



State Significant Development Application SSD 15_6957 Environmental Impact Statement



Crown Sydney Hotel Resort

Barangaroo South

Submitted to Department of Planning & Environment
On Behalf of Crown Sydney Property Pty Ltd

Volume 1 of 1

July 2015 ■ 13351

Reproduction of this document or any part thereof is not permitted without prior written permission of JBA Urban Planning Consultants Pty Ltd.

JBA Urban Planning Consultants Pty Ltd operates under a Quality Management System. This report has been prepared and reviewed in accordance with that system. If the report is not signed below, it is a preliminary draft.



Double click to insert signature
Benjamin Craig

8/07/2015

This report has been reviewed by:



Double click to insert signature
Lesley Bull

8/07/2015

Contents

1.0	Introduction	1
1.1	Overview of Proposed Development	1
1.2	Background to the Development	1
1.3	Objectives of the Development	8
1.4	Analysis of Alternatives	9
1.5	Secretary's Environmental Assessment Requirements	10
1.6	Project Team	16
2.0	Consultation	18
2.1	Stakeholder Consultation	18
2.2	Council and Agency Consultation	20
3.0	Site Analysis	22
3.1	Site Location and Context	22
3.2	Site Description	23
3.3	Land Ownership and Description	23
3.4	Existing Development and Structures	24
3.5	Traffic and Transport	27
3.6	Physical Characteristics	30
3.7	Vegetation	33
3.8	Surrounding Development	34
4.0	Description of the Development	35
4.1	Overview of Proposal	35
4.2	Site Preparation and Staging	36
4.3	Development Objectives	38
4.4	Design Objectives	39
4.5	Numerical Overview	41
4.6	Vehicular Access and Parking	43
4.7	Pedestrian Circulation and Access	44
4.8	Facade Treatment	45
4.9	Landscaping, Licensed Areas and Terraces	46
4.10	Signage	47
4.11	Operational Details	48
4.12	Environmentally Sustainable Development	51
4.13	Construction Hours	52
5.0	Environmental Assessment	53
5.1	Consistency with Relevant EPIs, Policies and Strategies	53
5.2	Barangaroo Concept Plan (Mod 8)	57
5.3	Design Excellence	67
5.4	Urban Design and Built Form	69
5.5	Residential Amenity	80
5.6	Overshadowing Impacts	85
5.7	Wind	86
5.8	Reflectivity	88
5.9	Signage	89
5.10	Transport and Accessibility	92
5.11	Security and Safety	94
5.12	Social Impacts	96
5.13	Economic Impact	97

Contents

5.14	Climate Change and Sea Level Rise	98
5.15	Marine Ecology	99
5.16	Heritage	100
5.17	Archaeology	102
5.18	Operational Noise and Vibration	103
5.19	Navigation Impacts	104
5.20	Fire Safety	105
5.21	Stormwater and Drainage	105
5.22	Infrastructure and Utilities	108
5.23	Building Code of Australia (BCA) and Access	109
5.24	Structural Engineering	110
5.25	Geotechnical	110
5.26	Contamination	110
5.27	Operational Waste Management	117
5.28	Ecologically Sustainable Development	118
5.29	Sydney Observatory Impacts	121
5.30	Construction Management	125
6.0	Environmental Risk Assessment	133
7.0	Mitigation Measures	139
8.0	Justification and Conclusion	142

Figures

1	Concept Plan (Mod 8) proposed Development Block Layout	4
2	Locality Plan	22
3	Site Plan	23
4	Barangaroo Metro Station	29
5	Photomontage of proposed development, from the North West	35
6	Photomontage of the proposed development, including Globe Harbour in the foreground	36
7	Photomontage of the proposed development, as viewed from the south west	36
8	Stage 1C Remediation and Earthworks Area	37
9	Land use mix	42
10	Ground Floor Pedestrian Access and Permeability	45
11	Building Identification Signage	48
12	CSHR sculptural base	70
13	CSHR curved geometry	70
14	Concept Plan (Mod 8) Building Envelope vs proposed CSHR building	71
15	Building Envelope Analysis	71
16	Different types of stone veil used on podium	72
17	Tower glazing	73
18	CSHR building at night	73
19	Podium Façade showing stone veil	74
20	Western façade and waterfront promenade	75
21	Southern façade and public domain including Globe Harbour	75

Contents

22	Lime Street	76
23	Stormwater Catchment Contributors	106
24	Sun, Moon, Planets, Ring Nebula and Star Albireo view corridor	124
25	Southern Cross and Nearby Objects view corridor	124
26	Risk Assessment Matrix	133

Tables

1	Summary of Concept Plan Modifications	2
2	Secretary's Environmental Assessment Requirements	10
3	Consultation methods	19
4	Land use by level	42
5	Apartment mix	43
6	Summary of consistency with relevant Strategies, EPIs, Policies and Guidelines	53
7	Compliance with Concept Plan (Mod 8) Block Y GFA and Height Controls	57
8	Compliance with relevant design solutions in Part 4 of the Guidelines	59
9	Visual impact matrix	77
10	Assessment against the relevant Apartment Design Guide requirements	80
11	Daylight Access to Residential Units on 21 June	84
12	Assessment of heritage impact on surrounding heritage items	100
13	Background Noise and Construction Noise Management Levels	103
14	Patron Noise Impacts on Residential Receivers dBA	104
15	Soil and Groundwater Site Specific Target Criteria	112
16	Background Noise and Construction Noise Management Levels	127
17	Noise Impacts on Residential Receivers dBA	128
18	Environmental Risk Assessment	134
19	Mitigation Measures	139

Contents

Appendices

- A** Secretary's Environmental Assessment Requirements
Department of Planning and Environment
- B** Site Survey Plan
Rygate & Company Pty Ltd
- C** ESD Development Application Report
ARUP
- D** Visual and View Impact Assessment Report
JBA
- E** PAN-OPS Building and Crane Approvals
Department of Infrastructure and Regional Development
- F** Accessibility Review
McKenzie Group Consulting
- G** Pedestrian Wind Study
RWDI
- H** Reflectivity Study
ARUP Pty Ltd
- I** Transport Assessment
ARUP Pty Ltd
- J** Travel Demand Management Plan
ARUP Pty Ltd
- K** Construction Traffic Management Plan
ARUP Pty Ltd
- L** Crime Prevention Through Environmental Design Report
JBA
- M** Social Impact Assessment
Macro Plan Dimasi
- N** Climate Change and Sea Level Rise Report
ARUP
- O** Statement of Heritage Impact
TKD Architects
- P** Archaeological Statement
Casey + Lowe

Contents

- Q** Construction and Operational Noise Report
Wilkinson Murray
- R** Navigation Impact Assessment
Royal Haskoning DHV
- S** Fire Safety Statement
Rawfire
- T** Stormwater Management and Infrastructure Assessment
Cardno
- U** Consultation Summary Report
JBA
- V** BCA Assessment Report
McKenzie Group
- W** BASIX Assessment
ARUP Pty Ltd
- X** Structural Engineering Statement
Robert Bird Group
- Y** Geotechnical Overview Statement
Coffey
- Z** Remedial Action Plan + Addendum
AECOM
- AA** Site Audit Report + Interim Audit Advice
ENVIRON
- BB** Waste Management Plan
ARUP Pty Ltd
- CC** Marine Ecology Statement
Royal Haskoning
- DD** Sky View Impact Assessment
Lend Lease + UNSW Global
- EE** Construction Framework Environmental Management Plan
Lend Lease
- FF** Construction and Operational Air Quality Review
Wilkinson Murray
- GG** Operational and Security Management Plan

Contents

Crown

HH SEPP65 Design Verification Statement

Bates Smart

Under Separate Cover – Architectural Design Statement

A Architectural Plans

Wilkinson Eyre Architects

B Landscape Plans

St Legere

C SEPP65 & RFDC Compliance Checklist

Wilkinson Eyre Architects + Bates Smart

D Shadow Study

Wilkinson Eyre Architects

E Visual Impact Photomontages

Virtual Ideas

F Signage Locations

Wilkinson Eyre Architects

G Architectural Visualisations

Wilkinson Eyre Architects

Statement of Validity

Development Application Details

Applicant name	Todd Nisbet / Crown Sydney Property Pty Ltd
Applicant address	Level 3, Crown Towers 8 Whiteman Street Southbank Victoria 3006
Land to be developed	Lot 200 in DP 1204948
Proposed development	Construction and use of the Crown Sydney Hotel Resort as described in Section 3.0 of this Environmental Impact Statement

Prepared by

Name	Benjamin Craig
Qualifications	B RTP, GD Property Economics
Address	Level 7, 77 Berry Street, North Sydney
In respect of	State Significant Development - Development Application

Certification

I certify that I have prepared the content of this EIS and to the best of my knowledge:

it is in accordance with Schedule 2 of the Environmental Planning and Assessment Regulation 2000;

all available information that is relevant to the environmental assessment of the development to which the statement relates; and

the information contained in the statement is neither false nor misleading.

Signature



Name

Benjamin Craig

Date

8/07/2015

Executive Summary

Purpose of this Report

This submission to the Department of Planning and Infrastructure (the Department) comprises an Environmental Impact Statement (EIS) for a Development Application under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). It relates to the construction and use of the Crown Sydney Hotel Resort, at Barangaroo South, comprising a hotel, VIP gaming facilities and residential apartment building with associated retail and restaurant uses and a basement car park.

Barangaroo is identified as a State Significant Site in Schedule 2 of *State Environmental Planning Policy (State and Regional Development) 2011*. Development at Barangaroo with a capital investment value of more than \$10 million is State Significant Development (SSD) for the purposes of the EP&A Act. As the proposed development will have a capital investment value of more than \$10 million it is a State Significant Development.

The Secretary's Environmental Assessment Requirements (SEARs) were issued on 2nd April 2015. This submission is in accordance with the Department's guidelines for SSD applications lodged under Part 4 of the EP&A Act, and addresses the issues raised in the SEARs. The EIS has been prepared in accordance with Schedule 2 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) with regards to requirements for an EIS.

Overview of the Project

The State Significant Development Application (SSDA) seeks approval for:

- construction, fit out and use of a hotel, VIP gaming facilities and residential apartment building with associated retail and restaurant uses and a basement car park to accommodate parking and servicing allocated to the proposed uses within the development, comprising a total Gross Floor Area of approximately 77,500m² and a maximum building height of approximately 271 metres (RL 275);
- associated building signage; and
- provision of services and utilities required to service the building.

Landmark Building

Crown is proposing to develop and operate Sydney's first six-star luxury hotel resort at Barangaroo South. The Crown Sydney Hotel Resort will be a world-class tourist offering, helping Sydney compete with other global destinations and become a landmark attraction for millions of international and domestic visitors. Sydney's hotels are not competitive with the best luxury hotels in Asia and the city is missing out on a valuable segment of the Asian luxury tourist market. Sydney has a significant opportunity to capitalise on the enormous growth in Asian tourism – particularly high net worth tourists from China. To realise this opportunity, Sydney needs a luxury hotel resort that is designed, constructed and operated to the best world-class standards.

The Crown Sydney Hotel Resort will be a landmark building and a key tourist attraction.

To ensure that the Crown Sydney Hotel Resort is an architecturally iconic addition to Barangaroo and Sydney Harbour, an international design competition was conducted to identify a principal architect with an iconic design. Following the advice of an expert advisory panel, Crown selected Wilkinson Eyre's design for the Crown Sydney Hotel Resort. Crown and Wilkinson Eyre are committed to

ensuring that the Crown Sydney Hotel Resort is a landmark building that will complement Sydney icons like the Harbour Bridge and the Opera House. The futuristic design takes its inspiration from three twisting petals, featuring a white veil of sculptured glass rising above Sydney Harbour.

Wilkinson Eyre's founding director, Chris Wilkinson, commented:

"My ambition is to create a sculptural form that will rise up on the skyline like an inhabited artwork, clad in a white veil of glass with differing levels of transparency, striking a clear new image against the sky."

Source: Daily Telegraph (16 May 2013)

NSW Tourism

Crown Sydney will help New South Wales achieve its tourism goals.

Given the immense opportunity provided by tourists from China and other Asian countries, the world class quality of the Crown Sydney Hotel Resort and Crown's understanding of Asian visitors will assist New South Wales in meeting its ambitious tourism targets. The Commonwealth Government's 2012 'Australia in the Asian Century White Paper' suggested that the tourism industry needed to develop greater luxury experiences to attract Asian tourists, and singled out Crown's tourism offering as an example of what is required to succeed:

*"Importantly, the tourism industry needs to develop culturally relevant products to capitalise on growing Asian interest in Australia as a tourist destination. **This will mean developing sophisticated luxury urban tourism opportunities, such as those offered by Crown Limited, as well as showcasing Australia's outstanding natural beauty.**" [Our emphasis]*

Source: Australian Government, 'Australia in the Asian Century White Paper' (October 2012)

In addition, the Crown Sydney Hotel Resort will assist Sydney to compete with the best cities in the world for major international conferences and events and will provide a strategic addition to the stock of hotel accommodation in Sydney.

The Crown Sydney Hotel Resort will also help Sydney capture a greater share of the mainstream tourism segment.

The location of a globally recognised building on the harbour near the Sydney Harbour Bridge and the Sydney Opera House will also assist in attracting mainstream international tourists to Barangaroo. The design of the Crown Sydney Hotel Resort will allow the general public to access the ground floor of the luxurious building and also enjoy the restaurants and bars which will have views of Sydney Harbour and the Barangaroo precinct.

World Class VIP Gaming Facilities

The VIP gaming facilities at Crown Sydney will comprise world-class private gaming rooms and luxury gaming salons for international, interstate and local members. These facilities will be of a standard sufficient to compete against the best VIP gaming facilities in Singapore, Macau and Las Vegas. The VIP gaming facilities at Crown Sydney will significantly reduce the potential for problem gambling issues to arise given:

- There will be no poker machines;
- There will be no low limit tables; and
- The VIP gaming facilities will be for members and their guests only – no general public.

If these three criteria were applied to Crown Melbourne, only 5% of Crown Melbourne's local gaming customers would be playing in such a restricted gaming facility.

An Active and Vibrant Destination

Crown Sydney will help the New South Wales Government meet its objective of making Barangaroo a more vibrant precinct.

The Crown Sydney Hotel Resort will help the New South Wales Government meet its objective of making Barangaroo an active and vibrant destination, both during the day and at night. Andrew Wilson, Lend Lease's Managing Director of Barangaroo South recently outlined the major benefits Crown Sydney would bring to the Barangaroo precinct including:

*"Social – by enriching the mix of uses and activation along the waterfront to provide a vibrant area during and beyond office hours, and at weekends.
Visual – by creating an architectural "post card" statement along the foreshore and an iconic marker for Barangaroo and for Sydney."*

Source: Letter from Lend Lease, 'World class hotel at Barangaroo South' (18 March 2013).

The Crown Sydney Hotel Resort will utilise world's best practice design and will be sympathetic to the surrounding environment at Barangaroo South and Barangaroo Central to create a unique opportunity for tourists to experience the proposed cultural amenities and parklands. The hotel will integrate with the cultural and public space at the heart of Barangaroo South and serve as a destination for both locals and visitors. It will be vibrant and active; celebrate its unique location and position on the harbour; and become a focal point for the western edge of the city that is loved and embraced by Sydneysiders.

Status of the Crown Sydney Hotel Resort

In November 2013, the NSW Parliament has passed legislation enabling Crown Sydney to offer VIP gaming on a designated site on Barangaroo South adjacent to Sydney Harbour. The NSW Independent Liquor Gaming Authority issued a restricted gaming licence to Crown Sydney in July 2014 which permits the operation of VIP gaming facilities within the Crown Sydney Hotel Resort from November 2019 onwards. The development of Crown Sydney remains conditional on the granting of all necessary planning approvals.

The Site

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 a range of new development dominated by large CBD commercial tenants to the south.

The Barangaroo site has been divided into three distinct redevelopment areas (from north to south) – the Headland Park, Barangaroo Central and Barangaroo South, and has been subject to multiple investigations that detail the physical and natural characteristics of the site.

The area of land within which development is proposed under this Development Application, comprises land within Barangaroo South generally known and identified in the proposed Concept Plan (Modification 8) as Blocks 1, 2, 3, 4A, 4B, X and Y and the area of the foreshore between Block Y and Darling Harbour.

At the time of the initial Concept Plan Approval, the Barangaroo site comprised an open concrete/bitumen apron largely reclaimed over water. Construction under separate planning approvals has started within the majority of the Development Application site.

Planning Context

Section 5.0 of the EIS considers all applicable legislation in detail. The development is consistent with and complies with all the relevant strategic policies, environmental planning instruments, plans and guidelines, and proposed Modification 8 to the approved Concept Plan (as modified). The site is zoned B4 Mixed Use. The proposed development is permissible with consent and meets the objectives of the proposed zone.

Environmental Impacts and Mitigation Measures

This EIS provides an assessment of the environmental impacts of the project in accordance with the SEARs and sets out the undertakings made by Crown Sydney Hotel Resort to manage and minimise potential impacts arising from the development. It demonstrates that the proposed development is satisfactory with respect to:

- Urban design, built form and design excellence;
- Visual and view impact (including sky view loss);
- Public domain and public access;
- Residential amenity & SEPP65;
- Remediation;
- Overshadowing;
- Wind impacts;
- Reflectivity;
- PAN-OPS and Sydney airport prescribed air-space;
- Transport, traffic, parking and accessibility;
- Climate change and sea level rise;
- Marine ecology;
- Economic and social impact;
- Stormwater and waste-water;
- Environmental sustainability;
- Ecologically sustainable development;
- Archaeology and European heritage;
- Operational noise and vibration;
- Air quality and odour;
- Operational management;
- CPTED, safety and security;
- Building Code of Australia and accessibility;
- Fire safety;
- Infrastructure and utilities;
- Structural engineering;
- Geotechnical constraints;
- Operational waste management;
- Environmental, construction and site management, including construction noise and vibration impacts, construction air quality, construction traffic

management, construction waste management and erosion and sediment control.

All measures that have been recommended as part of the detailed technical studies to mitigate potential environmental impacts have been incorporated into the proposed development, or are included in the Mitigation Measures at Section 7.0.

Conclusion and Justification

The EIS addresses the Secretary's Environmental Assessment Requirements (SEARs), and the proposal relates to the Crown Sydney Hotel Resort. The potential impacts of the development are acceptable and are able to be managed. Given the planning merits of the proposal, the proposed development warrants approval by the Minister for Planning and Infrastructure.

1.0 Introduction

This Environmental Impact Statement (EIS) is submitted to the Department of Planning & Environment pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) in support of a State Significant Development (SSD) application for the construction and use of the Crown Sydney Hotel Resort, at Barangaroo South, comprising a hotel, VIP gaming facilities and residential apartment building with associated retail and restaurant uses and a basement car park.

The proposed Crown Sydney Hotel Resort is located entirely within the Barangaroo Site, which is identified as a State Significant Development Site in Schedule 2 of *State Environmental Planning Policy (State and Regional Development) 2011*. Development at Barangaroo with a capital investment value of more than \$10 million is SSD for the purposes of the EP&A Act.

The report has been prepared by JBA on behalf of Crown Sydney Property Pty Ltd, and is based on the Architectural Drawings provided by Wilkinson Eyre Architects and provided under separate cover, and other supporting technical information appended to the report (see Table of Contents).

This EIS has been prepared in accordance with the requirements of Part 4 of the EP&A Act, Schedule 2 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation), and the Requirements of the Secretary of the Department of Planning and Infrastructure for the preparation of the EIS (SEARs), which are included at **Appendix A**. This EIS should be read in conjunction with the supporting information and plans appended to and accompanying this report.

1.1 Overview of Proposed Development

This application seeks approval for the following development:

- construction, fit out and use of a hotel, VIP gaming facilities and residential apartment building with associated retail and restaurant uses and a basement car park to accommodate parking and servicing allocated to the proposed uses within the development, comprising a total Gross Floor Area of approximately 77,500m² and a maximum building height of approximately 271 metres (RL 275);
- associated building signage; and
- provision of services and utilities required to service the building.

1.2 Background to the Development

1.2.1 Approved Concept Plan

An international design competition for Barangaroo was held in 2005, attracting 139 entries from around the world. The winning design by Hill Thalys Architecture + Urban Projects, Paul Berkemeier Architects and Jane Irwin Landscape Architecture was announced in March 2006 together with a naming competition for the new headland precinct. The jury recommended key changes to the winning proposal which were required to be incorporated into the Barangaroo Concept Plan development.

The Concept Plan (MP06_0162) for Barangaroo South was approved in February 2007. It sets out the urban design and policy initiatives and is the statutory planning approval to guide the urban renewal of Barangaroo.

The approved Concept Plan has been modified seven times since originally being approved and the Statement of Commitments has been revised accordingly to correspond with these approved modifications.

The most recent approved modification is Concept Plan Modification No. 7 (Concept Plan (Mod 7)) which was approved on 11 April 2014. It provides for the use of a temporary concrete batching plant across the whole of the Barangaroo South site.

A summary of each of the approved modifications to the Concept Plan is provided in **Table 1** below.

Table 1 – Summary of Concept Plan Modifications

Modification	Status	Scope
Modification No. 1	Approved 25/09/2007	Correction of minor typographical errors in the concept plan Instrument of Approval and modification to design excellence requirements.
Modification No. 2	Approved 16/02/2009	Modification to seek an additional 120,000m ² of commercial floor space on the site distributed across Blocks 2, 3, 4 and 5.
Modification No. 3	Approved 11/11/2009	Amended design for the Headland Park and Northern Cove, removal of Block 8 and part Block 7, reduction of floor space by 18,800m ² and removal of the Sydney Ports Harbour Control tower.
Modification No. 4	Approved 16/12/2010	Modification to allow for a mixed use development involving a maximum of 563,965m ² of Gross Floor Area (GFA) contained within 7 blocks on a total site area of 22 hectares, an increase in height of a number of the proposed towers within Barangaroo South, the establishment of the new pier and landmark building extending into the Harbour; and reconfiguration and activation of the public waterfront area through the introduction of uses including retail and residential to the west of Globe Street.
Modification No. 5	Withdrawn	Modification to clarify wording within the Concept Plan relating to the distribution of total GFA within the Barangaroo site and to correct a number of minor typographical errors in the approval.
Modification No. 6	Approved 25/03/2014	Modification to realign several block boundaries, revise the approved urban design controls, modify several conditions relating to community floor space, and car and bicycle parking.
Modification No. 7	Approved 11/04/2014	Approval to add a temporary concrete batching plant to the approved range of uses intended for Barangaroo South.

1.2.2 Concept Plan Modification No. 8 (Mod 8)

The proposed Crown Sydney Hotel Resort development is the outcome of negotiations between Lend Lease and the NSW Government, including the

Barangaroo Delivery Authority, to relocate the landmark hotel approved as part of the Barangaroo Concept Plan (as amended) to a new location within the Barangaroo site.

To facilitate this outcome an application has been made to the Minister by Lend Lease to amend *State Environmental Planning Policy (Major Development) 2005* (the Major Development SEPP) and at the same time the Barangaroo Concept Plan Modification 8 seeks to include the proposed Crown Sydney Hotel Resort.

Both the amendment to the SEPP and Concept Plan (Mod 8) will establish the pattern of development, building envelopes, public domain concept, land uses and gross floor area distribution and traffic, access and parking arrangements for the ongoing development of the remaining parts of the Barangaroo South site.

Relevant to the proposed hotel development Concept Plan (Modification 8) seek to relocate the landmark hotel building (referred to as Block Y – see **Figure 1**), which is currently approved on a public pier extending into the harbour, back onto the area of the site in front of existing Blocks 4A, B and C. The proposed modifications to the Concept Plan for Block Y in response to its proposed new location on the site include:

- providing for retail and residential uses;
- increasing the amount of tourist uses (including VIP Gaming Facilities);
- increasing the maximum GFA for Block Y to 77,500m²; and
- increasing the maximum height for Block Y to RL 275 (see **Figure 1**).

The proposed Concept Plan (Mod 8) also results in the following amendments which affect the remainder of the Barangaroo site:

- The total Barangaroo South site area has been reduced from 7.8ha to approximately 7.6ha as a result of:
 - reconfiguration of the hotel pier for public uses; and
 - reconfiguration of the waterfront promenade adjacent to the hotel.
- The design of the Southern Cove has been amended and its location slightly modified.
- The hotel pier approved in Concept Plan (Mod 4) has been reduced in size and relocated such that it extends approximately 15m south of the existing site boundary and is shortened by approximately 20m. The pier is now proposed to accommodate public space and a 2-3 storey community building of approximately 3,000m², with a minimum of 2,000m² of community uses.
- The maximum tourist uses GFA permitted has been increased to 59,000m² and located specifically within the Barangaroo South site.
- The total GFA on the Barangaroo South site has been increased to a new maximum of 535,186m² (an 8.5% increase).
- The total GFA on the entire Barangaroo Concept Plan site has been increased to 605,411m². Noting a further increase is proposed within Barangaroo Central as part of Concept Plan (Mod 9).
- The public domain has been redistributed to continue to provide approximately 50% of the Barangaroo South site as publicly accessible space.
- In order to offset the potential loss of public domain that would otherwise occur as a result of the relocation of the landmark hotel building back on land, the maximum heights of the buildings within the modified 'Block 4' is to be increased and the footprints of those buildings rationalised. Maximum heights within Blocks 1-3 and X remain as per the approved Concept Plan, or

are reduced, while maximum heights in Block 4 are proposed to range from approximately RL107 to RL250 across three residential buildings.

To assist with the assessment framework for the future applications for development on the Barangaroo site the approved Urban Design Controls for the Concept Plan have been consolidated and integrated with other key elements of the Concept Plan into the 'Barangaroo South Design Guidelines'. The Barangaroo South Design Guidelines will replace the Urban Design Controls in their entirety and incorporate the key elements of the Rogers Stirk Harbour + Partners (RSHP) Master Plan that will be used to guide the detailed design of the future buildings.

A proposed hotel development has been assessed against the proposed Concept Plan (Mod 8) amendments, the SEPP amendment and the draft Barangaroo South Design Guidelines document in Section 5.0 of this report.

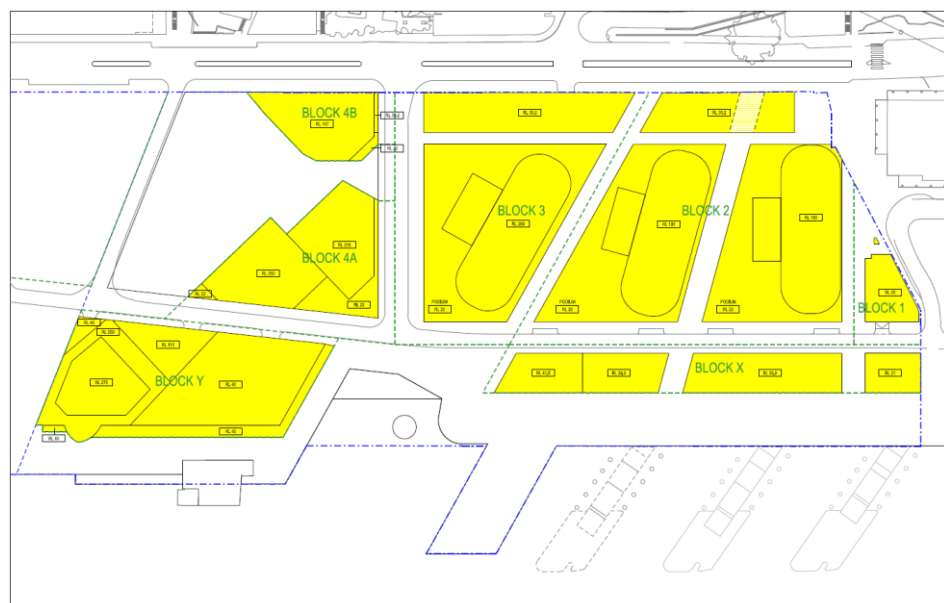


Figure 1 – Concept Plan (Mod 8) proposed Development Block Layout

Source: Lend Lease

1.2.3 Concept Plan (Mod 9)

The Barangaroo Delivery Authority has obtained SEARs for a further modification to the Concept Plan, referred to as Concept Plan (Mod 9), which relates to Barangaroo Central and the Headland Park.

On the basis of information received from the Barangaroo Delivery Authority, it is understood that Concept Plan (Mod 9) will:

- Update the Concept Plan as it relates to Barangaroo Central to reflect the master planning being undertaken by Skidmore Owings & Merrill (SOM) and Andersen Hunter Horne.
- Provide for the future use and GFA within the space created within the headland park for a future 'cultural facility'.
- Consider the existing gross floor area of Moores Wharf and the Dalgety Bond Store, not addressed in the maximum GFA calculations included in the Concept Plan.

Where appropriate the environmental assessment outlined in this EIS has been prepared in the context of the changes being proposed as part of Concept Plan

(Mod 9). Notwithstanding this, both applications are completely independent of each other and neither relies on the other to be determined.

1.2.4 Barangaroo Delivery Authority

The Barangaroo Delivery Authority (BDA) was established under the *Barangaroo Delivery Authority Act 2009* to manage the redevelopment of Barangaroo and to deliver world class benchmarks in urban design, public domain and sustainability.

The creation of the BDA reinforces the NSW Government's commitment to the delivery of Barangaroo in a coordinated and financially responsible manner.

The BDA owns the Site and has provided landowner's consent to this SSDA.

1.2.5 Stage 1C Remediation and Earthworks

A separate SSDA has been lodged with the Department of Planning and Environment for remediation and earthworks. Referred to as the Stage 1C remediation and earthworks SSDA, this application will facilitate the future development of an underground basement car park and the hotel building through:

- carrying out of remediation and validation within the Stage 1C remediation and earthworks area to ensure it is suitable for the intended future uses of the land;
- construction of a perimeter retention wall system and internal stabilising walls (called the 'Stage 1C groundwater retention wall system') to the west of Block 4B and Block 4C. The Stage 1C groundwater retention wall system would be fully integrated with the Stage 1B retention wall system (as specified by Lend Lease in the EIS for SSD 5897), with direct connections to create a unified groundwater retention wall system across Stage 1B and Stage 1C; and
- bulk excavation within the perimeter of the Stage 1C groundwater retention wall, and the installation of lateral restraining structures to support the perimeter retention wall system.

1.2.6 Unsolicited Proposal

In January 2012 the NSW Government launched its *Guide for Submissions and Assessment of Unsolicited Proposals* (the Guide) in order to encourage the private sector to put forward its best ideas and innovations for the development and delivery of new infrastructure and services in NSW. The Guide (which was updated in February 2014) identifies that all proposals will be subject to a four stage assessment process as follows:

- Pre-Submission Concept Review Stage – a pre-lodgement meeting between the Proponent and the Government to formally explore whether the proposal is likely to meet the Stage 1 assessment criteria, in particular the uniqueness criteria.
- Stage 1 –
 - Initial Submission and Preliminary Assessment – the Government will undertake a Preliminary Assessment of the proposal to determine if the submission constitutes an Unsolicited Proposal and therefore is subject to Stage 1 assessment.
 - Strategic Assessment of Initial Submission – a comprehensive initial assessment of the proposal to identify the potential benefit to the Government of further consideration and development with the Proponent. The Proponent is advised if the proposal can progress to Stage 2.

- Stage 2 – the Proponent and Government work cooperatively in the development and assessment of the detailed proposal. The Proponent is advised if the proposal can progress to Stage 3.
- Stage 3 – the Proponent and Government negotiate the Final Binding Offer which involves the finalisation of all outstanding issues with a view to entering into a binding agreement, should the Government accept the final offer.

In September 2012 Crown commenced the Unsolicited Proposal Process for the proposed Crown Sydney Hotel Resort. The subject of the proposal was the design, construction and operation of Sydney's first six-star luxury hotel resort at Barangaroo South on Sydney Harbour. The iconic hotel was identified as being world-class and featuring 350 hotel rooms and suites, 80 luxury apartments, signature restaurants, bars, luxury retail outlets, pool and spa facilities, conference rooms and VIP gaming facilities.

The process continued into the second half of 2013 when, at the end of Stage 3, Crown entered into a legally binding agreement with the NSW Government whereby Crown agreed to proceed with the development of the Crown Sydney Hotel Resort at Barangaroo South, Sydney, and the subsequent commencement of VIP gaming from 2019. In return, the NSW Government agreed to table legislation proposing that a restricted gaming facility licence would be issued in relation to the specific site where Crown Sydney was proposed to be developed at Barangaroo South. Completion of the Crown Sydney Hotel Resort is subject to a number of conditions identified in the Stage 3 Assessment Report including seeking development consent, the objective of this SSD application.

1.2.7 Design Competition

An international design competition was conducted under the supervision of an expert advisory panel to identify a principal architect with an iconic design for the Crown Sydney Hotel Resort. Expressions of interest were sought from eight of the world's leading architecture firms with experience in similar hospitality projects, and more specifically, experience in designing large scale resorts and iconic public buildings. The EOI included requirements to design and deliver an iconic world-class building on Sydney Harbour that would become a destination for international tourists. The firms were:

- Adrian Smith and Gordon Gill Architecture, Chicago;
- Kohn Pedersen Fox Associates, New York;
- Pelli Clarke Pelli Architects, New Haven, Connecticut;
- Renzo Piano Building Workshop, Genoa;
- Rocco Design Architects, Hong Kong;
- UN Studio, Amsterdam;
- Wilkinson Eyre Architects, London; and
- 5 Plus Design, Hollywood, California.

From these eight firms a shortlist was selected and invited to participate in an invitation-only design competition for the Principal Architect and Concept Design for the Crown Sydney Hotel Resort. The shortlist comprised:

- Adrian Smith and Gordon Gill Architecture;
- Kohn Pedersen Fox Associates;
- Wilkinson Eyre Architects, London; and
- Renzo Piano Building Workshop, Genoa.

Requests for Proposals were issued in December 2012 and submissions were due in April 2013. The firms presented their designs to a jury panel in Sydney at the end of April. The panel consisted of representatives from Crown, Lend Lease and the Barangaroo Delivery Authority, as well as a prominent architect representing the then NSW Department of Planning and Infrastructure, and an observer from the City of Sydney. The jury unanimously recommended Wilkinson Eyre Architects (WEA), and in May 2013 Crown announced that WEA would be the Principal Architect for the Crown Sydney Hotel Resort.

The futuristic design takes its inspiration from three twisting petals, featuring a white veil of sculptured glass rising above Sydney Harbour. Wilkinson Eyre's founding director, Chris Wilkinson, said of the design (Daily Telegraph, 16 May 2013):

'My ambition is to create a sculptural form that will rise up on the skyline like an inhabited artwork, clad in a white veil of glass with differing levels of transparency, striking a clear new image against the sky.'

1.2.8 Amending Legislation

On 27 November 2013, the NSW Parliament passed certain amendments to the Casino Control Act 1992 (NSW) whereby it was agreed that a licence for a restricted gaming facility would be issued in relation to Crown Sydney. The legislation mandated that the licence could only be issued in relation to the site where Crown Sydney was proposed to be developed at Barangaroo South.

1.2.9 Restricted Gaming Licence

Following the passing of the amending legislation by the NSW Parliament, Crown Sydney Gaming Pty Ltd was issued a restricted gaming licence by the NSW Independent Liquor and Gaming Authority. The key features of the Restricted Gaming Licence and the terms of the further Agreements include:

- The Crown Sydney Restricted Gaming Licence has a term of 99 years;
- Crown has paid a Licence Fee to the New South Wales Government of \$100 million;
- No poker machines will be permitted at Crown Sydney;
- Gaming in the Restricted Gaming Facility at Crown Sydney will be subject to minimum bet limits;
- Only members and guests will be permitted to participate in gaming at the Restricted Gaming Facility at Crown Sydney – no access to the general public;
- Gaming at Crown Sydney cannot commence until after 19 November 2019;
- Smoking will be permitted in the Restricted Gaming Facility at Crown Sydney provided that international best practice standard air quality equipment is installed, properly maintained and is subjected to regular testing;
- Gaming taxes to be paid to the State by Crown Sydney are:
 - Non-rebate Duty on Non-rebate Gaming Revenue of 29%, which includes the 2% Responsible Gambling Levy and GST; and
 - Rebate Player Duty on Rebate Gaming Revenue of 10%, which includes GST.
- Crown has guaranteed to the New South Wales Government that:
 - The aggregate of the gaming taxes received by the State (on a normalised basis) from Crown Sydney in the first three years of gaming at Crown Sydney will be equal to at least three times the gaming taxes received

from The Star (on a normalised basis) in the year prior to gaming commencing at Crown Sydney; and

- During the first 15 years of operation of Crown Sydney, the State will receive at least \$1 billion in gaming taxes (inclusive of the Licence Fee) from Crown;
- The Restricted Gaming Licence cannot be amended without Crown's consent;
- Given Crown's commitment to undertake this significant investment in Sydney's first six-star hotel resort, the State has agreed to compensate Crown for certain events, including if the State amends or cancels the Restricted Gaming Licence (other than with Crown's consent or as a result of disciplinary action for breach of licence) or if the State increases the rates of gaming tax in the first 20 years of operation of Crown Sydney; and
- Crown has agreed to a package of security documents for its payments and obligations to the State and ILGA.
- The restricted gaming facility licence only applies to the specific site at Barangaroo South where Crown Sydney is proposed to be developed.

The further Agreements which have been signed with the New South Wales Government and ILGA are a part of the licensing process and give effect to the Framework Agreement with the New South Wales Government. Those further Agreements include the following documents:

- Duty and Responsible Gambling Levy Agreement – under which Crown agrees to pay gaming taxes to the State;
- Financial Arrangements Agreement – under which Crown provides certain guarantees as to the amount of gaming tax which will be paid to the State;
- State Crown Financial Deed – under which Crown agrees to provide security for its obligations and the State agrees to compensate Crown in certain circumstances;
- VIP Gaming Management Agreement – which sets out certain requirements for the operation of the Restricted Gaming Facility; and
- Guarantees from Crown Resorts Limited and certain of its key subsidiaries.

1.3 Objectives of the Development

The overriding objective of the Crown Sydney Hotel Resort is to introduce a landmark waterfront building to Sydney that is both timeless and iconic in nature. The hotel will integrate with the cultural and public space at the heart of Barangaroo South and serve as a destination for both locals and visitors that is vibrant and active, that celebrates its unique location and position on the harbor, and that becomes a focal point for the western edge of the city that is loved and embraced by Sydney-siders.

In addition, the Crown Sydney Hotel Resort aims to:

- provide Sydney's first six star luxury hotel resort at Barangaroo;
- ensure NSW can compete with domestic and international tourist destinations;
- allow Sydney to compete for international government, business and sporting events;
- assist NSW to take advantage of opportunities provided by the boom in outbound tourism from China and Asia;
- meet the demands of China's new middle class tourist sector;

- increase domestic tourism;
- help address a major shortage of hotel accommodation in Sydney; and
- attract high wealth tourists and VIP gaming players to Sydney.

1.4 Analysis of Alternatives

Strategic Need for the Proposal

The redevelopment of the overall Barangaroo site is the result of a long term strategic planning process which culminated in February 2007 when the NSW Minister for Planning and Infrastructure approved a Concept Plan to guide the urban renewal of Barangaroo.

Barangaroo South is the southern, 7.6 hectares of the overall Barangaroo site and is destined to become the most advanced financial district in Australia and the first large scale carbon neutral precinct of its kind in the country. With a mix of uses, including commercial, residential, retail and dining along with a new landmark hotel, on completion it will be home to around 1,200 residents, 23,000 office workers and more than 2.9 hectares of public space.

The success of Barangaroo will be influenced by the provision of a variety of uses, including significant new buildings. The Crown Sydney Hotel Resort, comprising tourism, retail and residential uses within an iconic built form, will contribute to the success of Barangaroo.

Alternative Options

Three options were available to Crown in responding to the identified need for a hotel within Barangaroo South.

Option 1: The Proposal

Option 1 involves providing the Crown Sydney Hotel Resort as proposed in this Development Application (described in Section 4). The proposal will ensure that a high quality hotel will be provided on the site that responds to the strategic need identified above.

Option 2: Do Nothing

While the hotel was originally proposed to be located on land that extended into the harbour, and has now been relocated onsite, a landmark building has always been envisaged as an essential component of Barangaroo. Not providing the Crown Sydney Hotel Resort would leave Barangaroo without a landmark building which would be an inappropriate outcome for a site of the strategic importance of Barangaroo.

The Crown Sydney Hotel Resort is essential to the overall Concept Plan for the site and not providing this iconic building will have a significant impact on the calibre of the built form of Barangaroo. Not providing the hotel also has wider ramifications for NSW and Australia more broadly, in relation to competition for domestic and international tourists, hosting events, and addressing a shortfall in hotel accommodation.

Given that Crown has entered into binding agreements with the NSW Government to proceed with the development of Crown Sydney, Crown does not consider that 'doing nothing' is a viable option.

Option 3: Alternative Designs

The Crown Sydney Hotel Resort represents the outcome of a Design Competition. While schemes from other high-calibre architects were received, the Wilkinson Eyre proposal was deemed to be the most innovative and therefore essential to achieving delivery of a landmark building.

1.5 Secretary's Environmental Assessment Requirements

In accordance with section 89G of the EP&A Act, the Secretary of the Department of Planning and Environment issued the requirements for the preparation of the EIS on 2nd April 2015. A copy of the Secretary Environmental Assessment Requirements (SEARs) is included at **Appendix A**.

Table 2 provides a detailed summary of the individual matters listed in the SEARs and identifies where each of these requirements has been addressed in this report and the accompanying technical studies.

Table 2 – Secretary's Environmental Assessment Requirements

Requirement	Location in EIS	
General		
The Environmental Impact Statement (EIS) must address the <i>Environmental Planning and Assessment Act 1979</i> and meet the minimum form and content requirements in clauses 6 and 7 of Schedule 2 the Environmental Planning and Assessment Regulation 2000.	Whole of Report	
Notwithstanding the key issues specified below, the EIS must include an environmental risk assessment to identify the potential environmental impacts associated with the development.	Section 6.0	
Where relevant, the assessment of the key issues below, and any other significant issues identified in the assessment must include: – Adequate baseline data – Consideration of potential cumulative impacts due to other development in the vicinity. – Measures to avoid, minimise, and if necessary, offset the predicted impacts, including detailed contingency plans for managing any significant risk to environment.	Sections 5.0, 6.0 & 7.0	
The EIS must be accompanied by a report from a qualified quantity surveyor providing: – A detailed calculation of the capital investment value (as defined in clause 3 of the Environmental Planning and Assessment Regulation 2000) of the proposal, including details of all assumptions and components from which the CIV calculation is derived. – An estimate of the jobs that will be created by the development – Certification that the information provided is accurate at the date of preparation.	Submitted under a separate cover	
Key Issues	Report / EIS	Technical Study
1. Environmental Planning Instruments, Policies & Guidelines Address the relevant statutory provisions applying to the site, contained in the relevant EPIs, including: – State Environmental Planning Policy (State and Regional Development) 2011; – State Environmental Planning Policy (Major Development) 2005; – State Environmental Planning Policy 55 - Remediation of Land; – State Environmental Planning Policy (Infrastructure) 2007; and – Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005. Address the relevant provisions, goals and strategic objectives in the following: – NSW 2021; – Plan for Growing Sydney; – Draft Sydney City Sub-Regional Strategy; – Residential Flat Design Code; – Barangaroo Integrated Transport Plan; – Barangaroo Housing Strategy; and – Casino Control Act.	Section 5.0	-
2. Barangaroo Concept Plan – Demonstrate consistency with the terms of approval of the	Section	-

Requirement	Location in EIS	
Barangaroo Concept Plan MP06_0162 (as modified). – Demonstrate consistency of the proposed development with the Housing Strategy for the Barangaroo precinct.	5.2	
3. Land Use and GFA – Provision of a table identifying the building's different land uses*, including a Floor by floor breakdown of GFA, total GFA and site coverage. * Retail uses must be separately defined as per the Standard Instrument. – If the proposed uses include pubs, bars, nightclubs or the like, detailed Plans of Management and Security Management Plans must be prepared.	Section 4.5	Architectural Design Statement (Under separate cover) Operation and Security Management (Appendix GG)
4. Design Excellence, Built Form and Urban Design – Outline the design process leading to the proposal and justify the suitability of the site for the proposal. – Demonstrate design excellence with specific consideration to the site's character, its layout, setbacks, architectural design, materials, articulation and detailing, amenity, views and vistas, open spaces and public domain, connectivity and street activation. – Address the height, bulk and scale of the proposed development within the context of the locality and surrounds. – Address retail tenancy fit-outs, shopfront design and signage.	Section 5.3	Architectural Design Statement (Under separate cover)
5. Visual and View Impacts – Identify important sight lines and visual connectivity to and through the site. – A visual impact assessment is to be provided to identify the visual changes and impacts on the site and its surrounds when viewed from key vantage points (see plans and documents section).	Section 5.4.3	Architectural Design Statement (Under separate cover) Visual and View Impact Assessment Report (and Appendix D)
6. Prescribed Airspace for Sydney Airport and Sydney Observatory Impacts – Identify any impacts of the proposal on the prescribed airspace for Sydney Airport. – Undertake an analysis of potential sky view loss and resultant impacts on the functioning of the Sydney Observatory telescopes and astronomical sightlines.	Section 5.4.4	PAN-OPS Approvals (Appendix E) Sky View Impact Assessment (Appendix DD)
7. Amenity – Outline and address the proposed development's impacts in terms of sunlight, natural ventilation, wind, reflectivity, visual and acoustic privacy, and safety and security. – The EIS must include: - a shadow diagrams report; and - wind effects report.	Sections 5.5 to 5.8	Architectural Design Statement (Under separate cover)
8. Ecologically Sustainable Development – Detail how ESD principles (as defined in clause 7(4) Schedule 2 of the EP&A Regulation 2000) will be incorporated in the design, construction and ongoing phases of the development. – Outline resource, energy and water efficiency initiatives, including the use of sustainable technologies and or/renewable energy. – Provide an integrated Water Management Plan including alternative water supply, proposed end uses of potable and non-potable water, water sensitive urban design and water conservation measures.	Sections 4.12 & 5.25	ESD Development Application Report (Appendix C)
9. Public Domain and Public Access – Identify proposed open space, public domain and linkages with and between other public domain spaces, including Hickson Road, other	Sections	Architectural

Requirement	Location in EIS
streets and lanes, and the harbour foreshore. - Detail and outline the interface between the proposed uses and the public domain. - Demonstrate safe, accessible, prioritised pedestrian path of travel at entries and exits to the basement car park and porte cochere. - Outline specific design features (if applicable): - footpaths and pavements, roads and/or rights of carriageways; - materials and finishes; - public art; - furniture and fixtures; - street lighting, pedestrian lighting and feature lighting; - edges, screens and fences; - walls, embankments and mounds; - steps, ramps, vehicle crossings, decks and pathways; - services where affected, utility poles, and service pits; - civil and stormwater infrastructure; - tree planting; - mass planting beds, planter boxes and individual plantings; and - bicycle parking.	4.9 & 5.4.2 Design Statement (Under separate cover)
10. Transport and Accessibility Impacts - Demonstrate consistency with the Barangaroo Integrated Transport Plan. - The EIS shall include a Traffic Impact Assessment that: - daily and peak hour vehicle, public transport, pedestrian and bicycle movements and existing traffic and transport facilities provided on the road network; - daily and peak traffic movements likely to be generated by the development, including peak traffic movements; - assessment of the existing and future performance of key intersections providing access to the site, and any upgrades (road/intersections) required as a result of the development. The assessment of the existing and future road network operations needs to consider the cumulative traffic volumes and focus on intersections in the north-west quadrant of the CBD in the vicinity of Barangaroo. The assessment needs to be supported by appropriate modelling and analysis to the satisfaction of Roads and Maritime Services; - details of the proposed number of car parking spaces and compliance with appropriate parking codes. It should demonstrate a minimalist approach to the provision of on-site parking, and how traffic generation (number of vehicles and time of access) will be managed in response to capacity limitations on the road network; - pedestrian and cycle connections/circulation and required upgrades to meet the likely future demand within the precinct and connections to the external networks, particularly the cycle network identified in the Sydney City Centre Access Strategy; - existing public transport services and opportunities for greater usage for residents, workers and visitors; - outline late night transport provision and demonstrate late night transport provision to support Crown Resort; - assessment of future transport needs associated with the Crown Resort, including a clear understanding of the travel task for all modes at different times of the day (peak, off-peak, and other peak periods relevant to the hotel/casino) and week; - demonstrate that additional people movements can	Section 5.9 Transport Assessment (Appendix I) Travel Demand Management Plan (Appendix J) Construction Traffic Management Plan (Appendix K)

Requirement	Location in EIS	Location in EIS
- be accommodated by the surrounding public transport network (Wynyard bus/rail interchange via Wynyard Walk, bus stops, future light rail on George Street and proposed ferry hub at Barangaroo South); - details of sustainable travel initiatives for residents, workers and visitors, particularly for the provision of end-of-trip facilities; - assessment of proposed loading dock provisions and access arrangements to loading docks; - details of existing and proposed vehicular access and car parking arrangements for workers and visitors (cars, coaches/buses & taxi ranks), including compliance with parking codes and Australian Standards, and measures to mitigate any associated traffic impacts and impacts on public transport, pedestrian and cycle networks; and - details of access arrangements for emergency and service vehicles (including vehicle type and likely arrival and departure times of service vehicles). - The EIS shall include an updated Transport Management and Accessibility Plan. - In relation to construction traffic: - assessment of cumulative impacts associated with other construction activities on the Barangaroo and Wynyard Precincts; - details of anticipated truck movements to and from the site; - details of access arrangements for workers to/from the site, emergency vehicles and service vehicle movements; - details of temporary cycling and pedestrian access during construction; - details of proposed construction vehicle access arrangements at all stages of construction; and - assessment of traffic and transport impacts during construction and how these impacts will be mitigated for any associated traffic, pedestrian, cyclist and public transport, including the preparation of a draft Construction Traffic Management Plan to demonstrate the proposed management of impact. This Plan needs to include vehicle routes, number of trucks, hours of operation, access arrangements and traffic control measures for all demolition/construction activities. - The EIS shall include an assessment of the impact on the operation of the proposed Barangaroo Ferry Hub including environmental impacts on the ferry hub and ferry customers such as shadow and wind impacts. This should also consider lighting design and any potential impact on navigational safety.		
11. Heritage - The EIS must include an assessment of the likely impacts of the proposal on any heritage and archaeological items and outline mitigation and conservation measures.	Sections 3.7.1 & 5.14	Statement of Heritage Impact (Appendix O) Archaeology Report (Appendix P)
12. Social impacts - Outline the social benefits and disbenefits of the proposal. - Prepare a Social Impact Assessment.	Section 5.11	Social Impact Assessment (Appendix M)
13. Economic impacts - Outline the economic benefits and disbenefits of the proposal.	Section 5.12	Social Impact Assessment (Appendix M)

Requirement	Location in EIS
14. Contamination – Demonstrate compliance with the requirements of SEPP 55. – If remediation works are required, the EIS must include a Remedial Action Plan (RAP). The RAP must be accompanied by a Site B audit statement prepared by an Environment Protection Authority (EPA) accredited site auditor and the RAP must be prepared in accordance with the contaminated land planning guidelines under section 105 of the <i>Environmental Planning and Assessment Act 1979</i> and relevant guidelines produced or approved under section 105 of the <i>Contaminated Land Management Act 1997</i>. – Relevant Policies and Guidelines: The current guidelines under section 145C of the <i>Environmental Planning and Assessment Act 1979</i> are the guidelines "Managing Land Contamination, Planning Guidelines, SEPP 55 Remediation of Land" 1998.	Sections 3.6.3 & 5.23 Remedial Action Plan + Addendum (Appendix Z) Site Auditors Report + Interim Audit Advice (Appendix AA)
15. Earthworks – Provide a detailed survey showing existing and proposed levels and proposal quantities of cut and fill necessary for the proposed works. – Provide details of the fill, including types and materials and their source. – Provide details of the location for the disposal of excess cut and the methodology of transportation to this location.	Section 1.2.5 Architectural Design Statement (Under separate cover)
16. Soil and Water – Undertake an assessment of the potential impacts on water quality of Sydney Harbour and associated marine ecology impacts. – Assess impacts on water quality of Sydney Harbour and surface and groundwater hydrology and quality including proposed management, mitigation and monitoring measures. – Include an integrated water management system including consideration of stormwater and wastewater. – Detail erosion, sediment and stormwater management and controls during construction and management and mitigation measures for the prevention of potential water quality impacts during construction. – Assess the potential impact of the development on groundwater flow paths and discharge flows. – Identification of any water licensing requirements or other approvals required under the Water Act 1912 or Water Management Act 2000. – Assess the geotechnical and contamination issues (including Acid Sulphate Soils) associated with the construction of the development. – Include a suitable water quality monitoring program. – Consideration of any impacts on groundwater dependent ecosystems. – Provide details of water supply including consideration of alternative water supply arrangements, water sensitive urban design and water conservation measures.	Section 5.18 Stormwater Management and Infrastructure Assessment (Appendix T)
17. Waste Management – Identify all potential sources of liquid waste and non-liquid wastes as defined in the EPA's Waste Classification Guidelines 2014. The EIS should identify any waste that will be stored, separated or processed on the site and identify the procedures to be adopted to minimise, manage, dispose of this waste in accordance with the relevant standards and guidelines. <i>Relevant Policies and Guidelines</i> – <i>Waste Classification Guidelines Part 1: Classifying Waste 2014 (EPA)</i> – <i>Waste Classification Guidelines Part 4: Acid Sulfate Soils 2014 (EPA)</i> – <i>Acid Sulfate Soils Manual 1996 (ASSMAC)</i> – <i>Waste Avoidance and Resource Recovery Act 2001</i>	Sections 5.24 & 5.26 Waste Management Plan (Appendix BB)

Requirement		Location in EIS
18. Infrastructure Provision - Detail any infrastructure proposed to service the development and demonstrate that the site can be suitably serviced. - Detail the existing infrastructure on-site, and identify any possible impacts on Infrastructure arising from the construction of the proposed works. - Where the proposed works affect existing infrastructure, the application should detail any mitigation works proposed, including service relocations.	Sections 3.4.2 & 5.19	Stormwater Management and Infrastructure Assessment (Appendix T)
19. Noise - Undertake a noise impact assessment of the main noise generating sources and activities at all stages of construction (including cumulative noise), and any noise sources during operation (for intensive uses such as pubs, bars etc. a detailed noise impact assessment must be undertaken). Outline measures to minimise and mitigate the potential noise impacts on surrounding occupiers of land especially on adjoining residential buildings. - Relevant Policies and Guidelines: - NSW industrial Noise Policy (EPA) - Interim Construction Noise Guideline (DECC) - Assessing Vibration: A Technical Guideline 2006 NSW Road Noise Policy (DECCW 201 1)	Sections 5.16 & 5.26	Construction and Operational Noise Report (Appendix Q)
20. Air and Odour - Provide an Air Quality Impact Assessment. The assessment must be prepared in accordance with the Approved Methods for the Modelling and Assessment of Air Pollutants in NSW 2005 and must consider the requirements of the Protection of the Environment Operations (Clean Air) Regulation 2010. The key air quality issues that must be covered in the assessment include, where applicable: - the identification of the pollutants of concern including dust and odours; - the identification and assessment of all relevant fugitive and point source emissions; and - proposed air quality management and monitoring procedures during the works.	Section 5.26	Construction and Operational Air Quality Review (Appendix FF)
21. Sediment, Erosion and Dust Controls Identify measures and procedures to minimise and manage the generation and off-site transmission of sediment, dust and particles.	Section 5.20	Stormwater Management and Infrastructure Assessment (Appendix T) Construction Framework Environmental Management Plan (Appendix EE)
22. Building Code of Australia Prepare a detailed BCA and access report demonstrating compliance with the Building Code of Australia.	Section 5.20	BCA Assessment Report (Appendix V)
23. Environmental, Construction and Site Management Plan The EA shall provide an Environmental and Construction Management Plan for the proposed works, and is to include: - Community consultation, notification and complaints handling; - Impacts of construction on adjoining development and proposed measures to mitigate construction impacts: - noise and vibration impacts on and off site; - air quality impacts on the neighbourhood;	Section 5.26	Construction Framework Environmental Management Plan (Appendix EE) Waste Management Plan

Requirement		Location in EIS
– odour impacts; – water quality management for the site; and Construction waste classification, transportation and management methods in accordance with DECCW's Know Your Responsibilities: Managing Waste from Construction Sites Guideline.		(Appendix BB) Construction and Operational Air Quality Review (Appendix FF) Construction and Operational Noise Report (Appendix Q) Construction Traffic Management Plan (Appendix K)
24. Staging Details regarding the staging of the proposed development	Section 4.2	-
25. Sea Level Rise The EIS must assess the risks associated with sea level rise on the proposal.	Section 5.13	Climate Change and Sea Level Rise Report (Appendix N)
26. Consultation Undertake an appropriate level of consultation with council and State government agencies. Provide details on the Community Engagement Framework to guide the public consultation process.	Section 2.0	Consultation Summary Report (Appendix U)

1.6 Project Team

An expert project team has been formed to deliver the project and includes:

Proponent	Crown Sydney Property Pty Ltd
Urban Planning	JBA
Principal Architect	Wilkinson Eyre Architects
Executive Architect	Bates Smart
Landscape	St Legere
Traffic and Transport	ARUP
Contamination and Remediation	AECOM
EPA accredited site auditor	Environ
Geotechnical	Coffey
Stormwater and Drainage	Cardno
Waste Management	ARUP
Air Quality & Odour	Wilkinson Murray
Noise & Vibration	Wilkinson Murray
Climate Change and Sea Level Rise	ARUP
Archaeology	Casey and Lowe
Social Impact	Macro Plan Dimasi

Environmental, Construction & Site Management	Cardno and Lend Lease Project Management and Construction
Infrastructure & Services Provision	Lend Lease
Ecologically Sustainable Development	ARUP
Marine Ecology & Water Quality	Royal Haskoning
Shadow Impacts	Virtual Ideas
Wind	RWDI
Reflectivity	ARUP
Building Services	AECOM, CJA & JBA
Structural Engineering	Robert Bird Group
BCA	McKenzie Group Consulting
Fire Engineering	Rawfire
Site Auditor	Graeme Nyland (Environ)
Accessibility	McKenzie Group Consulting
Consultation and Engagement	JBA
CPTED	JBA
Quantity Surveyor	WT Partnership

2.0 Consultation

This section details the consultation undertaken as part of the preparation of this SSDA and outlines ongoing stakeholder engagement strategy. Feedback from this consultation work has been considered and incorporated, where feasible, into finalising the proposal.

In accordance with the SEARs for the proposed development (see **Appendix A**), consultation must be undertaken with relevant public authorities, community groups and affected landowners. Accordingly, consultation has been planned and undertaken throughout 2015 as anticipated by the now issued SEARs, and with a strong commitment to an inclusive and proactive community and stakeholder engagement process underpinning this strategy.

Crown Sydney Hotel Resort will work with consideration of Barangaroo Delivery Authority and Lend Lease's consultation processes and public messaging when planning and undertaking future engagement. Crown Sydney Hotel Resort and their specialist team are committed to ensuring future engagement is open, inclusive, transparent and provides a forum for community feedback.

All engagement work is undertaken by community and stakeholder engagement professionals with respect to the International Association of Public Participation's core values and principles.

In addition to the consultation to be undertaken by Crown Sydney Hotel Resort, several of the specialists responsible for the preparation of the technical reports that comprise the appendices of this EIS have engaged in various consultations with relevant stakeholders during the preparation process, including utility services consultation.

2.1 Stakeholder Consultation

Crown Sydney Hotel Resort has consulted with local residents and other relevant stakeholders through a number of direct and indirect methods including community face-to-face consultation with local residents, presentations, notifications and via the Crown Sydney Hotel Resort website.

Following lodgement of the SSDA, Crown Sydney Hotel Resort will further consult and notify the local community and relevant stakeholders, outlining the imminent public exhibition, formal submissions process and prior to the commencement of site works.

The consultation activities ensured that all parties were informed about the proposal, the planning process and were encouraged to provide feedback (formal submissions and questions to the project team) in a timely manner.

It is noted the consultation strategy encouraged feedback, which is in contrast to many media articles published on the status of the Crown Sydney Hotel Resort proposal or the work underway at Barangaroo South.

To date consultation has been undertaken with:

- Barangaroo Delivery Authority
- Lend Lease
- Local Chamber of Commerce
- Barangaroo Business Liaison Group
- Millers Point Resident Action Group

- Darling Harbour Alliance
Members include:
 - Sydney Harbour Foreshore Authority
 - IMAX
 - Darling Harbour Live
 - Darling Quarter
 - Australian National Maritime Museum
 - Cockle Bay Wharf
 - Sydney Festival
 - Lend Lease
 - Mirvac
 - Merlin Entertainment
 - Verve Communications
- Local residents:
 - Hickson Road
 - Kent Street
 - King Street Wharf
 - Walsh Bay / Dawes Point
- Barangaroo Community Liaison Group
- Local businesses:
 - Hickson Road
 - Walsh Bay / Dawes Point
 - King Street Wharf

Future and ongoing consultation is planned to be undertaken with the above as well as:

- Maritime users:
 - Ferry operators / Transport for NSW
 - Commercial cruise businesses at King Street Wharf
- Powerhouse Museum;
- Sydney Observatory;
- State Government Agencies ;
- Local Council's; and
- Local Schools.

Table 3 summarises the communication methods used for consulting with, involving and informing stakeholders, community and the public. A systematic approach to consultation ensured the right information was readily available, at the right time and in the right place. This is also particularly important during the public exhibition, formal submissions and planning approval processes, as well as with the site remediation and earthworks and future construction.

Table 3 – Consultation methods

Method of Consultation	Purpose
Personal doorknock	To discuss with members of the community who are located in direct proximity to the site to enable an opportunity for the community to raise any questions or concerns they may have about the Crown Sydney Hotel Resort, also putting a friendly face behind the project often spoken about in the newspapers.

Method of Consultation	Purpose
	In answering questions also outline as part of the proposed development, the measures that are being taken to reduce the potential impact on the community. Provide a postcard with website information and contact details should the resident not be at home.
Stakeholder briefings	To ensure that commercial stakeholders in close proximity to the site are consulted with and informed about the development both prior and during the activities. The Communications Team will personally meet with these commercial stakeholders to address any concerns they may have about the work and understand requirements of these groups during the development. Attend and/or organise stakeholder meetings with identified organisations or groups. See Council and Agency Consultation section below.
Crown Sydney Hotel Resort Website	The central portal to all information about the project and updated often. The website enables people to provide online feedback and provides contact details for any comments or requests for further information about the proposed development.
Community Notifications	To ensure all community members and stakeholders in close proximity to the work are informed about the development prior to any work commencing and provided updates when appropriate about the work. Provide a postcard with website information and contact details should the resident not be at home. Issued to the neighbouring community and stakeholders to provide formal notification about the commencement of the development. This notification will include details about the nature and location of works; the hours of work and the contact details of the Communications Team should they require any further information about the work.

2.2 Council and Agency Consultation

Crown Sydney Hotel Resort recognises the importance of positive relationships with Council and the various agencies and seeks to proactively engage with them over the duration of the project. Crown Sydney Hotel Resort has undertaken stakeholder engagement to ensure all individuals and/or groups that have an interest in, or are affected by, the proposed development are consulted with.

As part of the preparation of the SSDA, Crown Sydney Hotel Resort has met with the City of Sydney and presented iterations of the Crown Sydney Hotel Resort proposal. Following meetings feedback provided on the proposed development has been incorporated into the SSDA, where appropriate.

To date consultation has been undertaken with:

- City of Sydney Council (as above)
- NSW Department of Planning and Environment
- Utility service providers:
 - Telstra
 - Sydney Water
 - AGL
 - Ausgrid
 - Jemena
- Office of Environment and Heritage

After lodgement of the SEARs request Crown Sydney Hotel Resort and their project team held a round table discussion on 14th April 2015 with the Department of Planning and Environment and all the other respective state agencies and departments. A full briefing on the project was provided during this meeting to ensure that all key government stakeholders were aware of the details

of the project and also to provide the opportunity to ask any questions of the project team.

Following lodgement of the SSDA and ongoing throughout the life of the project, Crown Sydney Hotel Resort will continue to undertake further consultation with the relevant agencies and stakeholders above and with key NSW Government Agencies including:

- Transport for NSW;
- Sydney Harbour Foreshore Authority ;
- Roads and Maritime Services;
- Housing NSW;
- NSW Police;
- Environmental Protection Authority;
- North Sydney Council;
- Leichardt Council; and
- City of Sydney Council.

3.0 Site Analysis

3.1 Site Location and Context

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 a range of new development dominated by large CBD commercial tenants to the south.

The 22 ha Barangaroo site is generally rectangular in shape and has a 1.4 kilometre harbour foreshore frontage, with an eastern street frontage to Hickson Road. The locational context of the Barangaroo site and its distinct precincts are shown in Figure 2.



 Site Plan

Figure 2 – Locality Plan

3.2 Site Description

The Barangaroo site has been divided into three distinct redevelopment areas (from north to south) – the Headland Park, Barangaroo Central and Barangaroo South, and has been subject to multiple investigations that detail the site's physical and natural characteristics (see **Figure 2**).

The Crown Sydney Hotel Resort, the subject of this SSDA, is located on land in the North West corner of Barangaroo South. With reference to the Barangaroo 'development blocks', as identified within the approved Concept Plan Urban Design Controls (MP06_0162 MOD 4), the Crown Sydney Hotel Resort site is located to the west of Blocks 4A, 4B and 4C and to the north of Globe Harbour and referred to by Concept Plan (Mod 8) as Block Y. The Crown Sydney Hotel Resort site has a total site area of 12,651m², which comprises three components that are herein referred to as 'the site' (**Figure 3**). These components include:

- Crown building site area – 6,204m²
- Underground basement works beyond the building footprint – 5,062m²
- Ground level licensed area – 1,385m²

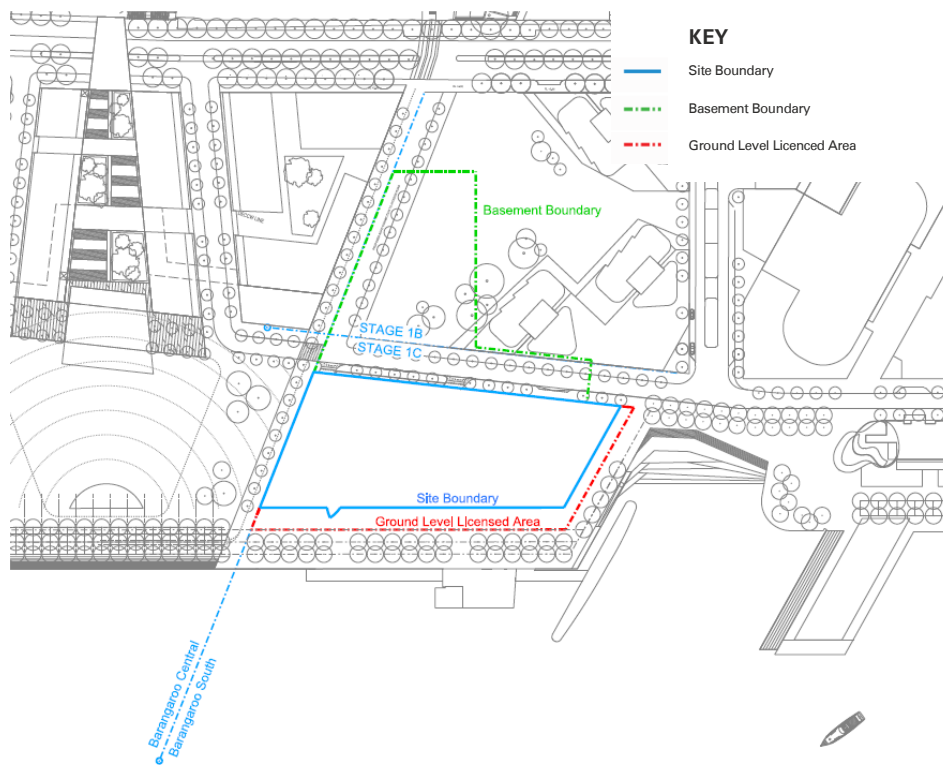


Figure 3 – Site Plan

Source: Wilkinson Eyre Architects

As illustrated in **Figure 3** the extent of the underground basement and public domain works extends beyond the core site which more closely aligns with the proposed building footprint.

3.3 Land Ownership and Description

A site survey plan is included at **Appendix B**.

Under the *Barangaroo Delivery Authority Act 2009* (NSW), Barangaroo is defined as the land identified as the "Barangaroo Delivery Authority operational area on the Barangaroo Delivery Authority Operational Area Map".

The Barangaroo Delivery Authority owns the majority of Barangaroo, however small areas are owned by other Government agencies including the Marine Ministerial Holding Corporation, the Roads and Maritime Services and the Crown.

The Crown Sydney Hotel Resort site comprises part of Lot 200 in DP 1204948. The Barangaroo Delivery Authority is the owner of the Site and has issued landowner's consent to the making of this Development Application, as evidenced by the completed Application Form submitted under separate cover.

3.4 Existing Development and Structures

3.4.1 Built Form

At the time of the initial Concept Plan Approval, the Barangaroo site comprised an open concrete / bitumen apron largely reclaimed over water.

Under the Basement Car Park project, approval was granted for the demolition of any existing structures and footings, part of an underground cassion wall, hardstand areas, removal of piles, and removal of existing vegetation within Blocks 1, 2, 3 (in part), 4A (in part) and X of Barangaroo, and with the adjacent public domain area, which had not previously been approved to be demolished or removed under the approval issued in respect of MP 07_0077 Demolition Works.

Construction under the Basement Car Park Approval has substantially commenced. The Crown Sydney Hotel Resort site is located to the north west of these works on a portion of the Barangaroo site which is still characterised by the open concrete / bitumen apron. The majority of the site is currently used for storage of construction materials and equipment associated with the works being undertaken at Barangaroo South. A portion of the site is also currently being used as a public access way along the foreshore.

Various other approvals have been granted for development within the Barangaroo South site. While no detailed development approvals have been granted on the site, the following approvals have been granted to the south of the Crown Sydney Hotel Resort site:

- the Bulk Excavation and Basement Car Park (Basement Car Park Approval) (MP10_0023)
- Commercial Building C3 (MP11_0044)
- Commercial Building C4 (MP10_0025)
- Commercial Building C5 (MP10_0227)
- Residential Buildings R8 and R9 (MP11_0002)
- Commercial Building C4 Fit out of Levels 1 – 28 (SSD 12_5582)
- Temporary Concrete Batching Plant (SSD 13_5967)

These approvals involve the construction of five separate buildings within the Barangaroo South site. Currently construction works have commenced on all of the above approvals, except Residential Building R8 and Residential Building R9.

Additional State Significant Development Applications within Barangaroo South have also been lodged, but are yet to be determined for:

- Remediation and land forming works (Block 4) - EPA declared area (SSD 5897)

- Remediation and land forming works (Block 5) - EPA declared area (SSD 6533)
- Stage 1A Public Domain (SSD 13_6303)
- Stage 1A Subdivision (SSD 6381)
- Retail Building R1 (SSD 6513)
- Retail Building R7 (SSD 6623)
- Commercial Building C2 (SSD 6425)

A number of modifications to existing approvals are currently under assessment and are yet to be determined.

3.4.2 Infrastructure and Services

Stormwater

The pre-development stormwater network is characterised by a series of in ground piped stormwater lines (typically between 300mm to 1800mm in diameter) draining Hickson Road and other external catchments through the Barangaroo site directly to the Harbour.

There are four (4) major stormwater lines within Barangaroo South. As part of the Stage 1A and 1B works, diversions have been planned for Lines A, B and C. As part of the Stage 1B works it is proposed to demolish Line B and C and divert them towards the south and discharge to the harbour between Stage 1A and 1B (i.e. south of the Stage 1C development area). Line C currently runs through the Stage 1C area however the diversion works as part of Stage 1B will negate the need for any works in Stage 1C apart from demolition of the redundant stormwater pipe.

Barangaroo South is currently a worksite which is the subject of extensive stormwater management controls, including the diversion of clean stormwater around the works areas, and the collection and treatment of contaminated stormwater.

Water

A Sydney Water owned 300mm water main is located on the western side of Hickson Road and extends for the full frontage of the Barangaroo South development. This main has adequate capacity to provide potable water to the development.

All existing supplies to the development site, serving buildings and other structures have been disconnected and are either disused or removed.

For the Stage 1A site a 250mm tapping from Hickson Road runs along Shelley St, Lime Street, and Globe Street.

Sewer

There is an existing sewer trunk main in Hickson Road near the western kerb line which drains to an existing Sydney Water sewage pumping station SP1129 outside the Barangaroo site.

The pre-developed sewerage network is owned by Sydney Water and consists of 225mm and 450mm gravity drainage in Hickson Road. This network drains to existing Sydney Water owned Sewage Pump Station SP1129 located north of Barangaroo South.

The existing pump station serves catchments extending to Sussex Street, Kent Street and includes the catchment served by Sewage Pump Station SP0014 located at Headland Park. SP0014 will be disused as part of the Headland Park works with flows diverted to SP1129.

All existing sewerage services to the development site, serving buildings and other structures have been disconnected and disused or removed.

Electricity

The Barangaroo South site was historically served by 5 KV high voltage feeders entering the Barangaroo site at the southern end of Hickson Road and terminating in an AusGrid (formerly Energy Australia) HV switch room. The HV supply and private HV reticulation were decommissioned and the private substations demolished as part of demolition works in 2010/2011.

Existing electrical services in Hickson Road include:

- Disused Railcorp 33KV feeder 746 and 745.
- An existing HV supply and concrete encased bank of conduits feeding “The Bond”. The bank of conduits is believed to consist of 150mm conduits laid in 4 rows of 4 conduits generally between 800mm and 1.2m depth;
- Existing HV supplies to substations serving the previous site which are to be disused and removed;
- Existing temporary HV supplies to temporary substations providing construction supply; and
- Various LV services for street lighting, parking ticket machines and other purposes.

As part of the Stage 1A works Ausgrid has advised that the site would be serviced at 33kV from their Pyrmont Switching Station. Lend Lease will own and operate the 33kV network and substations on site as a private embedded network. This will be configured in a triplex configuration and will provide a similar level of redundancy to the 11kV CBD system;

Telecommunications

The Kent Street telephone exchange is located relatively close to the site, and a number of telecommunications carriers have existing cables in the vicinity of the site.

All telecommunications infrastructure previously existing within the basement footprint was capped off at the boundary and removed.

Natural Gas

In the pre-developed case, there was an existing 110mm low pressure (7kPa) nylon gas main along Hickson Road and a high pressure gas main located at the corner of Sussex and Napoleon Streets. There was no existing high pressure main connection serving the Barangaroo site but there were small low pressure connections. The existing gas network from the low pressure main has been decommissioned and capped off at the site boundary and removed.

3.5 Traffic and Transport

3.5.1 Vehicular and Pedestrian Access

Hickson Road connects into Sussex Street south of Napoleon Street and is the predominant north-south access road for Barangaroo South and consequently the Crown Sydney Hotel Resort site.

Local road access to the Barangaroo site is provided as follows:

- via Napoleon Street and Margaret Street from the eastern CBD from Millers Point via Dalgety Road;
- via George Street from the north east; and
- via Harbour Street, Wheat Road (through King Street Wharf) to Shelley Street from the south via Sussex Street/Kent Street/Napoleon Street from the southern CBD.

3.5.2 Existing Public Transport

The Barangaroo site is served by the following public transport modes:

- **Rail:** Wynyard, Martin Place, Town Hall and Circular Quay railway stations are within walking distance of the Barangaroo site and provide frequent services throughout the day.
- **Bus:** There is a major bus interchange located at Wynyard Station for buses servicing the Hills District, Northern Beaches and the North Shore areas. These services all utilise the bus lane on the Harbour Bridge to access Wynyard. Stops for services to other locations are provided through the CBD including along George, Park, Elizabeth and Castlereagh Streets.

A number of bus routes terminate in the vicinity of the Barangaroo site, King Street Wharf and Circular Quay.

- **Ferry:** Commuter ferry services arrive and depart from both King Street Wharf and Circular Quay.

3.5.3 Future Public Transport

In addition to the existing public transport services described above, the Sydney City Centre Access Strategy outlines the intended plan for future public transport provision in the CBD. The Strategy considers all access modes and their key networks and seeks to balance the needs of customers for each transport mode in order to deliver a more integrated network that makes the best use of finite space in the Sydney city centre. There are several proposals within this Strategy relevant to Barangaroo and the Crown Sydney Hotel Resort, these being:

Bus Services

- a redesigned bus network aimed at improving bus reliability and addressing congestion and capacity constraints.
- new bus routes will run to Barangaroo and Walsh Bay via the city centre, Napoleon Street and Hickson Road;
- Erskine Street to act as a key east-west bus corridor in the northern CBD;
- the major bus stop precinct serving Barangaroo will be in the area surrounding Wynyard Station on York, Clarence and Kent Streets;
- approximately every second bus service on key Inner West bus routes entering the city centre via Broadway will only operate to Central. This will reduce the number of buses unnecessarily entering the city centre. The

remaining services will continue to the northern end of the city centre via Elizabeth Street northbound and Castlereagh Street southbound; and

- bus routes servicing the Eastern Suburbs will utilise Elizabeth Street. Passengers travelling to Barangaroo will alight at Martin Place and walk through the city and across Wynyard Walk.

Locations for new bus stops to serve the future routes along Hickson Road and Sussex Street outside of Barangaroo South are currently being investigated by Transport for NSW. These stops would be in close proximity to Barangaroo South and Crown Sydney Hotel Resort. The Barangaroo Integrated Transport Plan envisages two pairs of bus stops would be provided on Hickson Road to serve Barangaroo South and Central Barangaroo/Headland Park. The final location and provision of these bus stops will be determined by Transport for NSW.

Ferry Services

The Sydney City Centre Access Strategy commits to constructing a new ferry hub at Barangaroo. This new wharf will improve access to Barangaroo and support the Crown Sydney Hotel Resort, with new ferry services anticipated from the east and north, as well as the existing western ferry catchments. This additional ferry hub will reduce capacity constraints on the Circular Quay terminal. The anticipated location of the ferry wharves is outside the Barangaroo site and the provision of the wharves will be completed by the relevant government agencies.

Coaches

Kerbside space in the vicinity of the Crown Sydney Hotel Resort will be provided for coach set down / pick up. This is planned within the Concept Plan (Mod 8) layout. This will service tour groups travelling to and from the Crown Sydney Hotel Resort and to other areas of Sydney. Current planning has identified kerbside parking on the western side of Lime Street just south of the basement access to Crown Sydney for coach pick up and set down. The final location for coaches will be confirmed at a later date in consultation with key stakeholders.

Light Rail

Expected public transport patronage to Barangaroo from the inner west is likely to shift mode from bus and rail to light rail as a result of the inner-west extension from Lilyfield to Dulwich Hill. Opportunities to further increase modal split to light rail are capable of occurring with the planned CBD and South East light rail link. These new light rail links are beyond the scope of the Barangaroo project.

Taxis

A number of taxi ranks are proposed throughout the Barangaroo South precinct to service the commercial, resident and visitor population. These will be strategically located to serve major buildings including the Crown Sydney Hotel Resort in line with the objectives outlined in the Barangaroo Integrated Transport Plan.

Heavy Rail

A range of heavy rail services are available to the Barangaroo site, particularly through the nearby hub of Wynyard Station. Upgrades to Wynyard Station and the new planned pedestrian connections from Wynyard to Barangaroo South will enhance the attractiveness of heavy rail services. Planned extensions to the rail network, including the North West and south west rail links will increase the accessibility of Barangaroo. The implementation of initiatives such as Sydney Metro will also reduce travel times and increase the regularity of services.

3.5.4 Sydney Metro

Sydney Metro is the next major rail project identified in Sydney's Rail Future. Sydney Metro scope has been developed to meet the Project objectives and deliver key elements of Stages 4 and 5 of Sydney's Rail Future.

The Project represents a major increase in the capacity of Sydney's rail network, providing a 60 per cent increase in the number of trains in the peak periods and catering for an extra 100,000 customers per hour. Sydney Metro would significantly improve reliability across the rail network by addressing current and emerging constraints such as train crowding, platform and station crowding, and network complexity.

A new station would be constructed at Barangaroo as part of the Sydney Metro project. Based on patronage modelling undertaken by Sydney Metro, delivery of a new station at Barangaroo will in the morning peak, reduce entries and exits at both Wynyard Station and Martin Place station by approximately 5,000 passengers. This station will significantly improve public transport access for people traveling to and from the Barangaroo precinct.

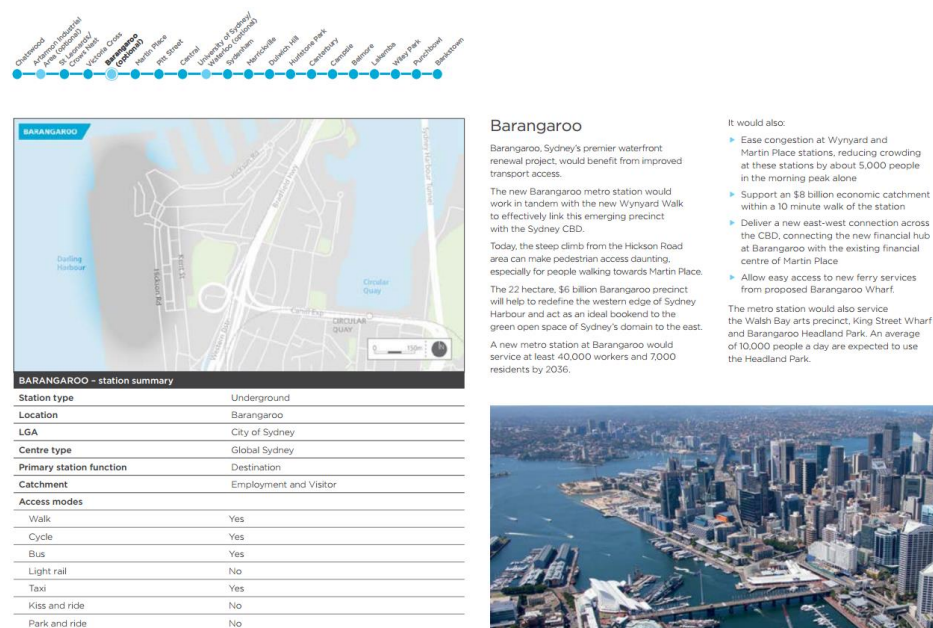


Figure 4 – Barangaroo Metro Station

Source: Sydney Metro City & Southwest Project Overview (June 2015)

3.5.5 Pedestrians and Cyclists

Pedestrian Access

The NSW Government has commenced construction on Wynyard Walk (previously Barangaroo Pedestrian Link), a direct pedestrian link between the new Barangaroo development and Wynyard Station and transport interchange. Wynyard Walk, expected to be completed during 2015, will provide a high level of access to public transport for the growing western corridor of the CBD, including Barangaroo and King Street Wharf.

In addition to this the City Walk Bridge project was approved by the Barangaroo Delivery Authority in October 2014 under Part 5 of the EP&A Act. The City Walk Bridge will provide an alternative pedestrian bridge from Wynyard Walk at

Napoleon Street over Hickson Road and connecting to Shelley Lane. Once complete and operational (expected 2015) the bridge will significantly enhance connectivity between Barangaroo South and the Wynyard Station precinct will assist in accommodating the additional commuters who are expected to use this route to access the Barangaroo site.

Pedestrian access to Barangaroo is available along local roads, all of which are footpath lined. Notwithstanding the high degree of pedestrian footpaths and thoroughfares, there are generally low levels of pedestrian activity adjacent to the Barangaroo site. Limited pedestrian access is currently available across the Barangaroo site and along the waterfront via fenced routes.

Bicycles

A marked bicycle lane exists along Hickson Road between Circular Quay and Napoleon Street which is utilised by both commuter and recreational cyclists. Cycling connections to the site have been improved through the construction of separated cycleways along King Street and Kent Street.

3.6 Physical Characteristics

3.6.1 Topography

The ground surface of the entire Barangaroo site is relatively flat with a slight slope from west to east.

The surrounding landform (outside the bounds of the Barangaroo site) rises rapidly to the east. A 10m high sandstone cliff is situated east of Hickson Road and Sussex Street, and is likely to continue beneath the fill and alluvial materials present on the site (see Section 2.6.2 below).

3.6.2 Geology and Geomorphology

Based on the previous site investigation data for Barangaroo South, the current geotechnical conditions at the site (prior to commencement of the proposed Stage 1C remediation and earthworks) comprise the following:

- Asphalt pavement and heterogeneous fill (Unit 1), typically 15-16m in thickness overlying;
- Alluvial and estuarine sediments (Unit 2A and Unit 2B) of variable thickness, typically 2-12m in thickness, overlying;
- Residual soils (Unit 3) and Hawkesbury Sandstone bedrock (Unit 4) encountered at depths of between RL -15 AHD and RL -28 AHD.

The Pittman LIV dyke crosses the site. The dyke is interpreted to be a near vertical structure approximately 3 m wide, generally orientated in an east-west direction. The dyke is completely weathered to stiff clay to approximately 6 m below the surrounding bedrock surface.

3.6.3 Site Contamination

Previous Contaminating Uses

The former AGL (now Jemena) gasworks historically occupied most of Blocks 4 and 5 and extended to the area now occupied by Hickson Road. Investigations have revealed that both the soil and groundwater is contaminated at Blocks 4 and 5 and in part of Hickson Road. The relevant areas have been declared as a Remediation Site by the NSW Environment Protection Authority (EPA) under the *Contaminated Land Management Act 1997*.

The former gasworks was restricted to the land to the east of the Crown Hotel Development area, within the Stage 1B development area. Part of the Crown basement will be located within the Stage 1B development. Lend Lease has submitted a separate SSD development application (SSDA) and EIS (SSD 5897-2013) for remediation, bulk excavation and land forming works at Block 4, incorporating the Stage 1B development area. This SSDA was approved by the Secretary of the DP&E, as delegate of the Minister for Planning, on 10 November 2014.

Identified Contamination

A review of the borehole logs and analytical data from the site indicates that some hydrocarbon odours and staining were noted in the soils predominantly at depth within the marine sediments. Impacted materials (including Separate Phase Gasworks Waste and Tar or SPGWT), likely to be attributable to the former gas works site (located to the east), are predominantly located within the marine sediments where there is negligible contaminant flux. Due to the depth of the marine sediments, these impacts are present at depths generally ranging between approximately 16.5 m below ground level (bgl) and 22mbgl.

Polyaromatic hydrocarbons (PAHs), including benzo(a)pyrene and naphthalene, and heavy metals (arsenic, chromium, cobalt and lead) were reported in soil at concentrations above the adopted site investigation criteria within the marine sediments across the Site.

Total Petroleum hydrocarbons (TPH), in the light fraction (C6-C9), were reported in soil at concentrations that exceeded the adopted site investigation criteria at one sample location, within the marine sediments. Heavy end TPH fractions (TPH C15-C28 and TPH C29-C36) were reported in soil at concentrations that exceeded the adopted site investigation criteria more broadly across the northern portion of the Site in both the fill and marine sediments.

BTEX (benzene, toluene, ethylbenzene and xylene) were typically reported in soil at concentrations below the laboratory levels of reporting and/or the adopted site investigation criteria. The only exceptions were in three boreholes where benzene concentrations were reported in marine sediments above the site investigation criteria at depths greater than 16m bgl.

Concentrations of phenols and semi volatile organic compounds (SVOC) were typically reported below the laboratory LOR.

A total of five samples (collected from locations where buried fill and rubble were identified) have been analysed for asbestos containing materials (ACM). No asbestos was detected in the samples analysed. No visual evidence of bonded fibre cement or possible asbestos fibres was observed during the investigations. Notwithstanding this, more than 1000 samples were analysed and/or visually inspected for the presence of ACM as part of Stage 1A basement excavations works. ACM was identified to be widespread within excavated material for Stage 1A. Therefore, it is assumed that there is significant potential for ACM to be present within fill materials at the Site.

Remedial Action Plans

ERM has prepared an Overarching Remedial Action Plan (RAP) for the Barangaroo site on behalf of the BDA. The Overarching RAP presents a summary of the contamination issues identified on the Barangaroo site and outlines an approach to the remediation of the site as a whole.

A Site Auditor's Statement has been prepared by Graeme Nyland in relation to the Overarching RAP. The Overarching RAP requires that site specific RAPs be

developed for the development sites. Site specific Remedial Works Plans are also required under the Overarching RAP, which are to detail remedial measures.

In accordance with the requirements of the Overarching RAP, a Site Specific Remedial Action Plan known as the Remedial Action Plan, Crown Hotel Development (Part of ORWN Area), Barangaroo South has been prepared by AECOM Australia Pty Ltd, dated 11 April 2015 (Crown RAP), subsequent to this a Addendum to the Remedial Action Plan has also been prepared by AECOM, dated 28 May 2015 (see **Appendix Z**). The preparation of the Crown RAP and the subsequent addendum was informed by the Human Health and Ecological Risk Assessment Stage 1C Development (ORWN Area), Barangaroo South prepared by AECOM, dated 10 December 2014 (Crown HHERA). The HHERA determines the Site Specific Target Criteria (SSTC) that has been applied in the Crown RAP.

Mr Graeme Nyland, the Accredited Site Auditor, has reviewed the Crown RAP and has issued a Site Audit Report that confirms that the provisions of the Crown RAP are capable of ensuring that the Crown development site can be made suitable for the future intended uses at the site (see **Appendix AA**). Subsequent to this an Interim Audit Advice has also been prepared by Mr Nyland and is also provided at **Appendix AA**.

It is highlighted that part of the Crown Sydney Hotel Resort development is located within the Stage 1B development area (being part of the Crown Sydney Hotel Resort underground basement). The Stage 1B development area is subject of a separate State Significant Development Application (SSD 5897), and associated RAP (the VMP / Block 4 RAP), which was approved on 10 November 2014. A Site Audit Report has been issued by an EPA accredited site auditor that certifies that the Stage 1B site can be made suitable for the proposed uses if it is remediated in accordance with the VMP / Block 4 RAP. A separate Site Auditor's Statement will ultimately be obtained for the Stage 1B development site, which will certify that the Stage 1B development site is suitable for the proposed uses.

3.6.4 Groundwater and Hydrogeology

The groundwater profile beneath the Barangaroo site is likely to be influenced by the groundwater flow from the east beneath the CBD and tidal fluctuations associated with Sydney Harbour.

Previous investigations carried out by AECOM for Barangaroo South identify the following:

- Groundwater was present as an unconfined, shallow aquifer within the fill materials and the underlying natural sediments. Groundwater was also likely to occur as a deeper bedrock aquifer within the underlying sandstone bedrock.
- The highest reported groundwater contaminant concentrations were generally encountered within wells screened deeper within the aquifer, across the base of the fill and natural sediments and immediately overlying bedrock.
- Due to the proximity of the Site to Darling Harbour, the depth to groundwater was shallow (between 1.8 to 2.9 m bgl) and the overall direction of groundwater flow was expected to be towards Darling Harbour.
- Groundwater at the Site was tidally influenced, resulting in the fluctuation of groundwater levels within the fill materials and natural sediments. However, the low dissolved oxygen concentrations reported across the Site suggested there was limited flushing of groundwater occurring.
- Whilst there appears to be an efficient hydraulic connection between the saturated fill material and Darling Harbour, indicating a significant exchange

of water during tidal cycles, groundwater flux in the underlying natural material was negligible.

- The hydraulic conductivities and laboratory permeability's reported for the Site were considered to be variable due to the heterogeneous nature and distribution of fill materials.

3.7 Vegetation

The site is devoid of existing terrestrial vegetation.

Royal Haskoning DHV has prepared an Potential Marine Ecology Impacts Report (at **Appendix E**) and concludes that no marine vegetation (including seagrasses, mangroves, and saltmarsh) was recorded in the vicinity of the proposed development during field surveys undertaken in May 2010, nor was any marine vegetation mapped by DPI (2005) in the immediate area.

Royal Haskoning also conclude that:

"There are no wetland areas in the vicinity of the proposed development...

*No introduced marine flora (such as *Caulerpa taxifolia*) was recorded in the vicinity of the proposed development during field surveys undertaken in May 2010, nor was introduced marine flora mapped by DPI (2005) in the immediate area."*

The report also concluded that it was unlikely that marine species listed under the *Threatened Species Conservation Act 1995* or aquatic vegetation or threatened species protected under the *Fisheries Management Act 1994* would be present in the vicinity of the site.

3.7.1 Heritage and Archaeology

Heritage

The approved Concept Plan (Mod 4) and Demolition Project Application comprehensively addressed the heritage significance of the Barangaroo site. The Heritage Impact Statement prepared for the Barangaroo site by City Plan Heritage in 2007 (refer to Demolition Project Application MP07_0077) confirms the Barangaroo South site is not of heritage significance and does not exhibit heritage values (including existing buildings and structures).

The Statement of Commitments for Concept Plan (Mod 4) required an Interpretation Strategy to be prepared prior to any works commencing that involve surface disturbance. Accordingly, an Outline Interpretation Plan was prepared by Tanner Architects and was submitted to the then Department of Planning and Infrastructure (now Department of Planning and Environment) as part of the EAR for the Basement Car Park Project Application (refer to Appendix FF of that EAR). The Outline Interpretation Plan relates to the whole of the Barangaroo South area, including the Stage 1A site.

Indigenous and Non-Indigenous Archaeology

Casey & Lowe's reports on Barangaroo Stage 1 *Archaeological Assessment*, *Barangaroo Stage 1* (June 2010) and the *Archaeological Research Design & Management Strategy* (May 2010) identified and addressed the non-indigenous archaeological issues at Barangaroo South.

In addition Comber Consultants (on behalf of Casey & Lowe) addressed the Aboriginal archaeological issues in *Aboriginal Archaeological and Cultural Heritage Assessment* (May 2010) and *Aboriginal Archaeological Management Plan and Research Design, Barangaroo Stage 1* (May 2010) and identified that any

potential significant archaeological resource was limited to segments of the original foreshore likely to survive in the eastern 10 to 30m of Blocks 2 and 3. No potential Aboriginal archaeology was found during the archaeological program.

These reports assessed the whole of the footprint of development Blocks 1 to 4 and identified that the archaeological issues were restricted to the eastern 40m of Barangaroo South for non-indigenous archaeology and 10 to 30m for Aboriginal archaeology.

No significant archaeological remains are predicted to the west of the 30m to 40m zone as this area was within the harbour and underneath the water until the 1960/70s wharfage was constructed. The site is to the west of the 30m-40m zone of archaeology and therefore no archaeology is expected to be present.

3.8 Surrounding Development

The Site is surrounded by the following existing and proposed future land uses:

- **North:** The area immediately to the north of the Site is Barangaroo Central, which is currently being used as a construction logistics area, and which currently contains the Barangaroo South construction works water treatment plant. Barangaroo Central will ultimately be developed for a range of commercial, residential and open space uses in accordance with the Concept Plan. Further to the north is the new Headland Park (which is being developed for open space land use) currently under construction.
- **South:** To the south of the Stage 1C site is the Stage 1A development work site. Stage 1A is under construction and will provide for commercial, residential and open space land use.
- **East:** To the east of the site is the Stage 1B development works site, and beyond this Hickson Road, the northerly continuation of Sussex Street. The Stage 1B development site will ultimately be developed for commercial, residential and open space land uses, in accordance with the Concept Plan. On the eastern side of Hickson Road are residential and commercial multistorey buildings.
- **West:** To the west of the site are the waters of Darling Harbour, and beyond this Pyrmont and Balmain East.

4.0 Description of the Development

This chapter of the report provides a detailed description of the proposed development. Architectural Drawings and a Design Statement prepared by Wilkinson Eyre Architects are provided under separate cover.

4.1 Overview of Proposal

This application seeks approval for the following development:

- construction and use of a hotel, VIP gaming facilities and residential apartment building with associated retail and restaurant uses and a basement car park to accommodate parking and servicing allocated to the proposed uses within the development, comprising a total Gross Floor Area of approximately 77,500m² and a maximum building height of approximately 271 metres (RL 275);
- building signage; and
- provision of services and utilities required to service the building.

The following detailed description of the proposal is based on the Architectural Drawings and Architectural Design Statement prepared by Wilkinson Eyre and provided under separate cover. The Architectural Design Statement provides a comprehensive description of the development's composition, layout and design intent.

Photomontages of the proposed development are provided at **Figures 5, 6 and 7** below with further photomontages located in the Architectural Design Statement.



Figure 5 – Photomontage of proposed development, from the North West

Source: Wilkinson Eyre Architects



Figure 6 – Photomontage of the proposed development, including Globe Harbour in the foreground

Source: Wilkinson Eyre Architects



Figure 7 – Photomontage of the proposed development, as viewed from the south west

Source: Wilkinson Eyre Architects

4.2 Site Preparation and Staging

Prior to the construction of the Crown Sydney Hotel Resort building preparatory earthworks and remediation will be undertaken on site, these include:

- Construction of a groundwater retention wall system to the west of Block 4. The land within the groundwater retention wall system relates to the future Stage 1C remediation and earthworks area. The Stage 1C retention wall system is to be fully integrated with the Stage 1B retention wall system to the point that it will share a common wall along the boundary with Stage 1B, and

will have direct physical connections to create a unified groundwater retention wall system which will provide for the future development of Stage 1B and Stage 1C (if the western part of the Stage 1B perimeter retention wall system is not already constructed then it will be constructed as part of the Stage 1C retention wall system);

- Carrying out of remediation within the perimeter of the Stage 1C groundwater retention wall to ensure the Stage 1C remediation and earthworks area is suitable for the intended future uses of the land;
- Bulk excavation of the Stage 1C remediation and earthworks area to a depth of approximately 2m below existing ground level (RL 0).

The extent of these works is shown in **Figure 8** below. Approval for these works is sought as part of the Stage 1C 'Remediation and Earthworks' SSDA (Reference SSD 14_6956). A detailed assessment of this scope of works is included in the corresponding EIS for SSD14_6956

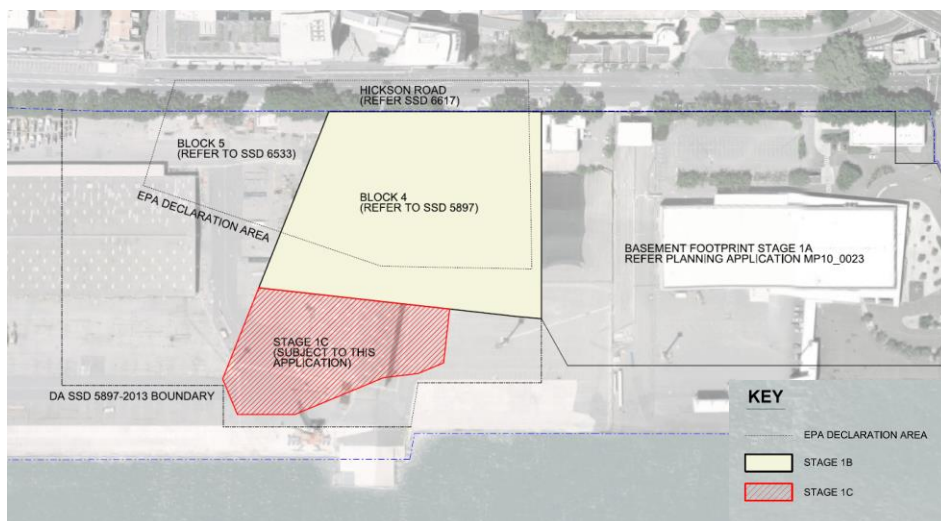


Figure 8 – Stage 1C Remediation and Earthworks Area

Source: Wilkinson Eyre Architects

It is noted that further bulk earthworks to a depth of RL -10.3 will be carried out as part of the proposed Crown Sydney Hotel Resort building., with these earthworks to be carried out as an integral part of the top down construction methodology for the basement structure.

Given the size and scale of the Crown Sydney Hotel Resort building the proposed development will be constructed over a number of stages that can be broadly broken down as follows:

- **Stage 1** – Construction of basement structure up to ground level.
- **Stage 2** – Construction of podium structure up and including Level 4.
- **Stage 3** – Construction of mid-rise component up to and including Level 23.
- **Stage 4** – Construction of tower component up to and including Level 48.
- **Stage 5** – Construction of tower component up to and including rooftop.
- **Stage F1** – Fit-out and use of podium component up to and including Level 5.
- **Stage F2** – Fit-out and use of Hotel and up and including Level 28.
- **Stage F3** – Fit-out and use of Villas on Levels 29 to 34 (inclusive).

- **Stage F4** – Fit-out and use of residential apartments on Levels 35 to 46 (inclusive).
- **Stage F5** – Fit-out and use of residential apartment on Levels 47 to 65 (inclusive).
- **Stage F6** – Fit-out and use of Super Villas and Sky Villas on Levels 66 to 71 (inclusive).

It is intended that each of these stages be the subject of separate construction and occupation certificates thus allowing the building to be progressively built and occupied throughout the construction programme. It is therefore requested that any future conditional development approval be structured in such a way to allow staging and phased occupation to occur as described above.

The construction program for the proposed development is forecast to be as follows:

- Bulk Excavation and Basement Structure – February 2017 to March 2019
- Crown Sydney Hotel Resort Building – March 2017 to November 2019

4.3 Development Objectives

The proposed development has undergone a robust and iterative design development process to date, including a comprehensive competitive design process involving a number of renowned architects from around the world, consultation with various stakeholders and an analysis of the existing site conditions, and surrounding locality. There have been several key objectives which have guided this process including:

- Increasing Sydney's hotel accommodation capacity, particularly within close proximity to the CBD and Darling Harbour;
- Delivering a new benchmark of quality and service for hotel accommodation in Sydney by providing Sydney's first six star luxury hotel resort;
- Creating a new iconic building that positively contributes to and enhances Sydney's skyline;
- Delivering positive and high quality regeneration to the Barangaroo site and Sydney Harbour foreshore;
- Achieving a built form that actively engages and embraces its surroundings, particularly at street level;
- Delivering new exemplary residential accommodation;
- ensure NSW can compete with domestic and international tourist destinations;
- assist NSW to take advantage of opportunities provided by the boom in outbound tourism from China and Asia;
- allow Sydney to compete for international government, business and sporting events;
- attract high wealth tourists and VIP gaming players to Sydney; and
- Delivering a building that sets a new benchmark for sustainability through the achievement of a 6 Star Green Star rating and a NABERS base building 5 star rating for hotels.

4.4 Design Objectives

The objective for the development's design has been to create a unique sculptural built element that has a complex but slender form and which will be an iconic feature of the Sydney Harbour foreshore. To achieve this outcome WEA has designed a building that:

- Is characterised by a pivoting built form with a 60 degree twist on its outer skin, while maintaining a rectangular core layout;
- maximises views to all aspects including the city, harbour and beyond;
- exhibits a more organic and naturally curved built form compared to traditional angular city tower buildings;
- provide an luminous and sheer finish to the exterior of the building;
- provides a building base that does not detract from the upper and more slender tower form, but also maximises activation and interest at the ground floor; and
- distinguish the building as a landmark element within the Barangaroo precinct and more broadly as a key building that will form the city's north western edge.

Overall the building includes three primary built form elements, the podium, a mid-rise component and the slender high rise tower component. The mid-rise and tower elements grow out of the podium level that acts as a strong foundational base for the overall building.

The podium comprises the building's ground floor entries, hotel restaurants and associated facilities, a spa, pool and recreational areas, and some VIP gaming areas. The mid-rise portion of the building includes hotel suites/ rooms and the tower includes the remaining VIP gaming areas, hotel villas and residential apartments.

Three basements levels are also included that accommodate vehicle parking, building plant and services, storage and loading areas that will support the building's various loading and servicing operations, patrons and residents.

Aside from the external aesthetics of the building Wilkinson Eyre has sought to ensure that the functionality of the internal operations and various uses within the building all work in an integrated manner. This has sought to be achieved by:

- separating or co-locating appropriate uses over dedicated floors of the building;
- activating the ground floor of the building by providing numerous opportunities for entry to the building, and to allow for through pedestrian movements;
- ensuring the reception and lobby area at the ground floor act as the development's key hub and nerve centre for the building;
- opening up the ground restaurants and retail spaces such that the blend with the adjoining public domain areas;
- sleaving retail shops at the ground floor around the building's driveway entry to maximise ground floor activation and disguise back of house operations;
- concealing plant areas within dedicated levels of the building to eliminate the need for bulky and unsightly roof top plant areas; and
- Providing clear points of pedestrian access and circulation.

A comprehensive overview of the proposed design for the development is included in the Architectural Design Statement prepared by Wilkinson Eyre Architects.

4.5 Numerical Overview

4.5.1 Numerical Summary

Table 4 outlines the key numeric information of the proposed development.

Table 4 – Key development information

Component	Proposal
Project site area	Application Site Boundary: 6,204m ² Ground Level Licenced Area: 1,385m ² Extent of Basement Level Works: 5,062m ² Total Project Site Area : 12,651m²
GFA	Tourism: 48,200m ² Retail: 6,700m ² Apartments: 22,600m ² Total GFA = 77,500m² (Max)
Hotel Rooms	350 rooms
Residential Apartments	66 apartments
Maximum Height	■ RL 275m ■ 271.1m ■ 71 storeys
Total proposed parking spaces	Maximum of 610 car parking spaces, comprising: ■ 110 residential spaces ■ 250 valet car parking spaces ■ 250 self-parking spaces (including 10 disabled parking spaces)
Additional end of trip facilities	■ 35 motorcycle spaces ■ 188 bicycle spaces

4.5.2 Height

The Crown Sydney Hotel Resort is comprised of a mid-rise and high rise interconnecting tower supported by a five storey podium. The taller tower rises to RL 275.0m to the top most point of the building (or 271.1m from finished ground level). While the building's mid-rise component reaches to RL 106.0m (or 102.1m when measured from finished ground level). Overall the building rises 71 storeys.

4.5.3 Land Uses and Floor Area

The development is technically a mixed use development that encompasses various uses and serves different clients for these uses. The development will cater to guests of the hotel, patrons of the VIP gaming facilities, residents and visitors of the residential apartments, shoppers frequenting the retail premises at the ground floor and patrons of the bars and restaurants throughout the development.

Tourist uses include the hotel, VIP gaming facilities, spa and associated recreational areas for guests.

The ground floor level of the building will be publicly accessible and open to the public 24 hours a day, 7 days a week.

The development comprises a total GFA of 77,500m². **Table 5** provides a detailed breakdown of the proposed gross floor area and use on a floor by floor basis, with the land use mix graphically shown in **Figure 9**. In summary, the key uses within the Crown Sydney Hotel Resort development are:

- 48,200m² tourist uses;
- 6,700m² retail uses; and
- 22,600m² of GFA for residential uses.

Table 5 – Land use by level

Level	Dominant use
B3	Self parking
B2	Self parking + residential parking spaces
B1	Loading dock + valet parking
Ground	Hotel reception, porte cochere, restaurants/bars, retail + back of house facilities
0 (Mezzanine)	Restaurant, staff facilities and hotel back of house facilities
1	Restaurant, bar and VIP gaming rooms
2	Restaurant, bar and VIP gaming rooms
3	Restaurant, hotel function rooms + pool deck
4	Hotel spa, gym, tennis court + pool
5	Plant + hotel offices
6 – 22	Hotel rooms
23	Plant
24	Hotel boardroom, residents lounge, Crystal Club, lounge, reception to villa hotel rooms + pool terrace
25-26	VIP Gaming Rooms
27 – 28	Plant
29 – 33	Hotel villa rooms
34 – 47	Residential apartments
48	Plant
49 – 64	Residential apartments
65	Plant
66 – 69	Hotel villa rooms
70 - 71	Plant + BMU

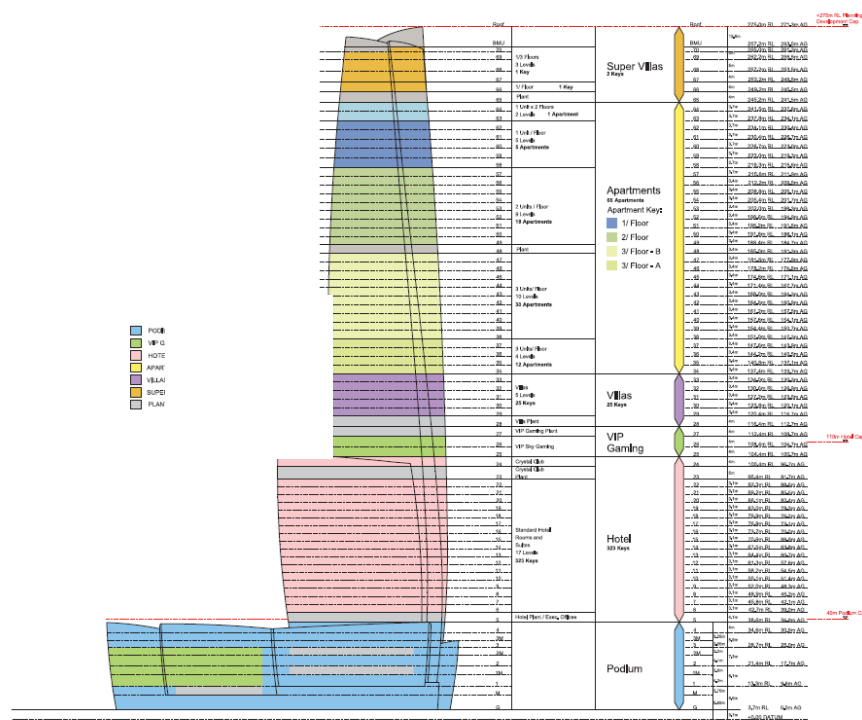


Figure 9 – Land use mix

Source: Wilkinson Eyre Architects

4.5.4 Residential Apartment Mix

Table 6 provides a detailed breakdown of the proposed mix of residential and serviced apartments in the development.

Table 6 – Apartment mix

Level	2 Bedroom	3 Bedroom	4 Bedroom	5 Bedroom	Total
34	2	1			3
35	2	1			3
36	2	1			3
37	2	1			3
38	2	1			3
39	2	1			3
40	2	1			3
41	2	1			3
42	2	1			3
43	2	1			3
44	2	1			3
45	2	1			3
46	2	1			3
47	2	1			3
48	-	-	-		-
49		2			2
50		2			2
51		2			2
52		2			2
53		2			2
54		2			2
55		2			2
56		2			2
57		2			2
58			1		1
59			1		1
60			1		1
61			1		1
62			1		1
63				1	1
64					
Total	28	32	5	1	66

4.6 Vehicular Access and Parking

Vehicular movements to the site are restricted to two key points along Lime Street. The first of these is a porte-cochere at the north eastern edge of the building that will be used for drop off, pick up, taxis and valet parking collection and returns.

The other vehicle egress point is a two way driveway off Lime Street. This will serve both valet return vehicles, service vehicles, and patron and resident

vehicles, and will be the primary egress between Lime Street and the basement levels of the development.

A small dedicated one-way driveway access from the porte-cochere to Basement Level 1 will be provided to service valet vehicles. Valet vehicles will be returned to the porte-cochere via the main two way driveway.

Basement Level 1 only provides car parking for valet parked vehicles. A car park stacking system will be employed by the valet attendants to maximise available space and will once full, be able to accommodate up to 250 vehicles. Basement Level 1 also includes the building's loading dock.

Basement Levels 2 and 3 include both self parking for patrons of the hotel and resident parking (located primarily on B2).

4.7 Pedestrian Circulation and Access

The principal street address for the building is located on Lime Street. The building has four separate pedestrian entries that lead to the reception area and which allow for through pedestrian movements. Pedestrian access to the retail areas will be located from their respective frontages, which are primarily located adjacent to Lime Street and the foreshore promenade.

All upper levels of the development will be directly accessible via 16 dedicated lifts. **Table 7** below illustrates which levels of the building are served by which lifts. An integrated system of fire stairs will also serve the building in the event of an emergency.

Table 7 – Lift Access arrangements for the development

Lift	Basement Levels	Podium Levels	Mid-Rise Tower (Hotel Rooms)	Level 24 Villa Reception	VIP Gaming (Levels 25 + 26)	Hotel Villas	Residential Apartment Levels	Super Villas (Levels 66-67)
G1	-	✓	✓	✓	-	-	-	-
G2	-	✓	✓	✓	-	-	-	-
G3	-	✓	✓	✓	-	-	-	-
G4	-	✓	✓	-	-	-	-	-
G5	-	✓	✓	-	-	-	-	-
G6	-	✓	✓	-	-	-	-	-
V1	✓ (B2)	✓	✓ (Level 5)	✓	✓	✓	✓	-
V2	✓ (B2)	✓	✓ (Level 5)	✓	✓	✓	✓	✓
V3	✓ (B2)	✓	✓ (Level 5)	✓	✓	✓	✓	✓
B1	✓ (B1)	✓	✓	✓	✓	-	-	-
B2	✓ (B1)	✓	✓	✓	✓	✓	✓	✓
B3	✓ (B1)	✓	✓	✓	✓	✓	-	-
P1	✓ (B2 & B3)	✓	-	-	-	-	-	-
P2	✓ (B2 & B3)	✓	-	-	-	-	-	-
S1	✓	✓	-	-	-	-	-	-
S2	✓ (B1 & B2)	✓	-	-	-	-	-	-
K1	✓ (B1 & B2)	✓ (Ground & Mezz)						
K2	✓ (B1 & B2)	✓ (Ground)						
FL1	-	-	-	-	-	-	-	✓

The development's ground floor will include four separate access points from which to enter and exit the building at the ground plane. These entries are illustrated in **Figure 10**.

The main entry is located to the north eastern portion of the building and includes a porte cochere primarily for drop off and pick up of vehicles, which are then parked within the basement levels. This entry leads to the main hotel lobby and reception area, and the lift lobby.

Two building entries are located to the western side of the development at the ground floor, both of which open onto the foreshore promenade of Barangaroo. These entries are also adjacent to the majority of the proposed restaurant and bar areas at the development's ground level and which comprise both indoor and outdoor dining areas. Pedestrian access to these restaurants and bars can be made from within the building and directly from the adjoining public domain.

A further building entry is located to the south eastern side of the building. This entry is expected to draw pedestrians from the promenade through to the hotel lobby via a retail arcade.

All pedestrian entries lead to the main lobby and hotel reception area and allow for through pedestrian traffic.

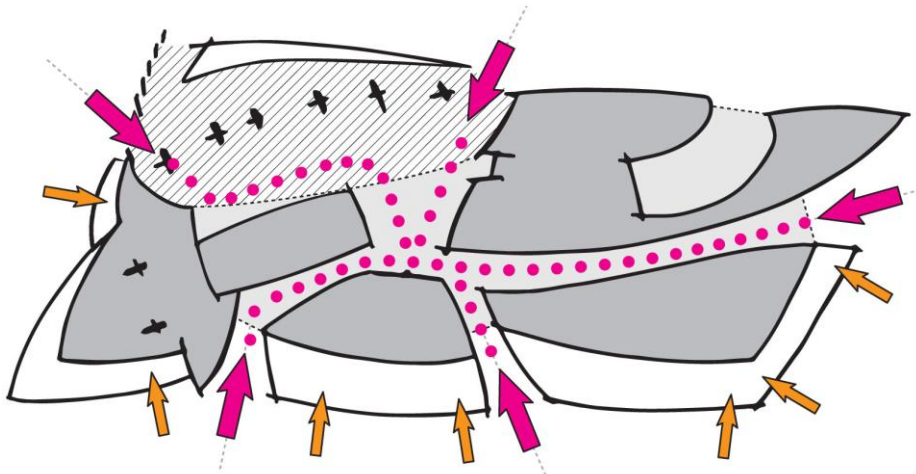


Figure 10 – Ground Floor Pedestrian Access and Permeability

Source: Wilkinson Eyre Architects

4.8 Façade Treatment

The building's façade treatment and use of materials has been designed to enhance the development's unique and elegant built form. There are different but complementary façade treatments to each elevation of the building and to the podium. The overall facade treatment for the building has been designed to give it a luminous and light appearance through the use of a high proportion of glass and light coloured stone elements.

More detail is included in the accompanying Architectural Design Statement.

The façade treatments at the ground floor level have been designed to activate the street level through the use of floor to ceiling external glass to maximise visibility and exposure of the internal retail, restaurant and hotel uses. Additional overhead awnings provide shelter to the building users and are complementary to the building's curved design.

The podium levels are faced with a mix of open balconies, windows and decorative louvres, overlaid with a veil of stone work that wraps around the

exterior and help to reinforce the verticality of the tower. The treatment to the podium also provides a subtle point of difference that assists with distinguishing it from the tower component and reflects a natural theme that complements the building's curved shaped.

Facades for the mid and high rise towers are variously treated with rectangular and diamond shaped glass with different configurations selected for the easterly, westerly and northern facades of the building to accommodate differing degrees of curvature in the building as it twists upwards.

As part of the high rise tower, hotel villa and residential apartments include outdoor terrace areas and balconies, the detail of which is integrated within the overall façade design with 1.4m high balustrade glazing and full height sliding glass doors. No wintergardens are proposed for the CSHR building.

4.9 Landscaping, Licensed Areas and Terraces

At ground floor, the proposed landscaping will be principally focused around the edge of the development including the outdoor restaurant and bar areas. These works will integrate into the more extensive public domain works that surround the site and which includes a wide foreshore promenade to the east and south of the site, the Lime Street streetscape to the east and a large public park to the north, which is expected to serve as a public event space. These adjoining landscaping works will be subject of separate approvals to be sought by Lend Lease.

Landscape Plans for the proposed development have been prepared by St Legere and are provided as an appendix to the Architectural Design Statement supplied under separate cover. Each of the proposed landscaped areas is broadly described below:

- **Ground Level** – Landscaping at ground level comprises low level landscaping including ground covers, shrubs and small accent trees. Planters, accent paving, seat walls and water features are also provided and will add to the visual interest and useability of the adjacent public domain and outdoor areas immediately surrounding the building. Landscape works at the ground level are designed to tie into the more extensive public domain works outside of the site, which include a wide foreshore promenade to the east and south of the site, the Lime Street streetscape to the east and a large public park to the north, which is expected to serve as a public event space. The design and implementation of landscaping works within the surrounding public domain areas will be subject of separate approvals to be sought by Lend Lease.
- **Level 3 and 4** – Levels 3 and 4 include western facing landscaped terraces that overlook Darling Harbour. Both spaces consist of landscaped garden beds of groundcover, shrubs and accent planting, with cabanas and built in seating areas overlooking infinity pools and jacuzzis.
- **Level 4** – Level 4 also consists of a larger rooftop terrace area that covers the majority of the podium rooftop and which includes a tennis court and further landscaping at the southern end of the building.
- **Level 24** – A rooftop terrace on the 24th floor includes a number of planter boxes with ground covers and shrubs as well as a variety of small massing trees and accent plants. This soft greenery is set around a centrally located swimming pool, jacuzzi and wet deck tiled area.
- **Level 69** – A private rooftop terrace on Level 69 consists of a central paved area that is surrounded by a wet deck tiled area and which includes a jacuzzi.

The terrace is book ended by landscape planters that comprise a small tree, shrubs, ground covers and accent plants.

All of the above areas have been specifically designed to complement the built form and provide a balance to the hard surfaces of these areas and provide attractive areas for patrons, residents and visitors.

4.10 Signage

The proposed signage strategy for the development is detailed in the Architectural Design Statement that accompanies this EIS.

Building Identification Signage

A total of 12 building identification signs (**Figure 11**) are proposed that are distributed across the building facades in key locations such as pedestrian and vehicle entry points, on the podium and oversail and at the top of the tower. Specifically the following signs are proposed:

East Elevation

- 1 x illuminated Crown sign (name and logo - Sign Ref - 02) located on the podium and measuring 5.95m wide by 4.8m high.
- 1 x illuminated Crown sign (logo only -Sign Ref - 05) on building oversail measuring 6.7m wide by 5.3m high.
- 2 x illuminated Crown signs (logo only) at the top of the tower (Sign Ref – 06/07) measuring 7.9m wide by 6.5m high.
- 1 x illuminated Crown sign (name and logo - Sign Ref – Porte Cochere) located at the porte-cochere entrance at ground level measuring 3.06m wide by 2.8m high.

West Elevation

- 1 x illuminated Crown sign including (name and logo - Sign Ref - 01) located on the podium and measuring 5.95m wide by 4.8m high.
- 1 x illuminated Crown sign (logo only) located on the building oversail (Sign Ref - 04) measuring 6.7m wide by 5.3m high.
- 1 x illuminated Crown sign (logo only) located at the top of the tower (Sign Ref – 08) measuring 7.9m wide by 6.5m high.
- 2 x illuminated Crown signs (logo only - Sign Ref – Typical Entrance) located at the top of the building entrance at ground level measuring 4.1m wide by 3.25m high.

South Elevation

- 1 x illuminated Crown sign including name and logo (Sign Ref - 03) located on the podium and measuring 5.95m wide by 4.8m high.
- 1 x illuminated Crown sign (logo only -Sign Ref – Typical Entrance) located at the top of the building entrance at ground level measuring 4.1m wide by 3.25m high.

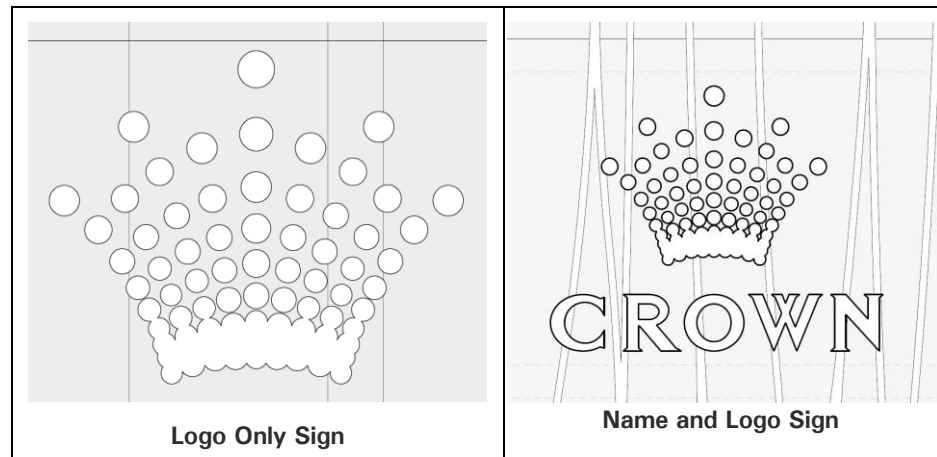


Figure 11 – Building Identification Signage

Source: Wilkinson Eyre Architects

Signage Zones

In addition to the 'Crown' building identification signs signage will also be required for a number of retail and restaurant uses located at ground level. Signage zones are therefore located along the building's ground level facade and are intended to provide an appropriate signage area for future occupiers. These zones are positioned to directly relate to the entrance and frontage of the relevant ground floor tenancy and range between 1.0m and 1.5m in height with varying lengths depending on the extent of the tenancy frontage. Specifically signage zones are proposed for the following:

- North café;
- North Restaurant;
- Lobby Bar;
- West Restaurant; and
- Retail Tenancies 1 and 3.

4.11 Operational Details

The proposal is for a mixed use development comprising various uses and facilities that serve a variety of different needs and functions including a hotel, residential, restaurants, bars, VIP gaming facilities and retail.

Recognising the diverse and complex nature of the proposed development Crown have prepared an Operational and Security Management Plan (**Appendix GG**) that sets out the overarching operational management principles and policies intended for the proposed development. Select details of the operational components of the proposed development are provided below.

Building Operational Hours

The specific hours of operation throughout the complex are proposed as follows:

- VIP Gaming and associated restaurants/bars – 24hrs per day 7 days per week.
- Hotel – 24hrs per day 7 days per week.
- Restaurants – 7am till 1 am, 7 days per week.
- Ground Floor Bars (not associated with gaming) – 12pm – 1am, 7 days per week.

- Lobby Bar – 7am – 1am, 7 days per week.
- Retail – 11am till 10pm, 7 days per week.

VIP Gaming Facilities Operation

As shown in Section 4.5.3 two VIP Gaming areas are contained within the proposed building, one being situated within the podium with the other located in the tower component and referred to as the 'Sky Gaming' area. Both gaming areas will only be accessible to members (and their guests) who have pre-qualified for membership prior to visiting the facility. Membership will be checked by hosts at the gaming entrance to ensure access is appropriately regulated. Public access into the gaming facilities will not be provided.

Membership to the VIP Gaming facility will only be available where people are:

- already members of a VIP gaming facility;
- are from overseas or interstate and have been accepted into 'high roller' rebate based play (this includes requirements for front money); or
- have applied for membership and that membership has been granted having regard to Crown's membership policy.

It is noted that NSW residents may be granted membership if they meet the membership requirements, but subject to a 24 hour 'cooling off' period unless they can provide evidence that they are already a member of an International or Australian VIP gaming facility. Further details of the Membership requirements are outlined within the Operational and Security Management Plan at **Appendix GG**.

To provide some context on the level of accessibility of the VIP Gaming facility, it is estimated that only 5% of existing customers at Crown Melbourne would be eligible to access VIP Gaming services within the CSHR building.

A key contributor to minimising access to the general public will be the fact that poker machines and low level gaming tables will not form part of the gaming offer, with high level table gaming being the only type of gaming available within these areas.

Crown Resorts has been a world leader in responsible gaming initiatives for over two decades and commits significant resources to promoting responsible gaming and providing assistance to customers who may be experiencing difficulty with their gaming behaviours. The procedures for providing this assistance are outlined in the Operational and Security Management Plan.

It should be recognised that, in Australia, the incidence of a small proportion of casino patrons having difficulties with their gambling behaviours arises principally from the playing of poker machines, not table games. As such, Crown Sydney is unlikely to generate significant problem gambling concerns given that it is not permitted to operate poker machines under NSW legislation.

Restaurant and Bar Operation

The restaurant and bar tenancies will be operated by Crown. All restaurants and bars will be operated in accordance with the overarching principles and policies set out in the Operational and Security Management Plan including:

- Ensuring that all relevant staff have completed an approved Responsible Service of Alcohol (RSA) course prior to commencing employment.
- Ensuring that management's primary responsibility is for the safety and well-being of its customers, and as such service of alcohol does not condone or facilitate irresponsible drinking behaviour.

- Ensuring that any person selling, purchasing, using or in possession of narcotics or other illegal substances on the premises will be subject to management action, including, if necessary contacting police.
- Regulating entry to the development including enforcement of a dress code and refusing entry to guests that are drunk and disorderly.

Retail Operation

Retail tenancies within the proposed Crown Sydney Hotel Resort building are proposed to have the ability to operate 11am to 10pm seven days per week. These tenancies will most likely be occupied by third party retail operators and their ultimate hours of operation will depend on the nature of the retailer. The operation of these tenancies will be carried out in accordance with the Operational and Security Management Plan.

4.11.1 Operational Security

The hotel will be managed by various staff including a dedicated team of security staff, who will be responsible for the security of various activities and areas throughout the premises including those areas for gaming, parking, retail, restaurants and bars. These staff will also:

- welcome and attend to patrons, guests and visitors
- ensure secure transit of cash and chips around the premises and minimise any risk to protect these assets;
- operate and monitor the premise through the use of CCTV throughout to further safe guard the safety of patrons, residents and employees;
- monitor and respond to unsuitable behaviour throughout the premises; and
- monitor gaming activities in line with IGLA requirements.

Other staff in the development will include those hotel reception, valet parking, restaurant, room service, gaming, and back of house services staff.

All security operations will be undertaken in accordance with the overarching Security and Operational Management Plan (Appendix GG). Crown will work closely with NSW Police to understand their concerns and obtain advice with regard to security management and enforcement and will prepare detailed confidential security management plans that will be used to plans used to manage daily security procedures and practices for the proposal.

It should be recognised that the scale and nature of security issues likely to arise at Crown Sydney will be significantly less than those associated with other major Australian casinos, given that the general public will not be permitted to access the gaming areas. Accordingly the volume of patrons at Crown Sydney will be significantly lower than other Australian casinos, given that Crown Sydney is only permitted under NSW legislation to offer VIP table gaming at high table limits.

4.12 Environmentally Sustainable Development

The design team is currently working with the Green Building Council of Australia (GBCA) to develop a custom Green Star custom rating for the integrated resort which includes Hotel, residential, retail, restaurants and excluding or including gaming areas at the election of Crown. In addition to this Crown will also:

- Obtain a NABERS energy rating for the hotel. Crown will endeavour to achieve a 5 star rating as represented by best practice after taking into account any penalties in the certified rating as a result of the intensity of the Hotel operation. NABERS protocol is to be developed in collaboration with the Office of Environment and Heritage;
- Meet or exceed BASIX targets.

To achieve the above the development will incorporate a number of ESD features and initiatives that will contribute to achieving this rating, this may include:

- The development will be designed to integrate with and take advantage of the Barangaroo Delivery Authority's current site wide infrastructure and energy initiatives;
- The Crown Hotel and residential apartments will connect to the Barangaroo precinct district cooling plant with chilled water to be reticulated to the development via connection to the precinct district cooling system.
- Fan coil systems will also be used for heating and cooling of apartments and hotel rooms.
- Heating will be provided through a centralized onsite gas fired boiler that takes advantage of low energy use through higher efficiencies achieved as a result of the small fans used for cooling.
- Use of a displacement ventilation system in the VIP Gaming areas will provide increased fresh air rates in a manner that is as energy efficient as possible.
- Recycled Water from the Barangaroo South Recycled Water Plant (RWP) being developed by Lend Lease, will be reticulated throughout the podium levels of the Crown building for non-potable water uses.
- Rainwater collection from the site is proposed to be reused onsite or be returned to the Barangaroo waste water system via an in-line treatment facility.
- The use of LED lighting and fluorescent fittings throughout the development will ensure energy use is reduced considerably and that the NCC lighting provisions are exceeded further reducing GHG emissions.
- Use of a site/building wide energy metering and viewing system (BMCS/SCADA) to allow Crown to regularly monitor and review energy use.
- Energy monitoring will be coupled with an intelligent control system that will facilitate automatic 'shut down' or 'turn down' of unoccupied spaces for air conditioning, and lighting.
- The use of Photovoltaic cells is currently also being considered for incorporation into the building design at ground level, different podium external areas and other areas such as roof space at the upper levels of the tower.
- Maximise diversion of construction and operational waste from landfill.
- Implementation of extensive energy metering and sub-metering.

- Using low embodied carbon practices for materials such as concrete and steel.
- Providing terraces to all villas and residential apartments such that these can be natural ventilated.
- Ensuring that 48 residential apartments (70.65%) achieve a minimum of 3 hours solar access during the winter solstice (21 June).
- Use of high performance glazing that will reduce heat gains and losses.

More details regarding the ESD and Green Star performance of the building is outlined in the ESD Report prepared by ARUP and included at **Appendix C**.

4.13 Construction Hours

In accordance with the Environmental, Construction and Site Management Plan prepared by Lend Lease for the Barangaroo South site, construction works are proposed to be undertaken between the hours of 7.00am and 6.00pm Monday-Friday and between 7.00am and 5.00pm on Saturdays. No work will be undertaken on Sundays or public holidays. These construction hours are consistent with those approved for the adjoining buildings in Stage 1A Barangaroo South. The potential impacts of construction during these hours have been assessed in this EIS.

5.0 Environmental Assessment

This section of the report assesses and responds to the environmental impacts of the proposed DA. It addresses the matters for consideration set out in the SEARs (see Section 4.0).

The Mitigation Measures at Section 6.0 complement the findings of this section.

5.1 Consistency with Relevant EPIs, Policies and Strategies

The relevant strategies, environmental planning instruments, policies and guidelines as set out in the SEARs are addressed in **Table 8**.

Table 8 – Summary of consistency with relevant Strategies, EPIs, Policies and Guidelines

Instrument / Strategy	Comments
Strategic Plans	
NSW 2021	NSW 2021 is a 10 year plan to rebuild the economy, provide quality services, renovate infrastructure, restore government accountability, and strengthen our local environment and communities. The Barangaroo site has an important role in the NSW 2021 Plan as it will assist with achieving multiple goals set out in the Plan, including but not limited to improving the performance of the NSW economy, increasing the competitiveness of doing business in NSW, providing critical infrastructure, building liveable centres. As discussed in Section 1.2, the hotel development is expected to play a role in the success of Barangaroo South and achievement of the above goals, but also for the State by helping to increase tourism to Sydney. In addition the development will directly contribute to the goal of providing capacity for additional and varied employment opportunities in a central location that will be well served by various forms of transport.
NSW Long Term Transport Master Plan	The proposed Crown Sydney Hotel Resort will provide an outcome that is consistent with the objectives of the NSW Long Term Transport Master Plan as it will: – deliver new development in a central location within Sydney that has excellent access to public transport services and facilities, and which will support a potential new railway station at Barangaroo. – support jobs growth in a highly accessible central location within Sydney thus enabling future employees to readily access their place of employment by public transport. – Support future economic growth and productivity both directly and indirectly, and in doing so will maximise the use of current and future planned public transport networks and services. – Help reduce social disadvantage and improve sustainability by providing access to a significant number of new employment and training opportunities in close proximity to public transport, and through also providing bicycle parking and end of trip facilities that encourage staff to use alternative modes of transport.
Plan for Growing Sydney	The SSDA is consistent with the Plan for Growing Sydney as it will make a significant contribution to the Barangaroo South development, which is identified as one of the key priorities for Global Sydney within the Strategy. More specifically development is consistent with the objectives of the Plan in that it will: – create a new building and urban environment which is active and inviting to the broader public; – help raise the global profile of the City of Sydney by not only delivering an iconic building that will contribute to the city skyline, but also by delivering a 6 star Green Star development that will be a worldwide model for innovation and hotel development; and – provide employment throughout the construction and operational phases of the development's life span.
Draft Sydney City Sub-Regional Strategy	The SSDA is consistent with the Draft Sydney City Subregional Strategy as it will deliver a building at Barangaroo South which is identified in the Draft Strategy as a major development opportunity to conduct a focused and considered renewal process aimed at generating a new urban precinct in Australia's premier city.
Sydney's Cycling	The proposed CSHR building will provide an outcome that is consistent with Sydney's Cycling

Instrument / Strategy	Comments
Future	Future. The building has been designed to include 83 bicycle parking spaces for use by staff with end of trip facilities also provided for staff members. A further 37 bicycle parking spaces are provided at street level for use by the general public. Through the provision of these facilities the proposed development will help to encourage cycling as a form of transport within Sydney.
Sydney's Walking Future	The proposed CSHR building will provide an outcome that is consistent with Sydney's Walking Future as it will contribute to the the regeneration of the Barangaroo foreshore area which once complete will be characterised by an extensive publicly accessible foreshore promenade. The buildings location within central Sydney will also mean that the large majority of visitors to the site will use public transport and walking as a means of accessing the site and the building.
Sydney City Centre Access Strategy	The Strategy will deliver a fully integrated transport network in Sydney's city centre that balances the needs of customers for each transport mode in order to deliver a more integrated network in the Sydney city centre. As with the Barangaroo Integrated Transport Plan, the Strategy sets out actions relating to Wynyard Walk, bus routes and services, ferries, light rail, Wynyard Station upgrade, and CBD rail capacity. It identifies cycleways around Barangaroo, and nominates Hickson Road a key bus corridor. The Stage 1C remediation and earthworks are preparatory works which will not result in any ongoing use of the land, and do not include any works in Hickson Road or any other public road. As such, the proposal will not impact on accessibility to/from or around the site, and will not undermine the actions set out in the Strategy.
Barangaroo Integrated Transport Plan	The Barangaroo Integrated Transport Plan (BITP) addresses a range of transport modes and recommends actions in the areas of walking, cycling, traffic and taxi access, Wynyard Bus Interchange, ferry services, light rail and bus services, Wynyard Station upgrades, rail capacity and a Transport Square Interchange on the western foreshore of the CBD. The development is consistent with the mode share targets that were established under the Concept Plan (as modified) that are reinforced in the BITP.
Barangaroo Housing Strategy	Consistent with the Barangaroo Housing Strategy prepared for Barangaroo South, the proposed residential component of the CSHR building will contribute to Barangaroo becoming a sustainable, vibrant and diverse community that provides housing to support a wide range of people. It is noted that the Barangaroo Housing Strategy commits to providing residential GFA as Key Worker Housing (KWH) when not less than 75% of the total residential developable GFA is complete. It is also envisaged that the KWH will be located within the residential buildings closer to Hickson Road. Accordingly, the 2.3% KWH target will be met as part of future buildings within Barangaroo South and no KWH is proposed in the CSHR building. It is noted that Lend Lease has committed to delivering intermediate housing for essential and key workers employed within the Barangaroo South precinct and the wider Sydney CBD area via the Australian Affordable Housing Partnership (AAHP), which is a collaborative partnership between Lend Lease and the public, private and community sectors. As a founding partner of AAHP, Lend Lease delivers origination, development, sales and marketing expertise across all AAHP projects. The intermediate housing offer that will be delivered by Lend Lease will deliver in response to the KWH requirements includes the following benefits: – social equity and inclusion by providing a mix of housing tenures for essential and key workers in the Barangaroo precinct and wider Sydney CBD area; – social mix and diversity by targeting a range of households including singles, families and retirees; and – international best practice by working with Community Housing Providers (CHPs) to deliver asset and tenancy management of affordable rental accommodation.
State Legislation	
EP&A Act	The proposed development is consistent with the objects of the EP&A Act for the following reasons: – it reflects the proper development of the site for the purpose of promoting the social and economic welfare of the community and a better environment; and – it will ensure the promotion and co-ordination of the orderly and economic use and development of land. The proposed development is consistent with Division 4.1 of the EP&A Act, particularly for the following reasons: – the proposed development has been declared to be of state significance;

Instrument / Strategy	Comments																																		
	– the development is not prohibited by the draft SEPP planning instrument; and – the development has been evaluated and assessed against the relevant heads of consideration under section 79C.																																		
EP&A Regulations	The EIS has addressed the specification criteria within clause 6 and clause 7 of Schedule 2 of the EP&A Regulation. Similarly, the EIS has addressed the principles of ecologically sustainable development through the precautionary principle (and other considerations), which assesses the threats of any serious or irreversible environmental damage (see Section 8.3). As required by Clause 7(1)(d)(v) of Schedule 2, and as set out below, no additional approvals will be required in order to permit the proposed development to occur. <table border="1"> <thead> <tr> <th>Act</th><th>Approval Required</th></tr> </thead> <tbody> <tr> <td colspan="2">Legislation that does not apply to State Significant Development</td></tr> <tr> <td>Coastal Protection Act 1979</td><td>N/A</td></tr> <tr> <td>Fisheries Management Act 1994</td><td>N/A</td></tr> <tr> <td>Heritage Act 1977</td><td>N/A</td></tr> <tr> <td>National Parks and Wildlife Act 1974</td><td>N/A</td></tr> <tr> <td>Native Vegetation Act 2003</td><td>N/A</td></tr> <tr> <td>Rural Fires Act 1997</td><td>N/A</td></tr> <tr> <td>Water Management Act 2000</td><td>N/A</td></tr> <tr> <td colspan="2">Legislation that must be applied consistently</td></tr> <tr> <td>Fisheries Management Act 1994</td><td>No</td></tr> <tr> <td>Mine Subsidence Compensation Act 1961</td><td>No</td></tr> <tr> <td>Mining Act 1992</td><td>No</td></tr> <tr> <td>Petroleum (Onshore) Act 1991</td><td>No</td></tr> <tr> <td>Protection of the Environment Operations Act 1997</td><td>No</td></tr> <tr> <td>Roads Act 1993</td><td>No</td></tr> <tr> <td>Pipelines Act 1967</td><td>No</td></tr> </tbody> </table>	Act	Approval Required	Legislation that does not apply to State Significant Development		Coastal Protection Act 1979	N/A	Fisheries Management Act 1994	N/A	Heritage Act 1977	N/A	National Parks and Wildlife Act 1974	N/A	Native Vegetation Act 2003	N/A	Rural Fires Act 1997	N/A	Water Management Act 2000	N/A	Legislation that must be applied consistently		Fisheries Management Act 1994	No	Mine Subsidence Compensation Act 1961	No	Mining Act 1992	No	Petroleum (Onshore) Act 1991	No	Protection of the Environment Operations Act 1997	No	Roads Act 1993	No	Pipelines Act 1967	No
Act	Approval Required																																		
Legislation that does not apply to State Significant Development																																			
Coastal Protection Act 1979	N/A																																		
Fisheries Management Act 1994	N/A																																		
Heritage Act 1977	N/A																																		
National Parks and Wildlife Act 1974	N/A																																		
Native Vegetation Act 2003	N/A																																		
Rural Fires Act 1997	N/A																																		
Water Management Act 2000	N/A																																		
Legislation that must be applied consistently																																			
Fisheries Management Act 1994	No																																		
Mine Subsidence Compensation Act 1961	No																																		
Mining Act 1992	No																																		
Petroleum (Onshore) Act 1991	No																																		
Protection of the Environment Operations Act 1997	No																																		
Roads Act 1993	No																																		
Pipelines Act 1967	No																																		
Casino Control Act	The VIP Gaming facilities provided within the Crown Sydney Hotel Resort will be operated under a single licence and will not commence operation until after the November 2019. Gaming machines and low limit gaming facilities and services will not form part of the offer at the Crown Sydney Hotel Resort access to the Gaming facility will be provided on a member only basis with access restricted for walk-in walk-out use from the general public. Crown are an experienced and highly regarded gaming facilities operator and will apply best practice principles in the operation of the Crown Sydney Hotel Resort to achieve the key objectives and requirements of the Act, namely to ensure that: - management and operation of the facility is free from criminal influence and exploitation; - gaming is conducted honestly; and - appropriate practices and procedures are in place to contain and control the potential of a casino to cause harm to the public interest and to individuals and families.																																		
SEPP 55	The site will be remediated (if necessary) and validated in accordance with the Crown RAP (see Appendix Z). A Site Audit Report has been issued by an EPA accredited site auditor certifying that the provisions of the Crown RAP are capable of ensuring that the Crown development site can be made suitable for the future intended uses at the site. A Site Auditor's Statement will ultimately be obtained upon completion of the works certifying the Crown Hotel development site is suitable for the proposed uses.																																		
SEPP 64	The proposed development will provide a design outcome that is consistent with the aims and objectives of SEPP64 as: - The signage is compatible with the desired amenity and visual character of the area. The signage has specifically been designed to be conservative, tasteful and minimalist in its appearance. It is therefore considered appropriate taking into account the site's locational context and the scale of the building. - The signage effectively identifies with the building; - The signage has been designed to be of a high quality finish consistent with																																		

Instrument / Strategy	Comments	
	the overall building. - The signage will not result on an adverse impact on local nearby transport corridors.	
SEPP 65	The Design Verification Statement prepared by Wilkinson Eyre and Bates Smart address the principles of SEPP 65. An assessment of the proposal against the relevant rules of thumb in the Residential Flat Design Code is located at Section 5.5 and within the Architectural Design Statement that is provided under separate cover.	
Major Development SEPP (Draft)	The Barangaroo site is listed as a State Significant Site under Part 12 of Schedule 3 of the Major Development SEPP.	
	Clause 8 - Zone B4 Mixed Use	The proposed uses within the development are all permissible with the B4 zone.
	Clause 9 – Zone RE1 Public Recreation	Part of the balconies and terraces for the development and parts of the future restaurant and bar areas at the ground floor are proposed within the RE1 zone. The subject application does not seek consent for the restaurant and bar uses, however it is noted that the likely future use of these premises as a food and drink premises is permissible and consistent with the objectives of the zone. Should consent be sought for a use that is not permissible in the RE1 zone then it will be subject to an assessment under clause 23 'Development near zone boundaries'.
	Clause 17 - Height of buildings (Maximum RL 41.5)	The proposed development has a maximum RL of 275, and therefore complies with the maximum permitted height development standard.
	Clause 18 - Gross Floor Area Restrictions - Maximum 77,500m ² (across Block Y)	The proposed development has a GFA of 77,500m ² , which complies with the maximum GFA development standard for the site.
	Clause 19 - Design Excellence	The proposed development demonstrates Design Excellence in accordance with clause 19. See Sections 1.2.6 and 5.3.
	Clause 23 – Development near zone boundaries	This clause applies to land within a 25m distance of a boundary of any 2 zones. In the case of the development, approval for parts of the terraces and balconies, and future food and drink premises' over RE1 zoned land is sought pursuant to this clause. In accordance with subclause (3) this encroachment is not inconsistent with the objectives of the zones in that the terraces and balconies relate to elements of the building will not obstruct public domain areas at the ground level, and will contribute to the overall design of the development. The proposed food and drink premises at the ground floor of the development will contribute to achieving the objectives of the RE1 zone by activating the adjoining public domain foreshore areas, providing additional surveillance of these areas and will be compatible with other recreational uses with the RE1 zoned land.
SEPP (Infrastructure)	In accordance with Schedule 3 of the SEPP (Infrastructure) the development is traffic generating development. The SSDA will therefore be required to be referred to the RMS for consideration.	
SEPP (State and Regional Development)	Development that has a capital investment value (CIV) of more than \$10 million on land identified as being within a State Significant Development Site is State Significant Development under Schedule 2 of State Environmental Planning Policy (State and Regional Development) 2011 (State and Regional Development SEPP). Accordingly, with a CIV of \$992.34 million this development is State Significant Development.	
Sydney Harbour REP	Clause 20 General	The matters referred to in Division 2 are addressed below.
	Clause 21 Biodiversity, ecology and environment protection	The proposed mitigation measures set out in Section 7 will ensure the development will not have any impact on the Harbour's biodiversity, ecology or environment.
	Clause 22 Public access	The development is consistent with Concept Plan (Mod 8) which

Instrument / Strategy	Comments
	to, and use of foreshores and waterways provides improved pedestrian access to Barangaroo and the foreshore. Moreover, the development will integrate development and the public domain areas of Barangaroo by providing restaurants, bars and retail development at the ground floor of the development to then encourage use of the foreshore areas. Similarly these aspects of the development will improve surveillance of the public domain, which will in turn contribute to making the surrounding foreshore areas perceivably safer. For these reasons the development is therefore considered to be consistent with clause 22.
Clause 23 Maintenance of a working harbour	The proposed development forms part of the redevelopment of the wider Barangaroo site for mixed uses that was assessed as part of the Concept Plan for the site, and as such will contribute to the economic use of the land while ensuring it is compatible with the foreshore uses of adjoining lands.
Clause 24 Interrelationship of water and foreshore uses	The proposed development will not have any adverse impacts on the use of waterway for maritime functions. The development is located away from the waterway. Additionally the development will not obstruct, but rather encourage, the use of adjoining foreshore areas. For this reason the development is consistent with the objectives of this clause.
Clause 25 Foreshore and waterways scenic quality	This application seeks to provide a high quality new building that will contribute to the scenic quality of the waterway, but will also help to establish the character of western edge of the city through the combination of scale, unique built form and use of high quality materials and finishes. For these reasons the development will enhance the scenic qualities of the foreshore of Barangaroo and the broader city.
Clause 26 Maintenance, protection and enhancement of views	The proposed development will not adversely impact any views and vistas to the harbour. Conversely, it will provide new views to the Harbour from the new building. A detailed view analysis from the public domain is included Section 5.4.3.
Clause 27 Boat storage facilities	N/A. No boat storage facilities are proposed.

5.2 Barangaroo Concept Plan (Mod 8)

This SSDA seeks approval for the construction of hotel development as described in Section 4 of this report. The development is located within Block Y of Barangaroo as identified under and has been designed in accordance with the proposed Concept Plan (Mod 8), as detailed below.

Proposed Concept Plan (Mod 8) identifies maximum GFA and height controls for each Development Block within Barangaroo South, including Block Y, within which development is to be located. The proposed development is required to comply with the Concept Plan (as modified).

In addition, the proposed Concept Plan (Mod 8) requires future applications to demonstrate consistency with the proposed Built Form Principles and 'Barangaroo South Design Guidelines'.

Numeric Concept Plan Controls

Table 9 provides a comparison of the development's compliance with the proposed Concept Plan (Mod 8) numerical controls.

Table 9 – Compliance with Concept Plan (Mod 8) Block Y GFA and Height Controls

Block Y Concept Plan (Mod 8) Control	Proposed	Compliance
Maximum GFA – 77,500m ²	77,500m ²	Compliant
Maximum height – RL 275	RL 275	Compliant

Draft Barangaroo South Design Guidelines

The draft guidelines are to provide a framework to guide the form and appearance of development within Barangaroo South, within the context of the Concept Plan.

Vision and Principles – Part 2

As demonstrated in the Architectural Drawings and Design Statement included under separate cover, the hotel development complies with the Concept Plan (Mod 8)'s Vision and Principles contained at Part 2 of the draft Barangaroo South Design Guidelines, given that it will:

- contribute to the creation of an integrated new western frontage to the city centre, characterised by a slender and elegant tower and a high quality public promenade consistent with Built Form Principle 1;
- define the public sense of space to Lime Street by building the facades to the street alignment and providing activated spaces and uses (such as the porte cochere and retail development) along the development's west façade consistent with Built Form Principle 3;
- create a marker building that will be the highest built form within Barangaroo South consistent with Principle 5;
- allow for view sharing across the Barangaroo site both at ground and upper levels consistent with Principle 7;
- provide for pedestrian permeability through the ground floor area of the development and around the development's edges consistent with Built Form Principles 4 and 6; and
- be orientated to the west and south to define the linear nature of the foreshore promenade consistent with Built Form Principle 8.

It is noted that the development is not inconsistent with the other Built Form Principle, despite that this does not specifically relate to the hotel development.

Design Guidelines – Part 4

Overall the hotel development complies with the principles and controls by providing:

- a building mass that is appropriate within the envelope;
- a street wall that defines the promenade;
- an articulated, well-proportioned and legible building mass;
- permeability and accessibility through Block Y;
- an articulated and legible rooftop;
- high architectural quality facades that contribute to the buildings articulation and mass; and
- potential activation of the promenade through providing 100% of the façade for future active uses.

Table 10 demonstrates that hotel development is generally consistent with the key performance criteria and design solutions outlined at Part 4 of the draft Guidelines.

Table 10 – Compliance with relevant design solutions in Part 4 of the Guidelines

Concept Plan (Mod 8) Block Y Control	Proposed Development	Comment
4.1 General		
Development occurs generally in accordance with Figure 2 – <i>Urban structure</i> .	The extent of the proposed building conforms generally with the building envelope shown in Figure 2 of the Guidelines.	Consistent
4.3 Street Network		
Performance criteria - To create an integrated network of publicly accessible streets.		
DS1 – Streets are provided generally in accordance with Table 3 – Street characteristics, Figure 5 – Street network and Figure 6 – Pedestrian and cyclist network. Lime Street Characteristics – The main north-south street through the site and the primary retail and commercial activity street – Connects with and continues the existing street to the south of the site and provides a connection with Barangaroo Central to the north – Layout and design is pedestrian-focused with a comfortable pedestrian scale and character It is a complete street accommodating vehicle movement in a slow-speed environment, on-street parking/drop off, pedestrian paths on both sides of the carriageway; tree grates that incorporate street trees and stormwater filtration.	The development will contribute to the desired character for Lime Street given that it will: – Provide retail along this street frontage; – Facilitates connections through the building to the Barangaroo foreshore areas; – Provide numerous through site links across Block Y that encourage pedestrian movements throughout the Barangaroo site; and – Provide appropriate street and public domain landscaping around the building to support the safe movement of pedestrians through the site.	Consistent
DS3 - Major pedestrian routes connect seamlessly with Lime Street and Shelley Street to the south and Barangaroo Central to the north.	The development provides various ground level thru connections between Lime Street and the public domain areas around the building.	Consistent
DS4 - A continuous public walkway traverses the entire waterfront edge of the site	The development will not impede the public walkways along the edges of the development.	Consistent
DS6 - All spaces in the public domain are designed to provide adequate and clear paths of travel	The development will not impede the public walkways along the edges of the development.	Consistent
5.1.1 Building Envelopes		
Performance criteria – Building mass is sited and is of a scale that is consistent with the role of the site as a major extension of the Sydney CBD; creates attractive, comfortable streetscapes; creates an integrated network of streets and public spaces; is set back from Sydney Harbour; provides a high level of amenity, including enabling adequate sunlight, daylight access and natural ventilation; to the public domain; and creates an active, vibrant and attractive public domain.		
DS1 - Building envelopes are in accordance with the Barangaroo South Building Envelope Plan approved in the Barangaroo Concept Plan <i>Note: Environmental mitigation measures, such as solar shading devices and other façade articulation may extend outside the development envelopes by a maximum of 600mm</i>	The development complies with the building envelopes for the Block Y. This is demonstrated in the building envelope images included in the accompanying Architectural Design Statement.	Consistent
5.1.2 Residential Amenity		
Performance criteria – Residential development achieves a high level of internal amenity and minimises impact upon the amenity of other existing and proposed residential development, including allowing for adequate solar access, natural ventilation, private open space and acoustic and visual privacy		
DS1 - The design of Residential Apartment Buildings is to have regard to the 'Rules of Thumb' in the Residential Flat Design Code	The residential components of the development have been design in accordance with the Code – see the accompanying Architectural Design Statement that details the compliance with the rules of thumb.	Consistent
DS2 - Landscape spaces for future residents are generally provided in the in the form of balconies, wintergardens and roof terraces	All of these elements are includes for the benefit of residents and will serve to provide a high level of amenity for residents. It is noted that there are no wintergardens within the proposed	Consistent

Concept Plan (Mod 8) Block Y Control	Proposed Development	Comment
	development, all private amenity spaces are in the form of open balconies and terraces.	
DS3 - Living rooms and private open spaces for at least 70% of apartments across the site should receive a minimum of 2 hours direct sunlight between 9 a.m. and 3 p.m. in mid-winter(excluding south-facing units)	A total of 77.8% of the overall number of residential units achieve 2 or more hours of solar access during the mid-winter between the hours of 9am and 3pm.	Consistent
DS4 - The maximum number of single aspect apartments with a southerly aspect (SW-SE) is 10% of all apartments proposed <i>Note: where this cannot be achieved, development must demonstrate how site constraints and orientation prohibit the achievement of these standards and how energy efficiency is addressed</i>	No apartments within the proposed development are southerly facing single aspect apartments.	Consistent
Performance criteria – Development encourages housing choice and affordability.		
DS1 - A minimum of 2.3% of all approved residential GFA is provided as key worker housing	Key worker housing will be provided as part of other residential development within Barangaroo South.	-
DS2 - Housing across the site should provide a variety of types, sizes and configurations	The development provides a wide variety of designs, layouts and bedroom numbers within units.	Consistent
DS3 - Wintergardens are encouraged in high-rise buildings where wind impacts do not support the provision of balconies. In such circumstances, wintergardens may not be considered GFA	No wintergardens are proposed as part of the development. Mitigation measures will ensure minimal impacts – see Section 5.7	Consistent
5.1.3 Car Parking and Servicing		
Performance criteria – Car parking and servicing balances on-site car parking to accommodate reasonable provision with encouraging alternative modes of transport to the private motor vehicle; is safe, functional and convenient; ensures buildings can be adequately serviced by service and delivery vehicles; and is located and designed to not visually dominate the public realm.		
DS1 – Car parking is provided in accordance with the Barangaroo Concept Plan	The development provides suitable car parking for the various uses within the proposal.	Consistent
DS2 – On-site parking areas comply with AS2890.1:2004	The design for the car parking areas complies with AS 2890.1:2004 – Section 5.9 for more detail.	Consistent
DS3 – For commercial buildings, a minimum of 1 shower for every 10 bicycle spaces is provided	No 'commercial/office' space is proposed for the CSHR development.	Consistent
DS4 – Building servicing and loading facilities are designed to adequately cater for forecast building demand	The design for servicing and loading areas is suitable for the development – See Section 5.9 for more detail.	Consistent
DS5 – Service/delivery areas accord with AS2890.2:2002 subject to driveways complying with City of Sydney Council's requirements	The design for servicing and loading areas is suitable for the development – See Section 5.9 for more detail.	Consistent
5.1.4 View Sharing		
Performance criteria – Development is located and designed to: a. provide a balance between enabling significant development on the site and protecting valued, key existing views from the public domain b. protect existing views corridors obtained from the public domain to iconic, landmark places that contribute to the sense of place and character of the CBD and its immediate surrounds c. protect the key attributes of existing public domain view corridors from Millers Point to maintain its amenity, character and sense of place, in particular its connection to the harbour d. enable views and outlooks from private premises to existing and proposed new attractive elements in the urban landscape, including Sydney Harbour, the open sky, parkland and streetscapes e. create an attractive new part of the CBD that contributes to the image and character of Sydney, in particular when viewed from the west		
DS1 – Public domain and built form are located along a radial fan arrangement as shown in Figure 2 – Urban structure and Figure 3 - Development blocks and indicative building envelopes	The development conforms to the proposed built form layout in Figures 2 and 3.	Consistent
DS2 – Adequate view corridors over and between new built form are created to maintain the following key attributes of public domain views from Millers Point:	Suitable view corridors are provided – see Section 5.4.3 for further details.	Consistent

Concept Plan (Mod 8) Block Y Control	Proposed Development	Comment
a. views to significant tracts of the water b. the junction of Darling Harbour and the Harbour proper c. the opposite foreshores d. panoramic qualities of existing views e. the most distinctive views to landmark structures		
DS3 – The northern park is located and has a sufficient area and dimensions, in particular an east-west depth relative to Kent Street, to contribute to a perception of open space for existing residential premises on Kent Street that currently have views across the site to Sydney Harbour.	The proposed development does not affect the northern park and provides an outcome consistent with this control.	Consistent
DS4 – Built form frames views of Sydney Harbour and the sky when viewed from both the public and private realms	The development is able to ensure suitable view sharing of the Sydney Harbour and sky - see Section 5.4.3 for further details.	Consistent
DS5 – Tower elements are separated to provide multiple view corridors to Sydney Harbour from existing development east of Hickson Road	The building aligns with the location prescribed by the guidelines.	Consistent
DS6 – View corridors are vertical in form, and where possible, each view corridor enables appreciation of the interface between the land edge of Barangaroo and Sydney Harbour	The development is able to ensure suitable view sharing of the Sydney Harbour and sky - see Section 5.4.3 for a detailed assessment.	Consistent
DS7 – Residential towers can be distinguished as separate built form.	The proposed building is a mixed use tower comprising various elements. Whilst this is the case it can be easily distinguished from the commercial built form by virtue of its architectural design.	Consistent

5.1.5 Overshadowing

Performance criteria – Development is located and designed to:

- provide a balance between enabling significant development on the site and creating a comfortable, high amenity public domain
- provide direct sunlight access to the foreshore promenade and activity area and northern park and facilitate daylight access to other parts of the public domain
- achieve an appropriate level of solar access for other new areas of public open space considering its orientation, scale or dimensions and desired future character

Note: for example, significant shadowing of Shelley Lane is acceptable due to its north-south alignment, narrow width and desired future character as an intimate, pedestrian scale place

DS1 – Public domain and built form are located and designed in accordance with Figure 2 – Urban structure and Figure 3 – Development blocks and indicative building envelopes	The development conforms to the proposed built form layout in Figures 2 and 3.	Consistent
DS2 – Development bulk and form is generally in accordance with Part 5 – Built Form Guidelines of these Design Guidelines	The development conforms to the proposed built form layout in Figures 2 and 3 and requirements in Part 5.	Consistent
DS3 – At least 50% of the foreshore promenade receives direct sunlight for a minimum of 2 hours between 9am and 3pm on 21 June	The development will afford a minimum of 2 hours of solar access to at least 50% of the foreshore promenade in mid-winter.	Consistent

5.1.6 Building Mass & Location (Block Y)

Performance criteria – To ensure building mass is appropriate within the envelope; responds to adjacent buildings; incorporates vertical massing as an integral part of the composition of towers where in tower form; and creates interesting building shapes.

DS1 – Building mass is located in accordance with Figure 3 Development blocks and indicative building forms	The development's massing conforms to the proposed built form layout in Figure 3.	Consistent
DS27 – The height of building mass increases northwards	The development is at the northern most part of Barangaroo South and will be the tallest building over this part of the Barangaroo as intended by the Guidelines.	Consistent
DS28 – Tower building mass tapers to the top of the building	The building tapers at its top most part.	Consistent

Concept Plan (Mod 8) Block Y Control		Proposed Development	Comment
DS29 – The building has a distinct podium and tower form		The building has a legible podium and tower elements.	Consistent
DS30 – The bulk of the podium massing is a maximum of RL40		The podium is contained within RL40.	Consistent
DS31 – The tower form is permitted to come to ground on the western frontage and may penetrate the general western building envelope line by up to 9m		A portion of the tower element at its western edge penetrates the building envelope, but not by more than 9m.	Consistent
5.1.7 Tower Setbacks			
<i>Performance criteria – To set back taller building elements from street walls to reduce their impact on the public domain, define public spaces and create a distinct podium and tower form</i>			
DS1 – Setbacks are generally in accordance with the Building Envelope Plan in the Concept Plan.		The development generally adheres to the building envelope shown in the Concept Plan (mod 8).	Consistent
DS3 – The primary western building façade is set back at least 25m from the existing harbour edge. Within the minimum average 25m setback: – at ground level, building activation in the form of restaurants, cafes, terraces, open balconies and the like may extend to within 16m of the existing harbour edge (i.e. within a zone of up to 9m) – at podium levels, terraces, open balconies and the like may extend to within 19m of the existing harbour edge (i.e. within a zone of up to 6 metres) – The tower form is permitted to come to ground on the western frontage and may extend to within 20m from the existing harbour edge at ground level and to within 16m of the existing harbour edge above ground level.		The western edges of the development extend into the required 25m setback in accordance with that permitted by this provision.	Consistent
DS4 – The primary southern building facade is to be setback an average of at least 17m from the proposed Globe Harbour edge. Within the minimum average 17m setback, building activation and articulation in the form of restaurants, cafes, terraces, open balconies and the like may extend to within 12m of the proposed Globe Harbour edge (i.e. within a zone of up to 5m).		Parts of the southern edges of the upper levels of development extend into the required 17m setback by no more than 5m, in accordance with that permitted by this provision.	Consistent
5.1.8 Street Walls			
<i>Performance criteria – To create cohesive, active and human scaled street walls that:</i>			
a. <i>define and enclose the public domain and create a highly urban character</i> b. <i>mitigate the visual impact of taller building elements on the public domain and increase the level of sunlight and daylight access to the public domain</i> c. <i>contribute to the creation of a vibrant and active public domain</i> d. <i>establish spaces that articulate and define facades</i>			
DS1 – Street walls incorporate active uses such as commercial, retail or residential uses and are designed to provide casual surveillance opportunities to the public domain through the use of measures such as large, transparent windows, balconies and other openings.		All edges both at lower and upper levels of the development provide opportunities for casual surveillance of the building's public domain surrounds.	Consistent
DS2 – Street walls are physically permeable and activate the adjoining public domain.		All facades of the building provide pedestrian access ways through the development and provide clear pathways to connect to the public domain.	Consistent
DS3 – Podium height is compatible with the streetscape form in the surrounding area, creates a co-ordinated streetscape and appropriately engages and frames the public domain.		The podium height is compatible with the desired built form, which in turn will provide a suitable streetscape to Lime Street.	Consistent
5.1.9 Building Articulation			
<i>Performance criteria – To establish an articulated, well-proportioned building mass that:</i>			

Concept Plan (Mod 8) Block Y Control	Proposed Development	Comment
a. responds to its context b. clearly articulates consistent elements of the building c. includes vertical and horizontal breaks d. encourages interesting forms with their own distinct character e. reduce the appearance of the Hickson Road building mass and bulk by articulating its form and clearly delineating top floor elements f. provides activation at the ground floor level of the Block Y podium to the Northern Park and Sydney Harbour		
DS1 – Vertical and horizontal articulation is provided to minimise perception of building mass.	The lower levels of the podium provide an exo-skeleton of vertical elements that will help minimise the scale and bulk of the building.	Consistent
DS4 – The incorporation of sustainability measures is encouraged.	The development is designed to a 6 star Green Star rating and a high level NABERS rating.	Consistent
DS5 – Buildings incorporate measures that enhance access to natural light, cross ventilation and solar shading.	The development has good orientation to all aspects to then afford high levels of solar access, cross ventilation and shading.	Consistent
DS6 – Internal access to natural light is encouraged through design responses such as transparent windows.	The development has good orientation to all aspects to then afford high levels of light penetration to all parts of the building.	Consistent
DS7 – Tower forms optimise access to natural light.	The development has good orientation and a high level of glazing to all aspects to then afford penetration of natural light into parts of the building.	Consistent
DS8 – Devices designed to articulate the building façade are encouraged. Building elements that moderate environmental conditions may extend beyond the building envelope by up to 600mm.	These devices do not extend more than 600mm beyond the building envelope permitted by these guidelines.	Consistent
DS19 – The building incorporates elements that articulate and enliven facades.	The use of various exterior elements will both contribute to the overall design of the building when viewed from the public domain and from within the development.	Consistent
DS20 – In order to mitigate wind impacts on balcony spaces, wintergardens are encouraged. In such circumstances, wintergardens may not be considered GFA.	It is noted that no wintergardens are proposed as part of the development. Balconies have however been designed to be recessed and integrated into the building's main façade which helps protect and mitigate against adverse wind impacts. Refer to the accompanying Architectural Design Statement.	Consistent
5.1.10 Building Legibility		
Performance criteria - To articulate constituent elements of buildings and in particular ensure elements of the building and structure are legible at the base of the building and that towers have their own unique identify however are also complementary and appear as a cohesive composition		
DS1 – Separate, structural tower elements are clearly expressed in the façade.	The development is suitably separated from other development/blocks within Barangaroo South to enable the façade of the building to be appreciated from various angles.	Consistent
DS2 – Facade elements are expressed through the use of measures such as shading and wind amelioration devices.	Various treatments are proposed to be used to mitigate wind and excess solar gains – see the accompanying Architectural Design Statement.	Consistent
DS10 – Building composition clearly defines a base, a middle and a top with well-balanced vertical and horizontal proportions.	The development incorporates these three defined elements.	Consistent
DS11 – The tower form may extend through to connect with the ground plane on the western frontage.	This design treatment has been incorporated for part of the building that extends to the public domain.	Consistent
DS12 – Building entries are clear and able to be readily distinguished.	All building entries are legible given that are wide, well-articulated and will be adequately signed.	Consistent
DS13 – Building function may be expressed in massing and articulation.	These elements have been expressed in the building form - see the accompanying Architectural Design Statement.	Consistent
5.1.11 Ground Floor Permeability and Accessibility of Public Realm		

Concept Plan (Mod 8) Block Y Control	Proposed Development	Comment
Performance criteria - To provide permeability and accessibility through Barangaroo South		
DS1 – Ground floor permeability is in accordance with Figure 5 – <i>Street network</i> and Figure 6 – <i>Pedestrian and cyclist network</i>	The development reinforces the pedestrian pathways routes shown.	Consistent
DS2 – Public access around the block is to be maintained on all edges.	The development will not obstruct the flow of pedestrians around the building.	Consistent
DS3 – Building entries are clearly articulated and visible from the public domain.	All building entries are legible given that are wide, well-articulated and will be adequately signed.	Consistent
DS4 – Shelley Lane is not less than 50% open to the sky	Not applicable	Not applicable
DS5 – Safety of the public realm is maximised through lighting, minimisation of concealed areas, active frontages and other design measures.	A detailed CPTED report as Appendix I have been prepared and clearly demonstrate that the public domain will greatly benefit from the casual and mechanical surveillance provided by the development.	Consistent
DS6 – For security purposes, through site links may be closed at certain times.	The operation of the hotel will be 24 hours 7 days a week and these will be supervised by on site security and hotel staff.	Consistent
DS7 – Public accessibility is maintained through and on the east, west and southern edges of Hickson Place	Not applicable	Not applicable
DS11 – The ground place encourages openness and accessibility of buildings.	All building entries are legible given that are wide, well-articulated and will be adequately signed to then encourage a high level of pedestrian permeability.	Consistent
DS12 – Building entries establish a public sense of arrival and engagement.	All building entries are legible given that are wide, well-articulated and will be adequately signed.	Consistent
DS13 – Secondary links open to public access providing additional routes between Lime Street, Globe Harbour and the Waterfront.	The ground floor of the development will provide alternative pathways to these elements. .	Consistent
5.1.12 Ensuring Quality of Rooftops		
Performance criteria – To ensure rooftops are designed to provide:		
a. an articulated built volume		
b. legibility		
c. architectural quality		
d. where appropriate, opportunities for private open space or public enjoyment and appreciation of the city		
e. sustainability features where appropriate		
DS1 – Roof forms incorporate architectural elements.	The roof design is appropriate as it appropriately conceals plant and the BMU. Furthermore the building roof seamlessly integrates with the overall tower element.	Consistent
DS2 – Architectural treatment is provided to lift shafts and overrun control rooms.	The roof design is appropriate as it appropriately conceals plant and the BMU.	Consistent
DS3 – Exposed mechanical equipment is avoided.	The roof design is appropriate as it appropriately conceals plant and the BMU.	Consistent
DS4 – Good quality materials that are durable, hardwearing and sustainable are to be used.	All proposed materials are of high quality and durability - see the accompanying Architectural Design Statement.	Consistent
DS5 – Where appropriate, roof design is to integrate sustainability features.	The ESD strategy also identifies and commits to further investigation of the use of photovoltaic cells being used on the roof. Despite this we note that the proposed development achieves a 6 Star Green Star rating that does not rely on sustainability features within the roof.	Consistent
DS6 – The architectural treatment of the roof and its form is to be designed and coordinated to be coherent with its adjacent context.	The building roof seamlessly integrates with the overall tower element, in the same manner as that of adjacent development elsewhere approved for Barangaroo South.	Consistent
DS10 – Public access to roofs and terraces for entertainment, recreation or viewing activities is	Public access to the terraces is possible if dining. Public access to the roof is not provided	N/A

Concept Plan (Mod 8) Block Y Control	Proposed Development	Comment
encouraged where appropriate.	as these spaces are associated with the hotel and residential uses.	
5.1.13 Articulated Facades		
Performance criteria – To ensure that building façades are articulated, designed and detailed to:		
a. define building functions and massing		
b. ensure the architectural quality of facades		
c. To contribute to the carbon neutral aims for Barangaroo South		
d. flexible, durable and able to achieve longevity		
e. activate Hickson Place as a space for civic gathering and social interaction that accommodates significant movement corridors at its edges		
DS1 – Building functions and massing are articulated with appropriate cladding design and detailing.	The building is appropriately cladded to still achieve the luminous qualities originally proposed for the winning design.	Consistent
DS2 – High quality materials such as steel, glass, concrete, timber and aluminium are used as primary façade materials.	All proposed materials are of high quality and durability - see the accompanying Architectural Design Statement.	Consistent
DS3 – Facades are expressed to be compatible with those its neighbouring buildings.	Building materials will be compatible to adjoining buildings elsewhere in Barangaroo South.	Consistent
DS4 – External shading devices are applied to provide light and shade and visual interest and may extend beyond the building envelope by a maximum of 600mm.	These devices do not extend more than 600mm beyond the building envelope permitted by these guidelines.	Consistent
DS5 – Relief and protrusions provide depth and layering of facades.	The building's façade has used various forms of exterior layering to achieve depth and interest.	Consistent
DS6 – Mirrored and heavily tinted facades are to be avoided.	Although the development incorporates a high level of glazing it does this without then creating reflectivity issues – see Section 5.8 for more detail.	Consistent
DS7 – Depth and layering of facades is achieved through relief and protrusions.	The building's façade has used various forms of exterior layering to achieve depth and interest.	Consistent
DS8 – Environmentally sustainable design on facades is encouraged.	The building is designed to a 6 star Green Star rating, which includes the use of ESD rated materials.	Consistent
DS9 – Facades longer than 60m are modulated above podium level by a distinctive and significant architectural elements	The façade of the podium structure has been modulated through the use of a variety of building materials and treatments that help to effectively articulate the building and provide variety in its expression to the street.	Consistent
5.1.14 Active Frontages		
Performance criteria – To provide active frontages to create a vibrant and active public domain and promote the establishment and success of key streets		
DS1 – Active frontages are generally in accordance with Figure 7 – <i>Active frontages</i> <i>Note: active frontages can include stairs, entrances and lobbies, however exclude parking entrances and fire escape doors.</i>	All ground planes to the building will be activated through the provision of various active uses such as the porte cochere, restaurants, bars, retail elements and a high number of entries.	Consistent
DS2 – Active frontages include active retail uses such as shops, restaurants or cafes and other uses where internal activity can be viewed from the public domain and that engage with the public domain.	These elements are incorporated along all edges of the development.	Consistent
DS3 – Active frontages maximise engagement with the public domain through orienting activity to the street and incorporating measures such as large, transparent windows, indoor / outdoor seating areas, large entries, attractive display areas and high quality finishes.	All ground planes to the building will be activated through the provision of various active uses such as the porte cochere, restaurants, bars, retail elements and a high number of entries.	Consistent
DS4 – The location and design of building service areas, parking areas & loading docks minimises adverse impacts on the streetscape, including safe and direct pedestrian movement and visual appearance.	These elements are concealed within the basement levels of the development.	Consistent

Concept Plan (Mod 8) Block Y Control	Proposed Development	Comment
DS5 – Driveways do not visually dominate the street. Where possible (within engineering constraints) driveway width is to be minimised.	The porte-cochere is located to provide a designated entry, however the driveway to the basement and loading areas is located and is designed so as to not dominate the Lime Street streetscape.	Consistent
DS6 – Car parking entrances are set back from the street alignment.	The driveway to the car parking in the basement is located and is designed so as to not dominate the Lime Street streetscape.	Consistent
DS7 – Loading docks are not located on Hickson Road or Lime Street.	Loading docks are located in the basement level of the development.	Consistent
DS8 – Hickson Place is activated with retail uses, including a small scale retail pavilion.	Not applicable	N/A
DS9 – Building service areas and loading docks are located in the basements and no loading or deliveries are provided at ground level.	Loading docks and servicing areas are located in the basement level of the development.	Consistent
5.1.15 Ground Plane and Pedestrian Comfort		
<i>Performance criteria:</i>		
<i>To ensure buildings increase the comfort of the public domain by maximising sunlight to external public spaces and where appropriate, providing shelter from direct sunlight and rain.</i> <i>To emphasise accessibility of the public realm in and around buildings.</i> <i>To maintain a strong visual connection to Sydney Harbour</i>		
DS2 – Buildings are sited generally in accordance with Figure 2 – Urban structure	The development is generally located in accordance with Figure 2.	Consistent
DS3 – Buildings incorporate devices that provide shelter from direct sunlight and rain for pedestrians at the ground level <i>Note: where used, canopies and their support structures may protrude beyond the block boundary</i>	Awnings are provided along the building's street frontages ensuring that pedestrians are able to get protection from the elements if desired.	Consistent
DS4 – Functions at the lower levels of the building are to be open and inviting to the general public	Through the use of glass canopies the restaurants and cafes within the ground level of the development can be open to the sky and provide alfresco dining areas. Upper level terraces will also provide these same outdoor opportunities for functions.	Consistent
DS5 – Canopies and awnings do not dominate or unreasonably impact views or vistas towards the Sydney Harbour or past the building along public footpaths or the promenade	Awnings and canopies within the development do not unreasonably impact or obstruct views and vistas toward Sydney Harbour or past the building along public footpaths or the promenade.	Consistent
5.1.16 Signage		
<i>Performance criteria - To ensure that the location, size, appearance and quality of building signage is appropriate and is integrated into the overall design of the building.</i>		
DS1 – Each building application is to include details of appropriate primary signage zones for building identification or tenant branding	Signage for the development is illustrated in the plans included with the accompanying Architectural Design Statement.	Consistent
DS2 – Retail and other tenant signage outside of primary signage zones is to be addressed by a signage strategy / approval	The signage proposed relates to the Crown logo for the hotel development. All other retail signage will be the subject of separate approvals, where required.	Consistent
DS3 – The size and location of signage is to be proportional and located appropriately to the architecture of the building	The size of signage is considered appropriate as it forms a small fraction of the building form such that it will not dominate the building or compete with other skyline signage in the city.	Consistent
DS4 – Signage is appropriate at podium and tower levels (and mid-rise in respect of the hotel building)	Signage is proposed for these locations.	Consistent
DS5 – Signage to be considered as part of the overall design of the building	The size of signage is considered appropriate as it forms a small fraction of the building form such that it will not dominate the building or compete with other skyline signage in the city.	Consistent
DS6 – Signage is to contribute to a diverse streetscape	The signage has been designed to be attractive and of high quality to match the development.	Consistent

5.3 Design Excellence

Pursuant to Clause 19, Part 12 of Schedule 3 of the Major Development SEPP and DGR 4 - Urban Design and Built Form, in determining an application for a new building at Barangaroo, the consent authority must consider whether the proposed development exhibits design excellence.

In considering whether the proposed building exhibits design excellence, the consent authority must have regard to the following matters:

- a) whether a high standard of architectural design, materials and detailing appropriate to the building type and location will be achieved;*
- b) whether the form and external appearance of the building will improve the quality and amenity of the public domain;*
- c) whether the building will meet sustainable design principles in terms of sunlight, natural ventilation, wind, reflectivity, visual and acoustic privacy, safety and security and resource, energy and water efficiency; and*
- d) if a design competition is required to be held in relation to the building, as referred to in subclause (3), the results of the competition.*

Clause 19(3) requires a design competition to be held for development that will be greater than RL 57, or where the erection of a new building is proposed on a site of greater than 1,500 square metres. A design competition is not required to be held if the Director-General certifies in writing that the development exhibits design excellence and is satisfied that the architect responsible for the proposed design has an outstanding reputation in architecture, and necessary arrangements have been made to ensure that the proposed design is carried through to the completion of the development concerned (as per cl19(4)).

In addition, Condition C2 – Design Excellence of the approved Concept Plan (Mod 4) requires a design excellence competition to be held by the Director-General and convention of a design review panel for development that exceeds 55 metres in height, or is on land exceeding 1,500m² in area. Under Condition C2, the key matters for consideration are:

- whether a high standard of architectural design, materials and detailing appropriate to the building type and location will be achieved;
- whether the form and external appearance of the building will improve the quality and amenity of the public domain;
- whether the building meets sustainable design principles in terms of sunlight, natural ventilation, wind, reflectivity, visual and acoustic privacy, safety and security and resource, energy and water efficiency;
- a comparison of the proposed development against the indicative building controls identified in Section 13.0 – Built Form of the approved Concept Plan EAR; and
- whether the new development detrimentally impacts on view corridors, particularly from public spaces and streets.

The Design Competition and Design Team

As described in Section 1.2.7, expressions of interest were sought from eight of the world's leading architecture firms with experience in similar hospitality projects, and more specifically, experience in designing large scale resorts and iconic public buildings. From these, a shortlist of three was selected and invited to participate in an invitation-only design competition for the Principal Architect and Concept Design for the Crown Sydney Hotel Resort. The jury unanimously

recommended Wilkinson Eyre Architects (WEA). The appointment of WEA satisfies the criteria identified in clause 19(4)(b)(i) of Part 12, Schedule 3 of the Major Development SEPP, namely that the architects responsible for the proposed design have an outstanding reputation in architecture.

WEA, twice winners of the prestigious RIBA Stirling Prize, is one of the UK's leading architecture practices. Its portfolio of bold, beautiful, intelligent architecture includes the Guangzhou International Finance Centre, currently the eighth tallest building in the world; the giant, sustainably-cooled conservatories for the Gardens by the Bay in Singapore, the new Mary Rose Museum in the UK and the acclaimed temporary structure of the London Olympics 2012 Basketball Arena.

Further information regarding WEA's outstanding reputation is included within the accompanying Architectural Design Statement.

High Standard of Architectural Design

Some of the key design features of the Crown Sydney Hotel Resort that demonstrate the high standard of architectural design include:

- WEA's complex architectural form is derived from a sculptural form that is reminiscent of three twisting petals;
- the sculptural form of the building takes its inspiration from nature, being composed of organic forms without literal or direct reference. It is an abstract shape that has been developed to leverage the unique aspects of the site while maintaining the requirements of the competition brief in an elegant form;
- the shape of the upper and intermediate levels of the tower are designed to maximise views of the Sydney Harbour Bridge and the Sydney Opera House;
- splitting the high-rise building into three primary forms; a podium, mid-rise hotel tower, and high-rise residential tower;
- creating a permeable ground floor that relates to the surrounding public domain;
- implementing multiple facades that offer degrees of transparency depending on the uses behind;
- incorporating a landscape strategy that is unique to the Crown Sydney Hotel Resort but speaks to the broader Barangaroo public domain; and
- implementing a variety of environmentally suitability measures to achieve a 5 Star NABERS rating and a 6-star Green Star rating under a new custom built Green Star tool; and

Design Review Process

The design process leading to the proposed development, the subject of this SSDA, is detailed in the accompanying Architectural Design Statement. The proposal for the Crown Sydney Hotel Resort has been through a rigorous process of design review, both internally and with independent design experts. The proposed design was presented to the Barangaroo Delivery Authority's Design Director and design advisors and to the City of Sydney Council. Comments from all of the design reviewers have been taken into account and have led to the refinement of the proposed design.

Achieving Design Excellence

The proposed development will exhibit design excellence as:

- world-renowned architectural practice WEA has been engaged as the Principal Architect of the project along with other esteemed members of the consultant team, including St Legere Landscape Architects;
- a high standard of architectural design, materials and detailing is achieved, appropriate to the building's calibre and location;
- the building form, external appearance and the ground floor plan provides for high amenity and quality of public domain;
- Crown Sydney Hotel Resort commits to ensuring continuity in the design process and realisation of the submitted design proposal in the completed building by ensuring that WEA has direct involvement in the design documentation phase;
- it complies with the planning framework established for the site;
- the new development will have minimal impacts on view corridors, particularly from public spaces and streets;
- it utilises Crown's skills and proven track record to deliver an exemplary and iconic hotel resort building; and
- it explores and implements innovative technical and sustainable solutions, contributing to cutting edge design excellence.

5.4 Urban Design and Built Form

5.4.1 Building Design

Architectural Drawings and an Architectural Design Statement have been prepared by Wilkinson Eyre Architects and are provided under separate cover. The design statement provides extensive commentary and a detailed analysis of all design aspects associated with the proposed CSHR building and should be the primary point of reference for all design information and justification. Some further planning analysis of the urban design and built form aspects of the proposal is however provided below.

Building Mass and Form

WEA's design ethos is characterised by a commitment to achieve the best possible design solution within the constraints of the brief, programme, context and budget. In designing the CSHR building WEA have sought to ensure the achievement of an iconic design that delivers both as a local landmark which engages with the public sphere, as well as a luxurious international destination.

The underlying design intent for WEA has been to create a building that is sculptural in form (**Figure 12**) and which rises to the skyline like an inhabited artwork, thus providing a clear point of difference compared to the more commonly found rectangular building forms that characterise much of Sydney's skyline.

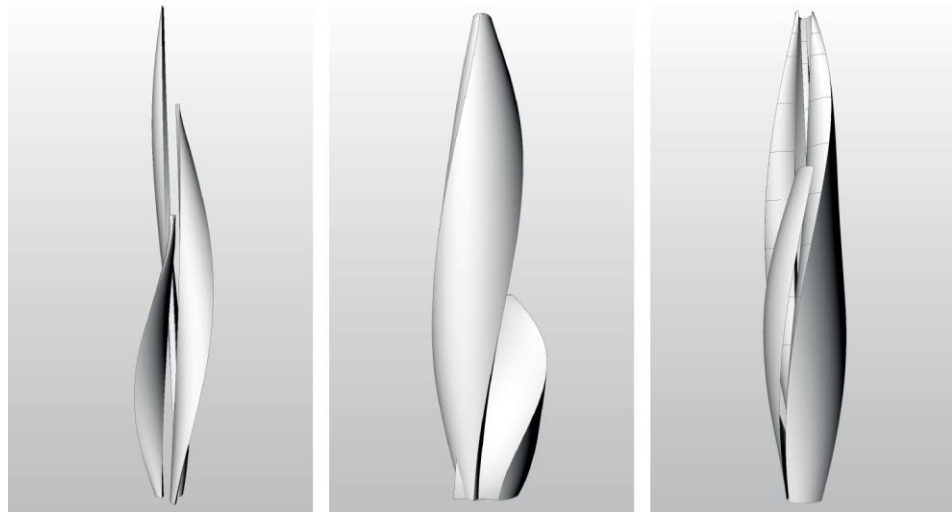


Figure 12 – CSHR sculptural base

Source: Wilkinson Eyre Architects

At 271m high CSHR will be one of the tallest buildings in the Sydney CBD. Its curved geometry emanates from a concept of three petal forms that twist and rise together, one tailing off and spreading out to form the main hotel accommodation with the whole composition visually grounded by a curvilinear podium structure. This design approach results in the tower having a 60 degree twist in the outer skin (**Figure 13**) whilst maintaining a rectangular core, which helps to maximise views to the Opera House and Sydney Harbour Bridge and underpins the elegant and sophisticated form of the building.

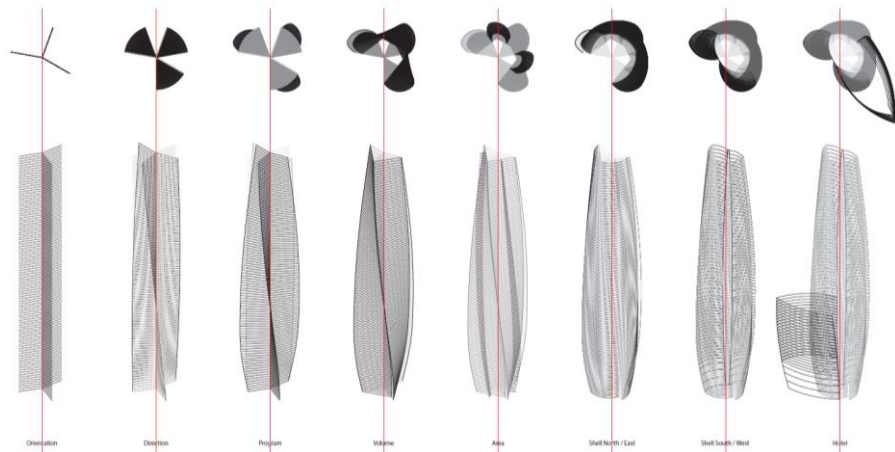


Figure 13 – CSHR curved geometry

Source: Wilkinson Eyre Architects

Given the site's highly prominent and visible position the proposed building has been the subject of extensive physical and digital modelling to test its form and mass from multiple viewpoints within Sydney. This process has been used to fine tune the building design to ensure the achievement of an architectural outcome that will deliver the greatest benefit to the Sydney skyline.

Careful consideration has also been given to ensuring the CSHR proposal fits within the building envelope established under Concept Plan Mod 8 (Ref No: MP06_0162). To do this the building has been designed to comprise three distinct elements, these being the podium, the mid-rise component and the tower component (**Figure 14**).

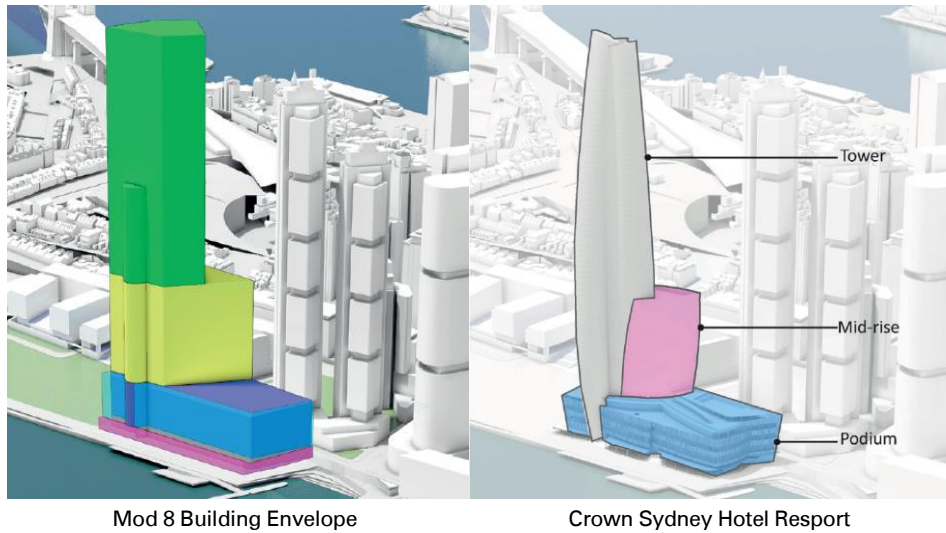


Figure 14 – Concept Plan (Mod 8) Building Envelope vs proposed CSHR building

Source: Wilkinson Eyre

Figure 15 further illustrates how the proposed CSHR building fits within the Mod 8 building envelope.

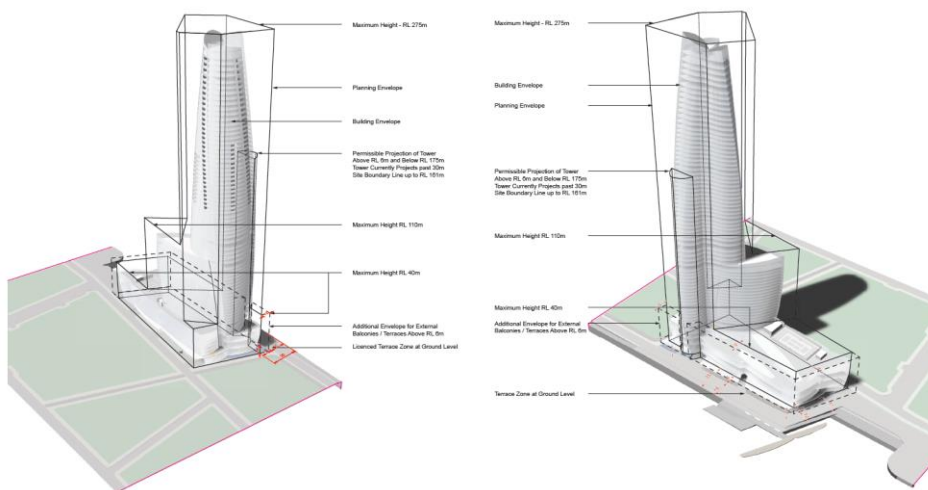


Figure 15 – Building Envelope Analysis

Source: Wilkinson Eyre Architects

In light of the above the massing and form of the building is considered to be acceptable. Overall, the unique sculptural and elegant form achieved in the design will ensure it becomes a landmark iconic structure in the future and will reinforce the building's status as the 'jewel' in the crown of the Barangaroo development site.

Façade Design

Great attention has been given to ensuring the façade design and material composition compliments and enhances the building's distinctive and iconic architectural design. With this in mind significant consideration has been invested in how to effectively articulate and emphasise the building's geometry and sculptural curved form.

At the lower levels the podium component comprises most of the public spaces, terraces, bars and retail tenancies that activate the building when viewed from the surrounding public domain. The terraces in particular add to the sense of transparency within the lower levels and help to articulate and vary the podium form when viewed from the ground.

A stone veil of tracery consisting of a series of organic strands or blades wrap around the podium and provide an almost Gothic style aesthetic reference to the delicate structural stone vaulting of the Vladislav Hall at Prague Castle in the Czech Republic. Three different combinations of the stone veil and glazing have been used to help define the podium whilst providing subtle variations in its appearance (**Figure 16**). These include the stone veil over the external terrace balcony; the stone veil inverse glass panel with glass infill; and the stone veil in front of the curtain wall system.

This combination of these different façade treatments is expected to unify the podium's architectural language and add to its visual interest by providing three dimensional shading effects that transform its appearance throughout different times of the day.



Figure 16 – Different types of stone veil used on podium

Source: Wilkinson Eyre

Above the podium the middle and tower component of the CSHR building is clad in a light silvery veil of glass with differing levels of transparency that accentuate and highlight the building's sculptural form and create a striking image against the sky and city backdrop.

A mixture of rectilinear and triangulated glazed panels are necessary to achieve the desired sculptural expression and design intent for the tower component (**Figure 17**). The tower's main north-eastern façade maximises the use of the staggered rectilinear panels while the south-western façade uses more triangulated panels due to the greater level of curvature in the building's form at this point. Wilkinson Eyre in reference to the triangulated panelling along the southern façade, note in their design report that:

"This panelisation has been derived from a series of diamonds and triangles, which allows the form to be described in purely flat panels, without the need for curved glass itself. A resultant characteristic of this diagrid pattern incorporates a subtly differing orientations of panel which will yield a beautiful and playful array of reflections of land, water and sky, further enhanced by the differing sun angles and light levels throughout the day."

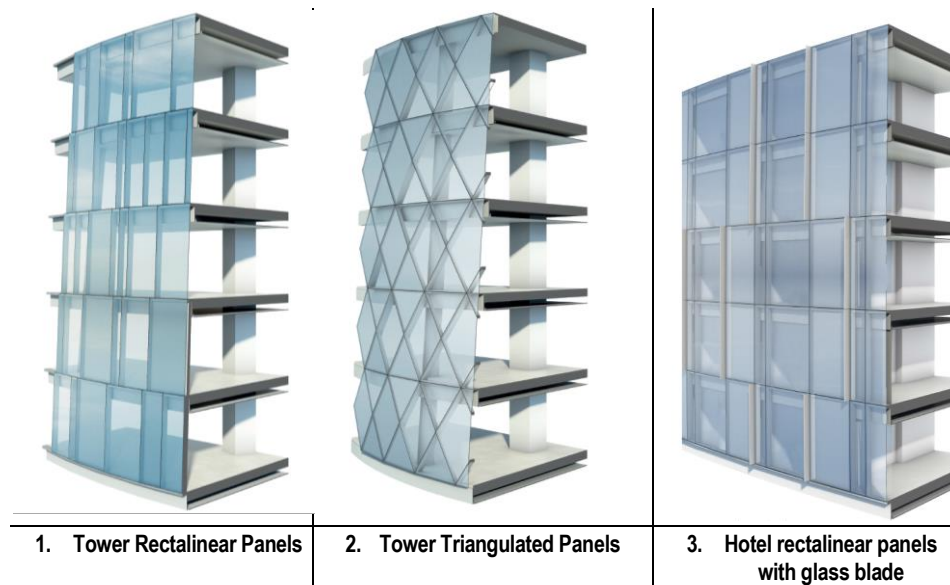


Figure 17 – Tower glazing

Source: Wilkinson Eyre

In addition to the differing types of panels, the type of glazing has been carefully considered with the intention of achieving varying degrees of reflectivity, allowing the building's appearance to transform with the differing times of the day. Careful use and layering of opaque and transparent glazing will help to subtly vary the building's reflectivity, creating a façade that is both colourful, jewel-like, and transient at all times (Figure 18).



Figure 18 – CSHR building at night

Source: Wilkinson Eyre

Overall, the combination of materials, colour and façade composition will help to deliver a building that is understated, elegant and sophisticated in its form and appearance and which will make a significant positive contribution to the visual tapestry of built form in the Sydney CBD and along the Harbour foreshore.

5.4.2 Public Domain

The Landscape Drawings and Design Statement have been prepared by St Legere and are appended to the accompanying Architectural Design Statement. An assessment of the proposal is provided below.

As highlighted in the Architectural Design Statement the Crown Sydney Hotel Resort benefits from its strategic location at Barangaroo which means that it is bounded by water and parkland. Its position at the junction of a number of different public realm initiatives provides the ideal setting for an exemplar iconic landmark building of the nature proposed.

To the immediate north of the site will be a new public park and a urban theatre that will provide an ideal open and green setting for the building. To maximise the opportunity presented by this interface the building's ground level and podium have been designed to address and interact with this space. Incorporation of the Porte-Cochere and multiple restaurants and terraces will present an attractive and active edge to the parkland, while the provision of a pedestrian walkway along this northern frontage (not within the subject site) will provide clear uninterrupted access between the foreshore promenade and Lime Street and promote high levels of pedestrian activity (**Figure 19**).



Figure 19 – Podium Façade showing stone veil

Source: Wilkinson Eyre

To the west of the building will be the foreshore promenade that allows for continuous pedestrian access along the site's water front from the park to the north through to Globe Harbour. The promenade will be lined with trees, landscaping and street furniture to ensure the creation of a high quality public domain and comfortable pedestrian scaled environment.

Fronting the walkway will be a range of ground floor restaurants that occupy the full extent of the building's western ground frontage with each designed to provide an original dining experience (**Figure 20**). Activation along this frontage will be further maximised above ground through a series of terraces and balconies used as outdoor areas for bars and other restaurants. As mentioned earlier these upper podium levels will be partly screened and shaded by a stone veil that wraps around the podium structure and which provides filtered light and shade across the podium facade. Overall the western frontage will be a vibrant lively and colourful pedestrian space framed by expansive views across Darling Harbour to Balmain East and enlivened by sights, sounds and smells that typically come with high quality alfresco dining experiences.



Figure 20 – Western façade and waterfront promenade

Source: Wilkinson Eyre Architects

The pedestrian promenade continues to wrap around along the building's southern façade and connecting with Globe Harbour that will be a public place where people can sit and relax and enjoy the sights, surrounds and activity of the Barangaroo south. Restaurant and retail tenancies will continue to activate the building along this frontage and will frame Globe Harbour with life and activity (**Figure 21**). Above ground balconies and terraces will also continue to wrap around the podium structure and will further activate and maximise building's interaction with the public domain. Landscaping will extend along the pedestrian promenade to Globe Harbour thus providing a common design theme that links the different public spaces.



Figure 21 – Southern façade and public domain including Globe Harbour

Source: Wilkinson Eyre Architects

Lime Street will border the CSHR building to the east and will have a different pedestrian environment to the other public domain spaces. The Lime Street public domain will include the building's Porte-Cochere and main pedestrian and vehicle entrances and in this regard will be a more typical shared vehicle and pedestrian space. Retail uses will be located along this frontage thus ensuring that the street retains an active commercial presence while Lime Street itself will be tree lined to help soften the appearance of the built form (**Figure 22**).



Figure 22 – Lime Street

Source: Wilkinson Eyre

Overall the CSHR development will facilitate the creation of a high quality public domain that supports and encourages pedestrian activity and interaction, and which recognises and responds to the building design and its surrounding Barangaroo context.

5.4.3 Visual Analysis from the Public Domain

View Analysis Drawings have been prepared by Virtual Ideas and are provided as part of the Architectural Design Statement under separate cover. These have informed the View and Visual Impact Assessment prepared by JBA, which is provided at **Appendix D**. A summary of the assessment is provided below.

Assessment

The visual assessment methodology included:

- review of aerial photography and topographic survey;
- site visit;
- review of key public domain views selected and analysed as part of Concept Plan Mod 8;
- determination of any other key views and vistas;
- undertaken photography and analysis of views to the site;
- preparation of photomontages; and
- assessment of visual impact.

Visual Analysis – Public Domain Views

The visual impact assessment analysed the visual impacts from the surrounding public domain and nearby vantage points. A total of 20 potential vantage points were analysed that can be broadly represented in three categories, these being:

- **From the water:** vantage points 11 Darling Harbour (Pyrmont Bridge), 12 Ballarat Park, 13 Pyrmont Park Pier (Jones Bay Wharf), 14 Balmain East, 15 Darling Harbour, 16 Blues Point, 17 Opera House Western Forecourt, 18 Cremorne Point;
- **From public open space:** as above, and in addition, vantage points 7 Millers Point (Observatory Hill, 8 Clyne Reserve, 9 Munn Reserve, 20 Watsons Bay; and

- **From key streets:** vantage points 1 Hickson Road, 2 Kent Street, 3 Shelly Street (from King Street Bridge), 4 Lime Street, 5 High Street, 6 Gas Lane, 10 Sydney Harbour Bridge, 11 Darling Harbour (Pyrmont Bridge), 19 Gladesville Bridge.

Table 11 below summarises the distance of view, extent of view, number of viewers and period of view to assist in determining the potential visual impact as being either low, medium or high. All views selected are public domain locations. It is noted that potential visual impacts arising from change to an existing view may be both positive and negative. With the redevelopment of a vacant urban renewal site a high degree of change to view is inevitable. The construction of high quality new buildings to create a new waterfront CBD precinct can therefore make a positive contribution to the city edge and sky line.

It is noted that **Table 11** was prepared to assess the development proposal to be modified as part of Concept Plan Mod 8. While Mod 8 showed only the building envelope / massing of the CSHR, given the detailed proposal falls within this envelope the assessment is considered to be relevant.

Table 11 – Visual impact matrix

Reference	Public Domain View	Distance	Extent of View	Number of Viewers	Period of View	Potential Visual Impact
1	Hickson Road	H	H	H	M	H
2	Kent Street	M	H	H	L	M
3	Shelly Street	L	L	M-H	L	L
4	Lime Street	L	L	M-H	L	L
5	High Street	M	H	L	H	M-H
6	Gas Lane	M	H	M	L	M
7	Millers Point (Observatory Hill)	M	H	M	H	H
8	Clyne Reserve	M	M	L	H	M
9	Munn Reserve	M	M	L	H	M
10	Sydney Harbour Bridge	M	M	H	L	M
11	Darling Harbour (Pyrmont Bridge)	M	M	H	M	M
12	Ballaraat Park	M	M	M	H	M
13	Pyrmont Park Pier	M	M	M	H	M
14	Balmain East	M	M	M	H	M
15	Darling Harbour	M	M	H	H	M-H
16	Blues Point	L	M	M	H	M
17	Opera House Western Forecourt	L	M	H	M	M
18	Cremorne Point	L	M	M	H	M
19	Gladesville Bridge	L	M	H	L	L
20	Watsons Bay	L	M	H	M	L

Key to Analysis

Distance: Within 100 m – high Within 500 m – medium Over 500 m – low Extent of view: Direct view – high Direct view within a panoramic view – medium An oblique or filtered view – low	Number of viewers More than 500 daily – high More than 100 daily – medium Less than 100 daily – low Period of view Long term (static) – High Short term – Medium Fleeting – Low Potential visual impact – high, medium or low
---	--

Overall the study concludes that given the buildings size and location it is inevitable that the CSHR will be visible in views from a wide number of key public domain locations, and in many cases the building will be clearly visible in the view plane. Whilst this is the case the CSHR has been specifically designed to be a high quality landmark building, providing a marker to the southern end of Barangaroo and distinguishing Barangaroo South from Barangaroo Central and the Headland Park. It will also bookend the tower buildings of this precinct. Given its iconic architecture and water's edge location, the visual impact analysis therefore concludes that CSHR will result in a generally positive view impact.

Visual Analysis - Private Domain Views

In addition to the analysis of view impacts from the public domain, a view analysis was also carried on private domain views, particularly from a number of key main buildings that would be potentially affected by the proposed building including:

- Highgate (127 Kent Street);
- Georgia at (155 Kent Street);
- Stamford Marque (161 Kent Street); and
- Stamford on Kent (187 Kent Street).

In addition to these building the assessment notes that there are a range of other buildings also in the vicinity of the subject site on Kent Street, and within the King Street Wharf and Shelley Street / Lime Street precincts, that will also be impacted in terms of views and outlook.

The analysis of view impacts on these buildings took into consideration the detailed proposal for the CSHR against those impacts identified in Concept Plan Mod 8 as shown in the Rogers Stirk Harbour + Partners View Analysis.

The Rogers Stirk Harbour + Partners View Analysis that accompanied Concept Plan Mod 8, determined the extent of the view impact to these residential buildings by carrying out an assessment of the change in views, the retention of views and the gain in views of Concept Plan Mod 8 compared to the previous approval. As a result of this analysis it was demonstrated that view sharing will be achieved from the majority of levels of the adjacent residential buildings rather than maximising views from the upper levels.

Previous view studies (prepared in support of the Concept Plan and its subsequent modifications) have also addressed impacts upon private views, view sharing and outlook. These have focused on the most significant and most-densely occupied buildings along Kent Street which presently enjoy largely unobstructed views. A review of anticipated impacts upon these buildings from the CSHR proposal was carried out as part of the Visual Analysis prepared by JBA, with reference to Concept Plan Mod 8.

The visual analysis carried out by JBA further concludes that CSHR will be visible in views from key residential apartment buildings, particularly those in Kent Street. Whilst this is the case the proposal's significant distance from these buildings means that CSHR is seen in a wide field of view that will also be enhanced by the new open space and parklands to be provided to the east. Accordingly while the CSHR building will have some impact on west and north-west views, view corridors to the harbour's waters are still provided and total view angles are greater than the benchmark viewing angle previously approved. Overall it is concluded that the view impacts caused by the proposed CSHR building will be consistent or less than those identified in Concept Plan Mod 8, given it has been designed to fit within the Mod 8 envelope and will therefore ultimately be a more slender elegant building form.

5.4.4 PANS OPS Assessment

An application was lodged with the Department of Infrastructure and Regional Development on 5 September 2014 seeking approval under the Airports (Protection of Airspace) Regulations 1996 for the intrusion into prescribed airspace for Sydney Airport. This application sought approval for both the CSHR building and the temporary use of a crane to construct the building.

Supporting this application was a report prepared by Avlaw Consulting titled 'Safety Case – Aviation Aspects of Building Height and Crane Activity' (**Appendix E**). The purpose of this report was to assess and document the safety aspects of the proposed building height and crane activities, and their impact on aviation operations at Sydney Airport.

Following consideration of the application and the 'Safety Case' the Department of Infrastructure and Regional Development issued two approvals on 18th February 2015 (i.e. one for the building and one for the crane) for the proposed breach of airspace. A copy of these approvals is located at **Appendix E**. Key conditions of the approvals include but are not limited to:

Building

- *The building must not exceed a maximum height of 283m AHD, inclusive of all lift overruns, vents, chimneys, aerials, antennas, lightning rods, any rooftop garden plantings, exhaust flues etc.*
- *The building must be obstacle lit at night by medium intensity flashing red lighting during the hours of darkness at the highest point of the building. Obstacle lights are to be arranged so as to at least indicate the points or edges of the building to ensure the building can be observed in a 360o radius as per subsection 9.3.4 of the Manual Standards Part 139-Aerodromes (MOS Part 139). Characteristics for medium intensity lights are stated in subsection 9.4.7 of MOS Part 139.*
- *The building must be obstacle lit by low intensity steady red lighting during the hours of darkness on the southern and north western corners of the building. The low intensity steady red lighting is to indicate the height of the building. These lights are to be placed as equally as possible, between medium intensity flashing red lighting on the top of the building and 156m AAHD. The spacing between the lights is not to exceed 45m. Characteristics for low intensity lights are stated in subsection 9.4.6 of MOS Part 139.*
- *At the completion of the construction of the building, a certified surveyor is to notify (in writing) the airfield design manager of the finished height of the building.*

Crane

- *The crane must not exceed a maximum height of 333m AHD.*
- *The crane must be obstacle lit at night with medium intensity flashing red obstacle lighting on top of the jib and top of the engine platform in accordance with Part 139 of the Civil Aviation Safety Regulations 1998, Section 9.4.*
- *The crane must be obstacle marked (red and white) in accordance with the Manual of Standards for Part 139 MOS, subsection 8.10.2, or , lit with flashing white obstacle lights and marked with a single conspicuous colour in lieu of obstacle marking in accordance with paragraph 9.4.7.4 of the MOS Part 13.*
- *The proponent must provide SACL with surveyed as installed details including the height of the tower crane after it is erected.*

5.5 Residential Amenity

The following provides an assessment of the proposal against the relevant design criteria under the provisions of the 'Apartment Design Guide' (ADG), which are a means for measuring the amenity of an apartment. **Table 11** lists the relevant criteria and assesses projects consistency with those standards.

It is noted that a SEPP65 and ADG Compliance Assessment has been prepared by Bates Smart for the application and is located in the accompanying Architectural Design Statement. The SEPP65 Statement confirms that the residential apartments have been designed in accordance with the SEPP65 design principles.

The assessment demonstrates that the proposed development complies with the majority of the 'Rules of Thumb' and that all apartments within the proposed development will achieve a very high standard of internal amenity. Where variations are proposed to the Apartment Design Guide they are discussed in further detail in Table 12 and in the subsequent sections thereafter.

A SEPP65 Design Verification Statement has also been prepared by Bates Smart Architects and is provided at **Appendix HH**. This statement confirms that it is the professional opinion of Bates Smart that the proposed design is capable of achieving the design principles set out in "State Environmental Planning Policy 65 - Design Quality of Residential Apartment Development" and has been designed with regard to the publication the Apartment Design Guide.

Table 12 – Assessment against the relevant Apartment Design Guide requirements

Design Criteria			Proposal
Part 3 Siting the Development			
Communal open space has a minimum area equal to 25% of the site			✓ Residents within the building will have access to the VIP pool deck which has an area of 1,900m ² , being 30% of the site area and in excess of the 25% requirement.
Developments achieve a minimum of 50% direct sunlight to the principal usable part of the communal open space for a minimum of 2 hours between 9 am and 3 pm on 21 June (mid winter)			✓
Deep soil zones are to meet the following minimum requirements:			Alternate Solution
Site Area	Minimum Dimensions	Deep Soil Zone (% of site area)	The proposed development has 100% site coverage which is reflective of the mixed use nature of the building and the site's location at Barangaroo and within central Sydney. While the site has no deep soil an appropriate stormwater solution, including on site retention, has been incorporated into the scheme to manage stormwater runoff. In addition to this the proposal will still provide trees and landscaping that will soften the appearance of the built form. The proposed solution therefore still provides an outcome that is recognised in the ADG.
Less than 650m ²	-	7%	
650m ² – 1,500m ²	3m		
Greater than 1,500m ²	6m		
Greater than 1,500m ² with significant existing tree cover	6m		
Separation between windows and balconies is provided to ensure visual privacy is achieved. Minimum required separation distances from buildings to the side and rear boundaries are as follows:			✓

Building Height	Habitable rooms and balconies	Non-habitable rooms
Up to 12m (4 storeys)	6m	3m
Up to 25m (5-8 storeys)	9m	4.5m
Over 25m (9+ storeys)	12m	6m

For development in the following locations: - on sites that are within 800 metres of a railway station or light rail stop in the Sydney Metropolitan Area; or - on land zoned, and sites within 400 metres of land zoned, B3 Commercial Core, B4 Mixed Use or equivalent in a nominated regional centre The minimum car parking requirement for residents and visitors is set out in the Guide to Traffic Generating Developments, or the car parking requirement prescribed by the relevant council, whichever is less. The car parking needs for a development must be provided off street.	✓
---	---

Part 4 Designing the Buildings													
Living rooms and private open spaces of at least 70% of apartments in a building receive a minimum of 2 hours direct sunlight between 9 am and 3 pm at mid winter in the Sydney Metropolitan Area and in the Newcastle and Wollongong local government areas.	✓ (78.78%)												
A maximum of 15% of apartments in a building receive no direct sunlight between 9 am and 3 pm at mid winter.	✓ / ✗ (0%) The unique shape of the floor plan, the curved nature of the façade and the layout of apartments ensures that no apartments within the development are single aspect.												
At least 60% of apartments are naturally cross ventilated in the first nine storeys of the building. Apartments at ten storeys or greater are deemed to be cross ventilated only if any enclosure of the balconies at these levels allows adequate natural ventilation and cannot be fully enclosed.	✓ (100%) The unique shape of the building floor plate, the large scale of the apartments and the fact that they all have frontages to different aspects means that all apartments are naturally cross ventilated. The use of operable windows within the design of the façade means that occupants are easily able to regulate the level of natural ventilation.												
Overall depth of a cross-over or cross-through apartment does not exceed 18m, measured glass line to glass line.	N/A There are no crossover or cross through apartments as envisaged within the Apartment Design Guide.												
Measured from finished floor level to finished ceiling level, minimum ceiling heights are: <table> <tr> <td>Minimum ceiling height</td><td></td></tr> <tr> <td>Habitable rooms</td><td>2.7m</td></tr> <tr> <td>Non-habitable</td><td>2.4m</td></tr> <tr> <td>For 2 storey apartments</td><td>2.7m for main living area floor 2.4m for second floor, where its area does not exceed 50% of the apartment area</td></tr> <tr> <td>Attic spaces</td><td>1.8m at edge of room with a 30 degree minimum ceiling slope</td></tr> <tr> <td>If located in mixed use areas</td><td>3.3m for ground and first floor to promote future flexibility of use</td></tr> </table>	Minimum ceiling height		Habitable rooms	2.7m	Non-habitable	2.4m	For 2 storey apartments	2.7m for main living area floor 2.4m for second floor, where its area does not exceed 50% of the apartment area	Attic spaces	1.8m at edge of room with a 30 degree minimum ceiling slope	If located in mixed use areas	3.3m for ground and first floor to promote future flexibility of use	✓ All apartments meet the minimum floor to ceiling requirements.
Minimum ceiling height													
Habitable rooms	2.7m												
Non-habitable	2.4m												
For 2 storey apartments	2.7m for main living area floor 2.4m for second floor, where its area does not exceed 50% of the apartment area												
Attic spaces	1.8m at edge of room with a 30 degree minimum ceiling slope												
If located in mixed use areas	3.3m for ground and first floor to promote future flexibility of use												

These minimums do not preclude higher ceilings if desired.											
Apartments are required to have the following minimum internal areas: <table> <tr> <th>Apartment Type</th><th>Minimum internal area</th></tr> <tr> <td>Studio</td><td>35m²</td></tr> <tr> <td>1 bedroom</td><td>50m²</td></tr> <tr> <td>2 bedroom</td><td>70m²</td></tr> <tr> <td>3 bedroom</td><td>90m²</td></tr> </table> The minimum internal areas include only one bathroom. Additional bathrooms increase the minimum internal area by 5m² each. A fourth bedroom and further additional bedrooms increase the minimum internal area by 12m² each.	Apartment Type	Minimum internal area	Studio	35m ²	1 bedroom	50m ²	2 bedroom	70m ²	3 bedroom	90m ²	✓ All apartments exceed the minimum size requirements.
Apartment Type	Minimum internal area										
Studio	35m ²										
1 bedroom	50m ²										
2 bedroom	70m ²										
3 bedroom	90m ²										
Every habitable room must have a window in an external wall with a total minimum glass area of not less than 10% of the floor area of the room. Daylight and air may not be borrowed from other rooms.	✓ All habitable rooms are provided with windows to allow for natural light.										
Habitable room depths are limited to a maximum of 2.5 x the ceiling height.	Alternative Solution Some habitable rooms of the proposed apartments will exceed the ceiling to depth ratio. Whilst this is the case the apartments have an extensive amount of glazing to their façade which has been deliberately chosen to maximise views and sunlight. The residential apartments have been designed to be luxury high end apartments and in this regard it is in Crown's own interest to ensure the design quality and residential amenity is of an exemplary standard.										
In open plan layouts (where the living, dining and kitchen are combined) the maximum habitable room depth is 8m from a window.	Alternate Solution The unique shape of the floor plan, the curved nature of the façade and the layout and size of apartments means that in some instances habitable room depth is greater than 8m from a window. Whilst this is the case we note that the proposed residential apartments have been designed to be luxury high end apartments and in this regard it is in Crown's own interest to ensure the design quality and residential amenity is of an exemplary standard.										
Master bedrooms have a minimum area of 10m² and other bedrooms 9m² (excluding wardrobe space).	✓										
Bedrooms have a minimum dimension of 3m (excluding wardrobe space).	✓										
Living rooms or combined living/dining rooms have a minimum width of: 3.6m for studio and 1 bedroom apartments 4m for 2 and 3 bedroom apartments	✓										
The width of cross-over or cross-through apartments are at least 4m	✓										

internally to avoid deep narrow apartment layouts.			
All apartments are required to have primary balconies as follows:			✓
Dwelling Type	Minimum Area	Minimum internal area	All balconies meet the minimum size requirements. Wintergardens are not proposed for the development.
Studio apartment	4m ²	-	
1 bedroom apartment	8m ²	2m	
2 bedroom apartment	10m ²	2m	
3+ bedroom apartment	12m ²	2.4m	
The minimum balcony depth to be counted as contributing to the balcony area is 1m.			
For apartments at ground level or on a podium or similar structure, a private open space is provided instead of a balcony. It must have a minimum area of 15m ² and a minimum depth of 3m.			N/A
The maximum number of apartments off a circulation core on a single level is eight.			✓
For buildings of 10 storeys and over, the maximum number of apartments sharing a single lift is 40.			✓
In addition to storage in kitchens, bathrooms and bedrooms, the following storage is provided:			✓
Dwelling Type	Minimum Area		
Studio apartment	4m ²		
1 bedroom apartment	6m ²		
2 bedroom apartment	8m ²		
3+ bedroom apartment	10m ²		
At least 50% of the required storage is to be located within the apartment.			

Visual Privacy

The ADG recommends a building separation of 24m between habitable rooms and balconies of buildings over 25m in height.

The proposed separation between the building's residential component and Block 4A is 56m metres and hence provides more than adequate separation from the nearest residential development. In addition it is noted that the tip of the hotel is separated by 27m on Level 3 at its closest point to the Block 4A.

Apartment Layout

As stated in the Architectural Design Statement prepared by WEA, apartments are configured around key central open plan living spaces that link to secondary spaces such as bedrooms, bathrooms, outdoor areas, studies and other areas.

Kitchen spaces are located within the main open plan living space, located nearer to the main core and internal circulation zones. Master bedrooms generally provide bathroom spaces adjacent to the building façade allowing them to benefit from direct natural ventilation and in some cases having access to external terraces shared with master bedrooms.

With regard to apartment layout the ADG recommends that where open plan living areas are proposed, the depth of these areas is be no more than 8m from a window. The majority of open plan living areas have been designed to provide an outcome that is consistent with the ADG. Some apartments within the proposed development do not however meet this requirement. The ADG states that where apartments do not meet the minimum recommended standard the applicant must be able to demonstrate consistency with the overarching objective, which is to ensure that "the layout of rooms within an apartment is functional, well organised and provides a high standard of amenity."

In light of the above the proposed variation to this ADG is considered acceptable as:

- The rear of the open plan living areas range between 9m and 10.5m from a window, therefore only marginally exceeding the requirement;
- All apartments that do not meet the Rule of Thumb are north facing and as such receive extensive solar access throughout the day thus ensuring they are well lit by natural light despite being more than 8m from a window.
- The facades of the apartments incorporate a significant amount of glazing that is above and beyond that typically provided in a residential flat development. The use of such materials helps to maximise the apartment's ability to capture natural light.
- All apartments have multiple frontages facing different directions and therefore receive a significant amount of natural cross ventilation.

In addition it is noted that the Apartment Design Guide was specifically drafted to regulate development of more common residential flat buildings and not necessarily developed with the intent of guiding the design of residential apartments of the scale and calibre proposed for CSHR. By virtue of their size and design there will inevitably be some variation to the ADG as these apartments are not the typical type of apartments that would be commonly seen in other residential development.

The proposed residential apartments within the CSHR have been designed to be luxury high end apartments and are an integral part of the proposal, it is in Crown's own interest to ensure the design quality and residential amenity is of an exemplary standard.

Daylight Access

The ADG recommends that for dense urban areas at least 70% of apartments in a development should receive a minimum of two hours direct sunlight to living rooms and private open space between 9am to 3pm in mid winter (21 June).

The amount of solar access achieved for each individual apartment is provided within the accompanying Architectural Design Statement. **Table 13** below provides a summary of the daylight access achieved by the proposed development.

Table 13 – Daylight Access to Residential Units on 21 June

Sublight between 9am - 3pm 21 June	No. of Apartments	%	ADG Compliance
1hr direct sunlight	14	21.2%	21.2%
2 hrs direct sunlight	9	13.6%	78.8%
3 hrs direct sunlight	14	21.2%	
4 hrs direct sunlight	20	30.4%	
6 hrs direct sunlight	9	13.6%	
Total	66	100%	100%

As demonstrated in **Table 12** the proposed development will comfortably exceed the 70% target of 2 hours of solar access with 78.8% of all apartments receiving 2hrs or more direct solar access.

5.6 Overshadowing Impacts

The Shadow Diagrams have been prepared by Virtual Ideas and are provided as an appendix of the Architectural Design Statement. An assessment of the overshadowing impacts is provided below.

Assessment

The shadowing analysis has been prepared hourly from 9am – 3pm on the winter solstice (21 June), the equinoxes (21 March and 21 September) and summer solstice (21 December), and considers the shadowing impacts of the proposed development in the context of the existing CBD and Concept Plan (Mod 8) indicative built form. To provide a more realistic indication of the potential shadowing impacts, the analysis identifies the maximum area within which shadows may potentially be cast by buildings within Barangaroo from their maximum building envelope.

Shadowing from existing CBD buildings is shown in grey; future shadows cast by the indicative built form of Concept Plan (Mod 8) are shown by a red line; and the shadowing from the proposed development is shown in yellow.

21 June

The analysis indicates that on 21 June between 9am and 12noon the proposed development overshadows Darling Harbour, extending as far as Pyrmont Bay on the western side of the harbour. However, the extent of overshadowing is within the approved envelope of Concept Plan (Mod 8), and further, the articulation of the proposed development, the subject of this SSDA, has resulted in a decrease in the width of the shadow, lessening the potential impact to buildings on the western side of the harbour, as well as to public open space including Metcalfe Park.

Between 12noon and 3pm the shadowing falls predominately on-land, and joins the shadowing of other Barangaroo and CBD buildings. While the articulated form decreases the width of the shadow, the benefit is not as significant given the extent of overshadowing of surrounding buildings.

21 March

The analysis indicates that on 21 March between 9am and 1pm the proposed development overshadows Darling Harbour, extending as far as Jones Bay on the western side of the harbour. However, consistent with the shadowing on 21 June, the extent of overshadowing is within the approved envelope of Concept Plan (Mod 8), and the articulation of the proposed development has resulted in a decrease in the width of the shadow, lessening the potential impact to buildings on the western side of the harbour, as well as to public open space including Ballarat Park.

Between 1pm and 3pm the shadowing falls predominately on-land, and joins the shadowing of other Barangaroo and CBD buildings. While the articulated form decreases the width of the shadow, the benefit is not as significant given the extent of overshadowing of surrounding buildings. However, the articulated form and reduced shadow width lessens the extent of overshadowing around Globe Harbour to the south of the proposed development, providing benefit to the public domain in this area.

21 September

The analysis indicates that on 21 September between 9am and 12noon the proposed development overshadows Darling Harbour. However, the extent of overshadowing is within the approved envelope of Concept Plan (Mod 8), and the shadowing does not reach land on the western side of the harbour.

Between 12noon and 3pm the shadowing falls predominately on-land, and joins the shadowing of other Barangaroo and CBD buildings. While the articulated form decreases the width of the shadow, the benefit is not as significant given the extent of overshadowing of surrounding buildings. However, consistent with the shadowing on 21 March, the articulated form and reduced shadow width lessens the extent of overshadowing around Globe Harbour, providing benefit to the public domain in this area.

21 December

The analysis indicates that on 21 December between 9am and 11am the proposed development overshadows Darling Harbour. However, the extent of overshadowing is within the approved envelope of Concept Plan (Mod 8), and the shadowing does not reach land on the western side of the harbour.

Between 11am and 3pm the shadowing falls predominately on-land, and joins the shadowing of other Barangaroo and CBD buildings. While the articulated form decreases the width of the shadow, the benefit is not as significant given the extent of overshadowing of surrounding buildings. However, the articulated form and reduced shadow width lessens the extent of overshadowing to the public domain immediately to the west of the proposed development.

Overall, it is considered that the shadowing impacts of the Crown Sydney Hotel Resort are acceptable given that:

- the extent of shadowing is within the proposed envelope under Concept Plan (Mod 8);
- the width of shadowing is reduced as a result of the articulation of the proposed development;
- the waters of Darling Harbour maintain significant direct daylight hours during the key recreational middle-of-the-day boating period;
- there is no additional overshadowing of any residential properties or public open space outside of the site; and
- the future Waterfront Promenade (to the south of Globe Harbour) and other public domain areas will enjoy an acceptable level of direct sunlight during the course of the day and, in the case of the Waterfront Promenade, during the peak lunchtime period.

5.7 Wind

A Pedestrian Wind Study has been prepared by Rowan Williams Davies and Irwin Incorporated (RWDI) and is provided at **Appendix G**. A summary of the assessment and proposed mitigation measures are provided below.

Assessment

The impact of the proposed development on existing wind conditions has been assessed through wind tunnel modelling of the site and the proposed CSHR development. The scale model used in the wind tunnel was equipped with 93 specifically designed wind speed sensors that were connected to the wind tunnel data acquisition system to record wind conditions at a full scale height of 1.5m above grade in pedestrian areas throughout the study site.

Wind speeds were measured for 36 different wind directions in 10 degree increments starting from true north. The results of the testing were then combined with long term meteorological data, recorded during the years 1986 through 1994 at the Sydney International Airport, in order to predict full scale wind conditions. The analysis was performed separately for summer and winter seasons.

Measurements were taken to evaluate pedestrian comfort at building corners, near building entrances, on adjacent pavements with high pedestrian traffic, and in open plaza areas. Key findings of the Pedestrian Wind Study are set out below.

- **Entrances and Covered Areas** – The assessment found that the wind environment for comfort at ground level entrances and covered areas varied from pedestrians sitting to business walking conditions. Winds comfortable for sitting and standing are generally expected near the base of the proposed development, with the only exception being the northwest tower corner where winds are expected to be suitable for walking in the winter and uncomfortable during the summer. The wind criterion was therefore expected to be met at all locations near the development with the exception of the buildings northwest corner (refer Location 9 of Pedestrian Wind Study).
- **Surrounding Grade Level Areas** – The overall massing and design of the proposed development is identified as a positive feature relating to pedestrian level winds. The study notes that the streamlined building shape and the incorporation of a podium structure reduces the effect of wind acceleration at building corners and provides a buffer to down-washing winds along the tower. As a result conditions suitable for walking or better are expected at all grade level locations surrounding the CSHR development during the summer and winter. The study states however that the winds from the north and north-east may result in elevated wind conditions at the north-west corner of the building (Locations 65 and 72 of Pedestrian Wind Study).
- **Above Grade Areas** – The wind safety criterion is expected to be met by all above grade areas. Winds conditions comfortable for strolling or better are expected at amenity areas on the proposed Crown Tower with the exception of the northwest tower corner (Location 92 of Pedestrian Wind Study). If improved wind conditions are desired in these areas then the addition of various local wind control measures may be implemented.

Mitigation Measures

While appropriate wind conditions are expected surrounding the site with the addition of the proposed development, summer winds from the north-east and north north-east have the potential to result in elevated wind conditions at the site that would affect the levels of pedestrian comfort experienced at the site and surrounding area. The effects of these winds are somewhat mitigated by the curved shape of the building façade and podium structure, however the wind analysis identified that the building's north-west corner experienced higher levels of windy activity and therefore should be a point of focus for further mitigation measures, which could include:

- Addition of vertical wind control elements at the northwest building corner, where elevated wind conditions are expected; and,
- Provision of landscaping including a significant amount of tree planting along the promenade and to the north of the building. Such landscaping is expected to significantly soften and reduce potential wind impacts.

In response to these recommended mitigation measures it is noted that:

- a) vertical glass blades have been incorporated into the building façade design for the hotel component as shown in **Figure 16** and page 95 of the Architectural Design Statement.
- b) Trees will be provided along the foreshore promenade and within the adjacent public park to the north and will be sufficient to mitigate wind impacts expected to occur throughout the year, particularly during the summer months.

Given the incorporation of the recommended mitigation measures it is considered that all locations will pass the wind criterion used to assess pedestrian wind safety.

5.8 Reflectivity

A Reflectivity Study has been prepared by Arup and is provided at **Appendix H**. A summary of the assessment and proposed mitigation measures are provided below.

Assessment

The proposed building comprises three distinct curved elements, with potential views to the building occurring from a number of roadway and pedestrian areas in the broader region. As motorists must follow clearly defined lines of travel and have less scope to safely re-direct their line of sight where glare occurs, analysis has primarily focused on the potential impacts on motorists. Arup's assessment considers the potential impacts of reflection from these surfaces on the following roads:

- Hickson Road, Sydney;
- Kent Street, Sydney;
- Grosvenor Street, Sydney;
- Lime Street, Sydney;
- Lower Fort Street, The Rocks;
- Cahill Expressway, Sydney;
- Sydney Harbour Bridge/Bradfield Highway;
- Western Distributor, Sydney;
- Darling Island Road, Pyrmont;
- Sydney Wharf, Pyrmont;
- Murray Street, Pyrmont;
- Darling Drive, Pyrmont;
- Darling Street, Balmain; and
- Blues Point Road, North Sydney

Arup assessed key near views to the site based on the qualitative requirements of the Central Sydney DCP 2012, taking into account factors including the distance of the view, the duration of exposure to potential glare based on normal travel speeds and likely obstructions to these views. Lime Street and Lower Fort Street both have long, straight, lines of site to the proposed building, and as a precaution fins will be installed on the north-east and south-west hotel facades that are oriented and sized to reduce reflections to these areas. The assessment concludes that, with the implementation of these measures and compliance with the reflectivity criteria discussed below, there is not likely to be any significant risk to safety.

Due to the curved façade structures of the proposed building, reflections occurring are will be scattered and any glare occurring from individual panels will be only for a short duration, and will be less concentrated toward individual locations and buildings in comparison to a design with flat facades. As such, the impact of glare to any one location or building is likely to be reduced and is not expected to result in any impacts on occupants of neighbouring buildings. Due to the close proximity of the building to areas

Mitigation Measures

The study finds that the proposed development will perform well in terms of solar reflectivity and that reflections will not cause unacceptable glare. Glazing for the hotel façade, which sits closer to the street level and thus has greater potential for hazardous glare, will be limited to a reflectivity level of 20% consistent with the provisions of the City of Sydney DCP 2012. Glazing for the other building elements may be up to a maximum of 32%, as the scattered reflections caused by the curved and smaller panels of these building facades mean that a higher level of reflectivity may be allowed.

5.9 Signage

SEPP 64 applies to all signage that under an environmental planning instrument can be displayed with or without development consent and is visible from any public place or public reserve.

The proposed signage is categorised as ‘business identification signage’ and building identification signage’ under the provisions of SEPP 64. As a result, Part 3 of the SEPP which relates to advertising signage does not apply. In this instance, only the objectives of the SEPP and the criteria in Schedule 1 – Assessment Criteria of the SEPP is required to be considered.

The proposed signage is consistent with the objectives of SEPP 64 and satisfies the criteria specified in Schedule 1 of SEPP 64 as outlined below.

Clause 3 states the aims and objectives of SEPP 64 which are:

- (a) *to ensure that signage (including advertising):*
 - (i) *is compatible with the desired amenity and visual character of an area, and*
 - (ii) *provides effective communication in suitable locations, and*
 - (iii) *is of high quality design and finish, and*
- (b) *to regulate signage (but not content) under Part 4 of the Act, and*
- (c) *to provide time-limited consents for the display of certain advertisements.*
- (d) *to regulate the display of advertisements in transport corridors, and*
- (e) *to ensure that public benefits may be derived from advertising in and adjacent to transport corridors.*

The proposal is consistent with the above objectives in that the signage compliments the building’s architecture and has been designed to a high standard of quality and finish. The signage will not be a source of distraction to drivers from any nearby transport corridors due to their discreet design and positioning on the building. This is further discussed in **Table 14** below.

Schedule 1 of SEPP 64 contains a range of assessment criteria which are matters for consideration by the consent authority in assessing applications incorporating signage. The way in which the proposed development meets the assessment criteria is set out in **Table 14** below:

Table 14 – Assessment of proposal against assessment criteria set out in SEPP 64 – Signage

Assessment Criteria	Comments	Compliance
Is the proposal compatible with the existing or desired future character of the area or locality in which it is proposed to be located?	The proposed main signage on the tower and podium will identify the CSHR while the signage zones located at the lower levels of the podium will identify the key tenancies within the building. The proposed signage represents an appropriate addition to the building identification signage dispersed throughout Central Sydney and Darling Harbour and in this regard is compatible with the existing and desired future character of the area.	Y
Is the proposal consistent with a particular theme for outdoor advertising in the area or locality?	There is no particular theme for signage in the locality, however the proposed signage is of a high architectural quality and is designed to be legible in order to assist guests and visitors in identifying the entrances to the hotel and the restaurants.	Y
Does the proposal detract from the amenity or visual quality of any environmentally sensitive areas, heritage areas, natural or other conservation areas, open space areas, waterways, rural landscapes or residential areas?	The proposed signage does not detract from the visual quality of the area, the signage has been designed to integrate and be complimentary to the building's landmark architecture.	Y
Does the proposal obscure or compromise important views?	The proposed signs are located on façade of the building. The signs will not obscure important views in their own right. A Visual Impact Analysis has been carried out for the proposed development and is included at Appendix D .	Y
Does the proposal dominate the skyline and reduce the quality of vistas?	The signage is discreet and scaled in accordance with the building upon which it is proposed and will therefore not dominate the skyline or reduce the quality of vistas.	Y
Does the proposal respect the viewing rights of other advertisers?	The proposed signage will not impact on the viewing rights of any of the existing or proposed surrounding signage.	Y
Is the scale, proportion and form of the proposal appropriate for the streetscape, setting or landscape?	The scale, form, proportion and positioning of signage is considered appropriate for the building's context and setting on the waterfront and within Barangaroo.	Y
Does the proposal contribute to the visual interest of the streetscape, setting or landscape?	The scale, form and proportion of the proposed signage is appropriate for the setting and will contribute to the visual interest of the building, while providing practical wayfinding information for pedestrians and motorists visiting the site.	Y
Does the proposal reduce clutter by rationalising and simplifying existing advertising?	N/A	N/A
Does the proposal screen unsightliness?	N/A	N/A
Does the proposal protrude above buildings, structures or tree canopies in the area or locality?	The proposed signage does not protrude above buildings, structures or tree canopies in the area or locality.	Y
Does the proposal require ongoing vegetation management?	No.	Y
Is the proposal compatible with the scale, proportion and other characteristics of the site or building, or both, on which the proposed signage is to be located?	The proposed signage has been carefully designed to respect be compatible with the proposed building, and in this regard is considered appropriate in this context and will make a positive contribution to the locality.	Y

Assessment Criteria	Comments	Compliance
Does the proposal respect important features of the site or building, or both?	The proposed signage is compatible with the building's architecture, as shown in the Architectural Design Statement.	Y
Does the proposal show innovation and imagination in its relationship to the site or building, or both?	The proposal is well integrated with the proposed building as shown in the Architectural Design Statement.	Y
Have any safety devices, platforms, lighting devices or logos been designed as an integral part of the signage or structure on which it is to be displayed?	The proposed signage incorporates LED backlighting to emphasise the identification of the building in the evening.	Y
Would illumination result in unacceptable glare?	Lighting associated with the proposed signage has been designed to minimise glare.	Y
Would illumination affect safety for pedestrians, vehicles or aircraft?	There will be no effect on the safety of pedestrians, vehicles or aircraft. A PAN-OPS approval for the proposal has been obtained and is provided at Appendix E .	Y
Would illumination detract from the amenity of any residence or other form of accommodation?	The proposed illuminated signage will be designed and controlled so as not to detract from the amenity of surrounding residences.	Y
Can the intensity of the illumination be adjusted, if necessary?	The proposed illumination will be softly lit. Further investigations will be carried out as part of the detailed design phase to determine the feasibility of having an adjustable intensity in the signs illumination.	Y
Is the illumination subject to a curfew?	No, which is considered to be appropriate given the highly urbanised location of the site and its proximity to Central Sydney.	Y
Would the proposal reduce the safety for any public road?	Given the design, location, scale and intensity of the signage, the proposal will not reduce road safety.	Y
Would the proposal reduce the safety for pedestrians or bicyclists?	The proposed signage will not reduce pedestrian or cyclist safety.	Y
Would the proposal reduce the safety for pedestrians, particularly children, by obscuring sightlines from public areas?	The proposed signage will not obscure sightlines from public areas.	Y

5.10 Transport and Accessibility

Traffic, access and parking impacts are addressed in the following reports prepared by Arup:

- Traffic Report at **Appendix I**;
- Travel Demand Management Plan at **Appendix J**; and
- Construction Traffic Management Plan at **Appendix K**.

A summary of the assessments and proposed mitigation measures are provided below, and the Construction Traffic Management Plan is addressed further at **Section 5.25**.

5.10.1 Traffic Generation

Traffic generation for the Crown Sydney Hotel Resort is based on the standard rates in the RMS's Guide to Traffic Generating Development, as well as estimates on the basis of existing developments similar to the proposal, in this case the Crown Towers Melbourne, noting that generation is largely influenced by public transport availability and car parking provision. The surveys considered self-park and valet and taxi movements associated with the hotel / restaurant / gaming functions, as well as service vehicle movements, while traffic generation as a result of residential movements was also assessed.

The assessment found that for self-park movements Friday is expected to be the busiest weekday with some 3,150 movements per day, while vehicle movements Monday through Thursday will generally be 10% - 20% less. On Saturday (the busiest day of the week), traffic generation peaks at over 3,400 vehicle movements for the day. For valet and taxi movements, again Friday and Saturday are busiest with some 1,400 vehicle movements per day. The peak period for self-park and valet and taxi movements is between 7pm and midnight, which is outside the evening commuter peak hour and therefore reduces any potential impacts. For service vehicles there is likely to be a maximum of 51 movements per day, with the majority of these occurring outside the AM and PM peak periods.

For the residential component of the Crown Sydney Hotel Resort the flowing rates, in accordance with the overall Barangaroo South proposal, are applicable:

- AM Peak (8am – 9am): 0.14 vehicle trips / dwelling; and
- PM Peak (5pm – 6pm): 0.09 vehicle trips / dwelling.

The above rates result in some 10 vehicle movements in the morning peak and some six vehicle movements in the evening peak, which have negligible impact on the overall traffic generation as a result of the proposed development.

Overall, the forecast traffic generation during the AM and PM peak hours is 75 and 213 vehicle movements per hour respectively.

5.10.2 Intersection Performance

In September 2008 a Transport Management and Accessibility Plan (TMAP) was prepared for the Barangaroo South site to determine the impact on the surrounding road network as a result of development of this precinct. The TMAP concluded that the road network would operate satisfactorily based on the approved Concept Plan (as modified) development proposal (which included a 730 room luxury hotel), with a 4% journey-to-work car mode share.

The assessment undertaken for the Crown Sydney Hotel Resort compares the impact of traffic generation as a result of the proposed development with that

outlined in the 2008 TMAP. The operation of the road network on completion of the Barangaroo South site has been modeled using LinSig, and further modeling has been undertaken of the nearest and most relevant intersections to the proposed development, these being:

- Hickson Road and Globe Street, Traffic Signals (Future);
- Napoleon Street and Hickson Road, Priority Controlled (Existing), Traffic Signals (Future);
- Sussex Street and Shelley Street, Traffic Signals;
- Sussex Street and Erskine Street, Traffic Signals; and
- Napoleon Street, Margaret Street and Kent Street, Traffic Signals.

The Level of Service (LOS) of the identified intersections changes only minimally with the addition of traffic as a result of the Crown Sydney Hotel Resort when compared to the 2008 TMAP. As noted above, the peak vehicular activity generated by the hotel is anticipated to occur between 7pm and midnight, which is outside the evening commuter peak hour and therefore reduces the impact on the local road network. In addition, the LinSig modeling considered the traffic generated by the hotel on a busy Friday evening when traffic movements are greatest. Vehicle movements Monday through Thursday will likely be 10% - 20% less which will further reduce the impact on the road network during these times.

5.10.3 Access and Circulation

The primary vehicle access route into the Crown Sydney Hotel Resort will be via Hickson Road and Globe Street. On Lime Street three driveway crossover points are proposed – one to the north east corner which will provide access to the porte cochere and the hotel's main entrance, and the other in the south east corner which will provide access via a ramp to the basement car park.

While the access points will be designed to be fully integrated with the adjoining footpath and therefore emphasise pedestrian priority, Lime Street is not expected to act as a major through pedestrian route, rather the main pedestrian access route is south of the hotel adjacent to Globe Harbour. It is also noted that the porte cochere and driveway access will be under staff control. Accordingly, it is considered that the proposed vehicular access points into Crown Sydney Hotel Resort, including taxi movements, can be managed appropriately.

5.10.4 Car Parking

The Crown Hotel Sydney proposal comprises some 610 car parking spaces located over three basement levels. Of these some 250 are dedicated to valet parking and 250 to self-parking. The remaining 110 are provided for the residential apartments in accordance with the maximum car parking rates set out under the Barangaroo Concept Plan, these being:

- 2 bed unit (with or without study) – 1.2 spaces;
- 3 bed unit (with or without study) – 2 spaces;
- 4 bed unit (with or without study) – 2 spaces; and
- 5 bed unit (with or without study) – 2 spaces.

With reference to vehicle movements (as detailed above) the total non-residential car parking demand for the proposed development is estimated to be in the order of 800 spaces on a Friday and Saturday evening. The provision of 500 non-residential car parking spaces represents a shortfall of 300 spaces. However, it is anticipated that the demand will be met by other off-street car parking facilities within the vicinity of the hotel including the Barangaroo Stage 1A basement which is available for public use on weekday evening and weekends when

demand generated by commercial uses is low; and the 300 space off-street car park planned for Headland Park which may also be utilised by Crown Sydney visitors.

All car parking areas, as well as access into and out the Crown Sydney Hotel Resort basement levels, will be designed in accordance with AS2890.1.

5.10.5 Bicycle and Motorcycle Parking

Bicycle Parking

A total of 188 bicycle spaces will be provided for the development.

83 of these bicycle parking spaces will be provided in secure, lockable compounds at basement level for staff of the proposed development in accordance with Green Star requirements. End-of-journey facilities will also be provided including one locker per space, six showers and male and female changing rooms.

A further 37 bicycle parking spaces for use by the public will be provided in close proximity to the building entries within the public domain, for use by short-term visitors to the precinct.

Bicycle parking for residents of the proposed development will be provided in accordance with Green Star and Council's requirements at a rate of one space per dwelling, a total of 68 spaces.

Motorcycle Parking

Space will be allocated within the basement for motorcycle parking in accordance with Green Star requirements. The current allocation allows for up to 34 motorbikes and/or mopeds.

5.10.6 Loading Dock

The Crown Sydney Hotel Resort loading dock is located on basement level one and has been designed to accommodate vehicles no larger than standard garbage trucks (medium rigid vehicles). Given the spatial constraints on the number of vehicles able to be in the loading dock at any one time, a Loading Dock Manager will be appointed who will be responsible for the management of service vehicle traffic and distribution of stock within the building.

5.11 Security and Safety

A Crime Prevention Through Environmental Design Report has been prepared by JBA and is provided at **Appendix L**. A summary of the assessment and proposed mitigation measures are provided below.

Assessment

This report demonstrates that the overall development will provide a high level of surveillance of surrounding public areas due to the various opportunities for natural surveillance both at the upper and lower ground levels of the development. Additional mechanical surveillance will also assist in providing further strengthen this as will the regular and ever presence of staff on the site. Given the 24 hour nature of the development and the presence of staff throughout all hours of the day, the development will also have a high level of territorial reinforcement.

These aspects will in turn discourage potential offenders due to the high level of risk associated with carrying out crime within the vicinity of this development.

Surrounding areas may not always provide adequate return surveillance to the site and the report recommends the provision of adequate lighting and way finding signage to maintain safety within the site.

Mitigation Measures

To further improve upon the anticipated performance of the development with regard to security and safety, the implementation of the following measures is recommended.

- It is recommended that if ATMs are to be placed within the development at the ground floor that these machines be placed in view of the hotel lobby area and within view of the CCTV system.
- Signage should be consistently used throughout the development to clearly delineate publicly accessible and restricted areas of the development.
- Signage should also be used to clearly denote which lift access, most particularly at the ground floor.
- To assist in legibility of the external development signage should be provided as a clear means of identifying lobby entries to the building and at the same time restricting access to unauthorised areas of the building (e.g. loading dock and car parking levels).
- Fire exits are for emergency use only and doors should be alarmed to alert security. These exits should be brightly lit and free of obstructions to ensure good sightlines to these doors.
- To assist in regulating access throughout the development secure access should be implemented through the lift system and to all staff only areas.
- The use of CCTV at the car parking and loading dock entry at the eastern edge of the development is strongly recommended as this area may be seen as the weakest point by which to gain unauthorised entry to the development.
- The other area where CCTV should be employed is to cover the pedestrian footpath along the eastern edge of the development adjacent to the footpath of Lime Street. This area may present an opportunity for unauthorised access into the development via the fire command centre, gas meter and staff entry doors.
- When the restaurant and bar premises are closed, access to these areas should be restricted to prevent these areas being used as ideal place to loiter out of business hours.
- Consult a qualified lighting engineer to ensure the correct lighting is provided to meet minimum Australia and New Zealand Lighting Standards, enable sufficient surveillance of the entire site and be vandal proof or resistant to limit breakage and minimise maintenance. To further improve lighting conditions within the car parking areas, painting the car park ceilings white will help to reflect lighting and further brighten these areas.
- Suitable lighting should be installed and well maintained along all pedestrian and vehicular pathways. The continuation of lighting along each of the building's edges is recommended to help illuminate this area during the evening and provide the perception of safety.
- Intercom systems at the publicly accessible lobbies could be installed to ensure access is only for residents, serviced apartment patrons and authorised visitors.
- Ensure mechanisms are in place for on-going maintenance and repairs of the building, which includes:
 - rapid removal policy for vandalism repair and the removal of graffiti; and

- maintenance of all surrounding public spaces including lighting.

5.12 Social Impacts

A Social Impact Assessment has been prepared by MacroPlan Damasi and is provided at **Appendix M**. A summary of the assessment and proposed mitigation measures are provided below.

Assessment

The report provides an assessment of both the social and economic impacts resulting from the Crown Sydney Hotel development, and is intended to sit alongside a broader consideration of environmental and other impacts associated with the proposal.

The report carries out a review of the local demography, key socio-economic indicators and key values and cultures in determining the net social impact of the proposal. It carries out this analysis having regard to the broader community benefits incorporated within the Barangaroo precinct and specific design, management and operational measures inherent to the Crown Sydney Hotel proposal. A summary of the findings of the report are provided below:

Potential Positive Social Impacts

- Employment opportunities during construction and operation.
- Positive employment and training implications associated with the project, in particular Crown's commitment to deliver training facilities in western Sydney and in conjunction with Mission Australia and/or other charity providers.
- Livelihood opportunities targeting the marginalised.
- Assist with addressing Sydney's void of premium tourism facilities by an experienced operator.
- Improved CBD activity and attraction of international tourists.
- Addition to the city's retail offering available to the general public and aligning to future community consumption needs.
- By forming relationships with the *Ellerston Retreat* in the Hunter Valley and the *Perisher Ski Resort*, the Crown Sydney Hotel Resort will extend opportunities to grow tourism across the whole of NSW (including the Hunter and Perisher) and also interstate.
- Civic pride and visitor allure resulting from an iconic structure and defining Barangaroo's place and contextual relationship with the city.
- New amenities for local residents via a comprehensive strategy to enhance the experience of Barangaroo South for residents, workers and visitors.
- 24-hour activity which ensures public access and will improve safety around the location.
- The Restricted VIP Gaming Facility licence revenues, taxes, stamp duties, and rates collected from the operating facility will find their way back to the community in the form of medical resources, improved transport, education, law and other civic infrastructure that State and Federal governments provide to enable further growth.

Potential Negative Social Impacts

- Amenity impacts to the immediate neighbours during construction & operation.
- Problem gambling impacts.

- Potential for work related health issues arising from shift work.
- By denying general public access to the VIP gaming, there could be a concern that the exclusivity of the gaming venue could deny broader public access into the site and present as a social barrier in the precinct.

Mitigation Measures

The SIA concludes that many of the potential negative social impacts associated with the proposed Crown Hotel Resort development will be mitigated by the building's conscientious design that accommodates both public and private access, and the manner of the resort's operation. Other key mitigation measures include:

- To address problem gambling impacts the restricted gaming facility at Crown Sydney Hotel Resort will operate on a member only basis. There will be no general public access to this part of the development, no low limit gaming and no poker machines. Crown has demonstrated its capacity to manage such a facility and will integrate responsible gambling procedures, staff training and support services (in conjunction with Mission Australia and/or other charity providers) for the hotel resort.
- Crown will utilise their extensive and demonstrated experience and track record as an exemplar employer and will maintain a robust Health and Safety Management System to mitigate against any potential health impacts and issues arising from shift work.
- The Crown Sydney Hotel Resort is designed to allow 24 hour public access to its lower levels and to interface directly with the surrounding public domain which will help mitigate any perception of the development being an elitist enclave that compromises public access and is at odds with the (idealised) notion of an egalitarian city.
- Carrying out extensive community consultation, engagement and public participation is a key ingredient of the 'good' planning process and during the operational phases of the development. Ongoing consultation and engagement with the public will enhance perception and ensure a broader appreciation of the project and how it will be managed and operated.

5.13 Economic Impact

The Social Impact Assessment prepared by MacroPlan Damasi and provided at **Appendix M** includes a high level analysis of the proposal's Economic Impact. A summary of the assessment and proposed mitigation measures are provided below.

Assessment

An evaluation of the economic impacts of the Crown Sydney Hotel development has been carried out by MacroPlan Damasi which identifies that the proposal will result in some significant economic benefits to the local economy, including:

Construction Phase

- Deliver a net GSP of some \$98,000,000.
- Result in an additional 600-1,100 new jobs during construction.
- Generate new net business investment in the order of \$381,000,000.

Operations Phase

- Deliver a net GSP of some \$638,000,000.
- Result in an additional 2,300-3,300 new jobs once operational.

- Generate new net business investment in the order of \$151,000,000.
- Generate new net export income in the order of \$513,000,000.
- Result in additional government tax revenues of approximately \$158,000,000.

The proposed Crown Sydney Hotel development is therefore expected to result in substantial economic benefits to Sydney and the wider region.

Mitigation Measures

No mitigation measures are proposed as the proposal is not expected to result in any substantial adverse economic effects on the area, but rather will deliver significant local, state and national economic benefits.

5.14 Climate Change and Sea Level Rise

A Climate Change and Sea Level Rise Report has been prepared by Arup and is provided at **Appendix N**. It is noted that any impacts as a result of climate change and sea level rise will predominately affect the public domain, and while these works are outside the scope of the proposed development, the subject of this DA, the Crown Sydney Hotel Resort proposal does include terraces, external seating and outdoor spaces which have the potential to be impacted by any changes. Accordingly, a summary of the assessment and proposed mitigation measures are provided below.

Assessment

The report provides an assessment of the risks of climate change in increasing sea levels in Sydney Harbour and the potential inundation impact on Barangaroo South. The assessment has been prepared in accordance with the *NSW Coastal Planning Guideline: Adapting to Sea Level Rise*. The former NSW Government adopted a planning benchmark of 0.9m mean sea level rise by 2100. However, a wider range of projections indicate that climate change induced sea level rise will result in an increase of between 0.26m and 20m by 2100.

The assessment determines that there is a risk that the projected sea level rise would result in inundation of parts of the Barangaroo South site by either direct coastal inundation or by a failure of the stormwater system where the discharge point to the Harbour would become submerged.

This risk of coastal inundation has been largely mitigated by the establishment of a sea wall as part of the proposed public domain (the subject of a separate DA), and the minimum finished floor levels of the proposed development. The minimum height of the seawall at 2.5m AHD is suitable as it is:

- greater than the current 1 in 100 year event (1.435 m AHD) for Sydney Harbour plus an additional 0.9m to accommodate mean sea level rise (2.335 m AHD);
- equivalent to the current Sydney Harbour Foreshores DCP (1.675 m AHD) plus an additional 0.9m (2.575 m AHD); and
- able to be incrementally increased in the future to respond to actual demonstrated sea level changes.

While the floor levels of the proposed development – ground floor, 3.8m AHD, car park entry 3.3m AHD (capable of being increased to 3.4m AHD) and outdoor spaces, 3.4m AHD – meet or exceed the minimum recommended.

Mitigation Measures

While the residual risk of coastal inundation on the proposed development as a result of climate change induced sea level rise is considered low, a greater risk remains due to the potential failure of the stormwater infrastructure if the discharge point is submerged. The following measures are proposed as part of the broader redevelopment of the Barangaroo site to mitigate against these risks:

- selecting materials to prevent accelerated degradation of infrastructure and public domain structures such as shading;
- locating key infrastructure such as generators above the ground floor;
- providing for safe exit routes above storm flood height level; and
- adopting principles of adaptive management such that external elements and drive way entry humps are designed to be incrementally increased in height should future research, change in Government policy or actual events suggest that sea level rise will be greater than currently projected.

5.15 Marine Ecology

Royal Haskoning DHV have prepared a brief addendum to their 2014 assessment of the entire Barangaroo South site (Marine Ecology, Water Quality and Contaminated Sediment Impact Assessment 2014) to address the potential impacts of the proposed building on marine ecology.

Separate approval is sought in relation to the remediation and earthworks, including the groundwater retention wall system, and is not the subject of this application. As such, only those impacts associated with the construction of a new building are described in **Section 4.0** are addressed.

Assessment

Due to the absence of species or suitable habitat, the proposed development would not impact on any marine vegetation, wetlands, including any threatened or protected species. Potential impacts on aquatic fauna arise principally from potential impacts of construction of the building on water quality as a result of dust. Mitigation measures to address these potential risks are identified below.

There would be no long term impacts of the proposed building on marine ecology, and expected improvements to stormwater quality are such that the existing impacts of stormwater discharge would be reduced.

Mitigation Measures

Royal Haskoning DHV find that the potential impacts of construction activities associated with the building can be managed to acceptable levels through the implementation of standard and appropriate industry techniques. These include:

- capturing concrete dust/debris and the like by using dust-control devices attached to tools;
- disposal of waste materials appropriately, with all waste managed in accordance with NSW EPA Waste Classification Guidelines;
- developing and implementing a Water & Stormwater Management Plan (including a Construction Environment Management Plan and Construction Water Quality Monitoring Plan) in which erosion and sediment management are addressed;
- water quality monitoring surrounding the development, to ensure that water quality conditions are maintained beyond the silt curtains and in the broader area (Lend Lease is currently undertaking water quality monitoring and it is

expected that the existing monitoring system would be utilised for this purpose); and

- having site spillage equipment available at the site to absorb any spills that may enter the water.

5.16 Heritage

5.16.1 European Heritage

A Statement of Heritage Impact (SoHI) (**Appendix O**) was prepared by TKD Architects to identify potential impacts on the significance of identified heritage items resulting from the building envelope proposed under Concept Plan Mod 8 (Ref No: MP06_062 (MOD 8)). This report was prepared in response to Director General's Requirements issued for the Concept Plan which stated as follows:

"Undertake an assessment of the likely impacts of development as modified on surrounding heritage and archaeological items (both on and off the site) and proposed conservation and mitigation measures, including the Millers Point Conservation Special Area, Observatory Hill and Walsh Bay."

As the proposed Crown Sydney Hotel Resort Building fits within the Mod 8 building envelope the heritage impacts are considered to be consistent with those contemplated in the SoHI. This is confirmed in a supplementary statement prepared by TKD Architects which states that the conclusions of their SoHI are also relevant to the Crown Sydney Hotel Resort proposal. It is therefore considered that this report sufficiently addresses the SEARs request that relates to the proposal, which states:

"The EIS must include an assessment of the likely impacts of the proposal on any heritage and archaeological items and outline mitigation and conservation measures."

An overview of the assessment and findings of the SoHI is provided below.

Heritage Context

TKD Architects have described the surrounding heritage context of Barangaroo South, identifying heritage items on the State Heritage Register, locally listed under the Sydney LEP 2012 and items listed on Section 170 Registers. The Barangaroo South site does not contain any items of heritage significance.

Assessment

Based on the significance of surrounding heritage items and the nature of the proposal TKD Architects have determined the location and height of the proposed building would have a potential impact on the significance of surrounding heritage items.

The SoHI assesses the potential impacts against each of the surrounding heritage items. The findings of this assessment are provided in **Table 15**.

Table 15 – Assessment of heritage impact on surrounding heritage items

Heritage Item	Impact Assessment
Grafton Bond Store and Sandstone wall	Minimal impact due to the location of revised building footprints and envelopes relative to the Bond Store's site. The Bond Store is close to the approved International Towers (C3, C4 and C5). There will be no impacts on views to the building within the public realm including views available from the north and north west along Hickson Road.

Heritage Item	Impact Assessment
Millers Point and Dawes Point Village Precinct And Millers Point Conservation Area	Minimal to no impact on the Precinct due to the distances between the Precinct and Barangaroo South. Any potential impacts will be ameliorated by the topography and built form of Miller's Point. Significant contributory buildings on Kent Street will be shielded by recent development along the western side of the street. Some impacts may occur on the setting of the Precinct when parts are viewed from vantage points on the western side of Millers Point and in views towards Millers and Dawes Pont from the north and northwest.
MSB Stores Complex and MSB Stores Complex Building 1	Some impact may occur on the western setting of the MSB group. This is likely to be ameliorated to some extent by open space to the east of the proposed hotel. Existing views to the buildings along Hickson Road will not be impacted due to existing large scale developments to the north, south and east of the Complex.
Sydney Observatory, Upper Fort Street, Millers Point	The proposal will have some impact on the setting of the Observatory, though it is noted impacts already exist by virtue of the existing approved buildings. This setting is also already affected to some extent by existing development in the northern section of Central Sydney, but the relative proximity of the Observatory to Barangaroo South and the increased scale and height of the proposed buildings will impact views to the Observatory from the south and south west or from the Observatory in the opposite direction. Existing mature trees on Observatory Hill in the vicinity of the Observatory will ameliorate some of these impacts. Other aspects of the Observatory's heritage significance will not be affected.
Walsh Bay Wharfs Precinct, Hickson Road Millers Point	Any potential impacts on the Walsh Bay Wharfs Precinct will be ameliorated by the location of Barangaroo South relative to the Precinct and the topography and character of development between the two locations.
Bureau of Meteorology and Fort Street Primary School site	Large scale development in the northern section of Central Sydney forms part of the setting of these items. The proposal will have little impact on these items due to the character of the existing setting and will not affect other aspects of the items heritage significance.
National Trust Centre	It is unlikely the proposal will have a significant impact on the National Trust Centre. The items eastern, southern and south western settings are already characterised by large office and apartment buildings in the northern section of Central Sydney.
Observatory Park, and Sydney Observatory Group (including Messenger's Cottages for Fort Phillip and Sydney Observatory	The proposal will be visible from the western side of the Park. There will be some impact on the setting of the Park and other items. This impact will be partly ameliorated by mature trees in the Park and existing residential towers along Kent Street. Other aspects of heritage significance will not be adversely affected.

An assessment against the model questions provided in the NSW Heritage Office's publication *'Statements of Heritage Impacts'* has also been undertaken by TKD Architects. Those questions of relevance to the category 'New development adjacent to a heritage item' have been addressed. The findings of this assessment are largely consistent with the individual assessment undertaken for each surrounding item outlined in **Table 15**. TKD Architects has also provided an assessment of the proposed Modifications against the relevant heritage provisions of the Sydney LEP 2012 and the Sydney DCP 2012, despite these instruments not applying to the site.

Based on the extensive assessment undertaken of the proposal and its relationship with surrounding heritage items and conservation areas, TKD Architects have determined:

- There are no physical impacts on identified heritage items and conservation areas in the vicinity of the proposal.
- Minimal to no impacts will occur to the Grafton Bond Store and Sandstone wall, Walsh Bay Wharfs Precinct, Bureau of Meteorology and Fort Street Primary School site and the National Trust Centre.

- Some impacts will occur to the setting of Millers Point and Dawes Point Village Precinct, Millers Point Conservation Area, MSB Stores Complex and MSB Stores Complex Building 1, Sydney Observatory, Upper Fort Street, Millers Point, Observatory Park, and Sydney Observatory Group (including Messenger's Cottages for Fort Phillip and Sydney Observatory).
- Impacts to most affected items will be lessened due to the distance of Barangaroo South from these items. These items include the Millers Point and Dawes Point Precinct, Sydney Observatory, and the Walsh Bay Precinct.
- A number of the affected items and the conservation areas are currently impacted by development in the northern section of Central Sydney. Impacts from the proposal are partly ameliorated by existing tall buildings, particularly those in Kent Street.
- Existing trees in Observatory Park will reduce the impact of the proposal to some extent and assist in minimising impacts of development at Barangaroo on views to the Observatory from northerly vantage points and from the from the Observatory to the south and south west given that they partially obscure these views.
- The existing curtilage around all heritage items and conservation areas is largely unaffected, allowing for the ongoing appreciation of heritage significance and interpretations of the place and individual items. The visual integrity and heritage significance of all items will be unaffected.
- The identified impacts can be minimised further by carefully designed massing and the detailed design of external components and façade treatments.

Whilst limited impacts have been identified on a number of items and conservation areas in the surrounding area, these are restricted to the setting of these items/areas and do not affect the visual integrity or interpretation of the items. This form of impact can be expected in a global city such as Sydney, and is largely evident in the existing situation with tall buildings located in the northern section of Central Sydney. On balance, considering the benefits of the Barangaroo South development, its locational attributes in a global city, and its minimal effect on the interpretation and significance of surrounding heritage items, the proposal is acceptable from a heritage perspective.

5.17 Archaeology

An Aboriginal and Non-Aboriginal Archaeological Issues Report has been prepared by Casey and Lowe and is provided at **Appendix P**. A summary of the report is provided below.

Assessment

The report identifies that previous assessments by Casey and Lowe and Comber Consultants found that the archaeological potential of development Blocks 1 – 4 was restricted to the eastern 40m of Barangaroo South for non-indigenous archaeology and 10 – 30m for Aboriginal archaeology. No significant archaeological remains are predicted to the west of the 30m – 40m zone, where the Crown Sydney Hotel Resort is now proposed, as this area was within the harbour and underneath the water until the 1960/70s wharfage was constructed.

The currently approved impacts for Barangaroo South will remove all archaeological remains within Blocks 1 – 4, and therefore there will be no change to the impacts as a result of the proposed development. Given the above, and the hotel's location, there will be no archaeological issues or additional impacts as a result of the proposal.

5.18 Operational Noise and Vibration

An Operational Noise and Vibration Assessment has been prepared by Wilkinson Murray and is provided at **Appendix Q**. A summary of the assessment and proposed mitigation measures are provided below.

Background Noise

The Noise and Vibration Assessment identifies five (5) commercial receivers and seven (7) residential receivers as well as three (3) heritage receivers. The receivers include those at Millers Point, Barangaroo, Darling Island, Pyrmont, King Street Wharf, and Balmain East.

To understand the existing noise environment, long-term ambient noise levels were monitored at eight (8) locations surrounding the Site, selected to cover the range of environments in the potentially affected receiver areas. The background noise monitoring locations included Hickson Road, Barangaroo, King Street Wharf, Millers Point, Darling Island and Balmain East. For each noise monitoring location the background noise level (Rated Background Level (RBL)) was determined during a period in 2010 (the RBL is taken to be the noise level exceeded 90% of the time or L_{A90}). **Table 16** below sets out the RBL calculated for each receiver location.

Table 16 – Background Noise and Construction Noise Management Levels

Location	Background Noise Level (RBL)				Construction Noise Management Level (LAeq,15-min)			
	Day	Evening	Night	Sat	Day	Evening	Night	Sat
Hickson Rd Residents	53	53	49	51	63	58	54	55
High St Residents	47	44	41	45 *	57	49	46	50
Merriman St Residents	46	44	40	46 *	56	49	45	51
Balmain East Residents	49	45	40	46 *	59	50	45	51
Darling Island / Sydney Wharf Residents	47	44	39	50 *	57	49	44	55
Commercial Properties	52-60	50-60	45-49	48-57	70			
Schools	47-53	44-53	41-49	45-51	55**			
Parks/outdoor areas	NA				65			

* Determined from the afternoon on Saturday 4 September as the morning was affected by rain.

** The external NML of 55dBA is based on a 10dB reduction through an open window to meet an internal level of 45dBA.

Assessment

A noise assessment has been conducted for the proposed operational activities associated with the Crown Hotel Resort development to determine the potential for noise and vibration impact at surrounding receivers.

The assessment considered noise impact in terms of both intrusiveness and amenity. Based on a review of the requirements of the NSW Office of Liquor, Gaming and Racing, patron and entertainment noise criteria have been determined based on a background 5 dBA criteria up to midnight and a minus 7 dBA after midnight. The later criteria has been adopted to meet the inaudibility criteria of the OLGR.

Given these requirements and the proposed hours of operation, the controlling external noise criteria for the surrounding residences, being

Hickson Road, Darling Island and Balmain residence are presented below in **Table 17**.

Table 17 – Patron Noise Impacts on Residential Receivers dBA

Scenario	Hickson Rd	Balmain East	Darling Island	R8 Residences
Criteria				
Evening (6pm-10pm)	58	50	49	63
Early Night (10pm – midnight)	58	48	47	63
Night (10pm-7am)	42	33	32	47
Predicted Noise (evening and night time only)				
Evening (6pm-10pm)	37	38	42	53
Early Night (10pm – midnight)	<10	36	40	52
Night (Midnight-7am)	<10	25	31	44

Notes: Where a predicted noise exceeds either of the relevant criteria it is highlighted in red in the table.

As demonstrated above, noise levels from patrons associated with the Crown Sydney Hotel Resort will meet all the associated screening noise criteria for all of the proposed hours of operation.

Road Traffic Noise

- A review of peak hour traffic noise levels at Hickson Road Residences has been carried out for the proposed development and confirms that:
- Hotel operational traffic will increase noise levels at Hickson Road residences by approximately 1.9dBA;
- Traffic noise levels are not predicted to exceed the 2dBA objective due to Hotel operations alone; and
- When all south Barangaroo operational traffic is included an increase of 3.5dBA is predicted.

5.19 Navigation Impacts

Royal Haskoning has undertaken a Navigation Impact Assessment to determine the potential impacts of Concept Plan (Mod 8) on navigation within Darling Harbour (**Appendix R**). The Concept Plan (Mod 8) proposal was assessed and compared to the approved Concept Plan (Mod 7).

Based on this comparative analysis Royal Haskoning determined that the proposal would result in reduced impacts on navigation as part of Concept Plan (Mod 8). Concept Plan (Mod 8) was therefore considered to be acceptable from a navigation perspective.

The Crown Sydney Hotel Resort building has been designed to fit within the building envelope provide under Concept Plan (Mod 8). The proposal does not change the land or water interface of the proposal in any material way and as such the findings of the Navigation Impact Assessment remain unaffected by the proposal.

5.20 Fire Safety

A Fire Safety Assessment has been prepared by Rawfire and is provided at **Appendix S**. A summary of the assessment and proposed mitigation measures are provided below.

Assessment

The Fire Safety Assessment (**Appendix S**) notes that the building design presents a number of solutions that will need to respond to the fire safety Deemed-to-Satisfy provisions of the BCA. Accordingly, the fire safety building solution will be performance-based rather than prescriptive-based. Overall, subject to the performance-based solutions satisfying the Deemed-to-Satisfy provisions, the assessment concludes that the proposed development, will not compromise the proposed strategy or conformance with the building regulations.

Mitigation Measures

To address the identified fire safety non-conformances and satisfy the performance requirements of the BCA, a Fire Safety Strategy will be developed prior to the commencement of the works. The strategy will focus on occupant egress, fire and smoke spread throughout the building and fire brigade intervention.

5.21 Stormwater and Drainage

A Stormwater Management and Infrastructure Assessment has been prepared by Cardno and is provided at **Appendix T**. A summary of the assessment is provided below.

Stormwater Catchments

Through interpretation of Area Laser Scan (ALS) data (as used by City of Sydney Council) and available survey data, Cardno have been able to estimate that the external catchment area draining to the Stages 1B and 1C is approximately 5.28Ha. Key contributors to the stormwater catchment area are:

- **Catchment 5:** This catchment has a total contributing area of approximately 2.83Ha, which discharges into Gas Lane and Jenkins Street through a 750mm diameter pipe and then into an existing 1200mm diameter pipe which traverses the Stage 1B development site prior to ultimately discharging directly into Darling Harbour.
- **Catchment 6:** This catchment has a total contributing area of approximately 2.29Ha, which discharges into the existing Hickson Road in ground stormwater drainage network prior to ultimately discharging into Darling Harbour through a series of varying diameter pipes traversing the Stage 1B/1C development site.
- **Catchment 7:** This catchment has a total contributing area of approximately 0.16Ha, which discharges to Hickson Road drainage and then through the site via proposed drainage.

Figure 23 shows these key contributors.

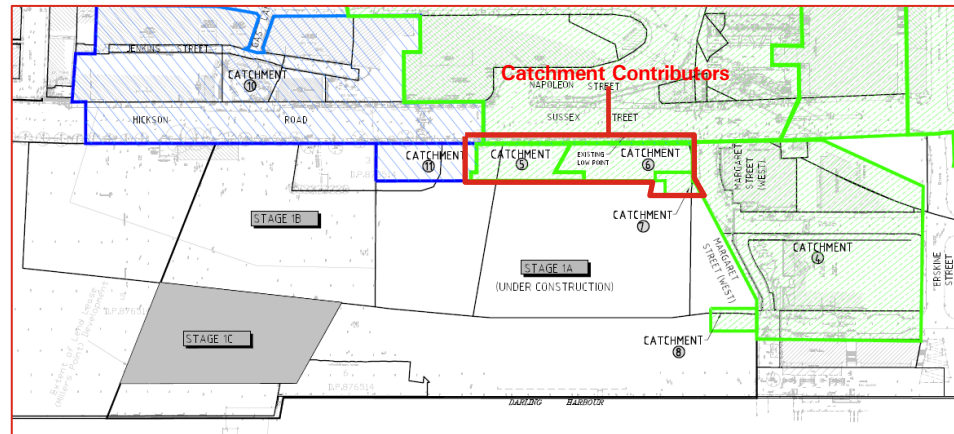


Figure 23 – Stormwater Catchment Contributors

Source: Cardno

Existing Overland Flow Paths

The most prominent overland flow paths that affect the Crown Sydney Hotel Resort site generally occur from surrounding local catchments, specifically:

- Catchment 5 - Overland flow splits at the intersection of Gas Lane and Jenkins Street prior to discharging into the existing Hickson Road in-ground stormwater drainage network;
- Catchments 6 and 7 – Overland flow generally occurs North and South on Hickson Road towards an existing low point generally located in front of “The Bond”; and
- Overland flow occurs through the development site.

Existing Trunk Infrastructure

The pre-development stormwater network is characterised by a series of in ground piped stormwater lines (typically between 300mm to 1800mm in diameter) that run along Hickson Road and other external catchments through the Barangaroo South site and then discharging stormwater directly to the Harbour.

Mitigation Measures

Construction Phase

Erosion and Sediment Control Measures

Prior to any earthworks commencing on site, all erosion and sediment control measures will be implemented generally in accordance with detailed drawings that will be prepared prior to issue of a Construction Certificate. The measures shown on the drawings are intended to be a minimum treatment only, as the contractor will be required to modify the erosion and sedimentation control measures to suit the construction program, sequencing and techniques. These measures may include:

- A site security fence and silt fence is to be constructed around the site;
- Installation of sediment fencing downstream of disturbed areas, including any stockpiles;
- Installation of silt arrestors to collect site runoff and retain suspended particles;
- Use of dust control measures including covering stockpiles, hessian to site fences and watering of exposed areas;

- Placement of hay bales or mesh and gravel filters around and along proposed catch drains and around stormwater inlet pits; and
- Construction of temporary sediment basins as required, and
- Harbour silt curtains.

Operational Phase

Trunk Stormwater Diversion

Upgrades to the trunk stormwater will be carried out as part of the proposed development, specifically diversion of the existing stormwater assets traversing the Barangaroo South site will be implemented as part of the excavation and remediation stage, including:

- The southern stormwater system (Line A), which drains the Hickson Road and Napoleon Street intersection has been diverted south around the Stage 1A basement;
- As part of the Stage 1B works it is proposed to divert Line B and C to a single stormwater line running along the southern end of the Stage 1B site which will discharge directly to the harbour. Line C runs through the Stage 1C area however the diversion works as part of Stage 1B will negate the need for any works in Stage 1C apart from demolition of the redundant stormwater pipe. The Stage 1B permanent diversion has undergone preliminary discussion with Sydney Water and will proceed to detailed design pending formal applications to Sydney Water; and
- Line D runs predominantly through Barangaroo Central however discharges to the harbour via Stage 1C Barangaroo South. Should Barangaroo Central works be undertaken in advance of Stage 1C then no diversion works would be required as part of Stage 1C and the existing discharge location could be utilised for the proposed development. However, should Barangaroo Central works not be undertaken, temporary diversion of Line D would be required, most likely to the south to join Line B and C (subject to detailed design). Ultimately Line D will be discharged within the Barangaroo Central area. The stormwater infrastructure diversion works for Barangaroo South are presented on drawing SK003 in the Stormwater Management and Infrastructure Assessment (**Appendix T**).

Stormwater Drainage

It is proposed to collect rainwater runoff from roof areas, awnings, internal driveways and associated public domain areas utilising traditional stormwater capture devices, water quality measures and WSUD principles prior to storage or discharge.

Water Sensitive Urban Design

The water quality strategy will consist of both internal and external treatment measures to achieve the required reductions in pollutant targets. The following internal measures will be incorporated into the development prior to discharge to Darling Harbour. WSUD initiatives that will be incorporated in the development will include:

- rainwater tanks to collect stormwater runoff from the roof and balconies, water collected will then be used to service other typical building water demands such as toilet flushing or water supply to mechanical plant; and
- bio-retention systems will be incorporated and used as 'source' treatment devices such as planter beds and tree pits along the promenade.

In summary the Stormwater Management and Infrastructure Assessment (**Appendix X**) concludes that the proposed drainage system and water sensitive urban design measures will allow the accommodate stormwater from large rainfall events (up to 100 year ARI) and safely convey this water to Darling

Harbour whilst also providing water quality treatment through a comprehensive treatment train.

5.22 Infrastructure and Utilities

An Infrastructure Report has been prepared by Cardno and is provided at **Appendix U**. A summary of the assessment is provided below.

Assessment

Potable Water

A Sydney Water owned water main is located on the western side of Hickson Road, to the east of the site. The main has adequate capacity to provide potable water to the proposed development. Accordingly, connection will be made to the existing water main, and from this, a potable water main will be constructed above the podium level structural slab.

Recycled Water

A Recycled Water Treatment Plant (RWTP) has been introduced to treat waste water from Barangaroo South, and also from sewer mining the existing Sydney Water sewer in Hickson Road. The existing recycled water main will be extended to the basement of the proposed development and connection will be made to service the building above. Recycled water will be used for landscape irrigation and public toilet flushing.

Waste Water

Sydney Water owns the sewer network in Hickson Road, which drains to the existing Sewage Pump Station north of Barangaroo South. The RWTP will capture and treat sewage from Barangaroo South, however additional storage within the local sewage network is required to offset the peak load from the proposed development when the RWTP is offline. An overflow from the RWTP will be required and has been approved as part of the Site Servicing Strategy.

Electrical Services

Barangaroo South has access to existing electrical services, which have been augmented as part of earlier works on the site. The site is serviced by a private embedded network, which connects to an Ausgrid substation via feeders that run to the site boundary. Branch connections will service the proposed development.

Telecommunications Services

Telecommunications providers will be able to extend existing pit and pipe infrastructure to service the site from Shelley Street to the south and from Hickson Road to the east. Optic fibre cables will be reticulated via cable trays at high level within the basement, with branch connections to service the building above.

Natural Gas Services

Jemena will provide natural gas to Barangaroo South via a low pressure gas main located within the roadways, and a high pressure regulator will be installed and connected to Jemena's high pressure gas main located in Hickson Road. The proposed development will be serviced by an extension of the low pressure gas main.

Chilled Water Services

A Centralised Chiller Plant and Harbour Heat Rejection System will be introduced to provide reticulated chilled water to Barangaroo South. The proposed development will have access to chilled water services via a continuation of privately owned pipework.

Notwithstanding the above, which finds that there is a process in place to ensure that the site will be suitably serviced, the services provider for the project is Lend

Lease who has separately negotiated agreements with external service providers. Accordingly, Lend Lease will supply the services to suit the demand generated by the Crown Sydney Hotel Resort.

5.23 Building Code of Australia (BCA) and Access

A Building Code of Australia Assessment Report has been prepared by Mckenzie Group and is provided at **Appendix V**. A summary of the assessment and proposed mitigation measures are provided below.

Assessment

An assessment of the projects ability to meet the relevant provisions of the Building Code of Australia 2013 (the BCA) has been undertaken by Mckenzie Group and is provided at **Appendix V**. The assessment concludes that the building design is capable of meeting the requirements of the BCA. Where non-conformances with the Deemed-to-Satisfy provisions of the BCA arise, alternate solutions that meet the performance-based criteria will be achieved.

The assessment concludes that the proposed development will comply with Part J – Energy Efficiency, either through the deemed-to-satisfy provisions of the BCA, such as relates to the building fabric, glazing, building sealing and air conditioning and ventilation systems etc.; or verification against a reference building. Compliance with the requirements of Part J will be documented prior to the commencement of the building works.

A BASIX assessment of the residential (Class 2) portion of the building has been undertaken and is provided at **Appendix W**.

Mitigation Measures

Where Deemed-to-Satisfy provisions of the BCA are not met, performance-based solutions will be developed prior to the commencement of the building works. Compliance with the requirements of Part J will also be demonstrated prior to the commencement of the building works.

5.23.1 Access

Assessment

An assessment of the projects ability to meet the relevant accessibility provisions of the BCA, AS1428.1-2009, the *Disability Discrimination Act* 1992 and the 2010 Access to Premises Standards has been undertaken by Mckenzie Group and is provided at **Appendix F**. This assessment has considered matters including paths of travel throughout the building, provision of accessible facilities including bedrooms, bathrooms and parking.

All common areas of the hotel portion of the building will be accessible, including lobbies, lounges and pool decks. The remaining portions of the building, including retail, restaurants and gaming will also be accessible.

Based on the hotel comprising 350 keys, fourteen accessible hotel rooms will be provided. All common circulation areas of the residential portion of the building will be accessible, including areas surrounding garbage chutes and mail rooms.

Accessible car parking will be provided in accordance with the class of the uses within the building using rates specified by the BCA or within AS/NZS 2890.6-2009.

Mitigation Measures

The building design will be subject to additional ongoing review in relation to door widths, circulation etc., and assessment by an access consultant prior to the commencement of the building works.

5.24 Structural Engineering

A Structural Engineering Report has been prepared by Robert Bird Group and is provided at **Appendix X**. A summary of the assessment is provided below.

Assessment

The Structural Engineering Report provides information in relation to the overall design criteria for the proposed structure and the structural methodology considered most appropriate to satisfy these criteria as determined at this stage of the design process, with specific consideration given to the relationship between the proposed building structure, the subject of this SSDA, and the proposed groundwater retention wall system, the subject of a separate development application.

The structure of the proposed development consists of two parts. The southern part, comprising the hotel, consists of vertical reinforced concrete columns and vertical reinforced concrete shear walls. The northern part, comprising the residential tower, consists of six helical columns, two vertical columns, and core and shear walls. Flat, post-tensioned and reinforced concrete slabs will span between the columns and walls. The roof structure will be framed using structural steel.

Bored piles founded within sandstone are proposed for the basement and tower footings, and will be capable of supporting both the basement and building superstructure. The design of the basement structure will take into consideration the high uplift loads as a result of groundwater fluctuations.

Robustness, wind and seismic loading will be applied in accordance with the relevant sections of AS1170, with additional data based on the results of wind tunnel testing undertaken by RWDI (**Appendix G**). Lateral stability will be provided by an arrangement of shear walls, outrigger walls, and reinforced concrete lintels.

The structural design of the proposed development will be refined as part of ongoing design development, and documentation will be provided prior to the commencement of the works.

5.25 Geotechnical

A Geotechnical Report has been prepared by Coffey for the Stage 1C works which will facilitate development of an underground basement car park and the Crown Sydney Hotel Resort building through construction of a groundwater retention wall system, remediation and excavation. The report is provided at **Appendix Y** and a summary of the assessment is provided below.

Assessment

Overall, the geotechnical conditions indicate that the site is capable of supporting the proposed development.

5.26 Contamination

A Remedial Action Plan (RAP) and Site Auditors Report have been prepared by AECOM and ENVIRON respectively and are included at **Appendix Z** and **AA**. A

summary of the assessment and proposed mitigation measures are provided below.

The RAP and the HHERA also relate to the Stage 1C Remediation and Earthworks SSDA (SSD 6956).

5.26.1 Assessment Criteria

Assessment Criteria (Human Health)

The human health risk assessment comprised derivation of Site Specific Target Criteria (SSTC) for soil and groundwater that are protective of future Site users, based on potential development options for different areas of the Site. SSTC were derived in accordance with Australian guidelines for risk assessment and derivation of health-based criteria in environmental media, and included the following key steps:

- Identification of Chemicals of Potential Concern (CoPC) in environmental media, based on comparison to relevant human health based 'Tier 1' screening criteria.
- Qualitative and quantitative assessment of the toxicity of each CoPC.
- Development of Conceptual Site Models (CSMs) for land use scenarios relevant to future development of the Site.
- Quantitative exposure assessment for each land use scenario, in order to estimate the extent to which human receptors may be exposed to CoPC at the Site and including vapour and dust migration modelling where relevant to the CSM.
- Adoption of acceptable risk levels upon which to base derived SSTC.
- Derivation of media and chemical specific SSTC for each CoPC based on consideration of toxicity criteria, exposure parameters, contaminant transport modelling and acceptable risk levels.

The future intended land uses considered by the HHERA included a mix of high density residential with minimal access to soil), commercial / retail (with minimal access to soil), public open space and potential open water (associated with a proposed Southern Cove) connected to Darling Harbour.

The HHERA identifies the following Chemicals of Potential Concern (CoPC) at the Stage 1C site:

- Metals, TPH, BTEX, PAHs, phenols, sulphate, cyanide, ammonia associated with the former gasworks up-gradient of the Site.
- Metals, TPH, BTEX, PAHs, PCBs, OCPs, VOCs, SVOCs, Asbestos associated with the importation of fill materials of unknown origin for reclamation of land from Darling Harbour in the former wharf areas.
- Demolition of former buildings potentially containing hazardous materials Lead, PCBs, asbestos.
- Potential ASS (PASS) is likely to be present in the natural silts, sands and clays overlying the bedrock at depth on the Site.

Identified contaminated is detailed in Section 2.7, which indicates that some of the above chemicals are present in the soils at the site in elevated concentrations.

For the purposes of establishing SSTC for the Crown Hotel Development, three distinct areas have been identified.

- Area A: relates to the parts of the Site that will remain in situ, generally located in the south-western parts of the site. This material could potentially remain in hydraulic connection with Darling Harbour, and limited or no excavation will be required.
- Area B: relates to the parts of the Site that will be excavated for the basement.
- Area C: relates to materials that will remain in situ below the base of the basement excavations. This area is located within the groundwater retention wall system (constructed as part of the SSD 6956 for the Stage 1C remediation and earthworks) and will have no hydraulic connection with Darling Harbour.

In addition it is highlighted that part of the Crown Hotel Development area (being the eastern section of the underground basement) is located within the Stage 1B development area. The land within the Stage 1B is subject of a separate RAP and SSDA for site remediation works (SSD 5897).

Relevant SSTCs for each part of the site determined as part of the HHERA are listed in **Table 18**. It is highlighted that SSTC for soils remaining below the basement (i.e. Area C) are not applicable because the basement will extend below the groundwater table and there is no complete exposure pathway for humans with saturated soils. Therefore, potential risk to human health for Area C materials has been assessed based on the derivation of groundwater SSTC only. Further, soils within Area B will be excavated and removed from the site. As such, no SSTC is required for these materials.

Table 18 – Soil and Groundwater Site Specific Target Criteria

CoPC	Concentration	
Soil SSTC (Area A)	mg/kg	
Benzene	2	
Cresols (Total)	250	
Dimethylphenol, 2,4-	36,000	
Ethylbenzene	50	
Methylnaphthalene, 2	100	
Naphthalene	4	
Lead	11,000	
Toluene	480	
TPH C6-C9	260	
TPH C10-C16	1,100	
Trimethylbenzene, 1,2,4-	1	
Xylenes (total)	-	
CPAH - Sum of 8 carcinogenic PAH Compounds (Benz(a)anthracene Benzo(a)pyrene; Benzo(b)fluoranthene; Benzo(g,h,i)perylene; Benzo(k)fluoranthene; Chrysene; Dibenz(a,h)anthracene; Indeno(1,2,3-c,d)pyrene)	130	
Asbestos	0.05% w/w	
Groundwater SSTC	Area A (mg/L)	Area C (mg/L)
Acenaphthylene	33	-
Acenaphthene	35	-
Ammonia	150	920

CoPC	Concentration	
Aniline	680	67,000
Arsenic	140	-
Barium	830	-
Benzene	2.0	49
Cadmium	110	-
Cobalt	250	-
Cresols (Total)	2.7	22.0
Dimethylphenol, 2,4-	430	-
Ethylbenzene	100	-
Lead and compounds	630	-
Manganese	27,000	-
Methylnaphthalene, 2-	22	150
Naphthalene	1.3	7.8
Nickel	1,300	-
Phenol	340	4,800
Styrene	47	-
Toluene	370	-
TPH C6-C10	9	19,000
TPH >C10-C16	12	1,800
Trimethylbenzene, 1,2,4-	4.0	91
Trimethylbenzene, 1,3,5-	15	460

Assessment Criteria (Environment)

The Ecological Risk Assessment (ERA) comprised the following key steps:

- Identification of appropriate ecological receptors, including both terrestrial and aquatic ecosystems (including groundwater dependant ecosystems).
- Identification of relevant Marine Water Quality Criteria (MWQC) from a nationally adopted hierarchy of acceptable guidance documents plus consideration of additional international sources based on the protection of the identified nearest surface water receptor, Darling Harbour.
- Identification of non-gasworks CoPC noting that the *VMP Remediation Extent* report (AECOM, 2013b) considered that if the *VMP / Block 4 RAP* (AECOM, 2013c) is implemented, residual gasworks related contamination remaining *in situ* down hydraulic gradient of the Declaration Area will not represent an unacceptable risk to the environment.
- Identification of potential risks associated with the non-gasworks related CoPC based on comparison of concentrations of CoPC (reported both within the Site and at the Site boundary) with the adopted MWQC.
- Assessment of whether (or not) the concentrations of non-gasworks related CoPC within the Site and at the down hydraulic gradient Site boundary represent a risk to Darling Harbour.

The HHERA considers that if the proposed remediation works at Block 4 (i.e. those remediation works subject of SSD 5897-2013) are implemented, then residual gasworks related contamination remaining *in situ* down hydraulic gradient of the Declaration Area (including the Site) will not represent an unacceptable risk to the environment.

The HHERA also considered that non-gasworks related CoPC (namely copper, zinc, cobalt and nickel), which were identified at a concentration above the ecological screening criteria in groundwater wells within both the fill and marine sediment, would not present a risk to the environment. This conclusion was based on the following considerations:

- The concentrations of the non-gasworks related CoPC are higher in groundwater wells screened within the marine clays. Given there is negligible contaminant flux within the marine sediments to Darling Harbour, these concentrations are not considered representative of those that may discharge to the environment.
- The proposed remedial strategy for Block 4 includes removal of up-gradient sources of contamination including historical infrastructure and Separated Phase Gasworks Waste and Tar (SPGWT).
- The groundwater retention wall system to be constructed as part of the proposed Block 4 Development Works will effectively cut off groundwater movement from up-gradient sources to the Site. It is considered that the up-gradient sources are a significant contributor to the groundwater quality within those wells screened within the fill materials at the Site.
- The proposed Crown Hotel Development (on the Site) will incorporate a basement, similar to that proposed as part of the Block 4 Development Works, contained within a groundwater retention wall which will be keyed into bedrock. While the extent of the basement has not yet been confirmed, it will reduce groundwater migration and potential contaminant flux from that area of the Site in which the basement is constructed.
- The Ecological Risk Assessment is overly conservative as it has not been adjusted to reflect dilution. It is therefore considered that concentrations reported within groundwater at the Site will undergo additional dilution prior to discharge to the nearest environmental receptor, Darling Harbour.
- Additional remediation works (as might be required to achieve a greater degree of environment protection), would be impracticable, cost prohibitive and inconsistent with the principles of Ecologically Sustainable Development (ESD). That is, the net cost to the environment of undertaking the additional works would be greater than the environmental benefit realised from the additional work at the Site.

Based on the above multiple lines of evidence, the HHERA concluded that residual metals contamination reported within groundwater wells screened with the fill materials will not pose a risk to the environment and that the quality of groundwater in fill within the Site will improve over time following the proposed remedial works in the Declaration Area and Block 4. It is therefore considered that the risks to identified environmental receptors at the Site are low and acceptable. Based on these conclusions, risk to the environment is not considered any further in this RAP while the focus of any required remediation works is focussed on the appropriate protection of human health.

5.26.2 Assessment

Area A

All CoPC concentrations were reported to be less than the relevant soil SSTC for Area A. In addition, key CoPC (including BTEX, TPH, PAHs and phenols) were generally reported at concentrations below the laboratory limit of reporting.

Asbestos was not detected in the Area A unsaturated soils. It is noted that asbestos analysis conducted in Area A did not include the gravimetric

assessment of bonded ACM as required for comparison against the SSTC for asbestos.

The results of the soil and groundwater analytical results within Area A were all less than the soil and groundwater SSTC established for Area A. As such, no CIM warranting remediation was identified within Area A. SPGWT has not been identified in Area A.

As such, no remediation work is likely to be required. However, only limited soil analytical results are available for soil in the unsaturated zone. Therefore, additional validation testing of the soils in the unsaturated zone of Area A should be conducted to ensure the sampling density is sufficient to appropriately characterise this material. Based on the findings of these additional investigations, an assessment of whether CIM is present within Area A unsaturated soils will be undertaken in consultation with the NSW EPA Accredited Site Auditor. If required, remediation and subsequent validation works will be undertaken in Area A unsaturated soil, in accordance with the RAP.

Area B

Based on the soil results and data collected during Stage 1A excavation works, it is considered probable that asbestos will also be encountered during the excavations and the majority of the excavated materials will be classified as Special Waste (containing asbestos).

Based on total CoPC concentrations (only) and excluding the probable presence of asbestos, it is likely that the majority of the excavated material would be classified as General Solid Waste in accordance with the Waste Classification Guidelines. Based on the available analytical data, the only exceptions to this are likely to be:

- The material in the vicinity of BH191 which is likely to be classified as Restricted Solid Waste based on a benzo(a)pyrene concentration of 12.6 mg/kg (3.7 m depth); and
- SPGWT that may be recovered during construction of the groundwater retention wall system, particularly where the wall extends into marine sediments where SPGWT has been inferred to be present.

Additional sample analysis will be required to fully characterise the excavated material for landfill disposal. Due to the likely space restrictions on the Site during the works and to avoid the requirement for stockpiling, it is considered likely that the additional waste classification required to confirm these preliminary waste classifications in accordance with the Waste Classification Guidelines would be undertaken in situ.

Area C

The observed SPGWT and the reported elevated benzene and naphthalene groundwater concentrations are not considered to be representative of CIM that warrants remediation because:

- Groundwater analytical results and field observations from other investigation locations within the Stage 1C remediation and earthworks area indicate that benzene and naphthalene impacted groundwater is localised to a single sampling location. Benzene and naphthalene concentrations are generally non-detect across the Site. Further, SPGWT was not observed in this location, indicating that the reported impact was relatively localised.
- The location of the elevated benzene and naphthalene groundwater concentrations was screened across the base of the fill and marine sediment interface. There is considered to be negligible contaminant flux from the natural marine sediments into the overlying fill.

- The observed SPGWT and benzene and naphthalene impacted groundwater is located well below the depth of the proposed excavation and, as such, will not be in direct contact with the lower basement; and
- The retention wall system will effectively isolate soil and groundwater within the excavation works area from surrounding ground conditions and mitigate significant groundwater flows to Darling Harbour.

Based on the available data, CIM has not been identified within Area C and no remediation work is likely to be required.

5.26.3 Mitigation Measures

Additional validation sampling is required from unsaturated soils in Area A to confirm that there is no CIM. The additional validation testing will be undertaken in accordance with the NSW EPA Accredited Site Auditor endorsed Validation SAQP. The additional validation sampling will involve:

- Collection of additional soil samples such that the net sampling frequency across Area A (including both the previous investigation locations and additional validation locations) is at least one sample location per 20 m grid interval (unless otherwise agreed with the Site Auditor);
- Where possible, soil samples will be collected from test pits to allow analysis for ACM;
- Soil samples will be collected from within the unsaturated zone at depths of approximately 0.5 and 1.5 m bgl;
- Soil samples will be biased toward those zones considered most likely to be impacted based on field observations (including visual/olfactory observations and PID readings);
- Analysis of soil samples for the CoPC in accordance with the analytical methods documented in the RAP.

Based on the additional unsaturated soil sample results, an assessment of whether CIM and/or SPGWT are present within Area A will be undertaken and conclusions drawn regarding remediation requirements in this area (if required). These works will be undertaken in consultation with the NSW EPA Accredited Site Auditor.

If SPGWT/CIM that warrants remediation is identified in Area A during the additional validation sampling, the material would be selectively excavated and disposed to a suitably licensed off-site waste facility. If necessary, the remediated material would be treated and managed in accordance with the procedures and protocols set out in the RAP.

If CIM and/or SPGWT is identified by the additional validation sampling, additional delineation works may be required to appropriately characterise the vertical and horizontal extent of the impacts. If required, these delineation works would also be conducted in consultation with the NSW EPA Accredited Site Auditor.

Validation of the base of the excavation (i.e. Area C) will also be carried out via visual inspections and additional samples (if required). Validation of soils remaining in situ beneath the base of the excavation is described in the RAP, and forms part of the EIS for the Stage 1C Remediation and Earthworks SSDA (SSD 6956).

Graeme Nyland, the Accredited Site Auditor, has reviewed the Crown RAP and has certified that the provisions of the Crown RAP are capable of ensuring that

the Crown Hotel development site can be made suitable for the future intended uses (see Site Audit Report provided in **Appendix AA**).

A Site Auditor's Statement will be obtained upon completion of the works certifying the Crown Hotel development site is suitable for the proposed uses.

5.27 Operational Waste Management

A Waste Management Plan has been prepared by Arup and is provided at **Appendix BB**. The statement provides details in relation to the waste generated during operation of the proposed development. Details in relation to the waste generated during construction of the proposed development are provided in **Section 5.25**. The plan makes an assessment against the legislative requirements including the *Protection of the Environment Operations Act, 1997*; *Waste Avoidance and Resource Recovery Act, 2001*; *NSW Waste Reduction and Purchasing Policy, 2007*; and *Council of the City of Sydney Policy for Waste Minimisation in New Developments, 2005*; as well considers Green Star requirements.

Generation and Storage

The proposed development is likely to generate the following waste streams;

- Mixed general waste;
- Co-mingle recycling;
- Organic waste (food and beverage only);
- Cardboard and paper recycling (commercial / retail only);
- Cooking oil (food and beverage only);
- Electronic waste;
- Hard rubbish;
- Metal waste; and
- Plastic wrap.

The estimated waste generation for each use is as follows:

- Commercial – 52,666 L/day
- Hotel – 4,886 L/day
- Residential – 1,663 L/day

The main waste facilities for the proposed development are:

- Separate central storage rooms in the basement for commercial waste, hotel waste and residential waste;
- Waste collection and temporary storage rooms on the upper floors; and
- Waste chutes from all floors.

The design specifications for all waste facilities are provided in the plan at **Appendix BB**.

Collection

All waste collection services will be provided by appropriate licenced contractors and collection will be undertaken as follows:

- Commercial

- Waste will be collected daily, except in the case of cooking oil, electronic waste, hard rubbish, metal waste and plastic wrap which will be subject to scheduled collections as necessary.
- Hotel
 - Waste will be collected daily, except in the case of co-mingle recycling and cardboard and paper recycling which will be subject to 2 – 3 collections per week, and electronic waste, hard rubbish and metal waste which will be subject to scheduled collections as necessary.
- Residential
 - Waste will be collected 3 times per week, except in the case of electronic waste and hard rubbish which will be subject to scheduled collections as necessary.

All waste bins and skips will be moved by waste contractors at designated collection times. Empty bins will be transferred from the loading dock back to the central storage area by building management.

Amenity

The general waste management areas have been designed so as not to be visible from the exterior of the building. The waste management equipment to be selected will not generate significant noise and will be located in areas containing adequate acoustic insulation. Any putrescible waste to be collected will be stored in a Council approved containers and all waste storage areas will be fitted with mechanical vertical ventilation systems. Waste will be collected regularly which will reduce the risk of odour to building occupants and neighbours. A Loading Dock Manager will be appointed who will be responsible for regulating service vehicle traffic into and out of the building to ensure minimal amenity impacts on the surrounding area.

Overall, the proposed waste management areas and waste management practices will ensure high levels of occupant amenity.

5.28 Ecologically Sustainable Development

The principles of ecologically sustainable development are set out in section 6(2) of the *Protection of the Environment Administration Act 1991* (NSW). The principles of ESD include intergenerational equity, the precautionary principle, conservation of biological diversity and ecological integrity and improved valuation, pricing and incentive mechanisms. The principles of ESD have informed the design, construction and proposed operation of the proposed mixed use residential development.

It is appropriate for decisions made under the EP&A Act to have regard to the objects of the Act, as set out in Section 5 of the Act, including ESD.

The EP&A Act adopts the definition of ESD found in the *Protection of the Environment Administration Act 1991*. Section 6(2) of that Act states that ESD requires the effective integration of economic and environmental considerations in decision-making processes and that ESD can be achieved through the implementation of:

- (a) *the precautionary principle - namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:*

- (i) *careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and*
- (ii) *an assessment of the risk-weighted consequences of various options,*
- (b) *inter-generational equity—namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations,*
- (c) *conservation of biological diversity and ecological integrity—namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration,*
- (d) *improved valuation, pricing and incentive mechanisms—namely, that environmental factors should be included in the valuation of assets and services, such as:*
 - (i) *polluter pays—that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,*
 - (ii) *the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,*
 - (iii) *environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.*

Importantly, the development of the Crown Sydney Hotel Resort is consistent with the principles of ESD as it meets the needs of the present without compromising the ability of future generations to meet their own needs. ESD design measures have been integrated into the design of the building as detailed in the ESD Report prepared by Arup (**Appendix C**) and summarised at Section 4.12 of this report. Each principle of ESD as relevant to the proposed development is addressed below.

5.28.1 Precautionary principle

The precautionary principle is utilised when uncertainty exists about potential environmental impacts. It provides that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. The precautionary principle requires careful evaluation of potential environmental impacts in order to avoid, wherever practicable, serious or irreversible damage to the environment. Measures included within the proposed development to mitigate against possible future risks include:

- Incorporation of high efficiency mechanical plant and electrical services to reduce energy dependence;
- Locate residential development in close proximity to public transport to reduce reliance on private vehicle use;
- Include stormwater treatment measures to eliminate present or future impacts on water quality; and
- Incorporate rainwater capture and storage for reuse for toilet flushing and landscape irrigation to reduce reliance on mains potable water.

When taking into account the above ESD measures, this EIS has not identified any serious threat of irreversible damage to the environment and therefore, the precautionary principle is not relevant to the proposal.

5.28.2 Intergenerational equity

Inter-generational equity is concerned with ensuring that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations. The proposal has been designed to benefit both the existing and future generations by:

- Reinvigorating and renewing a key part of the Barangaroo site and the Harbour foreshore for future generations to appreciate and enjoy;
- implementing safeguards and management measures to protect environmental values;
- facilitating business investment job creation to provide opportunities for future generations;
- provision of housing in close proximity to public transport; and
- Supporting the improvement of the public domain and amenity within the Barangaroo site.

The proposal has integrated short and long-term social, financial and environmental considerations so that any foreseeable impacts are not left to be addressed by future generations. Issues with potential long term implications such as waste disposal would be avoided and/or minimised through construction planning and the application of safeguards and management measures aimed at minimising waste and maximising recycling as described in this EIS and the appended technical reports.

5.28.3 Conservation of biological diversity and ecological integrity

The principle of biological diversity upholds that the conservation of biological diversity and ecological integrity should be a fundamental consideration.

The proposal would not have any significant effect on the biological diversity and ecological integrity of the study area. Design and management measures to reduce excavation within the site and reduce the export of gross pollutants into the waterway all contribute directly the conservation of biological diversity and ecological integrity within Sydney Harbour.

This is supported by the Marine Ecology Report (**Appendix CC**) prepared by Royal Haskoning DHV which concludes that there would be no long term impacts of the proposed building on marine ecology, and expected improvements to stormwater quality are such that the existing impacts of stormwater discharge would be reduced.

5.28.4 Improved valuation, pricing and incentive mechanisms

The proposed design for the Crown Sydney Hotel Resort building was selected on the basis of its design, economic, environmental and social merits. Since originally selecting the concept the building design has been the subject of an extensive and iterative design process to ensure that it ultimately achieves the best development outcome for the site taking into consideration key evaluation criteria and objectives.

The principles of improved valuation and pricing of environmental resources requires consideration of all environmental resources which may be affected by a proposal, including air, water, land and living things. As mentioned in the Waste Management Plan a number of initiatives and mitigation measures will be

implemented to ensure the effective management, reuse and recycling of waste during both construction and operation in order to divert resources from landfill.

5.29 Sydney Observatory Impacts

Lend Lease and UNSW Global has undertaken an analysis of potential sky view loss and resultant impacts resulting from the building envelope under Concept Plan (Mod 8) and the potential impact on the functioning of the Sydney Observatory astronomical sightlines. Following detailed analysis the Sky View Loss Assessment (SVLA) concludes that the proposed Crown Sydney Hotel Resort building is not expected to have a major detrimental impact on the observatories night time activities. The analysis is discussed in further detail below with the full assessment provided at **Appendix DD**.

The Sydney Observatory SVLA identifies the astronomical sightlines and functions of Sydney Observatory, and provides an assessment of the proposed Crown Sydney Hotel Resort building and its potential impact on these sightlines.

It is noted that as the proposed Crown Sydney Hotel Resort Building fits within the building envelope proposed and assessed under Modification 8, the potential impact on the functioning of the Sydney Observatory astronomical sightlines from the proposed building will therefore be less than that contemplated in the initial Sky View Impact Assessment (SVIA) prepared for Modification 8 dated September 2014.

The SVLA that accompanies this application has been specifically prepared to assess the potential sky view loss impacts on the Sydney Observatory (North Dome) as a result of the obstruction caused by the hotel, and in this regard is considered to sufficiently address the SEARs request that relates to the proposal, which requires *"an analysis of potential sky view loss and resultant impacts on the functioning of the Sydney Observatory telescopes and astronomical sightlines."*

5.29.1 Functioning of Sydney Observatory

The Sydney Observatory was historically important to navigation, meteorology, timekeeping and star studies in the 19th and 20th Centuries. Astronomers worked and lived in the building until 1982. The Sydney Observatory no longer functions as an astronomical observatory. The Observatory is now associated with the Powerhouse Museum and provides astronomy education and public sky viewing.

Astronomical observations in NSW are now carried out at the Australian Astronomical Observatory at Coonabarabran, between the Central West and North West Slopes of regional NSW.

The location and context of the Sydney Observatory in the Sydney CBD is not ideal for making astronomical observations due to light glare, smog, pollution and sky view constraints. The location of the Observatory adjacent to the Sydney Harbour Bridge, in particular, is also a considerable constraint due to the amount of light spill from the Bridge.

The astronomical viewing times for the Sydney Observatory are defined as:

- Monday to Saturday (6 days) during school term, 7 days outside of school term, excluding Christmas, Boxing Day and Easter Friday;
- February to March - 8.15pm to 9:45pm;
- April to September - 6.15pm to 7.45pm, and 8.15pm to 9:45pm;
- October and November - 8.15pm to 9.45pm, and;
- December and January - 8.30pm to 10:00pm.

The number of viewing days, sessions and hours on an annual basis would total approximately 326 nights, 491 viewing sessions and 737 viewing hours.

5.29.2 Astronomical Sightlines

Important astronomical sightlines determined with Sydney Observatory include:

Sun, Moon and Planets:

- The Sun:
 - Winter solstice - 298° Azimuth⁽¹⁾, and;
 - Summer solstice - 241° Azimuth.
- The Moon: +/- 5° further North or South of the Sun (i.e. between 236° and 303° Azimuth).
- The Solar System Planets: Less than 5° from the Sun at Sunset (i.e. between 236° and 303° Azimuth).

The Southern Cross and nearby objects (Jewel Box, Alf-Cen, Omega-Cen [NGC5139]):

- The Southern Cross (Crux), Jewel Box cluster (Kappa Crucis Cluster [NGC4755]), and Pointers (Alpha-Centauri and Beta-Centauri): From 225° up to 210° Azimuth.
- Omega-Centauri (NGC5139) globular cluster: Up to 298° Azimuth at 18° altitude.
- 47 Tucanae (a globular star cluster). This cluster is very similar to Centauri in appearance and rises just as Centauri is setting. So it would make a good alternative target when Centauri is no longer visible.
- Small Sagittarius Star Cloud – a small patch of sky containing millions of stars – part of the Milky Way.
- The constellation Scorpius – a pattern of bright stars in the shape of a scorpion.
- Antares – a giant red star.
- The Butterfly Cluster – a small open cluster of blue stars.

Ring Nebula and Star Albireo:

- To the North the Ring Nebula (M57, a dead star) and Albireo (Beta Cygni, a multi-coloured twin star): From 303° Azimuth at 15° altitude.

Based on the above key target objects, there are two key astronomical view corridors:

1. Between 210° and 225° Azimuth at 18° altitude.
2. Between 236° and 303° Azimuth.

5.29.3 Light Spill

As outlined above, the positioning of the Sydney Observatory in the Sydney CBD is not ideal for astronomical observations due to the presence of smog, pollution and other sky view constraints such as light glare, in particular the Sydney Harbour Bridge.

⁽¹⁾ 'Azimuth' is the angle measured from North to East

The proposal, by virtue of the fact that it fits within the building envelope prescribed under Modification 8, is not expected to result in an increased light spill effect on the Observatory given the existing surrounding environment. The principles for lighting are to minimise additional night glow through consistency with the requirements of AS4282. Further conceptual details on how light spill is to be minimised is provided in the Sky View Loss Report at **Appendix DD**. The lighting design will continue to be refined through the future stages of development, however, is not considered to pose an unacceptable impact.

5.29.4 Existing Constraints of the Sydney Observatory

Important to the assessment of sky view impacts are the existing contextual factors of the Sydney Observatory and the context of sky viewing. There are many factors that affect the ability to conduct these night viewing sessions, as summarised below and further outlined in **Appendix DD**.

- The low altitude of the Observatory and proximity to Sydney Harbour results in increased light glare;
- It can be assumed (based on meteorological evidence) that there is a 50% chance of cloud cover to disrupt astronomical observations;
- Astronomical observations will be more greatly affected by smog, bushfire smoke, light spill and contrast when observing at low altitudes;
- Increase of air mass affecting observations at low altitudes (scintillation); and
- Viewing from the observatory is constrained due to current tree and building locations around Observatory Hill.
- Bright moon which occurs near and during full moon events, with this effect illuminating the whole of the background sky making it difficult to observe other objects in the sky.

5.29.5 Sky View Assessment

The proposed Crown Sydney Hotel Resort building has a height of 275m and is situated approximately 440m south-west of the Sydney Observatory (North Dome) building. Viewing from the Observatory over the subject site is presently all the way down to the horizon within the azimuth angle range projected by the proposed building. **Figures 24 and 25** illustrate the view corridor compared to the Barangaroo South development.

Based on the analysis carried out by UNSW Global the proposed building will obscure a portion of sky approximately $30^\circ \times 6.3^\circ$ (altitude x azimuth) over an azimuth range of approximately 225.7° to 232.0° .

Consultation with the Sydney Observatory has revealed that they have concerns about the building's potential obstruction of the Omega-Centauri (NGC5139) globular cluster. In addition to this the Sydney Observatory had previously expressed concerns about the building's potential to impact on the ability to view other night sky objects including the Southern Cross, The Pointers and the Jewel Box Cluster.

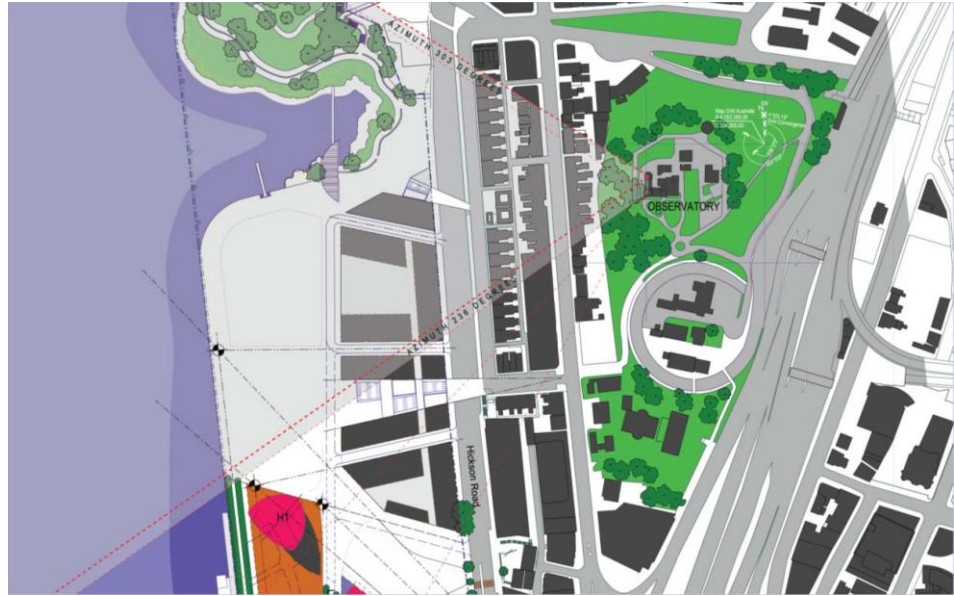


Figure 24 – Sun, Moon, Planets, Ring Nebula and Star Albireo view corridor

Source: Lend Lease and UNSW Global

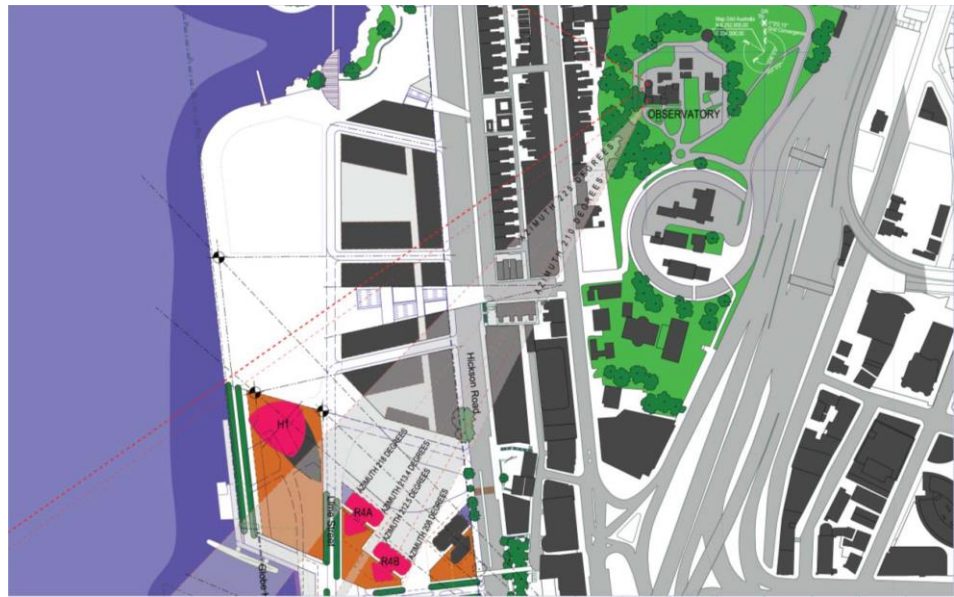


Figure 25 – Southern Cross and Nearby Objects view corridor

Source: Lend Lease and UNSW Global

Assessment and Conclusion

Following detailed analysis UNSW Global notes that from the list of sky targets of concern highlighted by the Sydney Observatory, only the viewing of Omega-Centauri will be affected by the presence of the proposed Crown Sydney Hotel Resort building.

The Omega-Centauri (NGC5139) globular star cluster passes through the area of night sky that is obstructed by the proposed building during late August, September and early October each year. During these months (or part months) Omega-Centauri is obstructed or potentially affected by light spill from the proposed development for a maximum of 73 minutes on a particular night.

The Sydney Observatory runs two viewing sessions each night during this period (6:15pm and 8:15pm), with each session lasting for 90 minutes. Hence viewing of Omega-Centauri is affected by the proposed building for only parts of the observation session times during the time it is affected. The SVLA highlights that if the Observatory was able to coordinate their viewing sessions at particular times they could significantly reduce the number and length of impact on these sessions caused by the proposed building. In addition to this the report notes that:

- a) in general, viewing targets in the vicinity of the sky obstructed by the proposed building would be done under far from ideal observing conditions, and that the image quality would be relatively poor on most nights; and
- b) The Observatory is no longer a research facility, with the observation carried out at the facility being for public education purposes. Observing for public outreach activities does not have the same demanding requirements as observing for research purposes, and that observing from the centre of the City is still considered satisfactory for public education purposes.

In light of the above UNSW Global conclude that despite impacting on an iconic sky object for parts of the some observing sessions over two months of the year, the *“presence of the proposed building is not expected to have a major detrimental impact on the observatories night time activities.”*

The proposed Crown Sydney Hotel Resort building is therefore considered to be acceptable in this regard.

5.30 Construction Management

A Construction Framework Environmental Management Plan (CFEMP) has been prepared by Lend Lease and is provided at **Appendix Q**. The CFEMP and associated sub-plans provide specific management measures to ensure that construction works associated with the Crown Sydney Hotel Resort have minimal environmental impact and risk, and where possible, enhanced environmental outcomes. The objectives of the CFEMP are that:

- all environmental requirements contained in statutory approvals, licences, agreements, and other
- controls relevant to the contracted builder are clearly defined, and mechanisms for implementation specified;
- processes for resourcing and implementing this plan are set to provide certainty of delivery;
- processes for auditing, monitoring and reporting on performance and effectiveness of the CFEMP are defined; and
- other objectives identified within environmental documents are met.

The CFEMP addresses a number of matters that were raised in the SEARs including:

- Community consultation, notification and complaints handling;
- Impacts of construction on adjoining development and proposed measures to mitigate construction impacts;
- Noise and vibration impacts on and off site;
- Air quality impacts on the neighbourhood;
- Odour impacts;
- Water quality management for the site; and

- Waste and chemical management.

The ECSMP should be read in conjunction with the:

- Construction Noise and Vibration Assessment prepared by Wilkinson Murray, which addresses the noise and vibration impacts on and off site (refer to **Appendix Q**);
- Construction Traffic Management Plan prepared by ARUP, which addresses construction traffic impacts (refer to **Appendix K**);
- Construction and Operational Air Quality Review prepared by Wilkinson Murray, which addresses air quality and odour impacts (refer to **Appendix FF**); and
- Waste Management Plan which addresses waste sources and management measures during construction prepared by ARUP included at **Appendix BB**.

Key elements of the ECSMP can be summarised as follows:

- All site personnel, including subcontractors and visitors, will be inducted under Lend Lease's Environment, Health and Safety Management System (EH&S). Records of all induction, ongoing training and reporting will be maintained.
- Site specific Environmental Management protocols will be established to ensure the company's environmental responsibilities are implemented and documented.
- Primary contact(s) to deal with environmental emergencies will be nominated and their 24 hour/day 7 days/week contact details will be prominently displayed on site.
- Management and monitoring of the noise and vibration generated from construction activity will be addressed according to the recommendations of the Construction and Operational Noise Report prepared by Wilkinson Murray (**Appendix Q**).
- Air Quality Management will be addressed in accordance with the Air Quality and Odour Management Sub Plan and recommendations of the Construction and Operational Air Review prepared by Wilkinson Murray (**Appendix FF**).
- Dust suppression, as well as erosion and sediment control measures, will be installed prior to detailed excavation works and service installations commencing as part of the works approved under the Remediation and Earthworks Application (SSDA 6956), and these shall be maintained for the duration of construction.
- The RAP prepared by AECOM will be implemented for remediation of contaminated soil and water as part of the works and processes approved under the Remediation and Earthworks Approval.
- Management of construction generated solid and liquid waste will be addressed in accordance with the recommendations of the Waste Management Plan (**Appendix BB**) prepared by ARUP.
- Traffic management and controls will be implemented and monitored to minimise disruptions to site activities, the surrounding road network.
- A Stakeholder Engagement Strategy will be implemented to maintain a good neighbour policy with surrounding businesses, residents and special interest groups during construction.

A summary of the assessment and proposed mitigation measures are provided below.

5.30.1 Construction Noise and Vibration Impacts

Wilkinson Murray has undertaken a Construction Noise and Vibration Assessment for the proposed development (**Appendix EE**). The Construction Noise and Vibration Assessment:

- establishes site specific construction noise management levels and vibration criteria in accordance with the OEH Interim Construction Noise Guidelines (ICNG) and Assessing Vibration: A Technical Guideline;
- identifies noise sensitive commercial and residential receivers likely to be affected by noise and vibration from the proposed works;
- calculates noise levels likely to be associated with the proposed works; and
- considers the impacts that may result from the proposed works, including the cumulative impacts of other construction activities that may occur concurrently with the Crown Sydney Hotel Resort, and, if necessary, mitigation measures to manage adverse impacts.

The Construction Noise and Vibration Assessment forms part of and should be read in conjunction with the CFEMP.

Background Noise

The Noise and Vibration Assessment identifies five (5) commercial receivers and seven (7) residential receivers as well as three (3) heritage receivers. The receivers include those at Millers Point, Barangaroo, Darling Island, Pyrmont, King Street Wharf, and Balmain East.

To understand the existing noise environment, long-term ambient noise levels were monitored at eight (8) locations surrounding the Site, selected to cover the range of environments in the potentially affected receiver areas. The background noise monitoring locations included Hickson Road, Barangaroo, King Street Wharf, Millers Point, Darling Island and Balmain East. For each noise monitoring location the background noise level (Rated Background Level (RBL)) was determined during a period in 2010 (the RBL is taken to be the noise level exceeded 90% of the time or L_{A90}). **Table 19** below sets out the RBL calculated for each receiver location.

Table 19 – Background Noise and Construction Noise Management Levels

Location	Background Noise Level (RBL)				Construction Noise Management Level (LAeq,15-min)			
	Day	Evening	Night	Sat	Day	Evening	Night	Sat
Hickson Rd Residents	53	53	49	51	63	58	54	55
High St Residents	47	44	41	45 *	57	49	46	50
Merriman St Residents	46	44	40	46 *	56	49	45	51
Balmain East Residents	49	45	40	46 *	59	50	45	51
Darling Island / Sydney Wharf Residents	47	44	39	50 *	57	49	44	55
Commercial Properties	52-60	50-60	45-49	48-57	70			
Schools	47-53	44-53	41-49	45-51	55**			
Parks/outdoor areas	NA				65			

* Determined from the afternoon on Saturday 4 September as the morning was affected by rain.

** The external NML of 55dBA is based on a 10dB reduction through an open window to meet an internal level of 45dBA.

Assessment

A noise assessment has been conducted for the proposed construction activities associated with the Crown Hotel Resort development to determine the potential for noise and vibration impact at surrounding receivers.

Noise modelling has been carried out for a number of construction related noise sources including construction traffic, construction plant and equipment, and other associated noise generators such as construction workers/staff. Modelling was carried out on two noise generating construction scenarios, these being:

Scenario A – Building construction including concreting and lifting and assuming 2 concrete pumps, 2 forklifts, 4 compressors, 2 cranes, a boom truck and lift operated in 15-minutes. Also concrete trucks and normal delivery trucks assumed to be 12 movements in 15 minutes.

Scenario B – Building construction involving work on the building façade in isolation from other construction activities. Assumes forklift and power tools as operated in 15 minutes, well as 4 truck movements during this time.

The modelling assumes a “typical worst case” scenario whereby all plant, is running continuously. As such the modelling represents likely noise levels that would occur during intensive periods of construction. Therefore the presented noise levels can be considered in the upper range of noise levels that can be expected at surrounding receivers when the various construction scenarios occur.

Once noise sources have been applied to the model, the resultant noise levels at identified surrounding receivers are predicted. These results are then compared with established construction noise management levels.

The anticipated noise impacts on the identified residential receivers through Scenarios A and B are summarised in **Table 20**.

Table 20 – Noise Impacts on Residential Receivers dBA

Scenario	Hickson Rd	High St	Merriman St	Balmain East	Darling Island	Sydney Wharf
Criteria						
Day	63	57	56	59	57	57
Saturday	55	50	51	51	55	55
Predicted Noise (Day only)						
Scenario A (Structure Construction)	62	50	48	46	49	49
Scenario B (Façade)	56	46	44	43	47	47

Notes: Where a predicted noise exceeds either of the relevant criteria it is highlighted in red in the table.

As demonstrated in the table above, compliance with noise levels will be achieved at all surrounding residents during weekdays. On Saturdays exceedances of between 1dBA and 7 dBA are predicted. In all cases however noise levels are well below the highly affected objective of 75dBA.

Commercial Receivers

For commercial receivers, general compliance with the 70dBA noise objective is anticipated, with predicted noise levels between 37 and 54 dBA for all commercial receivers, except for 30 Hickson Road, with a predicted noise level of 64 dBA.

Cumulative Impact

The cumulative impact of the construction works for the Crown Sydney Hotel development has been assessed alongside the ongoing projects underway at and adjacent to Barangaroo, including the following Barangaroo South projects:

- Stage 1A Basement;
- T1, T2 and T3 Commercial Buildings;
- C2 Commercial Building;
- R8 and R9 Residential Buildings;
- Black 4 Remediation;
- Block 5 Remediation;
- City Walk Bridge;
- R1 Building; and
- R7 Building.
- Stage 1B remediation of Block 4 and construction of the Stage 1B Basement D-Wall;
- Temporary concrete batching plant; and
- Waste water plant.

Arup, the traffic consultants, in their report titled '*Crown Resorts Limited Crown Sydney Hotel Resort Construction Traffic Management Plan Rev B*' calculate that construction traffic from Crown Sydney Hotel Resort could be expected to generate an additional 10 trucks per hour, taking the total volume of heavy vehicles related to Barangaroo construction to approximately 70 truck movements per hour.

Based on a review of noise levels at The Bond on Hickson Road, Wilkinson Murray have determined that existing noise levels during construction hours already exceed the daytime objective of 55 dBA. Field testing carried out in 2013 identified that the base case traffic noise levels for Hickson Road residences was 67.1 dBA at the time of measurement. The benchmark for assessing the proposal is therefore to ensure construction traffic related to the Crown Sydney Hotel Resort does not result in an increase to noise levels by more than 2 dBA.

Taking into consideration the forecast construction programme for the Crown Sydney Hotel Resort, the maximum noise level generated by construction traffic is expected to occur around March-April 2018. At this point in time it is forecast that the new operational traffic from Barangaroo South projects will elevate the base case scenario from 67.1dBA to 68.7dBA.

Taking into consideration forecast operational traffic noise and the peak construction traffic from the Crown Sydney Hotel Resort, Wilkinson Murray calculate that the total combined operational and construction traffic noise in March 2018 will be 70.5 dBA, representing an increase of 1.8 dBA. It is therefore concluded that traffic noise levels associated with the project will be acceptable as they will not exceed the 2 dBA objective.

A review of the above noise levels indicates that construction noise from the Hotel Resort construction will result in only a marginal cumulative increase in overall noise levels at residences where noise management are not predicted to be exceeded.

The above consideration does not preclude the application of the management procedures contained in the site environmental management plan which, of course, should be consistently applied to the Hotel Resort construction works

5.30.2 Construction Air Quality

A Construction and Operational Air Quality Review of the Crown Sydney Hotel Resort has been prepared by Wilkinson Murray and is provided at **Appendix FF**. The Construction and Operational Air Quality Review forms part of and should be read in conjunction with the CFEMP.

A summary of the assessment is provided below.

Assessment

The assessment notes that the proposed site works for the Crown Sydney Hotel Resort building are expected to consist of activities such as building construction, cladding and façade works and building finishing, all of which are expected to have minimal air emissions as there is no excavation or earthmoving associated with the works.

The proposed building works can be expected to occur concurrently with the construction of the Residential Buildings R4A, R4B and R5. As with the Crown Sydney Resort building the construction activities are expected to have minimal air emissions.

The assessment highlights that Lend Lease currently operate a reactive dust mitigation system which includes ambient pollution monitoring and which is directly linked to real time warnings to enable effective and rapid response to any elevated dust or pollution levels. Lend Lease also implement management procedures and practices on site at Barangaroo South to ensure that action is taken when necessary to reduce dust levels when they are elevated and near air pollution levels. It is noted that Lend Lease will be responsible for construction of the Crown Sydney Hotel Resort building and as such all of these established procedures and practices will be put in place for the proposal.

The assessment notes that in the case of the operational phase of the development, there are no significant sources of particulate or VOC associated with development and as such it is not expected to have any adverse impact on surrounding receivers. With regard to kitchen exhaust systems it is intended that all exhausts will have suitable smoke and odour systems installed to ensure air dispersion consistent with AS1616.1.

On the basis of this analysis Wilkinson Murray conclude that the proposed Crown Sydney Hotel Resort building will not result in any unacceptable air quality or odour impacts.

Mitigation Measures

- Implement dust suppression and air quality control measures during construction in accordance with an approved Construction Management Plan.
- Install smoke and odour control systems on building exhausts to achieve air dispersion consistent with AS1616.1

5.30.3 Construction Waste Management

A Waste Management Plan has been prepared by Arup and is included at **Appendix BB**. The Waste Management Plan forms part of and should be read in conjunction with the CFEMP.

Management and Mitigation Measures

Construction works for the CSHR development are to take place with consideration of 'principle led' Green Star pathway goals, particularly in regards to use of recycled building materials and recycling of construction waste streams.

The Waste Management Plan notes that the primary goal for waste management in the construction phase is to maximise diversion of construction waste from landfill, with a site wide target of 97% being set for the CSHR development.

Waste generation and management during the construction phase will be the responsibility of all on site, with waste to be prioritised for re-use and recycling, or as a secondary alternative disposed to landfill if required.

During the construction phase suitable on site areas (or off site, if necessary), will be identified prior to commencement of construction and provisioned to provide adequate space and access for:

- Storage of building materials;
- Storage and sorting of demolition and construction waste; and
- Removal of demolition and construction waste for recycling, re-use or landfill.

Waste management throughout the construction phase will be performed to meet the specific goals of the project 'principle led' Green Star pathway, which seeks *"To encourage and recognise management practices that minimise the amount of construction waste to landfill (at least 80% of all construction waste to be reused or recycled to achieve 2 points)."*

As a requirement of Green Star, the construction contractor will develop a detailed Construction Waste Management Plan (CWMP) to ensure that construction waste is minimised and diverted from landfill where ever possible.

5.30.4 Construction Traffic Management

A Construction Traffic Management Plan (CTMP) has been prepared by Arup (**Appendix K**) that will be incorporated into the Construction Environmental Management Plan prior to the commencement of works.

Assessment

Construction traffic movements will occur via the established routes for Barangaroo construction vehicles, being:

- From the north and north-west:
 - Harbour Bridge – Western Distributor – Bathurst Street – Liverpool Street – Harbour Street – Shelley Street – Erskine Street – Sussex Street (inbound); and
 - Hickson Road – Napoleon Street – Kent Street – Western Distributor – Harbour Bridge (outbound)

This southbound truck activity would occur during peak hours as there is no access for general traffic from the Harbour Bridge to York Street between 6.30am – 9.30am (Monday – Friday).

- From the west and south-west:
 - Anzac Bridge – Western Distributor – Sussex Street – Hickson Road (inbound); and
 - Hickson Road – Sussex Street – Western Distributor – Anzac Bridge (outbound)
- From the south and east:

- Eastern Distributor – Cross City Tunnel – Western Distributor – Wattle Street – Western Distributor – Sussex Street – Hickson Road (inbound); and
- Sussex Street – Harbour Street – Cross City Tunnel (outbound).

Approximately 70% of construction vehicles are expected to approach the site from the southern and western areas of Sydney.

Works associated with the proposed development are expected to generate construction traffic in the order of 40 to 64 vehicles per day, or approximately 4-6 vehicle movements per hour.

The CTMP assesses the cumulative impact of predicted traffic movements associated with the proposed development and traffic within the context of the development of the C3, C4 and C5 commercial buildings and the R8/R9 residential buildings within the Barangaroo South site. At key local intersections, the impact of the additional traffic is considered minor, with no changes to the Level of Service at the Sussex St/Erskine St, Hickson Rd/Napoleon St, Kent St/Margaret St and Hickson Rd/Globe St intersections. Increases to the average delays at each of these intersections during the AM peak will all be less than 1 second.

Access to and egress from the site of the proposed development for construction vehicles will be via the existing Hickson Road gatehouse located approximately 350m to the north of the Hickson Rd/Napoleon St intersection. No truck queuing will be permitted on Hickson Road.

In light of the above, it is considered that construction traffic associated with the proposed development can be satisfactorily managed within the established framework for access to the Barangaroo South site without significant impacts on the road network, subject to standard mitigation measures outlined below.

Mitigation Measures

In order to ensure that construction traffic is suitably managed to minimise disruption to the local road network, Arup's makes the following recommendations (outlined in full at **Appendix K**):

- Traffic Control Plan for each worksite access point to be prepared by an RMS accredited contractor prior to the commencement of construction;
- truck movements be staged to prevent queuing of trucks or unnecessary circulation of construction vehicles through CBD streets whilst awaiting site access;
- construction vehicles to utilise arterial roads when approaching and departing the CBD;
- size and length of vehicles to comply with clause 300-3 of the Road Rules; and
- manned site access procedures and traffic control in Hickson Road to be in accordance with Condition D4(c) of MP10_0023.

6.0 Environmental Risk Assessment

The Environmental Risk Assessment (ERA) establishes a residual risk by reviewing the significance of environmental impacts and the ability to manage those impacts. The ERA for the Crown Sydney Hotel Resort has been adapted from *Australian Standard AS4369. 1999 Risk Management and Environmental Risk Tools*.

In accordance with the SEARs, the ERA addresses the following significant risk issues:

- the adequacy of baseline data;
- the potential cumulative impacts arising from other developments in the vicinity of the Site; and
- measures to avoid, minimise, offset the predicted impacts where necessary involving the preparation of detailed contingency plans for managing any significant risk to the environment.

Figure 26 indicates the significance of environmental impacts and assigns a value between 1 and 10 based on:

- the receiving environment;
- the level of understanding of the type and extent of impacts; and
- the likely community response to the environmental consequence of the project;

The manageability of environmental impact is assigned a value between 1 and 5 based on:

- the complexity of mitigation measures;
- the known level of performance of the safeguards proposed; and
- the opportunity for adaptive management.

The sum of the values assigned provides an indicative ranking of potential residual impacts after the mitigation measures are implemented.

Significance of impact	Manageability of impact				
	5 Complex	4 Substantial	3 Elementary	2 Standard	1 Simple
1 – Low	6 (Medium)	5 (Low/Medium)	4 (Low/Medium)	3 (Low)	2 (Low)
2 – Minor	7 (High/Medium)	6 (Medium)	5 (Low/Medium)	4 (Low/Medium)	3 (Low)
3 – Moderate	8 (High/Medium)	7 (High/Medium)	6 (Medium)	5 (Low/Medium)	4 (Low/Medium)
4 – High	9 (High)	8 (High/Medium)	7 (High/Medium)	6 (Medium)	5 (Low/Medium)
5 – Extreme	10 (High)	9 (High)	8 (High/Medium)	7 (High/Medium)	6 (Medium)

Figure 26 – Risk Assessment Matrix

Table 21 – Environmental Risk Assessment

				Risk Assessment		
Item	Phase	Potential Environmental Impact	Proposed Mitigation Measures and / or Comment	Significance of Impact	Manageability of Impact	Residual Impact
Key: C – Construction, O: Operation						
Visual and Views	O	Visual impact from surrounding residents and public places	The proposed development has been designed to comprise a slender, elegant and sophisticated tower that once complete will be an iconic structure in the Sydney skyline and will positively enhance the quality of views from the large majority of public vantage points. The proposed tower also comfortably fits within the approved building envelope and in this regard the view impacts on nearby residences will be less than that approved under Concept Plan (Modification 8).	3	3	6 Medium
Overshadowing	O	Overshadowing impacts on surrounding public domain and buildings	- The proposed tower component of the CSHR building has been designed to be slender and articulated in its form which reduces width of the shadow footprint and ensures key areas maintain an adequate amount of solar access. - The building is smaller in width and height than the building envelope under Concept Plan (Modification 8) and therefore results in a reduced overshadowing impact.	2	2	4 Low / medium
Transport and Accessibility	C+O	- Increased traffic on local roads - Increased parking on local roads	- An assessment of the proposal's traffic generation has been carried out based on the Transport Management and Accessibility Plan (TMAP) 2008 prepared for Barangaroo South. The assessment concluded that the traffic generated by the CSHR building once operational would only have a minimal increase in the Level of Service (LOS) for intersections compared to the 2008 TMAP. It also concluded that construction traffic associated with the proposed development could also be satisfactorily managed with the implementation of mitigation measures. - The cumulative impact of predicted traffic movement from the proposed development within the context of the other buildings in Barangaroo South was also considered and concluded to be minor.	2	2	4 Low / medium
Non-Indigenous Heritage	C	- Impact on heritage items/Conservation areas - Impact on heritage items in the vicinity.	The proposed development will not result in any material impact on the significance or value of items of heritage significance, and as a result, no further assessment or mitigation measures are considered necessary.	1	1	2 Low

Table 21 – Environmental Risk Assessment

				Risk Assessment		
Item	Phase	Potential Environmental Impact	Proposed Mitigation Measures and / or Comment	Significance of Impact	Manageability of Impact	Residual Impact
Archaeology	C	Impacts to archaeological items of significance.	Investigations into indigenous and non-indigenous archaeology and the potential for such items to be on the site was carried out Casey and Lowe together with Comber Consultants. This analysis concluded that the proposed SSDA for Crown Sydney Hotel, Block 1C, is to the west of the 30m-40m zone of archaeology and therefore there are no archaeological issues. Furthermore that there are no additional impacts on the identified archaeological resource as a result of the CSHR proposal.	1	1	2 Low
Noise and Vibration	C+O	- Increase in noise levels during construction activities - Adverse noise impacts on proposed residential apartments during operation of the CSHR building	- Carry out construction during approved construction times only and in accordance with an approved Construction Management Plan. - Limit noise levels of the sound system to ensure compliance with the noise requirements. - Install noise locks on terrace doors for use during the night period and limit access to external terraces associated with the hotel, restaurants and bars where this results in a potentially unacceptable noise on nearby residential receivers. - Detailed design and management of residential apartments and communal areas to respond to potential noise impacts from surrounding uses.	3	2	5 Low / medium
Infrastructure and Utilities	O	Adequate connection to infrastructure and utilities.	The detailed design of the development is to identify the final design and provision of infrastructure and utilities. This is to be conducted in consultation with the relevant authorities and providers.	2	2	4 Low / medium
Waste Management	C+O	Generation of waste	- Manage construction waste in accordance with the Construction Waste Management Plan which seeks to maximise the recycling of construction waste streams and which seeks to achieve 97% of all construction waste being diverted from landfill. - Bins, storage locations and collection to be in accordance with the submitted Waste Management Plan.	1	1	2 Low
Climate Change, Flooding, Water Cycle Management	O	Potential flooding and stormwater impacts	- Design the proposed development to have levels that are above flood requirements and also take into account potential sea level rise as a result of climate change. - Implement the design and mitigation measures set out in the Stormwater Management Strategy.	4	1	5 Low / medium

Table 21 – Environmental Risk Assessment

				Risk Assessment		
Item	Phase	Potential Environmental Impact	Proposed Mitigation Measures and / or Comment	Significance of Impact	Manageability of Impact	Residual Impact
Air Quality	C+O	– Decrease in air quality	– Implement dust suppression and air quality control measures during construction in accordance with an approved Construction Management Plan. – Install smoke and odour control systems on building exhausts to achieve air dispersion consistent with AS1616.1	1	1	2 Low/medium
PANS OPS	C+O	– Potential impacts on aviation operations at Sydney Airport	– Implementation of safety and design measures in accordance with the Approvals issued by the Department of Infrastructure and Regional Development.	2	1	3 Low
Reflectivity	O	– Adverse solar reflectivity glare to motorists and pedestrians	– Building designed to comprise curved elements to minimise potential for single large focussed areas of solar reflection; – Fins to be installed along the north-east and south-west facades to reduce reflections in these key areas; and – Glazing on hotel façade and tower limited to 20% and 32% reflectivity respectively.	2	2	4 Low / medium
Marine Ecology	C	– Harmful impacts on local marine ecology as a result of debris, material and runoff into the Sydney Harbour from the site.	– Implement the Erosion and Sediment Control Plan to ensure dust suppressions and capturing of dust/debris from the site. – Disposal of waste materials in accordance with the Construction Waste Management Plan. – Implementation of the Stormwater management Plan. – Carry out water quality monitoring surround the development.	3	2	5 Low / medium
Social Impacts	C+O	– Impacts on existing residents during construction. – Problem gambling impacts – Workplace health and safety impacts	– Construction in accordance with conditions of consent and approved Construction Management Plan. – Operation of VIP Gaming facilities on a member only basis (i.e. general public not able to walk-in and walk out without a prior membership) – Operation of CSHR building in accordance with Crown's management policies and procedures	2	2	4 Low / medium

Table 21 – Environmental Risk Assessment

				Risk Assessment		
Item	Phase	Potential Environmental Impact	Proposed Mitigation Measures and / or Comment	Significance of Impact	Manageability of Impact	Residual Impact
Contamination	C+O	– Exposure of contamination or hazardous materials during construction and operation	– If localised contamination presents a higher than expected environmental risk, or if unexpected contamination is discovered, then the Contingency Planning procedures, listed in the Crown Remedial Action Plan prepared by AECOM (Appendix Z) will be implemented to reduce such risk to an acceptable level.	3	3	6 Medium
Wind Impact	O	– Adverse wind environment	– Addition of vertical wind control elements at the northwest building corner, where elevated wind conditions are expected (refer Figure 16 and page 95 of Architectural Design Statement); and, – Provision of landscaping including tree planting along the foreshore promenade and to the north of the building.	2	2	4 Low
Crime and Public Safety	O	– Anti-social intimidating behaviour.	– Design development of ground level landscaping in the public domain should ensure there are no opportunities for concealment or entrapment along pathways or at gathering spaces. – Appropriate lighting should be included in these locations.	2	1	3 Low
Environmental and Construction Management	C	– Noise, dust, air quality and traffic impacts	– Works are to be carried out in accordance with the Construction Management Plan.	3	2	5 Low / medium

This Page has been intentionally left blank.

7.0 Mitigation Measures

The collective measures required to mitigate the impacts associated with the proposed works are detailed in **Table 22** below. These measures have been derived from the previous assessment in Section 5.0 and those detailed in appended consultants' reports.

Table 22 – Mitigation Measures

Mitigation Measures	
Wind	■ Addition of vertical wind control elements at the northwest building corner, where elevated wind conditions are expected. ■ Provide landscaping along the foreshore promenade and to the north of the building.
Reflectivity	■ Glazing for the hotel façade to be limited to a maximum reflectivity level of 20% consistent with the provisions of the City of Sydney DCP 2012. ■ Glazing for the other building elements to be limited to maximum reflectivity level of 32%, as the scattered reflections caused by the curved and smaller panels of these building facades mean that a higher level of reflectivity may be allowed.
Traffic (Construction)	■ Implementation of the management and mitigation measures in accordance with the Construction Traffic Management Plan.
Safety and Security	■ ATMs placed within the development at the ground floor that these machines be placed in view of the hotel lobby area and within view of the CCTV system. ■ Signage to be consistently used throughout the development to clearly delineate publicly accessible and restricted areas of the development. ■ Signage to be used to clearly denote lift access, most particularly at the ground floor. ■ External development signage to be provided as a clear means of identifying lobby entries to the building and at the same time restricting access to unauthorised areas of the building (e.g. loading dock and car parking levels). ■ Fire exits are for emergency use only and doors to be alarmed to alert security. These exits are to be brightly lit and free of obstructions to ensure good sightlines to these doors. ■ Regulation of appropriate access to be provided through secure access through the lift system and to all staff only areas. ■ As a minimum CCTV to be implemented at the car parking and loading dock entry at the eastern edge of the development. ■ As a minimum CCTV to be employed to cover the pedestrian footpath along the eastern edge of the development adjacent to the footpath of Lime Street. ■ Access to restaurant and bar premises to be restricted when these areas are closed to prevent them being used as places to loiter out of business hours. ■ Consult a qualified lighting engineer to ensure the correct lighting is provided to meet minimum Australia and New Zealand Lighting Standards, enable sufficient surveillance of the entire site and be vandal proof or resistant to limit breakage and minimise maintenance. To further improve lighting conditions within the car parking areas, painting the car park ceilings white will help to reflect lighting and further brighten these areas. ■ Suitable lighting should be installed and well maintained along all pedestrian and vehicular pathways. The continuation of lighting along each of the building's edges is recommended to help illuminate this area during the evening and provide the perception of safety. ■ Intercom systems at the publicly accessible lobbies could be installed to ensure access is only for residents, serviced apartment patrons and authorised visitors. ■ Ensure mechanisms are in place for on-going maintenance and repairs of the building, which includes: - rapid removal policy for vandalism repair and the removal of graffiti; and - maintenance of all surrounding public spaces including lighting.
Social Impacts	■ To address problem gambling impacts the restricted gaming facility at Crown Sydney Hotel Resort will operate on a member only basis. There will be no general public access to this part of the development, no low limit gaming and no poker machines. ■ Integration of responsible gambling procedures, staff training and support services (in conjunction with

Mission Australia and/or other charity providers) for the hotel resort.

- Crown to implement and maintain a robust Health and Safety Management System to mitigate against any potential health impacts and issues arising from shift work.
- The Crown Sydney Hotel Resort is designed to allow 24 hour public access to its lower levels and to interface directly with the surrounding public domain which will help mitigate any perception of the development being an elitist enclave that compromises public access and is at odds with the (idealised) notion of an egalitarian city.
- Ongoing consultation and engagement with the public is to be carried out by Crown to ensure the community has a broader appreciation of the project and how it will be managed and operated.

Climate Change and Sea Level Rise

- Materials to be selected that help to prevent accelerated degradation of infrastructure and public domain structures such as shading.
- Key infrastructure such as generators to be located above the ground floor.
- Ensuring that safe exit routes above storm flood height level are provided.
- Adopting principles of adaptive management such that external elements and drive way entry humps are designed to be incrementally increased in height should future research, change in Government policy or actual events suggest that sea level rise will be greater than currently projected.

Marine Ecology

- Capturing concrete dust/debris and the like by using dust-control devices attached to tools.
- Disposing of waste materials appropriately, with all waste to be managed in accordance with NSW EPA Waste Classification Guidelines.
- Developing and implementing a Water & Stormwater Management Plan (including a Construction Environment Management Plan and Construction Water Quality Monitoring Plan) in which erosion and sediment management are addressed.
- Water quality monitoring to be carried out surrounding the development, to ensure that water quality conditions are maintained beyond the silt curtains and in the broader area (Lend Lease is currently undertaking water quality monitoring and it is expected that the existing monitoring system would be utilised for this purpose).
- Ensuring that site spillage equipment is available at the site to absorb any spills that may enter the water.

Fire Safety

- Fire Safety Strategy to be developed prior to the commencement of the works. The strategy is to focus on occupant egress, fire and smoke spread throughout the building and fire brigade intervention.

Stormwater and Drainage

- Diversion of existing stormwater trunk main infrastructure.
- Implementation of Water Sensitive Urban Design measures including rainwater harvesting and reuse, and implementation of stormwater quality treatment devices.
- Implementation of Erosion and Sediment Control measures during construction in accordance with an Erosion and Sediment Control Plan.

BCA

- Where Deemed-to-Satisfy provisions of the BCA are not met, performance-based solutions are to be developed prior to the commencement of the building works. Compliance with the requirements of Part J will also need to be demonstrated prior to the commencement of the building works.

Access

- Detailed architectural plans are to be subject to additional ongoing review in relation to door widths, circulation etc., and assessment by a qualified access consultant prior to the commencement of the building works.

Contamination

- Additional sampling will be carried out in accordance with the Crown RAP.
 - In accordance with the Crown RAP, remediation (if required) will be by way of the selective excavation of the material for disposal to a suitably licensed off-site waste facility.
 - If necessary, the remediated material would be treated and managed in accordance with the procedures and protocols set out in the RAP.
-

Air Quality and Odour

- Implement dust suppression and air quality control measures during construction in accordance with an approved Construction Management Plan.
- Install smoke and odour control systems on building exhausts to achieve air dispersion consistent with AS1616.1.

Construction Traffic Management

- Traffic Control Plan for each worksite access point is to be prepared by an RMS accredited contractor prior to the commencement of construction;
 - Truck movements are to be staged to prevent queuing of trucks or unnecessary circulation of construction vehicles through CBD streets whilst awaiting site access;
 - Construction vehicles are to utilise arterial roads when approaching and departing the CBD;
 - The size and length of vehicles to comply with clause 300-3 of the Road Rules; and
 - Manned site access procedures and traffic control in Hickson Road to be in accordance with Condition D4(c) of MP10_0023.
-

8.0 Justification and Conclusion

The Environmental Impact Statement (EIS) has been prepared to consider the environmental, social and economic impacts of the proposed Crown Sydney Hotel Resort development in Barangaroo South. The EIS has addressed the issues outlined in the Secretary's Environmental Assessment Requirements (**Appendix A**) and accords with Schedule 2 of the EP&A Regulation with regards to requirements for an EIS.

Having regard to biophysical, economic and social considerations, including the principles of ecologically sustainable development, the carrying out of the project is justified for the following reasons:

- There is a strategic need to provide the Crown Sydney Hotel Resort that will ensure the provision of an iconic landmark building as part of the high quality built environment within Barangaroo South;
- The proposal will facilitate the delivery of a new world-class facility that caters for domestic and international tourists, can host events, and can address the significant shortfall in high quality hotel accommodation (i.e. Sydney's first six star luxury hotel resort).
- The development is consistent with and complies with all the relevant strategic policies, environmental planning instruments (including Draft SEPP Major Development 2005), and plans and guidelines, including Concept Plan (Mod 8).
- The development will result in a wide range of positive social and economic benefits to Sydney, New South Wales and Australia.
- The development will help to reactivate and renew the Harbour Foreshore that borders the Barangaroo site.
- The development will be exemplar in its architectural design and appearance and will set a new benchmark for sustainability through the achievement of a Green Star Custom Rating and a NABERS energy rating for the hotel.
- There are no adverse environmental impacts that cannot be appropriately managed by the mitigation measures set out in this EIS.

Given the planning merits described above and the significant public benefits that will be delivered by the proposal, it is requested that the application be approved.