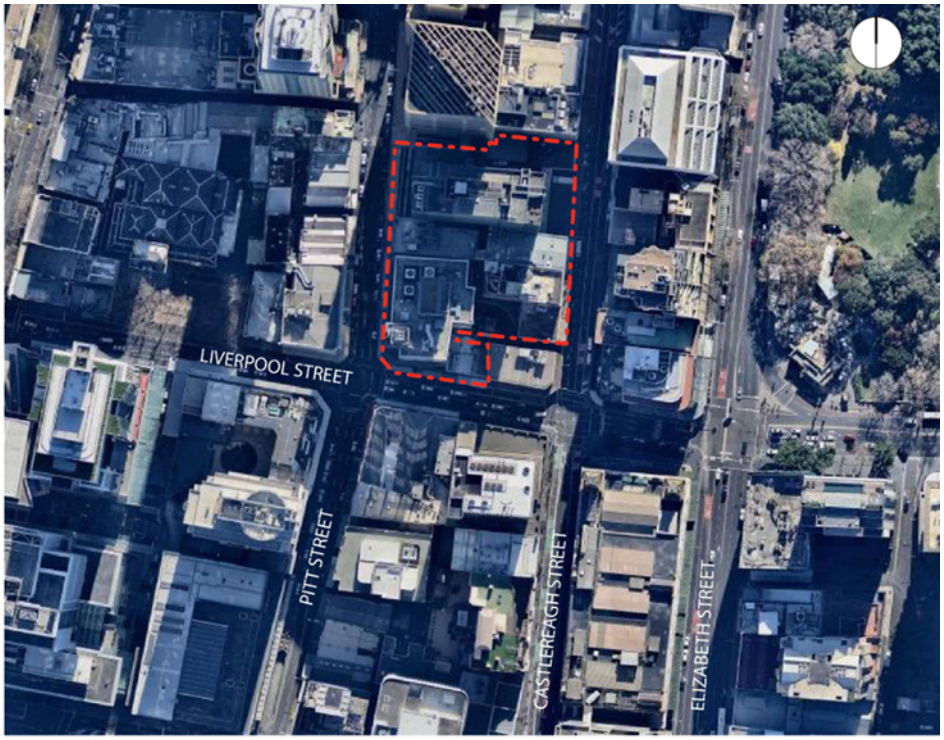

Figure 1 The Site

2 Secretary's Environmental Assessment Requirements

The overall ESD design strategy for the site and its buildings has been developed to respond to Section 13 of the Secretary's Environmental Assessment (SEARs) Requirements named "Ecologically Sustainable Development (ESD)".

The design ESD strategy responds to the following elements within SEARs:

Requirement	Relevant report Section
identify how the development will incorporate ESD principles (as defined in Clause 7(4) of Schedule 2 of the Regulation) in the design, construction and ongoing operation phases of the development, and include innovative and best practice proposals for environmental building performance	Section 4.1, 4.2, 4.3, 4.4, 4.5
include a framework for how the future development will be designed to consider and reflect national best practice sustainable building principles to improve environmental performance and reduce ecological impact. This should be based on a materiality assessment and include waste reduction design measures, future proofing, use of sustainable and low-carbon materials, energy and water efficient design (including water sensitive urban design) and technology and use of renewable energy	Section 3
include certification that the residential component of the development achieves the BASIX scores set out in the Concept Approval D/2016/1509	Section 2.3
investigate the use of third party ESD certification to achieve targets beyond those required under the concept approval and NCC	Section 3
outline any sustainability initiatives that will minimise/ reduce the demand for drinking water, including alternative water supply and end uses of drinking and non-drinking water that may be proposed, demonstrate water sensitive urban design principles are used, and any water conservation measures that are likely to be proposed.	Section 4.3

2.1 Section J and BASIX Compliance

The hotel and retail spaces are seeking compliance with Section J 2019 NCC and the residential portion is seeking compliance with BASIX.

2.1.1 Section J – NCC 2019

The building envelope of the concept design for the hotel and retail portions of the development have been developed in conjunction with the architects to meet the Section J of 2019 NCC.

This analysis has shown that generally a window to wall ratio of 50% is required throughout, this modelling and assessment will be finalised during the design development.

2.1.2 BASIX

The residential development has been developed in conjunction with the architects to meet the following BASIX targets

- BASIX Energy 25
- BASIX Water 45

The apartments have been assessed to ensure that they are capable of achieving an average NatHERS rating > 6.0. Full assessment of all apartments for both BASIX and NATHERS is located in Appendix A.

Through design development it is been identified that the building typology is challenged to achieve the original compliance target noted in the Concept Approval D/2016/1509 of BASIX Energy 30. The competition winning scheme is constrained in achieving the original DA target as the unique two building design results in relatively high building lift energy usage. To a lesser extent, maintaining the architectural intent of the façade with the high façade to floor area ratio also impacts the energy targets.

The development team have engaged with the Department of Planning, Industry and Environment (DPIE) to maximise the efficiency of the competition winning scheme which has resulted in compliance with the benchmark BASIX Energy 25 score commensurate with buildings of this scale.

To achieve this benchmark, alternative assessments have been made in the energy efficiency rating. To achieve the improved energy efficiency items noted below, justification was presented to show how the design is improved, and then a method for implementing them in the rating was agreed with DPIE.

- Increased air conditioning systems efficiency beyond typical BASIX allowance
- Increased lifting energy efficiency beyond typical BASIX allowance
- Inclusion of appliances with higher energy efficiency than allowed in a standard BASIX assessment

In future design development, a number of options are available to the team to enhance the rating further and potentially target BASIX Energy 30. These will require either additional alternative assessments agreed with DPIE or modifications to the building scheme to enhance efficiency. For example, at this stage the car park ventilation scheme is not detailed however the mechanical engineers are confident that this system could be designed to achieve significantly higher efficiency than code. DPIE cannot accept a commitment to achieve this design outcome and have not allowed an alternative assessment to capture this saving at this stage.

3 Overall ESD Strategy

The buildings' design will integrate sustainable initiatives to ensure superior environmental performance of the buildings.

The design will provide a superior indoor environment for the occupants. A combination of energy efficient and cost effective air conditioning systems will be designed aiming to provide improved thermal comfort for the occupants of the buildings.

All essential features to ensure water efficiency will be integrated in the design of the hydraulic systems. Water efficiency is considered to be an essential feature of the building, and this issue was agreed to be clearly reflected in design and technological strategies that are proposed for the buildings.

The purpose of this document is to discuss the ESD opportunities that will be incorporated within the buildings' design.

The following areas will be the focus of the design team:

- Energy – reduce energy use and greenhouse gas emissions. The building's envelope and services have been integrated to ensure the building is controlled to maintain the desired conditions whilst optimising the energy efficiency of the complex.
- Indoor Environmental Quality – design the buildings to maximize occupant comfort addressing issues of thermal and visual comfort and indoor air quality.
- Water – minimise potable water consumption and optimise the water efficiency of the development.
- Materials – minimise waste, encourage reuse and recycling of materials and use low environmental impact materials.
- Transport – encourage more energy efficient and less polluting forms of transport to and from the site.
- Benchmarking –
    - The buildings are to be designed to target a minimum NABERS Energy and BASIX Energy and Water performance
    - The strategies in this document have been developed through a benchmarking exercise of third part sustainability certification schemes.

Benchmarking the buildings against Australian excellence has been carried out from the beginning of the design process. The sustainability rating aspirations targeted as part of this are detailed in this report. The proposed ESD initiatives will be developed during the next design stages by the design team to achieve the NABERS and BASIXs targets. As buildings are responsible for 40% of CO2 emissions there is a need to further reduce their environmental impact in the coming years. This involves incorporating the flexibility required to accommodate mechanical systems and fit-outs that feature energy efficient technologies and the ability to adapt to multiple uses.

4 ESD Initiatives

Aiming at leading practice in energy and environmental targets, the design team focused on the following strategies for the proposed buildings:

- Energy efficiency
- Improved Indoor Environmental Quality for building occupants
- Water strategies to minimize potable water consumption and address stormwater management
- Use of reused or recycled materials to reduce embodied energy
- Effective transport strategies to reduce vehicular emissions
- Environmental benchmarking – aiming at BASIX and NABERS targets as described above.

These issues have been addressed by the design team through the consideration of the following initiatives:

Initiatives	**338 Pitt Street**
Building Envelope	High performance building envelope with added fabric insulation to improve energy efficiency and address indoor environmental quality.
HVAC system	Highly efficient mechanical system.
Renewables	Photovoltaic panels will be considered in the roof areas to offset electricity use and reduce energy use and carbon emissions associated with the buildings operation.
Water	High efficiency water fixtures and rainwater harvesting and reuse.
Stormwater	Management of stormwater on site before discharging into the public infrastructure through the implementation of appropriate stormwater treatment devices such as an onsite detention tank.
Materials	Selection of reused /recycled materials where possible.
Waste	Construction and demolition waste will be reused/recycled as appropriate to avoid waste material going into landfill. Consideration of operational waste management include options for organic waste treatment onsite.
Transport	Green Travel Plan and sustainable transport options.

The design concepts incorporated in the report are discussed in detailed in the following sections.

4.1 Building Envelope

The building envelope is essential in the design to guarantee the delivery of an appropriate environment. The role of the envelope is to block solar gains from penetrating the building fabric in summer while optimising daylight levels and minimizing glare. The glazing performance and shading configuration for each orientation will be optimised to ensure that thermal comfort is achieved, and solar gains are adequate for the efficient operation of the mechanical system.

The façade will be designed with a very high energy performance requirement to achieve the NABERS energy rating and BASIX Energy targets for the tower External shade elements, spandrel zones and high performance double glazing will be investigated to provide high levels of thermal comfort and visibility are achieved. The façade will be designed to optimise the façade performance in terms of thermal comfort, energy, daylight, maintaining views, achieving high levels of visual light transmission and access for maintenance.

The proposed facade arrangement will reduce the peak load and annual energy use imposed on the mechanical system whilst also addressing NCC Section J requirements and aligning with the NABERS and BASIX Energy targets. Furthermore, the façade arrangements will provide access to views, good daylight penetration, optimum thermal comfort and glare control. The façade will also be responsible for optimising thermal comfort and minimizing solar heat gains to minimize the required hours of operation of the proposed mechanical system.

4.2 Mechanical System

In design, emphasis will be placed on providing an appropriate level of system resilience and quality to ensure efficient operation of the buildings. The integration between the selected mechanical system and the façade performance play a fundamental role in delivering high levels of thermal comfort to occupants whilst optimizing energy consumption through building operation.

4.3 Water

Water recycling is a key component of the total water cycle management and integrated water resource management. Water recycling is fundamental to manage and balance all of the components of hydrological cycle (rainwater, stormwater, wastewater, groundwater, surface water and recycled water) to secure a range of social, economic and environmental benefits. The effective and safe implementation of water recycling strategies can help to reduce inputs of nutrients and other contaminants to surface water, conserve potable water and provide economic and social benefits to local communities.

Water related strategies have been considered as key environmental ones for the proposed buildings.

4.3.1 Building Water Strategy

To ensure water resources are maximized, Rainwater will be harvested through the roof and tanks sized to supplement water for HVAC cooling tower demands. The HVAC water demand will exceed the rainfall and thus WC flushing is unlikely to offer tangible water saving benefits. Notwithstanding this, consideration will be given during design development to harvested rainwater being delivered for irrigation and WC flushing.

The following initiatives will be incorporated into the development:

- Water efficient fixtures – 5 Star rated taps and 3 Star rated shower heads based on WELS rating scheme.
- Waterless or low flow urinals with a minimum 6 star WELS rating.
- 3 / 4.5 Litre dual flush toilets with a minimum 4 star WELS rating.
- Roof catchment area and rainwater tanks to provide water for reuse.
- Treatment: Filtration and disinfection of harvested water as appropriate to the uses.

4.3.2 Stormwater Treatment

All new stormwater drainage for the entire development is proposed to comply with the following:

- City of Sydney A4 Drainage Design Guidelines
- City of Sydney – Interim Floodplain Management Policy

4.3.3 Water Sensitive Urban Design (WSUD)

Water Sensitive Urban Design encompasses all aspects of urban water cycle management, including water supply, wastewater and stormwater management. WSUD is intended to minimise the impacts of development upon the water cycle and achieve more sustainable forms of urban development.

This will involve the consideration and potentially a combination one or more elements such as:

- Bio-swales
- Rain gardens
- Rainwater harvesting tanks
- Proprietary treatment tanks
- Gross Pollutant Traps

4.4 Energy

It is essential to ensure the development is designed and built to minimize energy consumption and reduce greenhouse gas emission to the atmosphere. Energy performance is considered by the design team as a crucial issue and the following measures will be targeted in the proposed design of each component:

Building	**Minimum Energy Target**
Residential	BASIX Energy 25
Hotel and Retail	Section J – NCC2019

This level of performance is attributed mainly to:

- A high-performance facade designed to reduce solar gain to perimeter areas for all buildings.
- The use of a high efficiency mechanical system to provide cooling effectively.
- High efficiency chillers performing better than the Minimum Energy Performance Requirements (MEPS).
- Reduction of tenant lighting: Due to increase natural daylight quality, and integration between natural and artificial lighting systems for all buildings.
- Use of renewable energy and low carbon technology to offset greenhouse gas emissions for all buildings.

4.4.1 NABERS Energy for Hotel

The hotel component of the development aspires to a NABERS Energy rating of 5 stars in design. Achievement of this is to be demonstrated through energy modelling of the building's performance to assess the effectiveness of the building envelope and services efficiency.

4.5 Transport

The use of motorised transport (both private and commercial) has been a major contribution to environmental pollution and the excessive consumption of natural resources.

The development has the opportunity to create an environment where pedestrian access is prioritised and the use of sustainable modes of transport is stimulated by:

- Encouraging walking and cycling by ensuring provision of bicycle facilities for building users;
- Provision of limited car parking spaces on site encouraging the use of alternative modes of transport such as public transport, cycling and walking.
- Selection of a site within close proximity to public transport networks including trains, buses and major transport focal points.

The Transport appendix for the SSDA submission includes a sustainable transport section highlighting the options for achieving the above noted targets and includes a Green Travel Plan overview.