COMMERCIAL BUILDING C1
BARANGAROO SOUTH

SUSTAINABILITY REPORT – PROJECT APPLICATION
OCTOBER 2017

lendlease

Document History

Revision	Date	Prepared By	Checked By	Description
01	03-Jul-17	Paul Hover	Daniel Grunbaum	Preliminary Issue
02	31-Jul-17	Paul Hover	Daniel Grunbaum	Updated design
03	14-Aug-17	Paul Hover		Revision for EoT
04	16-Aug-17	Paul Hover		Revised for MM comments
05	21-Aug-17	Paul Hover		Final Revision
06	10-Oct-17	Paul Hover	Daniel Grunbaum	Modified following BDA review
07	13-Oct-17	Tristan Goodchild		Updated Final Revision
08	18-Oct-17	Tristan Goodchild		Green Star update
09	21-Mar-18	Daniel Grunbaum		Update for RTS
G:\Sustainability\Projects\Committed Projects\Barangaroo C1\D Reports\Drafts\171018 BC1 ESD Report_08.docx				

Enquiries
Name: Daniel Grunbaum
Position: Manager Environmental Design
Telephone: 0412 447 511
Email: Daniel.Grunbaum@lendlease.com

Table of Contents

1.0 Introduction 4
1.1 Site Location 4
1.2 Overview of proposed development 5
1.3 Purpose of This Report 5
2.0 Referenced Documentation 5
3.0 Relevant Precinct Initiatives 6
4.0 Sustainability Contribution 8
5.0 Conclusion 12

1.0 Introduction

This report supports a State Significant Development Application (SSDA) (SSD 8529) submitted to the Minister for Planning pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act). The SSDA seeks approval for a stand-alone building known as Building C1 as described in the Overview of Proposed Development section of this report.

This Sustainability report has been produced by the Lendlease Sustainable Design team to describe the principles to be incorporated into the design, construction and ongoing operation phases of the project to minimise its impact on the environment.

1.1 Site Location

Barangaroo is located on the north western edge of the Sydney Central Business District, bounded by Sydney Harbour to the west and north, the historic precinct of Millers Point (for the northern half), The Rocks and the Sydney Harbour Bridge approach to the east; and bounded to the south by a range of new development dominated by large CBD commercial tenants.

The Barangaroo site has been divided into three distinct redevelopment areas (from north to south) – the Headland Park, Barangaroo Central and Barangaroo South (Stage 1). The C1 SSDA site area forms part of the eastern side of Barangaroo South Stage 1A and is located on Hickson Road between Waterman's Quay and City Walk Bridge. It is immediately north of International House Sydney (IHS), East of International Towers Sydney, and south of the future R5 Residential Tower in Barangaroo Stage 1B.

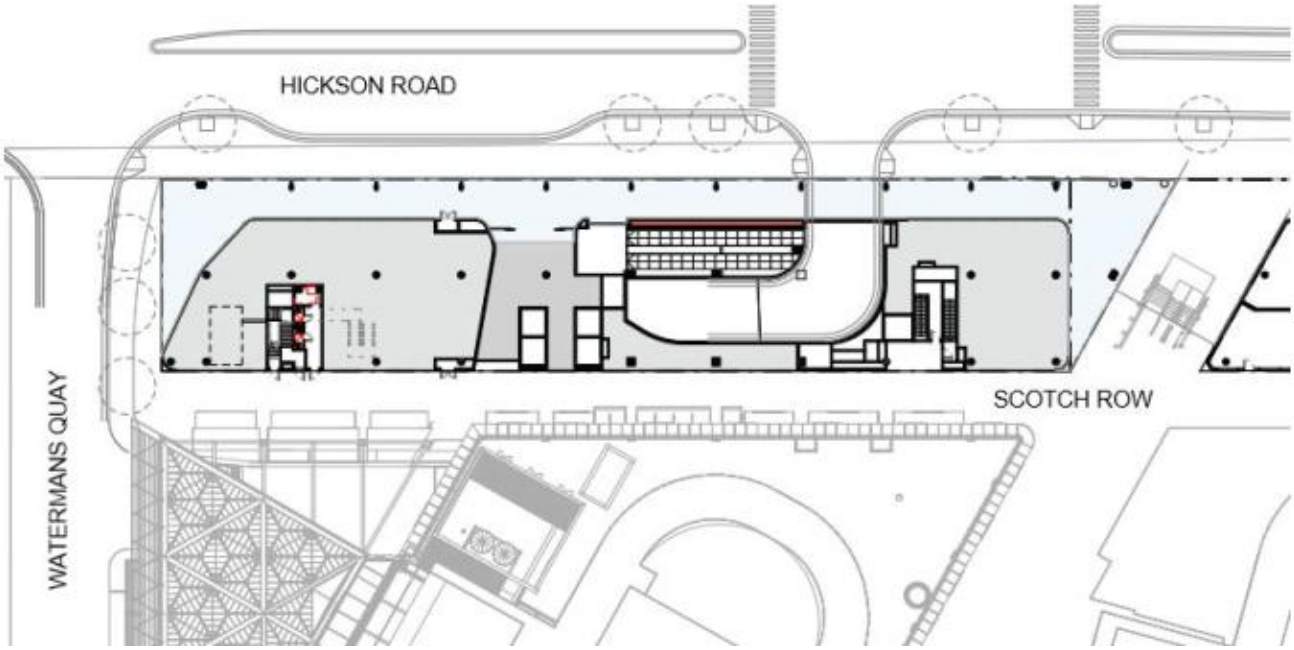

Figure 1: Building C1 Application Site Plan

1.2 Overview of proposed development

The Building C1 SSDA seeks approval for a seven level (ground plus six levels) building within 'Stage 1A' of the Barangaroo South Site and the Hickson Place Loggia.

1.3 Purpose of This Report

This report has been prepared to accompany the SSDA for the Building C1 works at Barangaroo South. It addresses the relevant Secretary's Environmental Assessment Requirements (SEARs) for the project, outlines the targets proposed for the development and in particular demonstrates the compliance of the works with the relevant requirements from the Statement of Commitments included in the approved Concept Plan.

The environmental sustainability initiatives for the development aim to be world class, and will complement work by the Council of the City of Sydney on its Sustainable Sydney 2030 plans. The overall Barangaroo South development aims to provide:

- Inspiring architecture with healthy, light filled homes and workplaces;
- Low energy buildings that respond to the environment and the people within;
- Transport links and options that make it easy to leave the car at home;
- A mixed use precinct with outdoor spaces that everyone can share and enjoy;
- Centralised precinct services that support a carbon neutral, water positive and zero waste aspirations;
- A long term Governance structure that also delivers carbon reduction and community benefits;
- A focused approach on delivering social initiatives that will assist in establishing a healthy and happy community integrated into the Sydney CBD; and
- A broad based skill development program that will meet a wide range of learning and skilling needs – from blue and white collar to green.

2.0 Referenced Documentation

The following documentation has been reviewed in preparing this report:

Document Number	Revision	Description
BCC1AD00000 to BCC1ADS0015	1	Barangaroo C1 Planning Application architectural drawings set. Issued 18.08.2017.
MSK-01 to MSK-08	7	Preliminary mechanical services drawings. Issued 13.07.2017.
SK-H01 to SK-H08	1	Preliminary hydraulic services drawings. Issued 11.07.2017.

3.0 Relevant Precinct Initiatives

The Barangaroo South precinct has established a range of significant sustainability targets that will be delivered progressively throughout the development phase. This short overview provides a summary of the alignment of the Building C1 SSDA against the aspirations of the broader precinct.

Healthy Buildings:
Target:

- Tuned to Sydney's climate and connected to outdoors.
- Passive design, low energy buildings.
- Use of some sustainable materials, including recycled content and low emissions.

C1 Response:

- The east, south and majority of the western facade will experience a fair degree of solar shading from surrounding buildings placing emphasis on glazing with high light transmission and high insulation levels.
- The north and northern portion of the western facade is more exposed and will thus consider appropriate glazing and shading devices.
- Materials, sealants and adhesives will be chosen responsibly to be consistent with Green Star to minimise VOCs and formaldehyde.

Energy and Carbon:
Target:

- Barangaroo South Stage 1 onsite photovoltaic generation systems sized to generate an amount of renewable energy that exceeds the energy demands of the public domain lighting and recycled water treatment plant.
- 20% reduction in embodied carbon within the built form.
- Aspirational target of a 75% reduction relative to BAU in operational energy use related carbon.

C1 response:

- A rooftop solar photovoltaic array is proposed to support the precinct wide on-site solar commitment. While the C1 roof experiences some site shading from T1, T2 and the CBD to the east, the estimated energy yield (kWh/kWp) will still be 70%+ of what the tower roofs yield.
- Use of sustainable materials including a responsibly sourced, prefabricated cross laminated timber (CLT) structure to assist in achievement of the 20% embodied carbon requirement. The CLT structure represents a reduction of approximately 70% of embodied carbon relative to a concrete structure.
- Low energy design incorporating external shading, low energy LED lighting, passive chilled beams and connection to the precinct district cooling plant, contributing to a targeted performance of 5 Star + 30% NABERS Energy.
- Extensive and comprehensive energy metering and monitoring system.
- The building will connect to Barangaroo South's District Cooling Plant (DCP) via a heat exchanger in the basement. The DCP is expected to achieve a system COP of around 6 during peak load periods, rising to nearer 12 during low load periods, both exceeding typical industry performance, therefore greatly reducing annual energy consumption and lowering peak electrical events, supporting the broader electrical network.

Water Positive:
Aspirational Target:

- A water positive outcome

- Initiative of treatment and reuse of a proportion of on-site rainwater / stormwater catchment.
- On-site waste water treatment and water recycling.
- *C1 response:*
- Connection to Barangaroo South's recycled water treatment plant (RWTP) which incorporates sewer mining to offset potable water use within the precinct for irrigation, wash-down and toilet flushing. The RWTP is sized to treat all captured volumes from the Barangaroo South precinct plus provide an additional 295,000 L/day sewer mining for export to effectively zero the potable water consumption of the precinct
- Selection of low flow fittings and controls to minimise water use.
- Stormwater run-off from the site will be treated as part of the precinct wide stormwater strategy.
- A rainwater tank is proposed to capture water for irrigation purposes.

Zero Waste:
Initiative:

- 97% diversion of construction waste from landfill by weight.

C1 response:

- Recycling of construction waste in accordance with the Barangaroo South (Stage 1) Waste Management Plan to target 97% diversion of construction waste.
- Operational waste to landfill reduction strategies through onsite separation of waste.

Sustainable Transport:

Target:

- A new connection/entry point for the CBD (with provision for light rail, ferries, and the Barangaroo Pedestrian Link).
- Infrastructure and support for cyclists and pedestrians including End of Trip showers, lockers and bicycle storage.

C1 response:

- C1 is well serviced by public transport and pedestrian links as part of the broader public domain and precinct works.

Landscape and Biodiversity:

- Target:
- Use of native flora and encourage habitats for fauna.
- Inclusion of water-sensitive urban design.
- Planning for climate change.
- Landscaped public spaces.

C1 response:

- A green roof is proposed that will reduce the heat island effect, reduce stormwater run-off and increase biodiversity.
- Plantings are proposed for C1 at ground and on level 6 northern terrace.

4.0 Sustainability Contribution

The proposed SSDA will address the sustainability requirements included in the Statement of Commitments of the approved Concept Plan. Through addressing these requirements, the project also addresses the relevant Ecologically Sustainable Development (ESD) SEARs that are summarised as follows:

- Detail how ESD principles will be incorporated into the design, construction and ongoing operation phases of the development.
- Describe measures to be implemented to minimise consumption of resources, energy and water, including details of alternative energy and water supplies, rainwater harvesting, proposed end uses of potable and non-potable water, demonstration of water sensitive urban design and any water conservation measures.
- Demonstrate that the environmental performance of the proposed development has been assessed against a suitably accredited rating scheme to meet industry best practice.

The table below summarises the approved Concept Plan commitments and confirms how the project will respond to each. As these commitments are generally greater or more specific than the SEARs, the responses are considered to also address the SEARs.

Category	Commitment	Approved Concept Plan	C1 SSDA
General ESD	78	There is to be an environmental focus on the Water, Energy, Micro-Climate, Environmental Quality/Amenity, Landscape, Transport, Waste and Materials strategies for the development. Each building on site will achieve the primary benchmark of a "6star" standard of Commercial: Green Star 5 star, and Residential: Green Star Residential score >60, and each development will be required to demonstrate how it satisfies each of the following Key Performance Indicators for each of the ESD focus areas referred to below.	The building will achieve a 6 Star Green Star rating under the Design and As-Built tool. The following is a summary of the proposed features for C1 which will contribute to this rating: • Strong passive design response including external shading and high performance glazing to minimise energy use, provide for high indoor environmental quality (IEQ), and maintain access to views and daylight. • Selection of materials, adhesives and sealants to minimise VOC and formaldehyde off-gassing as well as lower embodied carbon of the building. • Connection to site wide infrastructure including the stormwater system, district cooling plant and recycled water plant. • Inclusion of a rooftop solar photovoltaic array. Minimum target capacity is 134kWp that is to be confirmed during design development and procurement.

Category	Commitment	Approved Concept Plan	C1 SSDA
Water	79	There is to be a 35% reduction in Potable Water Consumption compared to a standard practice development and a 40% reduction in flow to sewer compared to a standard practice development.	The 35% reduction in potable water demand is met through low flow fixtures, appropriate demand controls for high volume kitchen sinks, and use of recycled water from the precinct recycled water plant for flushing. A 4 kL rainwater tank is proposed to harvest rainwater and reuse for irrigation (where required). This may be increased during design development to accommodate fire system test water. The building will be provided with chilled water from the district cooling plant, with heat rejection via the central harbour heat rejection system, which greatly reduces annual energy and water consumption compared to equivalent air and water cooled plant. C1 will connect to the Barangaroo South Recycled Water Treatment Plant which will greatly reduce the buildings potable water consumption.

Category	Commitment	Approved Concept Plan	C1 SSDA
Energy	80	There is to be a 35% reduction in Greenhouse Gas Emissions compared to a standard practice development. 20% of power is to be purchased from low impact, renewable sources or alternatively there should be a 20% reduction in GHG emissions through carbon offsets.	The building envelope and glazing selection for C1 will consider managing winter heat loss and summer solar gains while maintain a transparency to visible light to enable significant lighting energy savings. Façade typology based on concept design analysis which determined the permissible solar loads and subsequent solar control options. The building will connect to the district cooling plant which will provide superior cooling efficiency relative to packaged type plant that would typically be used for this size of building. The use of LED lighting will result in a significant energy reduction relative to fluorescent lighting historically used in this type of application. A combination of demand side initiatives will enable the building to achieve the performance level targeted. Building C1 is to be designed and constructed so as to be capable of operating at no less than 25% better than the 5 Star NABERS Energy requirement determined on the basis of the NABERS assumptions specified in Schedule 5 of the PDA. Additionally, as part of the Barangaroo South precinct, C1 will participate in the carbon neutral scheme through the purchase of voluntarily retired renewable energy certificates (RECs) or other offsets.
Micro-Climate	81	Key public open spaces (parks and squares) are to receive direct sunlight in mid-winter.	C1 will not reduce sunlight to key public open spaces. Overshadowing of public spaces already exists from other surrounding buildings.
Landscape	82	Primarily non-invasive species are to be used on the site.	This requirement will be met through the choice of appropriate plant species on the roof, level 6 terrace and on the ground plane.

Category	Commitment	Approved Concept Plan	C1 SSDA
Transport	83	Ensure that there is sufficient public transport to achieve points under the public transport credit for Green Star Rating Tools for commercial buildings and a future Green Star tool for residential buildings.	Proximity to Wynyard station trains and buses within short walking distances will ensure a high score in the Green Star Sustainable Transport credits. C1 will benefit from a level of End-of Trip amenities provide in the shared basement.
Waste	84	Centralised recycling areas are to be provided in all buildings and 100% of waste bins allow for waste separation.	Waste collection areas in the basement (separate application) have been provided allowing for the streaming of waste and recyclables from C1. The operational waste management plan requirements will be included within the tenant fitout guidelines. Food and wet waste will be separated and to supply a waste to energy scheme as part of the precincts waste management strategy
Wind	85	Wind tunnel modelling and verification of proposed treatments will be carried out at the building design application stage due to the significant exposure of the site to the southerly and westerly winds. Any development proposal for the southern portion of the site should be subjected to a wind tunnel study, carried out in accordance with the procedures outlined in industry recognised guidelines such as the Australasian Wind Engineering Society Quality Assurance Manual.	This is addressed in a separate wind report as per the commitment.

5.0 Conclusion

The C1 SSDA supports the sustainability aspirations set for the Barangaroo South precinct and addresses the project SEARs. The precinct-wide sustainability initiatives such as the district cooling plant with harbour heat rejection, on-site renewables strategy and precinct recycled water plant are supported within this plan. These initiatives are essential to ensure the precinct achieves the many sustainability objectives.

The C1 project aims to deliver a sustainable building, with low operational energy consumption, reduced potable water use, minimisation of waste to landfill, and appropriate materials selection while at the same time maintaining a high level of indoor environmental quality.