



KEYLAN
consulting pty ltd

Suite 2, Level 1
1 Rialto Lane
Manly NSW 2095

Environmental Impact Statement

State Significant Development Application
SSD 8663

**Sydney Opera House Building Renewal
Concert Hall and Creative Learning Centre**



Prepared for the Sydney Opera House Trust
Submitted to the Department of Planning & Environment

October 2018

Certification of Environmental Impact Statement

Authors

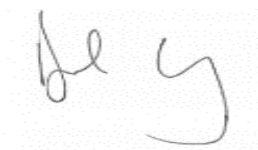
Name	Dan Keary
Qualifications	BSc MURP MPIA
Name	Michael Woodland
Qualifications	BTP NSW
Name	Rebecka Groth
Qualifications	BURP
Address	Suite 2, Level 1 1 Rialto Lane Manly NSW 2095

Proposed development

Applicant	Sydney Opera House Trust
Applicant's address	Bennelong Point, Sydney NSW 2000
Land to be developed	Concert Hall and Creative Learning Centre, Sydney Opera House
Legal description	Lot 5 in DP 775888 Lot 4 in DP 787933
Project description	Sydney Opera House Building Renewal Concert Hall and Creative Learning Centre

Declaration

We certify that the contents of the Environmental Impact Statement, to the best of our knowledge, has been prepared in accordance with the requirements of clauses 6 and 7 of Schedule 2 of *Environmental Planning and Assessment Regulation 2000*; contains all available information that is relevant to the assessment of the development and that to the best of our knowledge the information contained in this report is neither false nor misleading.



Dan Keary BSc MURP MPIA
 Director
 Keylan Consulting Pty Ltd



Michael Woodland BTP
 Director
 Keylan Consulting Pty Ltd

September 2018

Contact



Dan Keary
Director
E: dan@keylan.com.au

Michael Woodland
Director
E: michael@keylan.com.au

Cover image: The Sydney Opera House (Source: Sydney Opera House Trust)

All Rights Reserved. No material may be reproduced without prior permission of Keylan Consulting Pty Ltd. While Keylan Consulting Pty Ltd working on this project has tried to ensure the accuracy of the information in this publication, it accepts no responsibility or liability for any errors, omissions or resultant consequences including any loss or damage arising from reliance in the information in this report. This report has relied on information provided by the Sydney Opera House Trust in good faith and accepts no responsibility or liability for any errors, omissions or resultant consequences including any loss or damage arising from reliance in the information in this report.

Table of Contents

1	Introduction	13
1.1	Project Objectives.....	14
1.2	Project Overview	16
1.3	Secretary's Environmental Assessment Requirements.....	17
1.4	Commonwealth Approvals	19
1.5	Environmental Planning and Assessment Regulation 2000	19
1.6	Project Team.....	21
2	Site analysis	22
2.1	Site location and context	22
2.2	Project area description.....	24
2.3	Surrounding development	26
3	Proposed Development.....	27
3.1	Project Description	27
3.2	Renewal Design Process.....	29
3.3	Construction program	39
3.4	Consultation	40
3.5	Proposed future consultation framework	43
4	Strategic Justification	44
4.1	Need for the proposal	44
4.2	Options and design alternatives.....	45
4.2.1	Renewal Design Process.....	45
4.2.2	Options and alternatives analysis.....	46
4.3	Strategic Planning Documents	49
4.3.1	NSW Premier's Priorities (updated 2018).....	49
4.3.2	State Infrastructure Strategy	50
4.3.3	Greater Sydney Region Plan	50
4.3.4	Eastern City District Plan	51
4.3.5	Sustainable Sydney 2030 Community Strategic Plan 2014	51
4.3.6	Sydney's Walking Future	52
4.4	Sydney Opera House Plans and Policies.....	52
4.4.1	Sydney Opera House Management Plan.....	52
4.4.2	Respecting the vision – Sydney Opera House, a Conservation Management Plan (CMP 4th edition)	53
4.4.3	Utzon Design Principles, 2002	53
4.4.4	Statement of National Heritage Values of the Sydney Opera House	53
4.4.5	Sydney Opera House Accessibility Master Plan	53
5	Statutory Planning Framework	55
5.1	Relevant Commonwealth Legislation and Policy.....	55
5.2	Environmental Planning and Assessment Act 1979.....	56
5.3	Environmental Planning and Assessment Regulation 2000	60
5.4	Heritage Act 1977	60
5.5	Biodiversity Conservation Act 2016.....	60
5.6	State Environmental Planning Policies	61
5.6.1	State Environmental Planning Policy (State Significant Precincts) 2005	61
5.6.2	State Environmental Planning Policy (State and Regional Development) 2011	61
5.6.3	Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005	62
5.6.4	Draft State Environmental Planning Policy (Environment)	63
5.7	Sydney Local Environmental Plan 2012.....	64
5.8	Development Control Plans	67
6	Environmental Planning Assessment	68
6.1	Overview	68
6.2	Heritage	68
6.2.1	World Heritage Values	68
6.2.2	National Heritage Values.....	69

6.2.3	State Heritage Values.....	75
6.2.4	Conservation Management Plan	80
6.2.5	Utzon Design Principles.....	80
6.2.6	Conclusion and recommendations.....	82
6.3	Built Form, Urban Design and Visual Impacts	82
6.3.1	Concert Hall.....	83
6.3.2	Creative Learning Centre.....	85
6.3.3	Conclusion and recommended mitigation measures.....	85
6.4	Lighting	86
6.5	Access and Circulation.....	87
6.6	Construction Management	87
6.6.1	Public safety and access.....	87
6.6.2	Noise and vibration.....	88
6.6.3	Traffic and access.....	88
6.6.4	Air quality.....	89
6.6.5	Water quality.....	89
6.6.6	Waste and hazardous materials	89
6.6.7	Conclusion and recommended mitigation measures.....	90
6.7	Operational Noise.....	90
6.8	Building Code of Australia.....	90
6.9	Ecologically Sustainable Development	91
6.10	Biodiversity	93
7	Environmental Risk Assessment	95
8	Conclusion	98

Figures

Figure 1:	Building Renewal Program. Note UTS is removed from the scope of this SSD.....	15
Figure 2:	Sydney Opera House	16
Figure 3:	Sydney Opera House Building Renewal Program	16
Figure 4:	Location Map	22
Figure 5:	Sydney Opera House Site Plan.....	23
Figure 6:	Project Area (highlighted blue) - Concert Hall upgrades.....	24
Figure 7:	Project Area (highlighted orange) - Creative Learning Centre	25
Figure 8:	Existing Concert Hall and Eastern Landing	25
Figure 9:	Northern facade showing the area for the Creative Learning Centre.....	25
Figure 10:	Building Renewal Design Phases	29
Figure 11:	Building Renewal governance	30
Figure 12:	Section showing existing and proposed passageways and lift locations.....	31
Figure 13:	New passageway through the steps connecting to the Concert Hall / Eastern Foyer	32
Figure 14:	Comparison between the existing and proposed west facing podium ventilation hoods ..	33
Figure 15:	Location of proposed new disabled seating	34
Figure 16:	Acoustic reflector locations.....	35
Figure 17:	Render of acoustic reflectors, stage riser and lighting	36
Figure 18:	Render of proposed air conditioning diffuser slots locations/layout	37
Figure 19:	Artist impression of the Creative Learning Centre.....	38
Figure 20:	Proposed construction works program	39
Figure 21:	Sydney Opera House World Heritage Listing	55
Figure 22:	Comparison of the existing (left) and proposed (right) level 4 Lift 30.....	83
Figure 23:	Level 4 Lift 30 entry (Source: ARM Architecture)	84
Figure 24:	Comparison of existing & proposed ventilation hoods at the western podium elevation ..	84
Figure 25:	View within the Creative Learning Centre to the Northern Board Walk	86

Tables

Table 1: Structure of the EIS.....	14
Table 2: JST Combined Projects	15
Table 3: Project Overview.....	16
Table 4: Secretary's Environmental Assessment Requirements	18
Table 5: Requirements of the Environmental Planning and Assessment Regulation 2000	20
Table 6: Project Team	21
Table 7: Summary of the Concert Hall and Creative Learning Centre projects	29
Table 8: Stakeholder Consultation (Source: Sydney Opera House Trust).....	43
Table 9: Assessment against clause 6.21 (4) of Sydney LEP 2012.....	45
Table 10: Objects of the EP&A Act	58
Table 11: Section 4.15(1) assessment.....	59
Table 12: Assessment against clause 6.21(4) of Sydney LEP 2012	66
Table 13: Assessment against National Heritage Values (Source: Design 5 Architects).....	74
Table 14: Assessment against State Heritage Values (Source: Design 5 Architects)	79
Table 15: Assessment against relevant Utzon Design Principles (Source: Design 5 Architects)	82
Table 16: Sustainability principles and initiatives (Source: Cundall)	92
Table 17: Consideration of the proposal against ESD principles	93
Table 18: Environmental Risk Assessment	97

Appendices

Appendix 1	Quantity Surveyor's Certificate of Cost, Ridler Levett Bucknall
Appendix 2	Secretary's Environmental Assessment Requirements
Appendix 3	Relevant Commonwealth approvals
Appendix 4	Architectural Design Statements and Drawings, ARM Architecture
Appendix 5	Architectural Design Statements and Drawings, Tonkin Zulaikha Greer
Appendix 6	Construction Management Plan, Sydney Opera House
Appendix 7	Construction Pedestrian & Traffic Management Plan, PTC
Appendix 8	Letters of support for Proposal
Appendix 9	Proposed SOH Future Consultation Framework
Appendix 10	Options and Design Alternatives Analysis, Sydney Opera House
Appendix 11	Heritage Impact Statement, Design 5 Architects, and Acoustic Testing Report, SOH
Appendix 12	Biodiversity Statement assessment, Cumberland Ecology
Appendix 13	Biodiversity Development Assessment Report Waiver
Appendix 14	Access Reports, iAccess Consultants
Appendix 15	Noise Impact Assessment, Arup
Appendix 16	Building Code of Australia Capability Statement, Group DLA
Appendix 17	Accessibility and Renewals Project Overarching Fire Strategy, Arup
Appendix 18	Sustainable Design Report, Cundall

Abbreviations

ACO	Australian Chamber Orchestra
BDAR	Biodiversity Development Assessment Report
BCA	Building Code of Australia
CBD	Central business district
CC	Conservation Council
CMP	Conservation Management Plan
DEE	Department of the Environment and Energy
DP&E	Department of Planning and Environment
EAP	Eminent Architects Panel
EIS	Environmental Impact Statement
EP&A Regulation	<i>Environmental Planning and Assessment Regulation 2000</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
ESD	Ecologically Sustainable Development
ESP	Environmental Sustainability Plan
JST	Joan Sutherland Theatre
OA	Opera Australia
POM	Plan of Management
SAVE	Safety, Accessibility and Venue Enhancement
SEPP	State Environmental Planning Policy
SLEP	<i>Sydney Local Environmental Plan 2012</i>
SOHT	Sydney Opera House Trust
SPC	Sydney Philharmonia Choirs
SSD	State significant development
SSO	Sydney Symphony Orchestra
TAB	The Australian Ballet
TMP	Theatre Machinery Project
Uts	Under the Steps
WHS	Workplace Health and Safety

Executive Summary

This Environmental Impact Statement (EIS) supports a State significant development (SSD) application for the Concert Hall and Creative Learning Centre project at the Sydney Opera House. The application is made under Part 4, Division 4.7 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The EIS has been prepared in accordance with the requirements of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) and the Secretary's Environmental Assessment Requirements (SEARs) that were issued on 28 August 2017. The SEARs have been modified on three occasions to reflect legislative changes and amendments to the project scope. The EIS has been prepared in accordance with the final SEARs re-issued on 24 August 2018.

The proposal is a controlled action under the provisions of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) as it involves works that may have significant impacts on the Sydney Opera House.

The proposal is required to be assessed in accordance with a bilateral agreement between the Commonwealth and NSW governments under section 45 of the EPBC Act.

The Site and Locality

The Sydney Opera House is located on the peninsula on the eastern side of Circular Quay known as Bennelong Point. The site is legally described as Lot 5 in DP 775888 and Lot 4 in DP 787933.

The Opera House is serviced by a recently constructed underground loading dock below the forecourt, accessed via an entry ramp off Macquarie Street adjacent to the cliff face known as the Tarpeian Wall.

Immediately adjoining land uses include the Royal Botanic Gardens to the south and southeast, Government House to the south and East Circular Quay (a pedestrian boulevard that links the Opera House with Circular Quay and the Sydney central business district (CBD)) to the southeast. To the north of the Sydney Opera House site on the opposite foreshore of Sydney Harbour is predominantly medium to high residential development in the North Sydney local government area, while to the west on the western foreshore of Circular Quay is the Overseas Passenger Terminal and mixed-use development in The Rocks.

Proposed Development

The Concert Hall and Creative Learning Centre works form part of the *Sydney Opera House Building Renewal Program* which will:

- provide functional and acoustic upgrades to the Concert Hall, including accessibility upgrades to both front-of-house and back-of-house areas; and
- provide a Creative Learning Centre (configurable into three smaller spaces) for the Opera House's world-renowned Children, Families and Creative Learning Program

The proposal is classified as State significant development (SSD) under the provisions of the *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP) as

clause 1 of Schedule 2 of the SEPP states that all development within the Sydney Opera House is SSD. The Minister for Planning is the consent authority for SSD.

The project initially included upgrade works to the covered concourse, known as Under the Steps (UtS). However, following detailed design phase and value management review, these works were removed from the project scope in April 2018.

Strategic Context

The strategic justification for the proposal is outlined in Section 4 of this EIS. The proposed works are part of the Building Renewal Program for the Sydney Opera House, which is aimed at maximising its economic and cultural contribution to NSW, improving the operational efficiency of the building and ensuring compliance with modern building, accessibility and WHS requirements.

Section 4 also outlines project alternatives and considers the proposals against key State and local strategic policies and documents and key Sydney Opera House documents.

Statutory Context

Section 5 of the EIS considers relevant Commonwealth and State legislation:

- *Environment Protection and Biodiversity Conservation Act 1999* – the delegate of the Minister for Environment and Energy determined that the proposed works are a controlled action. Therefore, the proposal will be assessed in accordance with the Commonwealth / NSW Governments' Bilateral Agreement.
- *Environmental Planning and Assessment Act 1979* and *Environmental Planning and Assessment Regulation 2000* – the proposal is SSD and the Minister for Planning is the consent authority. The proposal is consistent with the objects of the EP&A Act and has been assessed against the matters for consideration under section 4.15. As required by clause 288 of the Regulation, the provisions of the Management Plan for the Sydney Opera House have been considered in the HIS and in Section 4.4 of this EIS.
- *Heritage Act 1977* – an application for approval for the proposed works will be made to the NSW Heritage Council under section 57(1) of this Act.
- *Biodiversity Conservation Act* – under section 7.9(2) of the BC Act, a proponent for SSD may seek a waiver from the requirement to lodge a Biodiversity Assessment Report (BDAR) with the SSD application. On 29 March 2018, DP&E and OEH advised that the proposed development is not likely to have any significant impact on biodiversity values and that there was no need for the SSD application to include a BDAR.

Section 5 of the EIS also considers the relevant environmental planning instruments, including:

- *State Environmental Planning Policy (State Significant Precincts) 2005* – the proposed works are not considered to be exempt development under the provisions of this SEPP and therefore require development consent.
- *State Environmental Planning Policy (State and Regional Development) 2011* – the proposal is SSD under the provisions of this SEPP and the Minister for Planning is the consent authority.

- *Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005* – as outlined in Section 5.6.3, the proposal generally complies with the relevant provisions of the Harbour SREP.
- *Sydney Local Environmental Plan 2012* (Section 5.7) – the proposed works are permissible with consent in the B8 Metropolitan Zone. A detailed consideration of the proposal against the design excellence provisions of the LEP is contained in Section 5.7.

Environmental Planning Assessment

A detailed assessment of the potential environmental impacts of the proposal is contained in Section 6, which considers the following key issues:

Heritage

The EIS is supported by a detailed Heritage Impact Statement (HIS) which concludes that the proposed works in the Concert Hall project will strengthen the core function of the Opera House as a performing arts centre, and this, combined with the Creative Learning Centre project will have an overall positive impact on the significant values of Sydney Opera House, including those that are enshrined at State, National and World Heritage level.

Further, the proposed works are expected to improve the ability of the Opera House to cater for tourists as well as patrons and engage them in a diverse range of performing arts activities at the house, including for children, thereby strengthening its role in Australia's cultural vitality and as a world renowned performing arts centre.

Built form, urban design and visual impacts

The proposed works are largely internal and do not result in any built form, design or visual impacts. External works include:

- alternations to glazing to accommodate two new lifts relating to the Concert Hall and the provision of a new ventilation hood at the western podium elevation
- relocation of double doors on western façade and new access ramp to the Creative Learning Centre

These are minor external elements which do not add to the bulk or scale of the building and which have been designed to be compatible with the materiality and design of the building. Further, the HIS concludes that these works will have negligible impact on the external architecture and setting of the Opera House and no adverse impact on the heritage values of the building.

Lighting

The proposed lighting for the Concert Hall and Creative Learning Centre is internal, will not be readily visible from the surrounding area and will not have an adverse impact on the appearance of the Opera House.

Access and circulation

The EIS is supported by detailed access reports which conclude that the proposed works provide accessible access as nominated in the National Construction Code Performance Requirements. The reports generally demonstrate compliance with the statutory requirements of the Disability (Access to Premises – Buildings) Standard and provide a checklist of compliance for the project architects in the on-going detailed design process. The

reports further conclude that if the works are constructed in accordance with this process, accessibility compliance will be achieved.

Construction management

Section 6.6 outlines how the following issues will be managed during construction:

- noise and vibration
- traffic and access
- air quality
- water quality
- waste and hazardous materials

Construction works will largely occur within the Sydney Opera House and generally serviced via the underground loading dock, reducing their impact on the general public.

A comprehensive Construction Management Plan (CMP) has been prepared outlining how construction will be managed demonstrating no significant residual construction impacts are anticipated. A detailed Noise Impact Assessment (NIA) has been undertaken which outlined predicted construction noise levels associated with the proposed works and an extensive range of mitigation measures to reduce construction noise emissions.

Operational noise

Section 6.7 outlines that there are no likely adverse operational noise impacts arising from the use of the Concert Hall and Creative Learning Centre spaces.

Building Code of Australia

The EIS is supported by a BCA Capability Statement which concludes that that compliance with the BCA for the proposed works will be able to be achieved by a combination of compliance with the deemed-to-satisfy (DTS) provisions and the Performance Requirements. An Overarching Fire Strategy has also been prepared to provide a guiding approach to fire safety and which concludes that the building's level of fire safety won't be diminished through the various renewals projects and further enhancement to safety can be achieved.

Ecologically sustainable development

The EIS is supported by a Sustainable Design Report which outlines the multiple sustainability principles to be implemented through the proposed works.

The assessment in Section 6 is summarised in an Environmental Risk Assessment and overview of key mitigation measures in Section 7.

Conclusion

This EIS has been prepared in accordance with the final SEARs issued by the Department of Planning and Environment (DP&E) on 28 August 2018 and complies with all relevant statutory requirements.

The EIS assesses all potential environmental impacts associated with the proposed Concert Hall and Creative Learning Centre project and demonstrates that the proposal is in the public interest as it will improve the ability of the Opera House to cater for tourists as well as patrons, and engage them in a diverse range of performing arts activities at the Opera House, thereby strengthening its role in Australia's cultural vitality and as a world renowned performing arts centre.

Further, this EIS demonstrates that the works can be undertaken without adversely impacting on the heritage significance of the building or the surrounding environment.

Accordingly, the EIS concludes that the proposal warrants approval.

1 Introduction

This Environmental Impact Statement (EIS) supports a State significant development (SSD) application for the Concert Hall and Creative Learning Centre, Sydney Opera House, under section 4.38 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The proposed works form part of the *Sydney Opera House Building Renewal Program* and involves the architectural changes to the Concert Hall interior and the Concert Hall foyers. The proposal also involves alterations and re-purposing of the north-western corner of the Sydney Opera House as a Creative Learning Centre.

The proposal is classified as:

- **SSD** under the provisions of the *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP) as it involves development within the Sydney Opera House, which is a listed State Significant Development site under Schedule 2 of the SRD SEPP. The Minister for Planning is the consent authority for SSD
- **a controlled action** under the provisions of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) as it involves activities likely to have significant impacts on the Sydney Opera House. The proposal is being assessed in accordance with the Bilateral Agreement between the Commonwealth and NSW governments under section 45 of the EPBC Act.

The 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 Secretary's Environmental Assessment Requirements (SEARs) issued on 28 August 2018. This EIS should be read in conjunction with the supporting information and plans appended to this report.

This EIS provides a comprehensive environmental assessment of the proposed upgrade works. In doing so, it outlines the subject site, the proposed development, project justification and public benefits and assesses the proposal against relevant matters set out in legislation, environmental planning instruments and planning policies and strategies.

The structure of this EIS is summarised in the table below:

Section	Section Heading	Description
	Executive summary	Concise summary of this report and its findings
1	Introduction	Overview of the EIS and the proposed development
2	Site analysis	Description of the site and surrounding development
3	Proposed development	Description of the project and consultation undertaken with key stakeholders
4	Strategic justification	Need for the proposal and strategic framework
5	Statutory planning framework	Identifies the key legislation that this EIS must address and the criteria the project must comply with.
6	Environmental planning assessment	Identifies key activities and assesses the potential impact on the environment.

Section	Section Heading	Description
7	Environmental risk assessment	Identifies and assesses the potential environmental risks associated with the project and mitigation/ management measures to manage any impacts.
8	Conclusion	Concise statement of key findings.

Table 1: Structure of the EIS

1.1 Project Objectives

The Sydney Opera House Trust (SOHT) has developed a Building Renewal Program to guide the transformation of the building over the decade up to the fiftieth anniversary of the building's opening in 2023. This program includes a range of works aimed at maximising the Opera House's economic and cultural contribution to NSW and Australia as the nation's premier tourist destination and one of the world's pre-eminent performing arts centres.

It is also aimed at improving the operational efficiency of the building and ensuring compliance with modern building, accessibility and work health and safety (WH&S) requirements. The Renewal Program works will support the evolution of the Sydney Opera House as a key element of the overall renewal process in preparation for the building's 50th birthday in 2023.

The Concert Hall and Creative Learning Centre project are a key component of the Building Renewal Program comprising of the following works packages and development applications (DAs) (Figures 1 to 3):

Works Package/DA	Description	Status
Joan Sutherland Theatre (JST) Machinery Project (SSD 7639)	<ul style="list-style-type: none"> Upgrade of the JST theatre machinery and associated infrastructure in the JST which has reached the end of its operational life and needs to be replaced. 	Approved 25 October 2016
SAVE and Entry Foyer Refurbishment (SSD 7665)	<ul style="list-style-type: none"> A range of accessibility and operational upgrade works for the JST Accommodation works and refurbishment of the Entry Foyer. 	Approved 4 May 2017
Function Centre and Related Works (SSD 7881)	<ul style="list-style-type: none"> Construction of a Function Centre for commercial and private venue hire in the JST Conversion and refurbishment of the Ballet Rehearsal Room. 	Approved 4 August 2017
Concert Hall and Creative Learning Centre (SSD 8663)	<ul style="list-style-type: none"> Architectural changes to the Concert Hall interior and the Concert Hall foyers Alterations and re-purposing of the north-western Learning Centre 	SEARS issued 24 August 2017 SEARs re-issued on 8 December 2017 to include <i>Biodiversity Conservation Act 2016</i> requirements SEARs re-issued on 29 June 2018 to remove UtS

Works Package/DA	Description	Status
		project from the scope of the SSD SEARs re-issued on 24 August 2018 to clarify applicable heritage documents

Table 2: JST Combined Projects

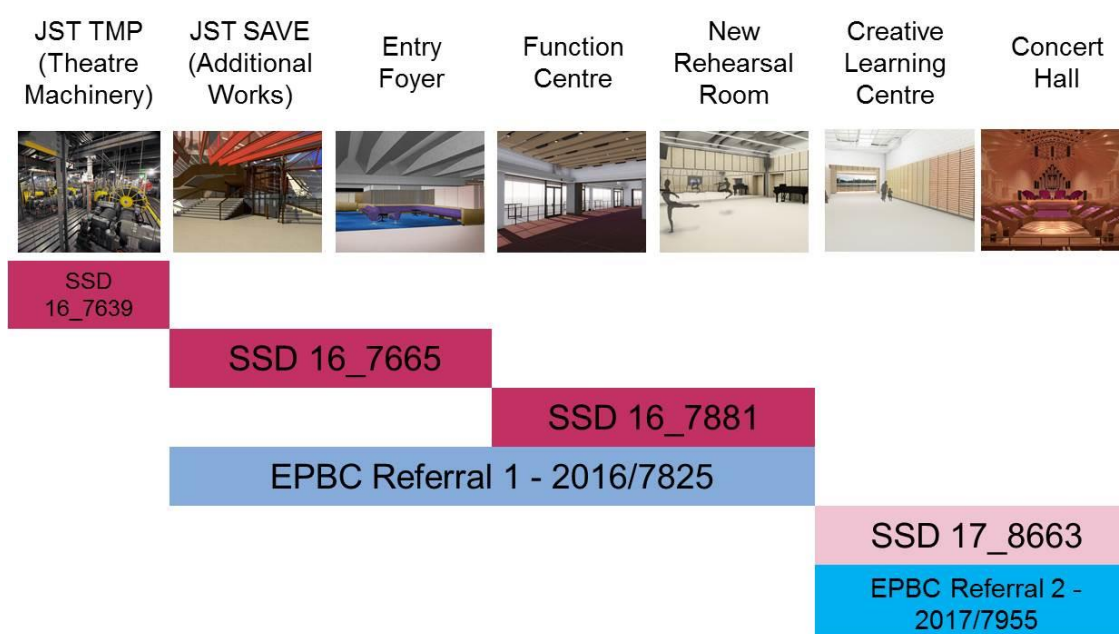


Figure 1: Building Renewal Program. Note UtS is removed from the scope of this SSD (Source: SOHT)

The principal objective of the Concert Hall and Creative Learning Centre works is to provide a range of accessibility and technical enhancements for both patrons and performers within the Concert Hall, re-use of existing office/staff meeting rooms as a Creative Learning Centre and to provide the redefinition of the vehicular concourse beneath the Opera House steps to a primarily pedestrian space.

The proposal comprises essential works to ensure that the Opera House continues to provide world-class facilities for celebratory events, as well as a revenue stream to assist funding other activities, and which meet operational, accessibility and WHS standards.

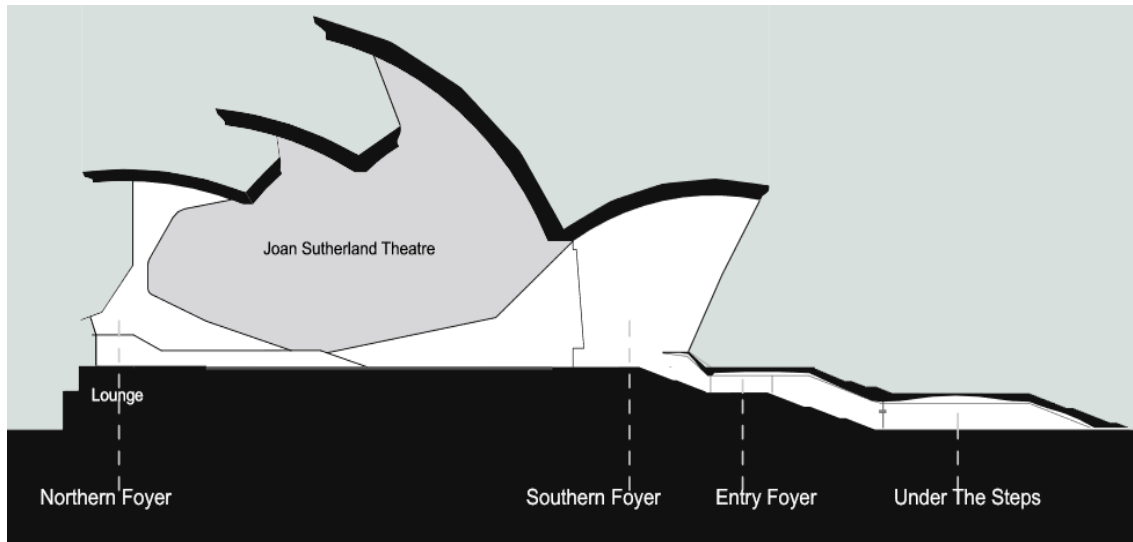


Figure 2: Sydney Opera House (Source: Sydney Opera House Trust/TZG Architects)

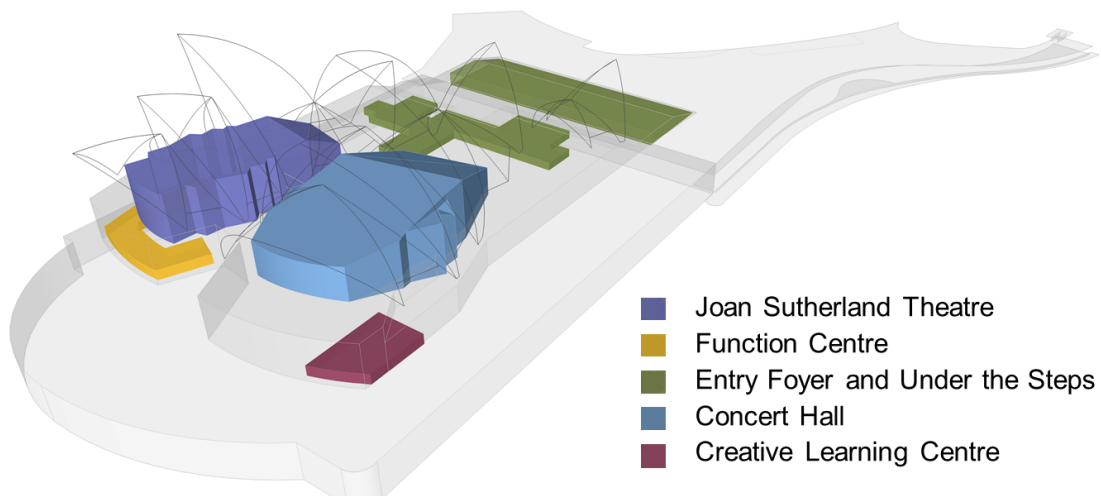


Figure 3: Sydney Opera House Building Renewal Program (Source: Sydney Opera House Trust)

1.2 Project Overview

An overview of the project is provided in the table below:

Address	Sydney Opera House – Bennelong Point, Sydney
Legal Description	Lot 5 in DP 775888 and Lot 4 in DP 787933
LGA	City of Sydney
Zoning	B8 Metropolitan Centre
Permissibility	Permissible with consent
Project	Concert Hall and Creative Learning Centre
Capital Investment Value	\$115,337,788.00
Employment (estimate)	250 to 270 full-time positions

Table 3: Project Overview

The project initially included upgrade works to the covered concourse, known as Under The Steps (UtS) works). However, following detailed design phase and value management review, these works were removed from the project scope in April 2018. Consequently, revised SEARs were issued (refer Section 1.3) and a request to vary the proposed action under the EPBC Act was approved (refer Section 1.4).

1.3 Secretary's Environmental Assessment Requirements

The Department of Planning and Environment (DP&E) issued SEARs (SSD 8663) for the project on 24 August 2017. The SEARs were subsequently modified and re-issued on three occasions:

- On 8 December 2017, the SEARs were updated to reflect the requirements of the *Biodiversity Conservation Act 2016* (BC Act) which came into effect on 25 August 2017. The BC Act requires all SSD applications to prepare a biodiversity development assessment report (BDAR). Accordingly, the SEARs were modified to include this requirement. A BDAR waiver was subsequently issued on 9 April 2018 and is discussed in Section 5.5;
- On 29 June 2018, the SEARs were updated to reflect changes to the project scope including the removal of the UtS component; and
- On 24 August 2018, the SEARs were updated to clarify the relevant heritage documents to be addressed in the EIS.

A copy of the final SEARs issued on 24 August 2018 are provided at Appendix 2.

The SEARs and where they are addressed in this EIS are set out in Table 4.

Environmental Assessment Requirement	EIS Reference	Supporting Study
General Requirements		
Address the requirements of the EP&A Act 1979 and clauses 6 and 7 of Schedule 2 of the EP&A Regulation 2000	Page 2 'Certification of Environmental Impact Statement'	N/A refer to certification within the Executive Summary
Address matters outlined in Schedule 4 of the <i>Environment Protection and Biodiversity Conservation Regulations 2000</i>	Sections 1-8 of the EIS	N/A
Environmental risk assessment	Section 7	Appendix 11 Heritage Impact Assessment Appendix 6 Construction Management Plan Appendix 15 Noise Impact Assessment
Quantity surveyor report on capital investment value and jobs estimate	Section 1.2	Appendix 1 QS Report

Environmental Assessment Requirement	EIS Reference	Supporting Study
Key Issues		
Environmental Planning Instruments, policies and guidelines	Section 5	Appendix 11 Heritage Impact Assessment Appendix 14 Access Reports Appendices 4 and 5 Design statement and architectural drawings
General Requirements	Sections 1 to 8	Appendix 1 QS Report Appendix 14 Access Reports Appendix 12 SOH Accessibility Master Plan Appendices 4 and 5 Design statement and architectural drawings
EPBC Act	Section 5.1	Appendix 11 Heritage Impact Assessment
Heritage	Section 5	Appendix 11 Heritage Impact Assessment
Built Form, Urban Design and Visual Impacts	Section 6.3	Appendices 4 and 5 Design statement and architectural drawings
Use	Sections 3.1 & 6	
Access	Section 6.5	Appendix 14 Access Reports
Acoustic	Section 6.6.2	Appendix 15 Noise Impact Assessment
Construction Impacts	Section 6	Appendix 6 – Construction Management Plan
Waste Management	Section 6.6	Appendix 6 Construction Management Plan
Ecologically Sustainable Development (ESD)	Section 6.9	Appendix 18 Sustainable Design Report
Biodiversity	Sections 5.5 and 6.10	Appendix 12 Biodiversity statement assessment
Consultation	Section 3.4	Appendix 9 Proposed Consultation Framework
Plans and Documents		
Plans and documents - site survey, locality/context plan and architectural drawings	Section 2	Appendices 4 and 5 Design statement and architectural drawings

Table 4: Secretary's Environmental Assessment Requirements

1.4 Commonwealth Approvals

On 1 June 2017, the SOHT referred the proposed works comprising the project to the Department of the Environment and Energy (DEE) for a decision on whether they are a controlled action under the EPBC Act.

On 17 July 2017, the delegate of the Minister for Environment and Energy, under section 75 of the EPBC Act, determined that the proposed works are a controlled action (EPBC 2017/7955). As such it was determined the application requires an assessment and determination under the EPBC Act.

As the project has been deemed to be a controlled action, it will be assessed in accordance with the Bilateral Agreement [between New South Wales and the Commonwealth] made under section 45 of the EPBC Act 1999 relating to environmental assessment under the EP&A Act.

Subsequent to the controlled action decision on 17 July 2017, Keylan Consulting, on behalf of the SOHT, wrote to the DEE requesting a variation to the proposed action to reflect proposed modifications to the projects, including:

- Removal of Concert Hall Rehearsal Room 1 (GM.01) & Rehearsal Room 2 (GM.02)
- Removal of the Southern Foyers scope.

On 24 August 2017, the DEE approved the variation to the proposed action to remove the works noted above.

On 16 May 2018, the SOHT wrote to the DEE advising that works associated with UtS were proposed to be removed from the proposed action. Previously proposed works including lighting, seating, digital art walls and signage will not be progressed at this time.

On 13 June 2018, the DEE approved this request to vary the proposed action.

Accordingly, works relating to the Concert Hall and Creative Learning Centre comprise the controlled action requiring approval under the EPBC Act.

All relevant Commonwealth approvals as mentioned above are included at Appendix 3.

1.5 Environmental Planning and Assessment Regulation 2000

This EIS has been prepared in accordance with form and content requirements of Schedule 2 of the EP&A Regulation. An overview of how the individual requirements of the EP&A Regulation have been satisfied is included in Table 5:

Environmental Planning and Assessment Regulations 2000 (extract)		Area addressed in EIS
(1)	<i>An environmental impact statement must also include each of the following:</i>	
(a)	<i>a summary of the environmental impact statement,</i>	Executive Summary
(b)	<i>a statement of the objectives of the development, activity or infrastructure,</i>	Section 1.1
(c)	<i>an analysis of any feasible alternatives to the carrying out of the development, activity or infrastructure, having regard to its</i>	Section 4.2

Environmental Planning and Assessment Regulations 2000 (extract)	Area addressed in EIS
<i>objectives, including the consequences of not carrying out the development, activity or infrastructure,</i>	
(d) <i>an analysis of the development, activity or infrastructure, including:</i> (i) <i>a full description of the development, activity or infrastructure, and</i> (ii) <i>a general description of the environment likely to be affected by the development, activity or infrastructure, together with a detailed description of those aspects of the environment that are likely to be significantly affected, and</i> (iii) <i>the likely impact on the environment of the development, activity or infrastructure, and</i> (iv) <i>a full description of the measures proposed to mitigate any adverse effects of the development, activity or infrastructure on the environment, and</i> (v) <i>a list of any approvals that must be obtained under any other Act or law before the development, activity or infrastructure may lawfully be carried out,</i>	Sections 2, 3, 6 and 7
(e) <i>a compilation (in a single section of the environmental impact statement) of the measures referred to in item (d) (iv),</i>	Section 7
(f) <i>the reasons justifying the carrying out of the development, activity or infrastructure in the manner proposed, having regard to biophysical, economic and social considerations, including the principles of ecologically sustainable development set out in subclause (4).</i> <i>Note. A cost benefit analysis may be submitted or referred to in the reasons justifying the carrying out of the development, activity or infrastructure.</i>	Sections 4.1 and 6.9
(2) <i>Subclause (1) is subject to the environmental assessment requirements that relate to the environmental impact statement.</i>	Noted
(3) <i>Subclause (1) does not apply if:</i>	
(a) <i>the Secretary has waived (under clause 3 (9)) the need for an application for environmental assessment requirements in relation to an environmental impact statement in respect of State significant development, and</i> (b) <i>the conditions of that waiver specify that the environmental impact statement must instead comply with requirements set out or referred to in those conditions.</i>	N/A

Table 5: Requirements of the Environmental Planning and Assessment Regulation 2000

1.6 Project Team

An expert project team has been formed to deliver the project and includes consultants listed in Table 6:

Consultant	Role
Keylan Consulting Pty Ltd	Town Planning
ARM Architecture Tonkin Zulaikha Greer	Architecture
Design 5 Architects	Heritage Impact Assessment
Group DLA	Building Code of Australia Assessment
iAccess	Accessibility Assessment
Arup	Structural Engineering Noise Impact Assessment Fire Safety
Steensen Varming	Lighting, Mechanical and Electrical Services
Cundall	Ecologically Sustainable Development Assessment
Ridler Levett Bucknall	Quantity Surveyor
Parking and Traffic Consultants	Traffic Assessment
Theatreplan UK	Theatre Designers
Muller-BBM	Acoustics

Table 6: Project Team

2 Site analysis

2.1 Site location and context

The Sydney Opera House is located on the peninsula on the eastern side of Circular Quay known as Bennelong Point, as shown in the figure below. The site is legally described as Lot 5 in DP 775888 and Lot 4 in DP 787933.



Figure 4: Location Map (Source: SIX Maps)

The Opera House comprises three main structures (Figure 5), being:

- The Concert Hall on the western side of Bennelong Point
- The Opera Theatre (Joan Sutherland Theatre) on the eastern side
- The Bennelong Restaurant, to the south of the two venues.

To the south of the above three structures are the main podium steps and the southern forecourt. The Opera House precinct adjoins the Royal Botanic Gardens to the east and East Circular Quay to the south.

The Opera House building is serviced by a recently constructed underground loading dock below the forecourt, accessed via an entry ramp off Macquarie Street adjacent to the cliff face known as the Tarpeian Wall.

The Opera House is listed on the NSW State Heritage Register and the National and World Heritage Lists (Section 5). It is the Nation's premier tourist attraction, hosting more than 8.2 million visitors each year, with more than 1.5 million attending about 1,800 performances and more than 500,000 people taking a guided tour of the building.

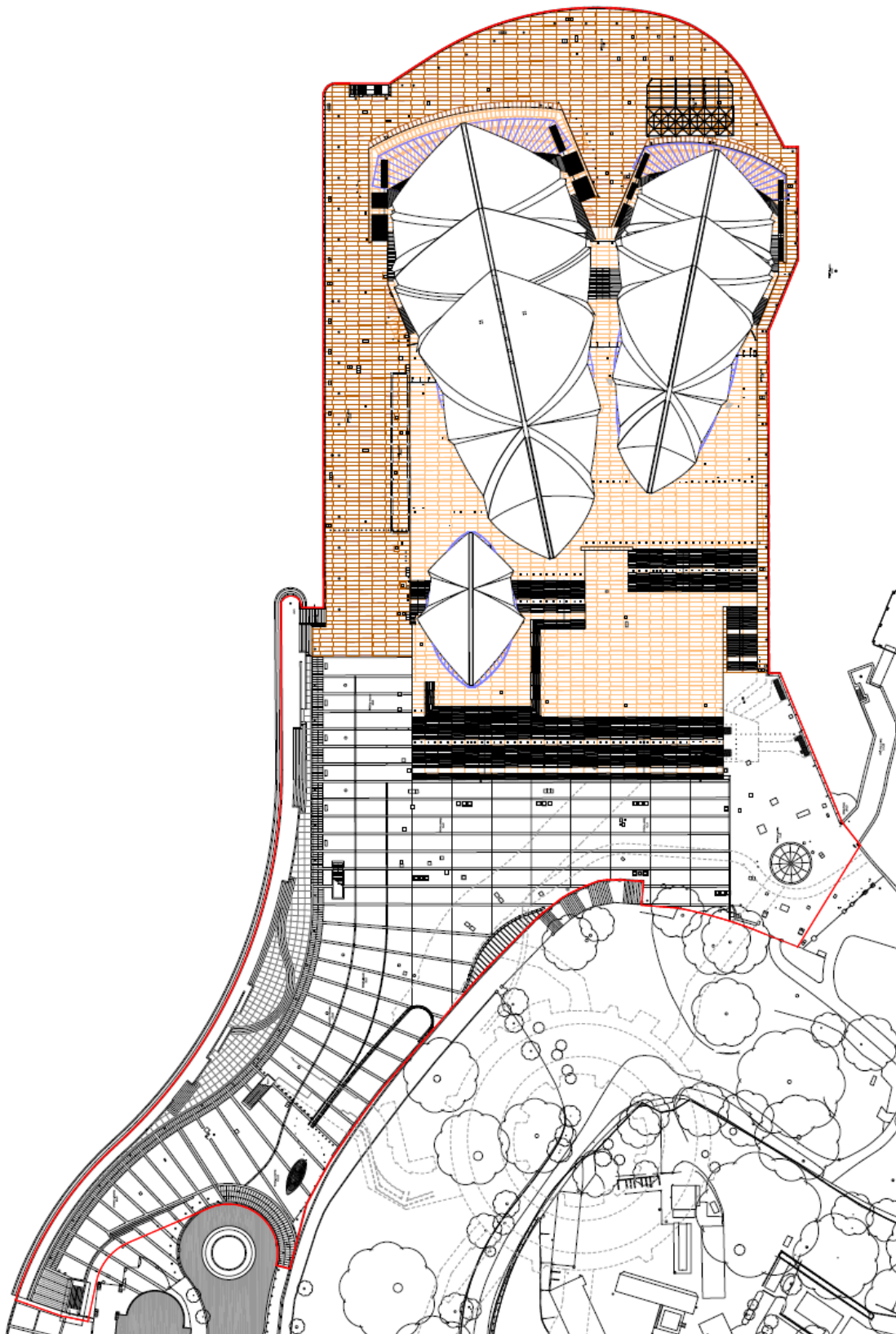


Figure 5: Sydney Opera House Site Plan (Source: Sydney Opera House Trust)

2.2 Project area description

The project area is located in the following areas of the Sydney Opera House:

- Concert hall – located on the western side of the site (Figure 6)
- Creative Learning Centre – located on the northern end of the western side of the site (Figure 7)

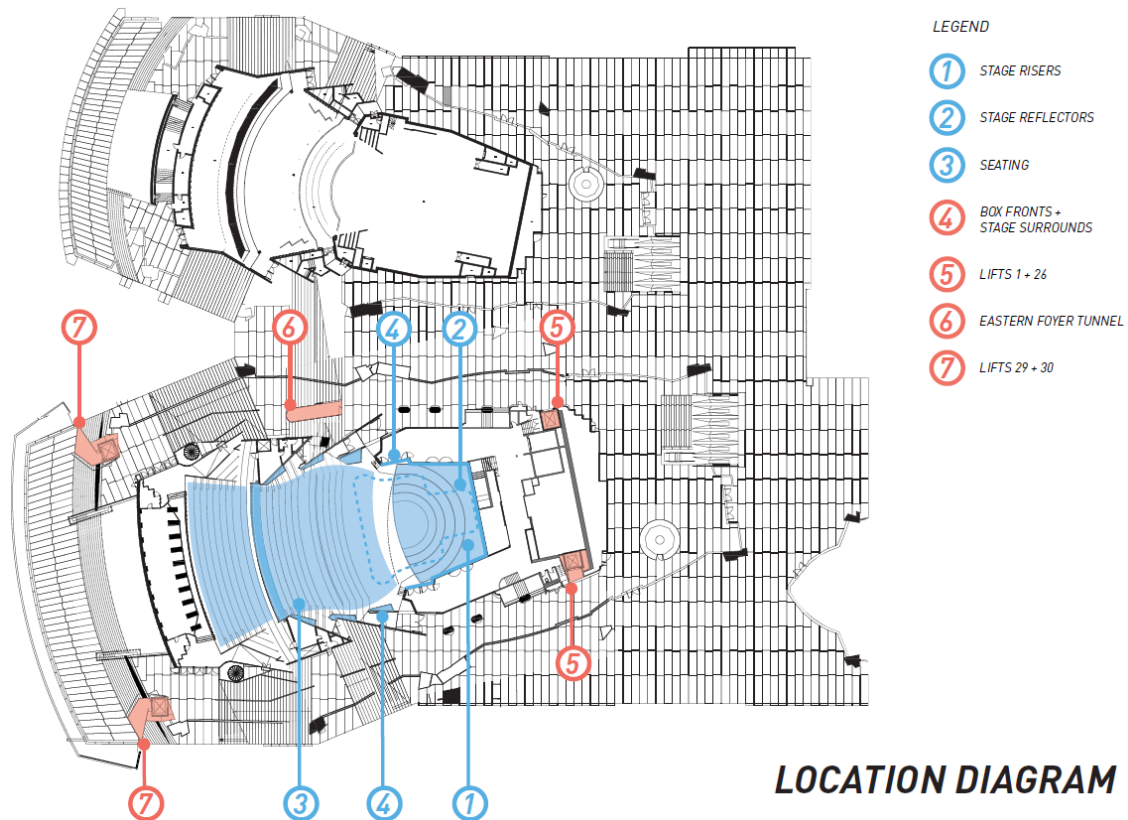


Figure 6: Project Area (highlighted blue) - Concert Hall upgrades (Source: ARM Architecture)

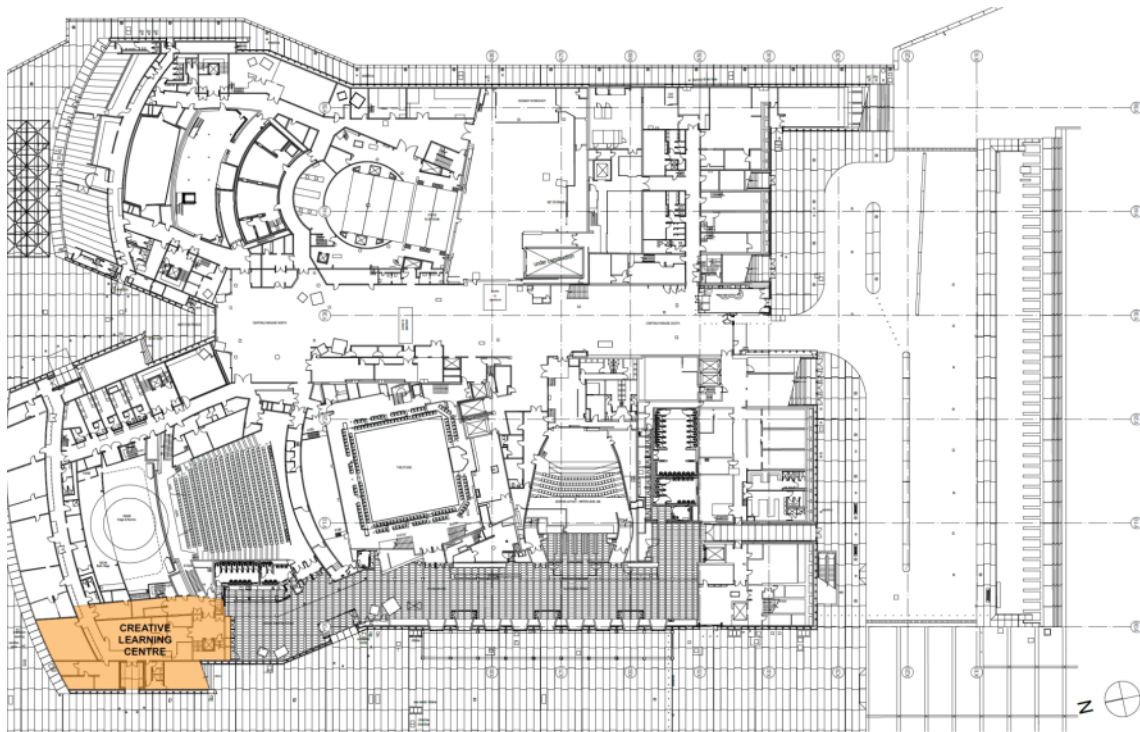


Figure 7: Project Area (highlighted orange) - Creative Learning Centre (Source: TZG Architects)

Site photos of the project area are shown in the figures below:



Figure 8: Existing Concert Hall and Eastern Landing (Source: ARM Architecture)

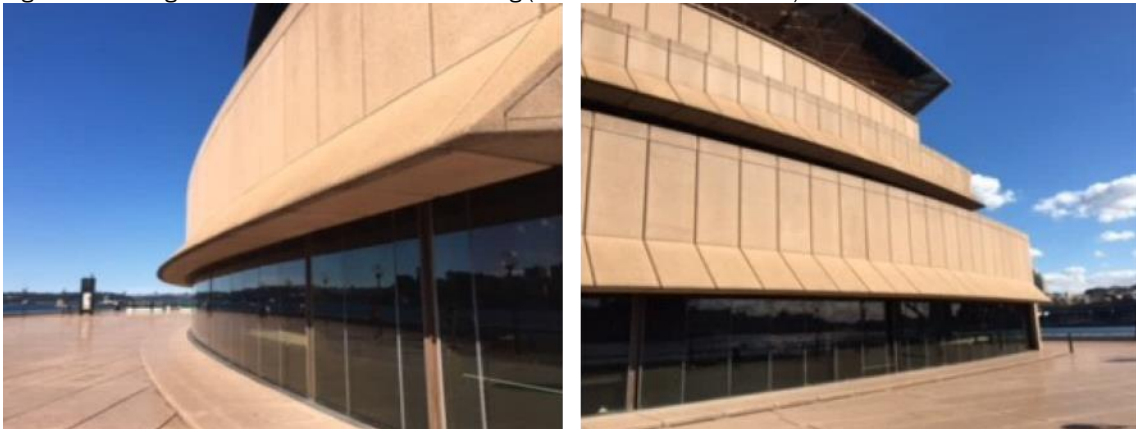


Figure 9: Northern facade showing the area for the Creative Learning Centre (Source: Keylan)

2.3 Surrounding development

Bennelong Point occupies the eastern peninsula of Circular Quay, with immediately adjoining land uses including the Royal Botanic Gardens to the south and southeast, Government House to the south and East Circular Quay to the South East. East Circular Quay is a pedestrian boulevard that links the Opera House with Circular Quay and the CBD.

Mixed use buildings mainly containing residential apartments above ground and first floor commercial premises are located to the south west of the Opera House along East Circular Quay. Many of the ground floor commercial premises include food and drink premises with outdoor seating. The nearest residential premises are the Bennelong Apartments at 1 Macquarie Street, the northern end of Macquarie Street and East Circular Quay.

A roundabout at the northern end of Macquarie Street provides vehicular access to the southern forecourt of the Opera House and to the underground Opera House carpark, which is a separately owned commercial entity. Pedestrian access to the car park is provided via an underground tunnel from the Lower Concourse. Outdoor seating areas associated with commercial uses occupy the western part of the Lower Concourse.

To the north of the Sydney Opera House site on the opposite foreshore of Sydney Harbour is predominantly medium to high residential development in the North Sydney local government area, while to the west on the western foreshore of Circular Quay is the Overseas Passenger Terminal and mixed-use development in The Rocks.

3 Proposed Development

3.1 Project Description

The works subject to this EIS are described in the table below. Architectural drawings of the proposed works are included at Appendices 4 and 5.

Proposed Works	
Concert Hall Projects	<p>The proposal involves significant technical improvements and alterations to the existing building fabric essential for the future operational requirements of the Sydney Opera House and visitor and patron experience. It also involves architectural changes to the Concert Hall interior and the Concert Hall foyers. The proposed scope for the Concert Hall is summarised as below:</p> <p>Accessibility</p> <ul style="list-style-type: none"> On-grade access from the Southern Foyer at Level 2 to the corresponding level in the Northern Foyer via new passageway within the Eastern Foyer stairs Two new lifts, No 29 and 30, located in the east and west of the Northern Foyer New handrails in the centre of the Eastern and Western Foyer stairs New handrails to replace existing non-compliant handrails throughout the Concert Hall Changes to accommodate increased number of wheelchair positions (up to 34 total) throughout the Concert Hall Two new accessible sanitary facilities on Level 3 of the Northern Foyer Improved mobility access and wet area facilities to the performers dressing rooms on Level 1 <p>Theatre Planning and Technology</p> <ul style="list-style-type: none"> Stage <ul style="list-style-type: none"> Redesign and reconstruction of stage Automated and adjustable stage risers Lowering the stage level Provide under stage storage, including automated storage of seating rows A and B when stage extension is implemented Backstage <ul style="list-style-type: none"> Adjustment to the floor level to meet the stage level Increased size of the stage wings New downstage entry doors Technical Zone <ul style="list-style-type: none"> New technical equipment zone in the ceiling above New winch room Relocation of some of the Plant Room 21 mechanical equipment New penetrations in the existing ceiling <p>Acoustics</p> <ul style="list-style-type: none"> Acoustic Music <ul style="list-style-type: none"> Replacement of the existing acrylic over stage reflectors with a new array of adjustable reflectors New operable side wall reflectors New adjustable stage risers

Proposed Works	
	<ul style="list-style-type: none"> ○ New stage floor ○ New acoustically diffusive timber panelling to the box fronts ○ New acoustically diffusive timber panelling to the stage surround ○ New acoustically diffusive timber panelling to the rear of the side boxes, the rear wall of the circle, choir and the rear wall of the stalls ○ Adjustment of the box fronts and stage surround geometry • Amplified Music <ul style="list-style-type: none"> ○ Acoustically absorbent fabric introduced to the venue via mechanically deployed banners above the stage and on the stage-surround walls, box fronts and rear walls ○ New speaker amplification system <p>Concert Hall air conditioning</p> <ul style="list-style-type: none"> • New secondary air ductwork behind the side walls of the Hall • Closing up of the existing cannon port openings and installation of new air conditioning diffuser outlets • Increased number of ceiling diffusers in the lower sections of ceiling over the boxes • Upgrade of the smoke exhaust capacity within the Concert Hall <p>Seat Refurbishment</p> <ul style="list-style-type: none"> • Refurbishment of sections of existing patron seating to comply with fire engineering requirements and requirements for different patron seating configurations/wheelchair use/technical operational requirements <p>Other</p> <ul style="list-style-type: none"> • New external air exhaust hood on Level 2 of the western podium facade
Creative Learning Centre	<p>For the first time, the Opera House will have a dedicated space for children and young people to experiment and learn in a building that embodies creativity and innovation. Students, teachers and visitors will learn to collaborate in ways that foster creativity, problem-solving and innovative-thinking.</p> <p>This project transforms existing office spaces in the building's north-western corner to maximise public enjoyment of the Opera House – a public asset - and enable artists, Opera House resident arts companies and creative-learning specialists to inspire the community.</p> <p>The Creative Learning Centre will be a flexible space hosting workshops, creative-play activities, talks and performances, and will also include a separate space for a permanent digital classroom. Consistent with the multi-purpose nature of the Opera House and most spaces within the building, when the Centre is not being used for creative learning, it may be used for occasional small scale events and functions e.g. for gatherings prior to performances in the Concert Hall or Western Venues.</p> <p>Any caterer who provides an alcohol service for functions in the Creative Learning Centre venue will be required to comply with their liquor licence conditions, including, wherever required, maintaining a Plan of</p>

Proposed Works	
	<p>Management (POM) for the operation of the space. The POM will cover the following matters:</p> <ul style="list-style-type: none"> • Relationship with the NSW Police and the Liquor Accord • Operating hours and the use of the premises • Capacity of the premises • Responsible Service of Alcohol • General amenity • Complaints process • Signage • Security measures

Table 7: Summary of the Concert Hall and Creative Learning Centre projects

3.2 Renewal Design Process

The architects engaged on these works – ARM Architecture for the Concert Hall, and Tonkin Zulaikha Greer for the Creative Learning Centre - have undertaken a comprehensive process of options analysis, consultation with heritage and other experts, alignment with key guiding documents including the Utzon Design Principles (UDP) and Conservation Management Plan (CMP) and design review by the Opera House's Eminent Architect's Panel (EAP) and Conservation Council (CC).

The key Building Renewal Design Phases are outlined in the figure below.

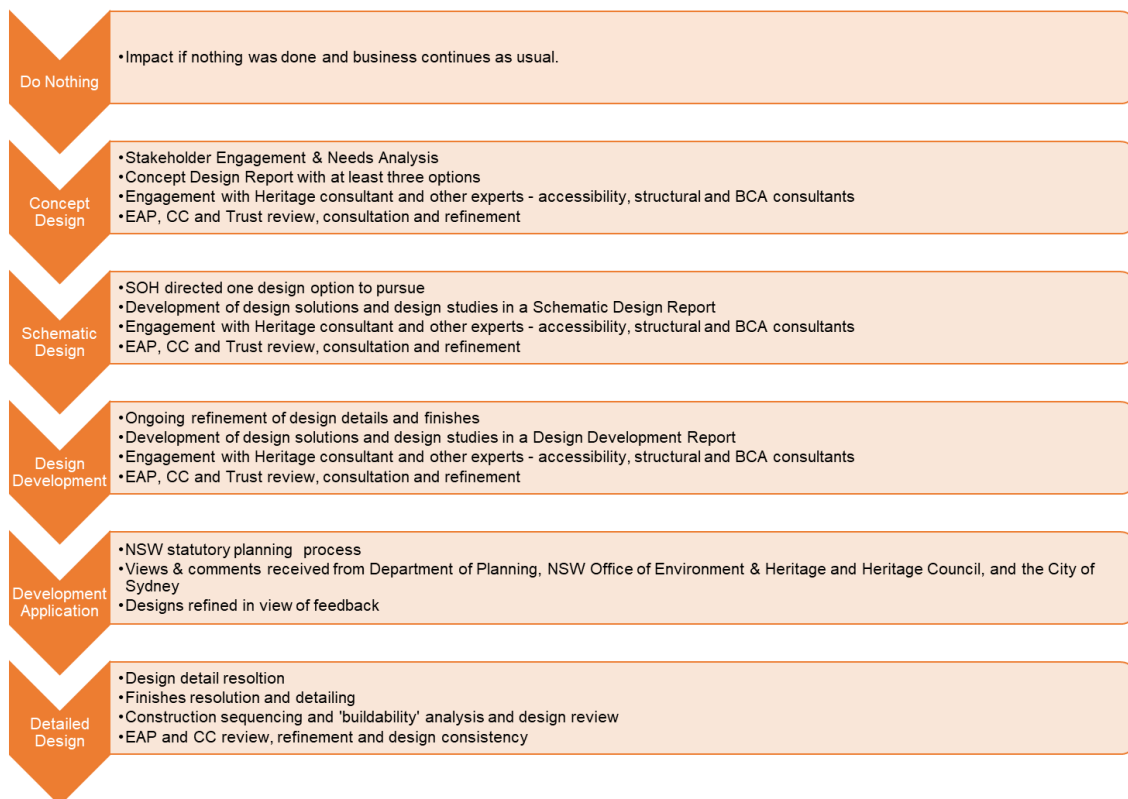


Figure 10: Building Renewal Design Phases (Source: SOHT)

The current proposal is the result of detailed consultation with a wide variety of experts and testing of multiple design options and alternatives (see Section 4.2), including by the following key groups:

- **Technical experts:** The Opera House has engaged consultant expertise to provide clear, world class advice on all technical aspects of the design, including in relation to acoustics, accessibility, structural engineering and BCA compliance
- **Heritage Architect:** Design 5 architects were engaged to advise each Architect throughout the design phases as well as providing services to write the HIS for the Development Application. Design 5 has 12 years' experience at the Opera House and authorship of the CMP Fourth Edition
- **Sydney Opera House users:** The Opera House boasts a world class staff with clear technical expertise in accessibility, theatre, visitor experience, events and the detailed technical requirements of artistic programming at the Opera House
- **Resident companies:** Sydney Symphony Orchestra (SSO), Australian Chamber Orchestra (ACO), and the Sydney Philharmonia Choirs (SPC) are the key resident companies engaged and consulted for expert advice on the Concert Hall projects through the development of options for the design
- **EAP:** Are charged with providing technical advice to the Sydney Opera House Trust on matters related to design, architecture and heritage. The EAP reinforces the significance of design excellence and consistency of architectural approach to ensure the Opera House maintains and conserves its outstanding universal values
- **Conservation Council:** Are charged with providing advice to the Sydney Opera House Trust on conservation and heritage-related matters.

The final proposal, summarised at Section 3.1, is based on this consultation and adopts an evidence-based approach, which has carefully considered and balanced the heritage conservation of the building with its on-going function as a living public building to be celebrated by existing and future generations.

The Building Renewal governance structure is provided in the figure below.

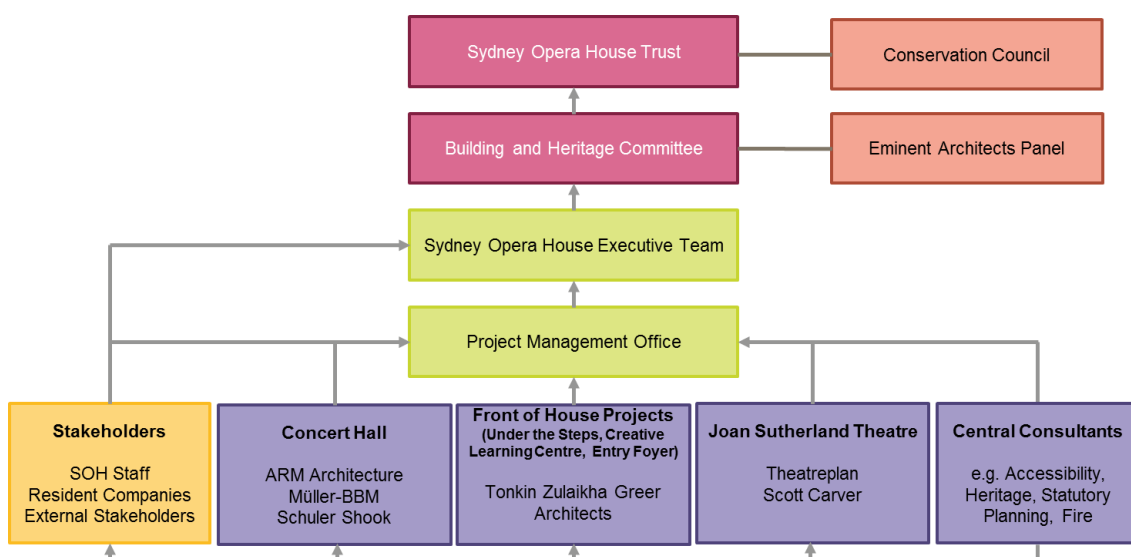


Figure 11: Building Renewal governance (Source: SOHT)

Images of the proposed key alterations to the Opera House are shown in the figures below.

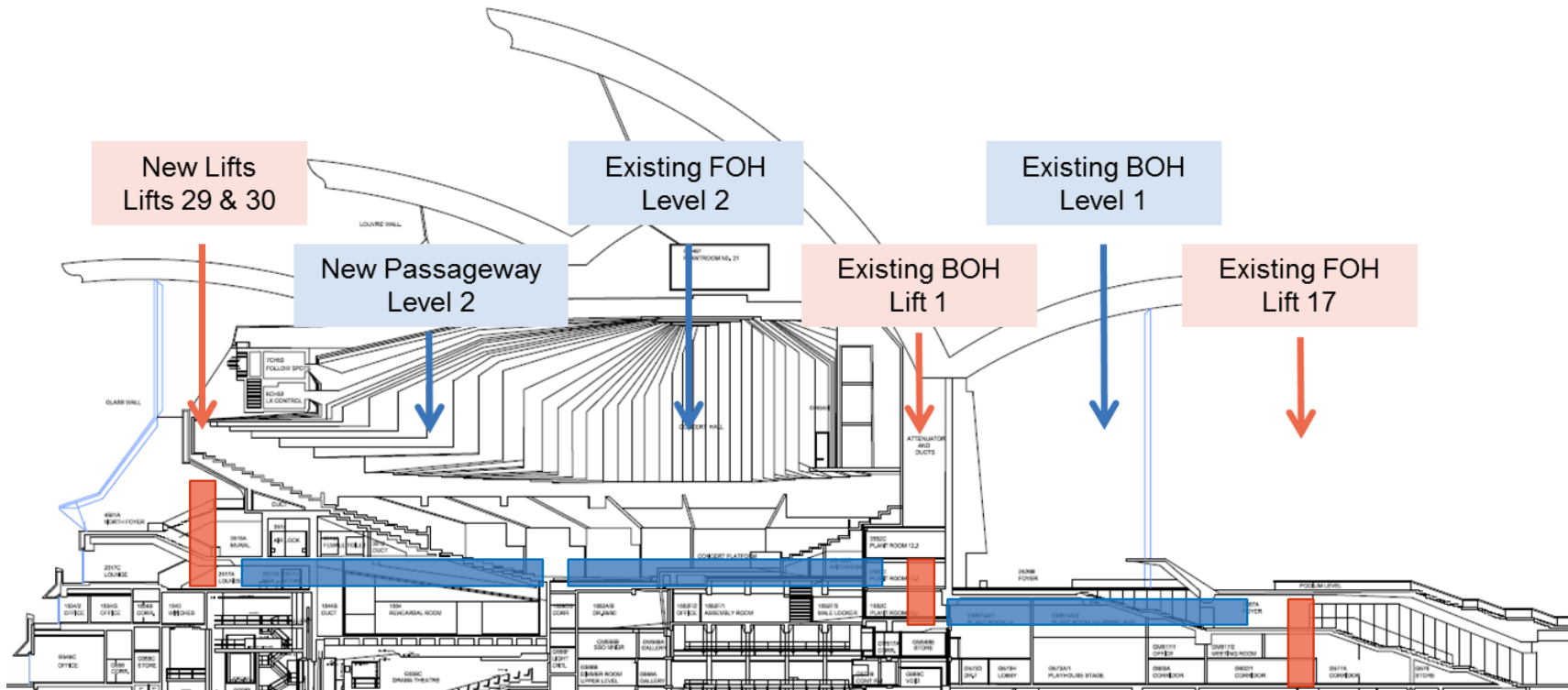


Figure 12: Section showing existing and proposed passageways and lift locations

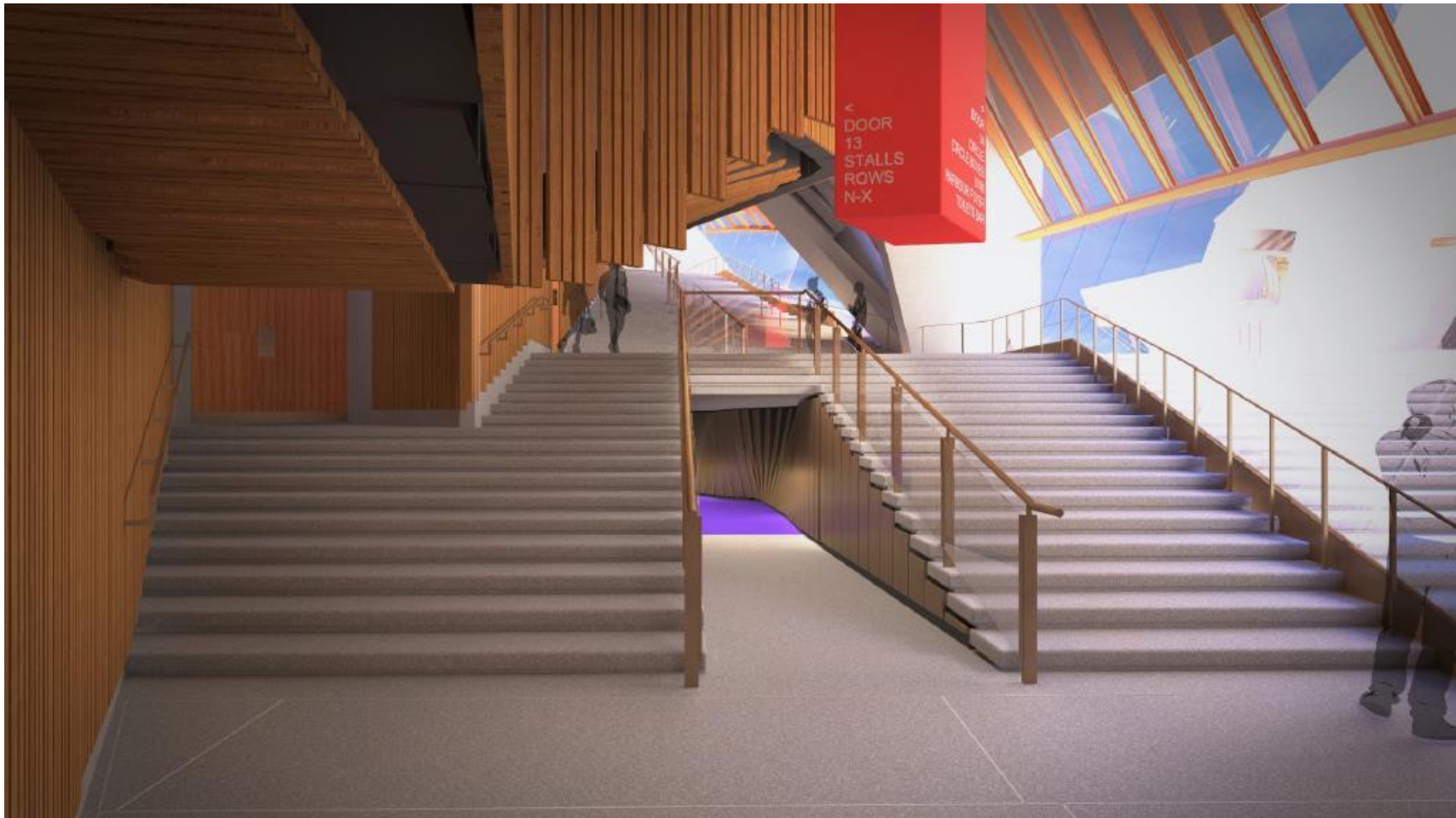
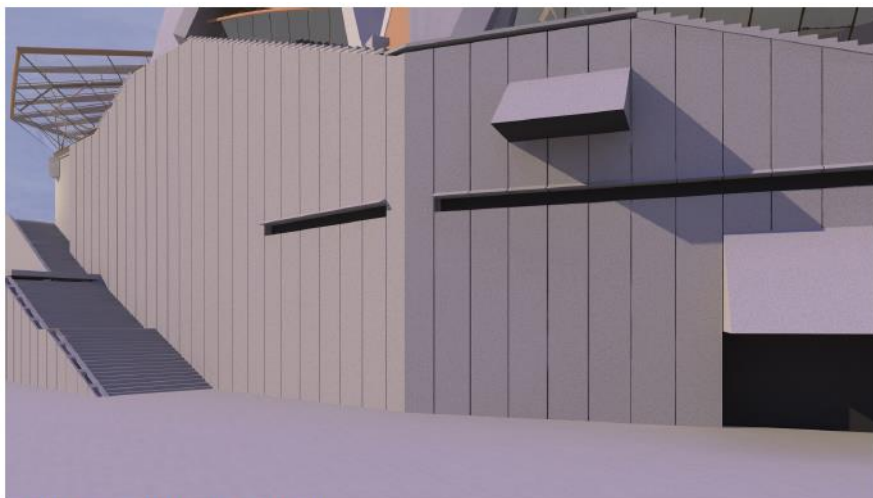


Figure 13: New passageway through the steps connecting to the Concert Hall / Eastern Foyer



EXISTING CONDITIONS RENDER



PROPOSED RENDER

Figure 14: Comparison between the existing (left) and proposed (right) west facing podium ventilation hoods

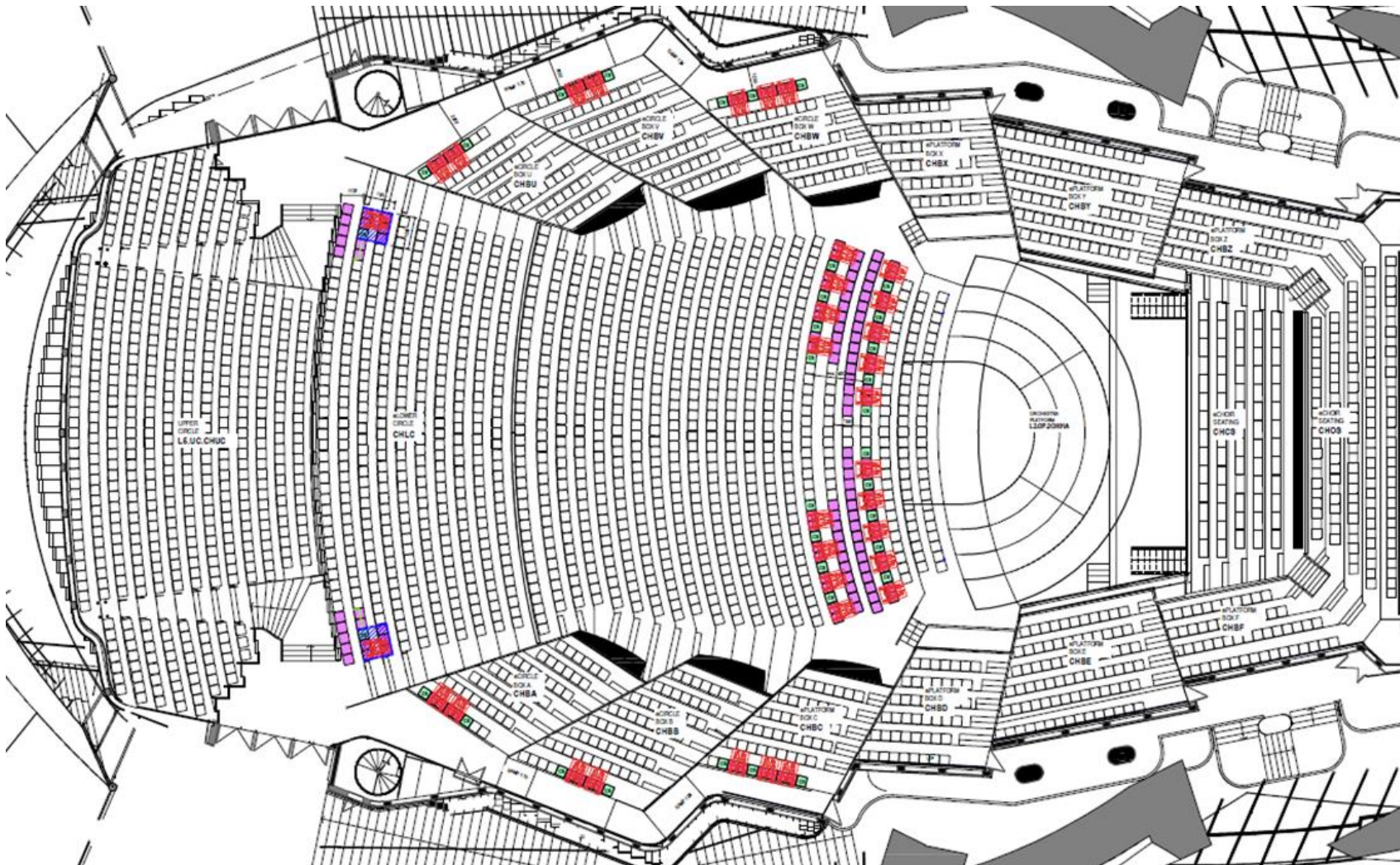


Figure 15: Location of proposed new disabled seating

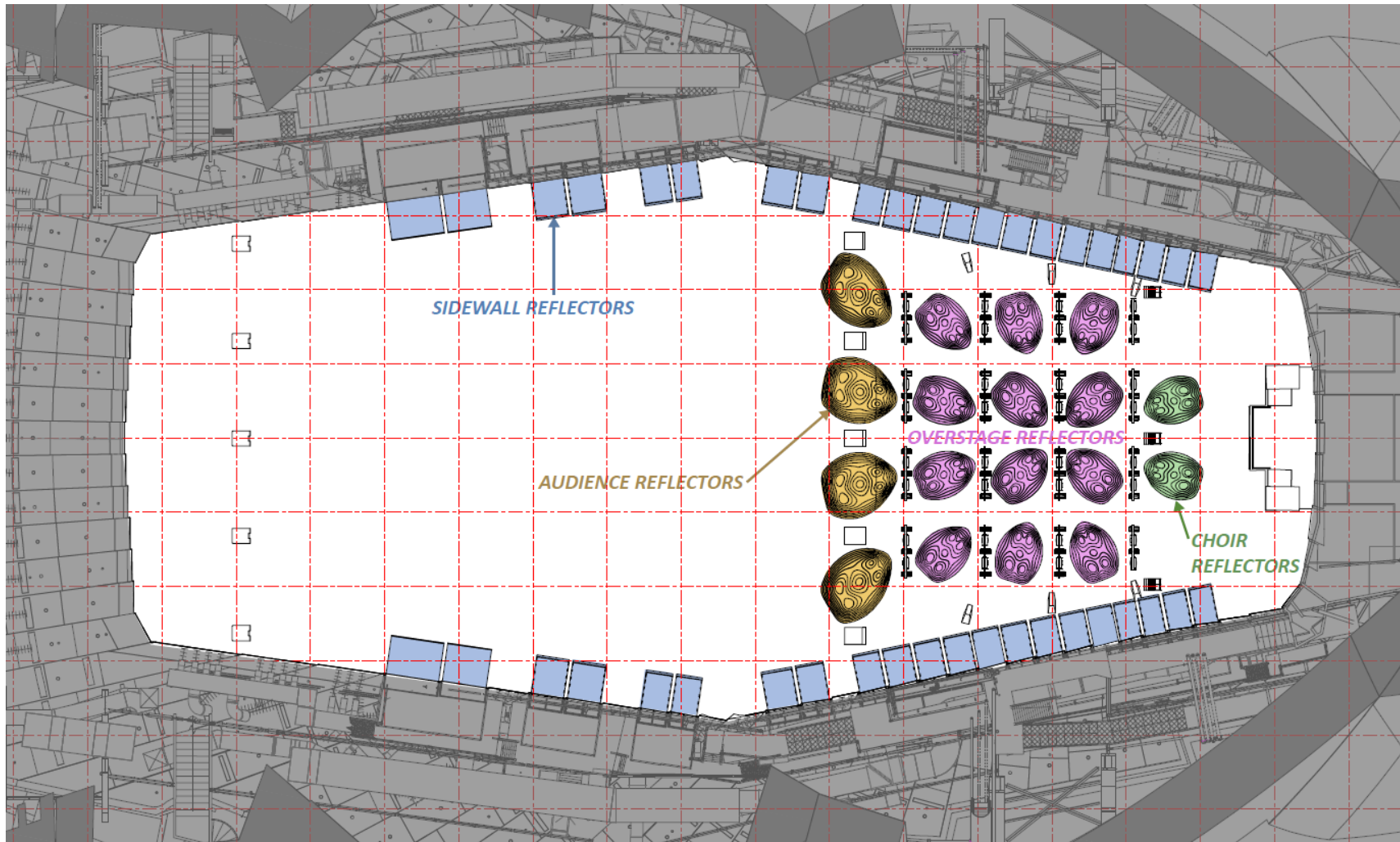


Figure 16: Acoustic reflector locations



Figure 17: Render of acoustic reflectors, stage riser and lighting



Figure 18: Render of proposed air conditioning diffuser slots locations/layout



Figure 19: Artist impression of the Creative Learning Centre

3.3 Construction program

The proposed programming for the works is shown in the figure below:

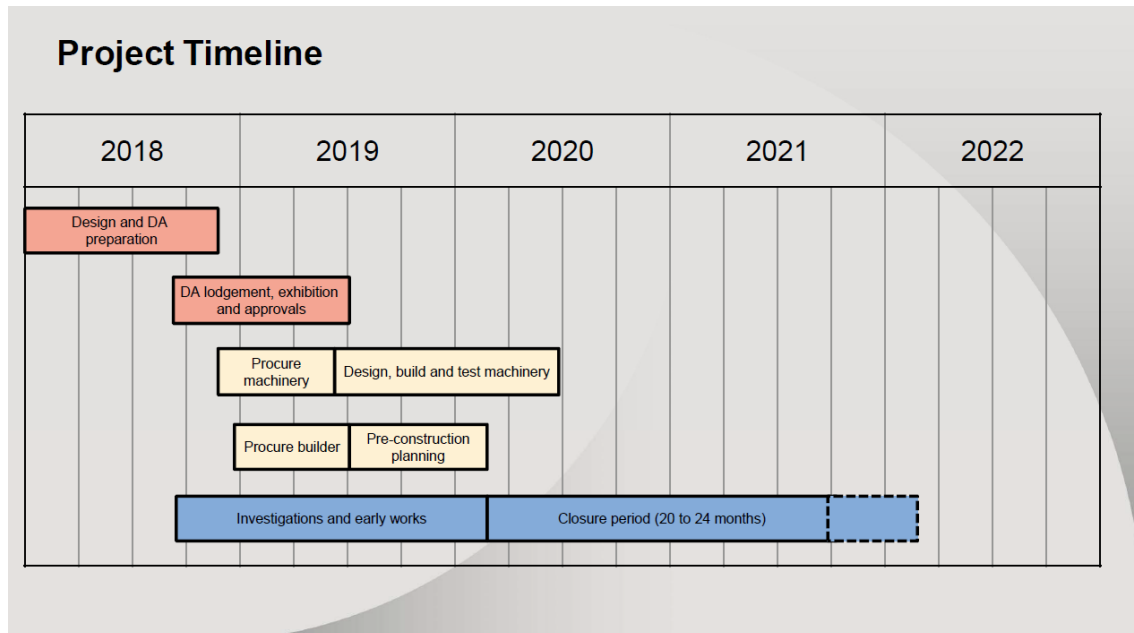


Figure 20: Proposed construction works program (Source: SOHT)

As outlined above and in the Construction Management Plan at (Appendix 6) the proposed works would be carried out in accordance with the following standard hours of construction:

- 7am to 6pm, Monday to Friday
- 8am to 1pm, Saturday
- No work on Sunday and Public Holidays.

To account for potential impacts on visitors, patrons and operations of the Sydney Opera House, it is proposed that internal works will be undertaken outside the standard hours of construction on a 24 hours a day, 7 days a week basis and in accordance with the following shift patterns:

- 10:30-18:00 – no major noise but general construction, allowing daily SOH operations (i.e. matinee's)
- 18:00-23:30 – planning and quiet activities which are compatible with live performances occurring in other venues within the site
- 23:30-10:30 – works which would otherwise be disruptive to SOH operations.

The proposed hours of construction and shift work scheduling are consistent with previous approvals relating to Sydney Opera House Building Renewal Program and are crucial to the delivery of the project within the closure timeframe.

The carrying out of works outside of standard construction hours would be confined to internal works which can readily managed in order to minimise noise impacts on nearby receivers.

As discussed in the Construction Pedestrian and Traffic Management Plan (Appendix 7), the delivery and collection of building materials and equipment will be managed so as not to unreasonably impact on the amenity of the patrons of the Opera House and its surrounding neighbours.

3.4 Consultation

The SOHT has undertaken extensive consultation on the Building Renewal Program, including the proposed Concert Hall and Creative Learning Centre projects as summarised in the table below.

Stakeholder	Consultation Summary
Resident Companies:	<p>The Opera House is home to a number of Australian performing arts companies. The Opera House has been working closely with them all to ensure the Renewal plans meet their needs and they have made an important contribution to the planning and final designs for the Concert Hall upgrades.</p> <ul style="list-style-type: none"> The Opera House's Renewal program governance structure was established in late 2015, which includes regular management meetings with resident companies, including <ul style="list-style-type: none"> Sydney Symphony Orchestra Australian Chamber Orchestra Opera Australia The Australian Ballet Bangarra Dance Theatre Bell Shakespeare Sydney Theatre Company Regular meetings with the CEO of the Opera House and resident company CEOs The Concert Hall and Creative Learning Centre Renewal projects have been discussed at these forums. Design workshops and prototype testing have been held with Sydney Symphony Orchestra, Sydney Philharmonia Choirs and Australian Chamber Orchestra who are the principal users of the Concert Hall.
Sydney Symphony Orchestra	<ul style="list-style-type: none"> A regular Renewal Senior Management forum takes place where senior executives of the SSO and the SOHT meet to discuss and review the designs and plans. Quarterly meetings with the CEO of the Opera House, Louise Herron and CEO of the SSO, Emma Dunch, also take place. As part of the design development phase for the Concert Hall upgrades, a series of full scale tests of the proposed stage risers, acoustic reflectors, and the acoustic absorption drapes were undertaken in 2016 and 2017, which the SSO were involved in. Feedback from SSO musicians and executives were extremely positive. A specific briefing on the Concert Hall designs took place on the 12 September 2018. The SSO has provided a letter of support for the project and this is included in Appendix 8.
Australian Chamber Orchestra	<ul style="list-style-type: none"> A regular Renewal Senior Management forum takes place where senior executives of the SPC and the SOHT meet to discuss the designs and plans of Renewal of the Concert Hall. The ACO has been involved in a series of tests of the acoustic upgrades and have indicated that the upgrades will benefit

Stakeholder	Consultation Summary
	<p>audiences and musicians and audiences will also benefit from the proposed accessibility works.</p> <ul style="list-style-type: none"> • A specific briefing on the designs and scope of work took place on the 26 June 2018. • The ACO has provided a letter of support for the project and this is included in Appendix 8.
Sydney Philharmonia Choirs	<ul style="list-style-type: none"> • A regular Renewal Senior Management forum takes place where senior executives of the SPC and the SOHT meet to discuss and review the designs and plans. • The SPC have been involved in a series of tests of the acoustic upgrades. Performers and key executives from SPC have provided positive feedback on proposed upgrades, specifically the acoustic and accessibility improvements. • A specific briefing on the designs and scope of work took place on the 26 June 2018. • The SPC has provided a letter of support for the project and this is included in Appendix 8.
Eminent Architects Panel	<ul style="list-style-type: none"> • The EAP provides advice to the SOHT and management on issues of architecture or design, and in relation to the management and conservation of the building. Approximately five formal meetings are held each year, in addition to out of session design review sessions. The EAP has been briefed regularly on the Concert Hall and Creative Learning Centre and were involved in the design process. • Current members of the EAP include: <ul style="list-style-type: none"> ○ Mr Peter Poulet, Chair (NSW Government Architect) ○ Mr Jan Utzon ○ Mr Peter Mould ○ Mr Ken Maher ○ Ms Abbie Galvin ○ Ms Sheridan Burke • The EAP has provided a letter of support for the project and this is included in Appendix 8.
Conservation Council	<ul style="list-style-type: none"> • The Conservation Council provides advice to the SOHT and management team on conservation and heritage matters. Approximately five formal Conservation Council meetings are held each year, in addition to out of session design review sessions. It is chaired by an Opera House Trustee, and comprises representatives from key external organisations, heritage and architectural specialists, and management representatives. The Conservation Council has been regularly briefed on the Concert Hall and Creative Learning Centre projects, and was involved in the design process. • Members of the Conservation Council include: <ul style="list-style-type: none"> ○ The Hon Helen Coonan, Chair of Committee and Opera House Trustee ○ Ms Sarah Jane Brazil, Acting Manager, Conservation, Heritage Division, Office of Environment & Heritage ○ Ms Tanya Koeneman, Aboriginal Heritage Officer, Office of Environment & Heritage ○ Ms Sheridan Burke, Conservation Heritage Specialist ○ Mr Peter Mould, Architectural Specialist ○ Mr Peter Poulet, Government Architect ○ Ms Elizabeth Kinkade, Department of Planning and Environment

Stakeholder	Consultation Summary
	<ul style="list-style-type: none"> ○ Mr Greg McTaggart, External Specialist • The CC has provided a letter of support for the project and this is included in Appendix 8.
NSW Heritage Council	<ul style="list-style-type: none"> • On 30 May 2016, the Heritage Council was briefed on the Building Renewal program and undertook an extensive site tour. • On 3 May 2017, the Heritage Council participated in a prototype display in the Concert Hall of the acoustic upgrades. • The SOHT will continue engagement with the Heritage Council and the Office for Environment and Heritage regarding relevant approvals under the Heritage Act 1977. • The Office of Environment & Heritage was briefed in Parramatta on this and the Renewal scope on the 16 September 2016 and given a site tour of Sydney Opera House on the 6 October 2016 and 31 January 2017.
City of Sydney	<ul style="list-style-type: none"> • SOHT provided a high-level briefing to senior officers of the City of Sydney on Stage 1 Renewal projects on 8 February and 5 August 2016. • A more detailed briefing on Stage 1 Renewal projects, was provided to City of Sydney planning and heritage representatives on 15 July 2016. • Representatives of the City of Sydney attended a briefing on the Concert Hall project on 31 January 2017. • Representatives of the City of Sydney attended a briefing on the Concert Hall and Creative Learning Centre projects on 7 December 2017. • A further detailed briefing on the Concert Hall and Creative Learning Centre upgrades took place on 17 August 2018.
The National Trust	<ul style="list-style-type: none"> • SOHT provided members of the National Trust with a formal briefing on the Building Renewal program and an extensive site tour on 18 August 2016. • Representatives of the National Trust attended a briefing session and site tour for the architecture and heritage communities on 27 February 2018. • Representatives of the National Trust attended a further briefing on the project on 12 October 2018.
Metropolitan Local Aboriginal Land Council (MLALC)	<ul style="list-style-type: none"> • A letter was sent on 18 July 2018 to Mr Nathan Moran, CEO MLALC, offering a briefing on the Concert Hall and Creative Learning Centre projects.
Neighbouring residents to the Sydney Opera House	<ul style="list-style-type: none"> • SOHT provides regular face-to-face briefings on the Renewal program to neighbours of the Opera House, including residents of the Bennelong Apartments. This included on the 16 August 2016, 16 May 2017 and 12 July 2018.
Other	<ul style="list-style-type: none"> • The SOHT has also provided face-to-face briefings on the Building Renewal Program to the following key stakeholders: <ul style="list-style-type: none"> ○ Department of Premier and Cabinet ○ The Treasury ○ Infrastructure NSW ○ Arts NSW ○ Royal Botanic Gardens Sydney ○ Sydney Harbour Foreshore Authority ○ Circular Quay Precinct Steering Committee ○ Government Property NSW ○ Art Gallery of NSW ○ State Library of NSW

Stakeholder	Consultation Summary
	<ul style="list-style-type: none"> ○ Artspace ○ The Museum of Contemporary Art ○ Committee for Sydney ○ Tourism and Transport Forum
Onsite commercial operators	<ul style="list-style-type: none"> • SOHT provided a briefing on the Renewal Building Program to onsite commercial operators on 12 August 2016 and 31 March 2017. Another session is scheduled to take place in October 2018.
Disability community	<ul style="list-style-type: none"> • SOHT provided briefings on the Renewal Building Program to members of the accessibility community on 15 August 2016 and 17 September 2018. • A community representative in a mechanised wheelchair specifically welcomed the passage on the eastern side of the Concert Hall and new lifts which will enable wheelchair access all levels of the harbour-side Northern Foyer for the first time and making this section of the Opera House independently accessible.
Opera House donors and corporate sponsors	<ul style="list-style-type: none"> • SOHT provided a briefing on the Renewal program to donors and partners on 12 August 2016, 28 September 2016, 26 September 2018 and 4 October 2018.
Business Events Sydney	<ul style="list-style-type: none"> • A Renewal briefing took place with Business Events Sydney on 24 August 2016.
Architectural and heritage community	<ul style="list-style-type: none"> • A face-to-face briefing took place with members of the architecture and heritage community on 13 September 2016 and a specific briefing on the Concert Hall and Creative Learning Centre upgrades took place on 27 February 2018. • A further briefing occurred on 12 October 2018.
Performing arts community	<ul style="list-style-type: none"> • A Renewal briefing took place with members of the Performing arts community on 30 August 2016.
General public	<ul style="list-style-type: none"> • Information about the Renewal projects were made publicly available from August 2016.
Sydney Opera House Staff	<ul style="list-style-type: none"> • Opera House staff have been consulted extensively throughout the development of the proposal, including face-to-face briefings that took place from August – October 2018. • Opera House employees across the organisation have also been involved in the development of the designs and the proposal.

Table 8: Stakeholder Consultation (Source: Sydney Opera House Trust)

3.5 Proposed future consultation framework

The SOHT have prepared a consultation framework which proposes to establish a forum to provide local resident and interested members of the community with an update on the operations and management of SOH.

The forum will be held twice a year with the aim of informing and addressing any concerns raised by the Bennelong Apartments or residents of Kirribilli. A copy of the proposed future consultation framework is provided at Appendix 9.

4 Strategic Justification

4.1 Need for the proposal

As outlined in Section 1.1, the proposed works are part of the Building Renewal Program for the Opera House, which is aimed at maximising its economic and cultural contribution to NSW, improving the operational efficiency of the building and ensuring compliance with modern building, accessibility and WHS requirements.

The proposal has been the subject of a rigorous process of review amongst key stakeholder groups, specialist consultants, the Opera House's heritage architect, the Eminent Architects Panel and Conservation Council. The proposed works are the result of this rigorous review process.

The purpose for the enhancements to the Concert Hall is to improve:

- the acoustic performance of the facility
- compliance to current building codes and standards
- access to the facility for all
- customer experience and enjoyment of the facility
- flexibility and capability to meet a diverse range of production demands
- flexibility to adapt to newer technologies
- safety of back of house operations
- efficiency of production installations and turnarounds through improved systems and technology and design
- utilisation of the facility and its use for multiple productions
- support facilities such as storage and rehearsal facilities for performers.

For the first time, the Opera House will have a dedicated space for children and young people to experiment and learn in a building that embodies creativity and innovation. Students, teachers and visitors will learn to collaborate in ways that foster creativity, problem-solving and innovative-thinking.

This project transforms existing office spaces in the building's north-western corner to maximise public enjoyment of the Opera House – a public asset - and enable artists, Opera House resident arts companies and creative-learning specialists to inspire the community.

The Creative Learning Centre will be a flexible space hosting workshops, creative-play activities, talks and performances, and will also include a separate space for a permanent digital classroom. Consistent with the multi-purpose nature of the Opera House and most spaces within the building, when the Centre is not being used for creative learning, it may be used for occasional small scale events and functions e.g. for gatherings prior to performances in the Concert Hall or Western Venues.

The proposal therefore comprises essential works needed to ensure that the Sydney Opera House continues to provide world-class facilities for celebratory events, as well as a revenue stream to assist funding other activities and which meet operational, accessibility and WHS standards.

4.2 Options and design alternatives

4.2.1 Renewal Design Process

The opportunity for change at the Sydney Opera House was articulated by Jørn Utzon in the Utzon Design Principles (2002):

“As the architect of the Sydney Opera House, as the creative force behind its character, I sincerely believe that a large multipurpose structure such as this building, in time will undergo many natural changes.

The ideas as they were developed in the sixties, evolved as the result of the needs and technique at the time.

As time passes and needs change, it is natural to modify the building to suit the needs and technique of the day.

The changes, however, should be such that the original character of the building is maintained.

That is to say, I certainly condone changes to the Sydney Opera House. Both changes due to general maintenance and changes done due to functional changes.

Had I completed the Sydney Opera House as the architect in charge, the building would have developed and changed with the time ever since.”

As identified in Section 4.1 there is a clear need for change, the Opera House operates in a rapidly shifting landscape with increasing technological innovation, especially in the performing arts, and growing popularity of cultural tourism. The table below summarises the implications of a ‘do nothing’ approach.

Case for Change	Do Nothing
Age and rapidly advancing technology are affecting the operational capacity of the building to meet the requirements of contemporary performers and audiences, and its capabilities as a world-class performing arts centre	<ul style="list-style-type: none"> • Technology not updated • Unable to meet requirements of contemporary performers or audiences • Status as a world class performing arts venue diminished.
Critical infrastructure components have reached the end of their operational life	<ul style="list-style-type: none"> • Technology not updated, left in current state • Increased maintenance costs • Greater chance of ‘downtime’ or un-planned maintenance.
Physical limitations, some stemming from design scope changes made in the late 1960s, constrain safety, accessibility, operational efficiency and financial sustainability	<ul style="list-style-type: none"> • Physical limitations remain • Compliance risks increase in relation to safety and accessibility legislation • Increased costs to implement administrative overlays, with limited operational and artistic effectiveness • Greater reliance on Government funding for operations and maintenance.
Changed legal and regulatory requirements, including workplace health and safety, building codes, accessibility and security, have significantly increased compliance risks.	<ul style="list-style-type: none"> • Increased compliance risk • Increased administrative overlays • Increase operational costs in insurance premiums and staffing.

Table 9: Assessment against clause 6.21 (4) of Sydney LEP 2012

Detailed design analysis has been undertaken in consultation with the SOHT's Heritage Architect and the EAP to determine the opportunities and constraints associated with the proposed action. In particular, this analysis focussed on design options that:

- implement the recommendations of the Sydney Opera House Accessibility Masterplan (AMP)
- resolve existing WHS issues
- improve the operational efficiency of the building to ensure the Opera House is provided with state of the art performance facilities, consistent with similar world-class performing arts venues
- supplement and enhance the World and National heritage values of the site
- minimise the removal or modification of significant building fabric.

4.2.2 Options and alternatives analysis

A detailed Options and Design Alternatives Analysis (ODAA) has been prepared by the SOHT in conjunction with its architects and the Heritage Architect and is provided at Appendix 10. The HIS, which is provided at Appendix 11, also considers the options and alternatives for the proposal.

The ODAA has applied closer detailed design scrutiny to several components of the proposal as they have a more significant impact on the Opera House's structure and fabric, including:

- Level 2 passageway in Concert Hall Eastern Foyer
- lifts in the Concert Hall Northern Foyer (Lifts 29 and 30)
- acoustic upgrades to the Concert Hall, including changes to the stage, anteroom, wings, air conditioning and noise reflectors
- upgrades to Concert Hall technical systems
- introduction of the Creative Learning Centre

A summary of the options and alternatives analysis is provided below, for the detailed assessment refer to Appendix 10.

Concert Hall

Accessibility Passageway

The provision of a passageway in the location identified in the proposal is considered appropriate on the basis that Jørn Utzon's original design for the building envisaged passageways on Level 3 in both the Eastern and Western foyers of the JST and Concert Hall. The current proposal for a passageway builds upon this vision for access.

The initial concept was for a symmetrical approach (two passageways, one either side of the Concert Hall) to provide universal access to the areas around the Concert Hall, Southern & Northern Foyer connections. However, the SOH Executive determined that the option of only one passageway should be taken forward, and that this passageway should be on the Eastern Foyer side. This would retain the broad sweep of stairs in its original form on one side of the auditorium, reduce the heritage impact on significant fabric and minimise change when viewed from external areas.

Testing concluded further schematic designs were required to determine the full impacts of the works on the integrity of the internal building spaces and significant building fabric. All options were reviewed with the EAP, CC and the Heritage Consultant - Design 5 Architects.

The consensus reached was that the centrally located passage was the best option to proceed with to satisfy both heritage and DDA amenity requirements. Escalators located within the Eastern and Western Foyer stairs were also considered but due to the existing building structure restricting the space required to accommodate escalators this option was ruled out. Various options were considered for the materials and detailing of the stairs and integration into existing fabric.

Final schematic design resulted in the alignment and width of the passageway entry in the eastern foyer being positioned to provide users with an obvious path of travel while keeping the existing stairs as wide as possible on either side of the entry.

Northern Foyer Lifts

In terms of the conceptual analysis, four design options were identified and tested. These options comprised:

- Option 1: a single lift located at the eastern end of the broad stairs in the Northern Foyer, along with an optional connecting “bridge”, necessary to provide an accessible travel path to the accessible seating via Level 4 on both sides of the auditorium.
- Option 2: construction of two new lift shafts (lift shafts 29 & 30) within the Northern Foyers towards the edges of the central broad stairs.
- Option 3: construction of two new lift shafts (lift shafts 29 & 30) within the Northern Foyers at the centre of the central broad stairs and connecting “bridges” to Level 4.
- Option 4: construction of two new lift shafts (lift shafts 29 & 30) within the Northern Foyers towards the outer edges of the Northern Foyer.

Option 4 was deemed the most appropriate option as it had the least impact on existing fabric. The Schematic Design phase focussed on resolving the impact on the Northern Foyer stairs and cranked beams, along with assessing the preferred finishes for the lift, lift shaft and the modifications to the stairs.

The design development phase saw more resolution of the positioning and finishes of the two lifts (note that Lift 29 on the western side is a mirror image of Lift 30 on the eastern side). This phase has arrived at a “cantilevered” car solution for the lift, which results in no visible lift structure at Level 4.

Modifications to stage platform

At the concept design stage, the SOH’s acoustic consultants, Müller-BBM, developed an “Issues and Solutions Summary”. Based on Müller-BBM’s measurement results and stakeholder workshops and subjective listening tests, key issues regarding the acoustics in the Concert Hall were developed together with impacts of these issues and potential solutions. The proposed “solutions” to solve the acoustic issues are listed below, and the Concept Design by Müller-BBM was peer reviewed by Larry Kirkegaard, and also by Raf Orłowski of Rambøll:

1. Acoustic Orchestral Mode Modifications
 - a. Modifications to the stage platform (podium) and surrounds
 - b. Acoustic reflectors
 - c. Diffusive surfaces on the stage surround, box fronts and rear walls
2. Amplified Mode Modifications
 - a. Variable Acoustic Canopy
 - b. Banners and Drapes
 - c. New Sound System

The schematic design phase saw further refinements of the design for the stage and podium, and specifically the chevron pattern to the choir stalls was deleted. It included the automated forestage lift (stage extension), automated seat removal and understage storage of the forestage seating rows was added. In addition, retractable and removal stairs to access the choir stalls, acoustically diffusive surfaces on the walls surrounding the stage were included. The design development phase removed the perforations from the rear wall of the stage surround.

Acoustic Reflectors

At the concept design stage, the proposed reflectors included:

- ceiling reflectors suspended close to the ceiling of the Concert Hall
- forestage, overstage and choir reflectors suspended above the stage
- retractable “drawer” reflectors in the walls of the Concert Hall.

The design development phase saw further refinement of the acoustic reflectors. The ceiling reflectors have been deleted and the design of the overstage reflectors has been refined.

During design development full size prototypes of the over stage and side wall reflectors adjacent to the stage, along with a full size mock-up of the stage risers, were temporarily installed and a series of rehearsals and concerts were performed to test the acoustic performance and assess the visual impact of the new reflectors (Appendix 11). The results of the acoustic testing and responses to the design were very positive. Two further prototype tests were conducted in the Hall exploring the colour and finish of the reflectors. The result of this process has been the selection of the magenta colour in the semi-gloss finish and this is supported by the EAP. The use of the signature magenta colour will strengthen both Utzon and Hall’s concept of using celebratory colours in the auditoria. A natural timber finish matching the white birch ceiling has not been used as it may potentially confuse and detract from the strong geometric configuration of the ceiling.

The final design of the sidewall reflectors was developed after the design development stage, following a detailed review of the “drawer” style design. A folding design has been developed which minimises the amount of intervention in the structural members behind the plywood walls of the Concert Hall.

Box Fronts, Stage Surrounds and Rear Diffusion

Various options for the pattern and profile of the diffusive wall panels have been explored. They have been based on patterns generated by musical wave geometry. This has allowed a variety of options to be easily generated and acoustically tested. The proposed pattern has been tested by the acoustic engineers and also been prototyped in the brushbox timber finish

Amplified Mode

With the change of configuration for the overhead acoustic reflectors, a concurrent change to the automated banners and drapes was necessary. The folding, rectilinear overhead reflectors became petal shaped and their internal reflective elements were removed and a more intense pattern of drapes from the ceiling crown above the stage were proposed.

An options analysis around colours was developed and reviewed with the EAP. Black, magenta (picking up the magenta colour of the seating in the Concert Hall) and white birch were all considered. The culmination was that the EAP supported the magenta tone (or similar) for upper drapes and the drapes adjacent to the performance space on the stage remained black.

Theatre Machinery and Technical Zone

The concept design phase proposed that the Rigging System be renewed to provide enhanced flexibility, increased capacity and improvement in changeover productivity

The design development phase refined the proposed changes, including relocate Plant Room 21 to the northern end of the ceiling space, relocate plant relating to new wing platforms either side of the current plant room, demolish plant servicing the East and West Foyers, provision of new ceiling penetrations for fly-lines and close off redundant existing penetrations. The final design has seen a reduction in the amount of plant to be relocated.

Creative Learning Centre

The Creative Learning Centre area was originally intended by Utzon as the primary entry to the administration areas but has never operated as such and the project area is presently occupied by offices and associated facilities.

Initially three concepts were developed. Each option had different imperatives and/or opportunities for programming, access and amenities.

- Option 1 with amenities to north and south of the front western entry and a larger store room
- Option 2 with amenities to south of the front western entry and a smaller store room
- Option 3 with three lifting platforms to facilitate a quick changeover for displays and usage (vertical programming).

Option 2 was chosen for further development during the Schematic Design Phase when various user configurations were determined. The Detailed Design Phase firmed up details of Option 2 and a number of simplifications were made:

- deletion of motorised lighting bars in favour of all fixed bars
- reduced number of wobbly joinery cupboards
- a single position for the green screen
- reduced numbers of dimmers and dimmer sockets

Final adjustments were made as part of the value engineering process, principally the deletion of the external door onto the Northern Broadwalk.

4.3 Strategic Planning Documents

4.3.1 NSW Premier's Priorities (updated 2018)

In June 2018, the Premier provided an update on the 12 Premier's Priorities. Government's key areas of focus include transport, health, education, environment, police and justice, infrastructure, family and community services, economy and accountability.

- | | |
|---|-----------------------------------|
| • Creating jobs | • Protecting our kids |
| • Delivering infrastructure | • Reducing youth homelessness |
| • Reducing domestic violence | • Driving public sector diversity |
| • Improving service levels in hospitals | • Keeping our environment clean |
| • Tackling childhood obesity | • Making housing more affordable |
| • Improving education results | • Improving Government services |

The proposal is consistent with these Priorities, specifically creating jobs and delivering infrastructure, as it forms an integral part of the broader Sydney Opera House Building Renewal Program and contributes to the enhancement and modernisation of facilities at the Opera House, as well as improved accessibility opportunities, enhanced visitor experience and related spaces to support the Arts.

4.3.2 State Infrastructure Strategy

The *State Infrastructure Strategy* sets out the NSW Government's Rebuilding NSW Plan, which involves the investment of \$20 billion in new infrastructure across the state.

The Strategy states that as part of a new cultural infrastructure plan, the Government will focus future investments on creating an arts precinct in the Sydney CBD. This is aimed at re-affirming Sydney as a major centre for the arts. The Strategy states that priority will be given to investment in the Sydney Opera House, Walsh Bay Arts Precinct, and the Art Gallery of NSW.

The proposed works are consistent with this strategic action of creating an arts precinct in the Sydney CBD.

4.3.3 Greater Sydney Region Plan

The *Greater Sydney Region Plan* outlines how Greater Sydney will manage growth and change in the context of social, economic and environmental matters. It sets the vision and strategy for Greater Sydney, to be implemented at a local level through District Plans.

The Region Plan replaces *A Plan for Growing Sydney* as the leading region plan for Greater Sydney.

The overriding vision for Greater Sydney in the Region Plan is to rebalance Sydney into a metropolis of three unique but connected cities; an Eastern Harbour City, the Western Parkland City and the Central River City with Greater Parramatta at its heart.

The Region Plan provides broad *Priorities and Actions* which focus on the following 4 key themes:

- *Infrastructure and collaboration*
- *Liveability*
- *Productivity*
- *Sustainability*

The Region Plan recognises that artistic and creative expression is central to Greater Sydney's identity and international image and is also a hallmark of an innovative economy. In addition, growing the arts sector will draw greater participation from both residents and visitors, contributing to the economy and attracting visitors. The Region Plan seeks to support opportunities for creative and artistic expression and participation, wherever feasible with minimum regulatory burden.

The Region Plan confirms that sympathetic adaptive re-use of heritage is an important way to conserve significance. Respectfully combining history and heritage with modern design achieves an urban environment that demonstrates shared values and history and contributes to a sense of place and identity.

The Region Plan seeks to foster the visitor economy and supports the development of places for artistic and cultural activities, protecting heritage to enhance cultural tourism and supporting the appropriate growth of the night-time economy.

The proposed works are consistent with the Directions and Objectives of the Region Plan by promoting artistic and creative expression and sympathetically and respectfully enhancing the Sydney Opera House. The proposal would further foster the visitor economy by making the Opera House more accessible and a richer experience for local and international tourists.

4.3.4 Eastern City District Plan

The GSC has prepared District Plans to guide the implementation and 40-year vision of the Region Plan, and to connect local planning with the longer-term metropolitan planning for Greater Sydney Region. The Plans set overall Planning Priorities including liveability, productivity and sustainability, which give effect to the draft Regional Plan.

The GSC has divided the Greater Sydney Region into five districts including Central City, Western City, Eastern City, North and South Districts, and the District Plans are intended to inform local council planning and influence the decisions of State agencies.

The Sydney Opera House is located within the Eastern City District.

The proposed works are part of the Building Renewal Program for the Opera House, which is aimed at maximising its economic and cultural contribution to NSW, improving the operational efficiency of the building and ensuring compliance with modern building, accessibility and WHS requirements.

On this basis the proposal is considered to be consistent with the intent of the strategy in enhancing and promoting part of Sydney's cultural heritage and tourism.

4.3.5 Sustainable Sydney 2030 Community Strategic Plan 2014

Sustainable Sydney 2030 is the strategic plan for the City of Sydney Local Government Area and contains a vision and set of goals to be a Green, Global and Connected city. The proposal will contribute to the enhancement and modernisation of facilities, as well as improved accessibility opportunities which is consistent with the global goal which aims to ensure Sydney:

- remains a significant global city and international gateway with world-class tourism attractions and sustained investment in cultural infrastructure, icons and amenities
- supports social, cultural and recreational facilities to nurture, attract and retain global talent
- embraces innovation, and new generation technologies
- will be part of global cultural networks and an active participant in global knowledge exchange.

4.3.6 Sydney's Walking Future

Sydney's Walking Future is a NSW Government document aimed at encouraging walking in Sydney through actions to make it a more convenient, better connected and safer mode of transport. It aims to promote walking in Sydney through three pillars of activity:

- Promote the benefits of walking and provide quality information to customers
- Connect communities by delivering safe walking infrastructure and completing networks
- Engage with partners across the NSW Government, with local government, non-government organisations and the private sector to develop initiatives and policies.

Although none of the actions outlined in *Sydney's Walking Future* directly relate to the Sydney Opera House, it is noted that the Sydney Opera House is well-connected in terms of walkability to the major transport interchange of Circular Quay and to other key sites such as the Botanic Gardens.

The proposed Concert Hall and Creative Learning Centre project will promote the overall aims of the document as they will provide a new, highly accessible Creative Learning Centre and modernisation of the Concert Hall. The proposed works will not result in any adverse impacts on pedestrian access to or circulation around the external areas of the Sydney Opera House.

4.4 Sydney Opera House Plans and Policies

4.4.1 Sydney Opera House Management Plan

The *Management Plan for the Sydney Opera House* was prepared in 2005 and aims to:

- *protect and conserve the National and World Heritage values of the Sydney Opera House*
- *minimise duplication in the environmental assessment and approval of actions that may impact on the National and World Heritage values of the Sydney Opera House*
- *ensure there will be adequate environmental assessment of actions that may impact upon the National and World Heritage values of the Sydney Opera House*
- *ensure that actions that will have unacceptable or unsustainable impacts on the National and World Heritage values of the Sydney Opera House will not be approved*

The Management Plan incorporates the *Sydney Opera House Conservation Management Plan*, the *Utzon Design Principles* and the *Statement of National Heritage Values of the Sydney Opera House* (these documents are discussed separately below).

It is given legal effect through clause 288 of the EPAR, which requires consideration of the management plan in the assessment of any development at the Opera House under section 4.15(1) of the EP&A Act, including consideration of the proposal with the objectives of the Management Plan. The Management Plan describes the regulatory requirements affecting development of the Opera House and requires a Section 60 approval under the *NSW Heritage Act 1977* to be obtained for the proposed works.

A Statement of Heritage Impact must accompany the application which analyses the proposal in terms of its impact on the heritage significance of the site, and against the policies outlined in the Conservation Management Plan (CMP), showing whether the impact of the proposal will compromise the heritage significance of the Sydney Opera House. The Statement must also include a consideration of the way in which the National and World Heritage values (if any) are likely to be affected.

In determining the application, the Minister must consider any potential impacts on the National and World Heritage values of the Opera House and take account of the precautionary principle. Activities should not be approved if they will have unacceptable or unsustainable impacts (significant adverse impacts) on the National and World Heritage values of the Opera House.

A HIS accompanies this application (Appendix 11) which provides an assessment of the proposal's impact on National and World Heritage values. These considerations are discussed further in Sections 5 and 6.2 of this report, where it is demonstrated that the proposal will result in overall positive impacts on the National and World Heritage values of the Opera House.

4.4.2 Respecting the vision – Sydney Opera House, a Conservation Management Plan (CMP 4th edition)

The CMP 4th edition, endorsed by the NSW Heritage Council in August 2017, has been used as the basis for the assessment of heritage impacts on individual spaces and fabric affected by the Concert Hall and Creative Learning Centre renewal projects.

The CMP identifies and defines the significant values of the Sydney Opera House and then formulates policies framed to retain these values. The HIS assesses the impact of the proposed suite of projects in the same order as the CMP and include:

- Significant values
- Overarching policies
- Significant elements and components of the place
- Operational and management considerations.

Compliance with the CMP 4th edition is demonstrated in the HIS (Appendix 11) and Section 6.2.4 of this report.

4.4.3 Utzon Design Principles, 2002

The *Utzon Design Principles* outline Jørn Utzon's vision for the building and its setting, his comments on the future of the building, and the fundamental principles underlying his designs. It is a permanent reference document for the conservation of the building and its setting and to clarify original design intent, manage proposals for change and influence planning controls for the precinct.

Compliance with the relevant design principles is demonstrated in the HIS (Appendix 11) and Section 6.2 of this report.

4.4.4 Statement of National Heritage Values of the Sydney Opera House

This document describes the heritage significance of the Opera House and details its history. Its focus is construction of the main buildings on the design of Jørn Utzon that took place between 1957 and 1973. Compliance with the relevant provisions is demonstrated in the HIS (Appendix 11) and Section 5 of this report.

4.4.5 Sydney Opera House Accessibility Master Plan

The Sydney Opera House Accessibility Master Plan (AMP) outlines accessibility initiatives for the Sydney Opera House Building Renewal Program and provides an overall plan for

accessibility upgrades that can then be progressively implemented via discrete Renewal Projects.

The AMP demonstrates the SOHT's commitment to the implementation of the *NSW Government Disability Policy Framework*, which is underpinned by the *Commonwealth Disability Discrimination Act 1992*, the *NSW Anti-Discrimination Act 1977*, the *NSW Disability Inclusion Act 2014*, *Australian Standard AS 1428 Design for Access and Mobility*, and the *Disability (Access to Premises - Buildings) Standards 2010*.

The proposed Concert Hall and Creative Learning Centre works have been assessed as achieving accessibility compliance and is therefore generally consistent with the SOHT's Accessibility Management Plan.

5 Statutory Planning Framework

5.1 Relevant Commonwealth Legislation and Policy

The *Environment Protection and Biodiversity Conservation 1999* (EPBC Act) provides for the protection of Matters of National Environmental Significance, including National and World Heritage listed sites. The Sydney Opera House was inscribed on the National Heritage List in 2005 and the World Heritage List in 2007.

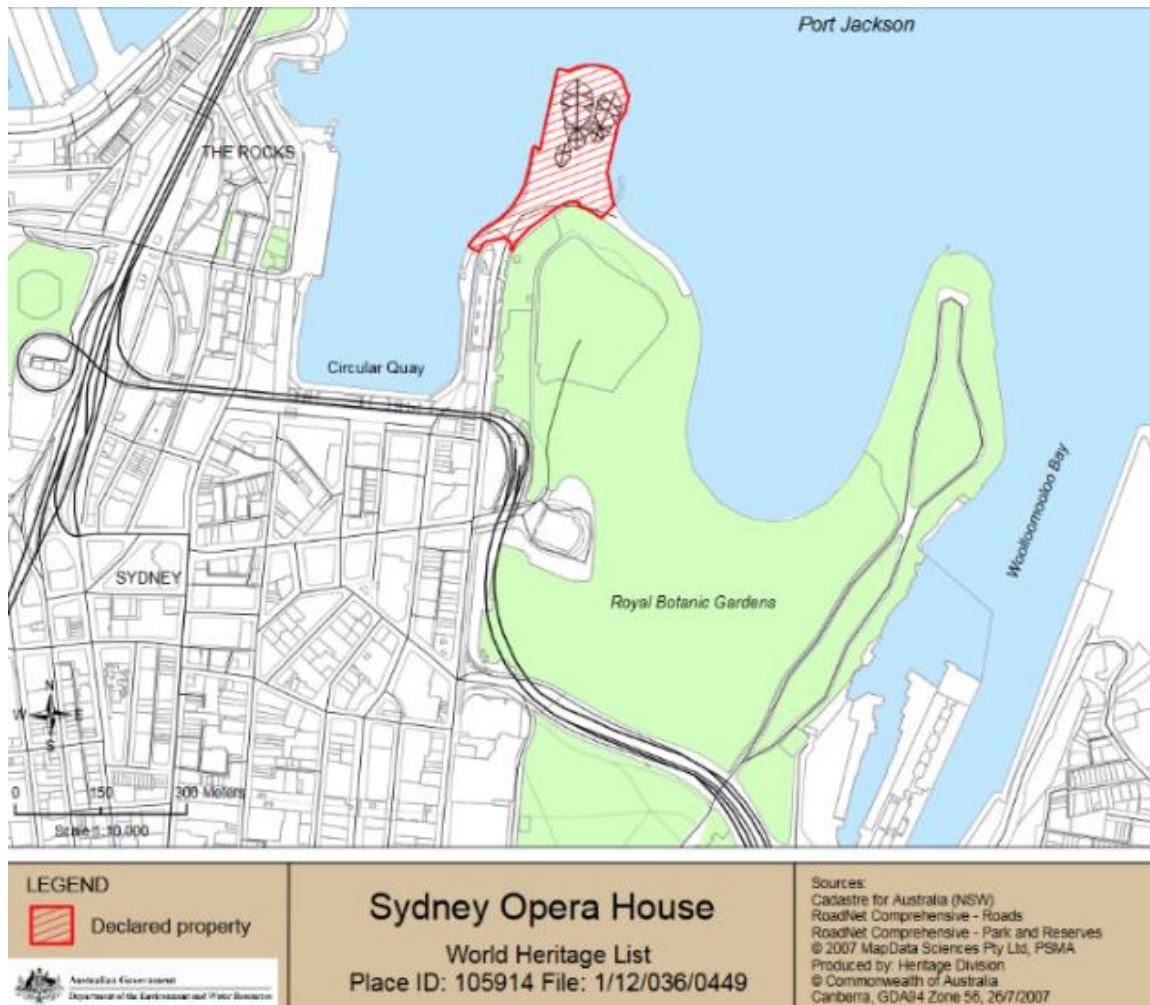


Figure 21: Sydney Opera House World Heritage Listing (Source: Commonwealth Department of Environment)

Actions that will or are likely to have a significant impact on matters of environmental significance under the EPBC Act require the approval of the Commonwealth Minister for the Environment. This report and the HIS (Appendix 11) concludes the proposed works will have overall positive impacts on the SOH and will not threaten or diminish the Outstanding Universal Values that enshrine it on the World Heritage List.

As discussed in Section 1.4, the Concert Hall and Creative Learning Centre components of the Building Renewal Program are subject to approval under the EPBC Act. Below is a summary of the timeline for this decision.

On 1 June 2017, the SOHT referred the proposed works comprising the project to the DEE for a decision on whether they are a controlled action under the EPBC Act.

On 17 July 2017, the delegate of the Minister for Environment and Energy, under section 75 of the EPBC Act, determined that the proposed works are a controlled action (EPBC 2017/7955). As such it was determined the application requires an assessment and determination under the EPBC Act.

As the project has been deemed to be a controlled action, it will be assessed in accordance with the Bilateral Agreement [between New South Wales and the Commonwealth] made under section 45 of the EPBC Act 1999 relating to environmental assessment under the EP&A Act.

Subsequent to the controlled action decision on 17 July 2017, Keylan Consulting, on behalf of the SOHT, wrote to the DEE requesting a variation to the proposed action to reflect proposed modifications to the projects, including:

- Removal of Concert Hall Rehearsal Room 1 (GM.01) & Rehearsal Room 2 (GM.02)
- Removal of the Southern Foyers scope.

On 24 August 2017, the DEE approved the variation to the proposed action to remove the works noted above.

On 16 May 2018, the SOHT wrote to the DEE advising that works associated with UtS were proposed to be removed from the proposed action. Previously proposed works including lighting, seating, digital art walls and signage will not be progressed at this time.

As the paving works associated with UtS are proposed to proceed (and will be undertaken as exempt development under *State Environmental Planning Policy (State Significant Precincts) 2005*), the Sydney Opera House's Heritage Architect undertook an assessment of the paving's impact on the Opera House's World and National Heritage Values. On the basis of this assessment, it was determined that the proposed paving does not have a significant impact on a Matter of National Environmental Significance.

On 13 June 2018, the DEE approved this request to vary the proposed action.

Accordingly, works relating to the Concert Hall and Creative Learning Centre comprise the controlled action requiring approval under the EPBC Act.

All relevant Commonwealth approvals are included at Appendix 3.

5.2 Environmental Planning and Assessment Act 1979

The EP&A Act provides the statutory framework for planning in NSW. Section 4.36 of the EP&A Act enables certain developments to be declared SSD by means of a State Environmental Planning Policy (SEPP) or by order of the Minister for Planning.

The project is SSD as Clause 1 of Schedule 2 of the SRD SEPP states that all development on land identified as being within the Sydney Opera House site is SSD (see Section 5.6.2). As

the works described in this report do not meet the exempt development categories of the SSP SEPP, they are considered to be SSD.

The project will be assessed under Part 4 Division 4.1 of the EP&A Act. The Minister for Planning is the consent authority for SSD.

This report responds to the requirements of Section 4.12 of the EP&A Act which requires the preparation of an EIS, Schedule 2 of the EPAR and the SEARs as outlined in Sections 5 to 7.

5.2.1 Objects

Development under the EP&A Act must have regard to the objects set out in Section 5 of the Act. The proposed development is considered to be consistent with the objects of the Act as follows:

The Objects of the Act	Response
The objects of this Act are as follows:	
(a) <i>To promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources,</i>	The proposed development will promote social and economic welfare of the community and a better environment by proper management, development and conservation by providing enhanced patron facilities, improved accessibility and world-class facilities for celebratory events, without adversely impacting on the heritage significance of the building or the surrounding environment.
(b) <i>to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment,</i>	The proposed works will be carried out in accordance with the principles of ESD principles (Section 6.9).
(c) <i>to promote the orderly and economic use and development of land,</i>	The proposed development will improve accessibility to and around the Sydney Opera House and provide for more contemporary patron facilities which will support its intended purpose of providing world-class theatre facilities and will contribute to the Opera House maximising its economic and cultural contribution to NSW.
(d) <i>to promote the delivery and maintenance of affordable housing,</i>	The proposal does not comprise affordable housing.
(e) <i>to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats,</i>	As the proposed works are largely internal and beneath the building and all works will be carried out in accordance with the CMP and are not considered to lead to any significant adverse impacts on the environment.
(f) <i>to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage),</i>	The Heritage Impact Statement prepared by Design 5 Architects concludes: <ul style="list-style-type: none"> The accessibility, functional and acoustic related works in the Concert Hall and its foyers will strengthen the core function of the Opera House as a performing arts centre and have a positive impact on its National Heritage values.

The Objects of the Act	Response
	<ul style="list-style-type: none"> The Creative Learning Centre project will retain and respect the design regimes of both Utzon and Hall and provide a unique facility that closely relates to the Western Foyers and other spaces within the Podium. This facility will enhance the ability of the Opera House to engage with and promote the performing arts to younger generations, both locally and nationally. This will strengthen its association with the performing arts and wider community. The project will improve amenity and comfort, improve acoustic performance.
(g) to promote good design and amenity of the built environment,	The HIS concludes this project will strengthen the identity of the Opera House as a nationally important visual, cultural and tourist focus.
(h) to promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants,	The proposed development will provide improved access, operational efficiency and patron facilities at the Sydney Opera House.
(i) to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State,	The proposed development is SSD and therefore the Minister for Planning is the consent authority. However, the City of Sydney Council has been consulted by the DP&E during the preparation of the SEARs and has been consulted through the DA assessment process.
(j) to provide increased opportunity for community participation in environmental planning and assessment.	The proposed development will be publicly exhibited in accordance with the requirements of the EP&A Act.

Table 10: Objects of the EP&A Act

5.2.2 Section 4.15 Assessment

The Minister (or the Minister's delegate) is required to take into consideration the matters listed under section 4.15 of the EP&A Act when determining the development application.

An evaluation of the proposal against the provisions of Section 4.15(1) of the Act is provided below:

Relevant Provision	Comment
(a) the provisions of:	
(i) any environmental planning instrument, and	Relevant environmental planning instruments are addressed in Sections 5.6 and 5.7.
(ii) any proposed instrument that is or has been the subject of public consultation under this Act and that has been notified to the consent authority (unless the Secretary has notified the consent authority that the making of the proposed instrument has been deferred indefinitely or has not been approved), and	<p>The draft State Environmental Planning Policy (Environment) applies to the site.</p> <p>The draft SEPP was exhibited from 31 October 2017 to 31 January 2018.</p> <p>The proposal has been assessed against the draft Environment SEPP and the conclusions of the assessment against the Harbour SEPP (Section 5.6.3) are considered to continue to apply.</p>

Relevant Provision	Comment
(iii) any development control plan, and	As the proposal is SSD, DCPs do not apply (clause 11 of the SRD SEPP).
(iia) any planning agreement that has been entered into under section 7.4, or any draft planning agreement that a developer has offered to enter into under section 7.4, and	Not applicable
(iv) the regulations (to the extent that they prescribe matters for the purposes of this paragraph),	The development application meets the relevant requirements of the EP&A Regulation, including Clause 288 that requires the provisions of the SOH Management Plan be taken into consideration by the consent authority. The procedures relating to development applications, public participation procedures for SSDs and Schedule 2 of the EP&A Regulation relating to environmental impact statements have been satisfied.
(v) (Repealed)	Not applicable
(b) the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality,	<p>The HIS concludes the proposal should not threaten or diminish the outstanding universal values that underpin this World Heritage Listing.</p> <p>The proposed works will improve amenity and comfort, improve acoustic performance within the SOH.</p>
(c) the suitability of the site for the development,	As the proposed works generally relate to enhanced patron facilities at the Sydney Opera House, the site is suitable for the proposal. Potential impacts of the proposal on the site and surrounds are considered in Section 6.
(d) any submissions made in accordance with this Act or the regulations,	<p>Any submissions made on this subject development application will be duly considered and addressed by <i>Keylan Consulting Pty Ltd</i>.</p> <p>In addition, DP&E will consider any public submissions relating to the proposal during its assessment.</p>
(e) the public interest.	The proposal is considered to be in the public interest as it will provide enhanced patron facilities, educational facilities, gathering spaces and accessibility improvements at the Sydney Opera House without adversely impacting on the heritage significance of the building or the surrounding environment.

Table 11: Section 4.15(1) assessment

5.3 Environmental Planning and Assessment Regulation 2000

As outlined in Section 1.4, this EIS responds to the requirements set out in Schedule 2 of the EP&A Regulation.

Clause 288 of the EP&A Regulation requires the provisions of the Management Plan for the Sydney Opera House to be considered in the determination of this application. Section 6.2.4 details the applicable components of the Management Plan relevant to the Opera House.

5.4 Heritage Act 1977

The *Heritage Act 1977* makes provisions to conserve the State's environmental heritage. It provides for the identification, registration and protection of items of State heritage significance and constitutes the Heritage Council of New South Wales.

The Sydney Opera House is listed on the State Heritage Register.

An Order under section 57(2) of the Heritage Act provides that a range of works at the Opera House are exempt from the requirement for approval under section 57(1). The proposed Concert Hall and Creative Learning Centre project works subject to this EIS are considered to be beyond the scope of these exemptions and will therefore require approval under section 57(1) of the Heritage Act. This process is intended to ensure that any changes or additions on site do not detract from the heritage significance of the place.

An application for approval for the works will therefore be made to the Heritage Council under section 57(1) of the Heritage Act.

The HIS (Appendix 11) and Section 7 of this report demonstrate the proposed works will not detract from the heritage significance of the Opera House and will be consistent with the provisions of the Heritage Act 1977 and should be supported.

5.5 Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act 2016* (BC Act) commenced on 25 August 2017 and provides the legislative framework for the assessment of biodiversity impacts from the development and use of land throughout the State.

Under sections 7.3 and 7.9 of the new BC Act, SSD applications require an accredited ecologist to prepare a BDAR. The BDAR reflects the current 7-part test in section 1.7 of the EP&A Act and the assessment must include the following:

- *assesses the biodiversity values (as defined in s1.5 of the BC Act) of the land the subject of the proposed DA, in accordance with the BAM*
- *assesses the impact of the proposed DA, proposed activity or proposed clearing on the biodiversity values of that land*
- *sets out the measures the proponent proposes to take to avoid or minimise the impact*
- *specifies the number and class of biodiversity credits that are required to be retired to offset the residual impacts on biodiversity values of actions to which the BOS applies.*

The consent authority must consider if the proposed development is likely to have serious and irreversible biodiversity impacts when assessing SSD or SSI and determine any

additional and appropriate measures that would minimise the impacts, if a consent or approval was to be granted.

Notwithstanding, under section 7.9(2) *“the Planning Agency Head and the Environment Agency Head [may] determine that the proposed development is not likely to have any significant impact on biodiversity values”*. If this determination is made, a BDAR is not required.

A Biodiversity Statement was prepared by Cumberland Ecology and is provided at Appendix 12, which concludes that the site does not contain any vegetation or threatened ecological community listed under current legislation. As such, the works to the Sydney Opera House are unlikely to impact on any biodiversity values (as defined in section 1.5 of the BC Act).

In line with the above, a request to waive the requirement for a BDAR under section 7.9(2) was submitted to DP&E and the Office of Environment and Heritage (OEH).

On 29 March 2018, DP&E and OEH advised that the proposed development is not likely to have any significant impact on biodiversity values and that there is no need for the SSD application to include a BDAR (Appendix 13).

5.6 State Environmental Planning Policies

5.6.1 State Environmental Planning Policy (State Significant Precincts) 2005

The SSP SEPP seeks to broadly facilitate the development, redevelopment and protection of State significant precincts and to ensure the service delivery outcomes for a range of public purposes. The SSP SEPP identifies a number of State significant precincts and provides planning controls relating to the carrying out of development in these precincts.

The SPP SEPP identifies the Sydney Opera House as a State significant precinct and provides exempt development provisions for the precinct.

Due to the scope of works and their potential heritage impacts, the proposed Concert Hall and Creative Learning Centre works are not considered to fall within the exempt development provisions of the SSP SEPP and therefore require development consent.

5.6.2 State Environmental Planning Policy (State and Regional Development) 2011

The SRD SEPP declares certain types of development and infrastructure to be of State and regional significance. As clause 1 of Schedule 2 of the SRD SEPP identifies all development within the SOH as SSD, the proposal is SSD.

Clause 11 of the SRD SEPP excludes the application of development control plans to SSD, meaning the provisions of the Sydney Development Control Plan (DCP) 2012 do not apply to this application.

5.6.3 Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005

The *Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005* (Harbour SREP) sets out objectives and planning principles for the Sydney Harbour Catchment.

The Sydney Opera House site is within the Sydney Harbour Catchment Area designated in the SREP. It is within the Foreshores and Waterways Area and City Foreshore Area designated as a Strategic Foreshore Site. It is also identified as a Heritage Item in the SREP.

An analysis of the proposal against relevant provisions of the SREP is outlined below:

Clause 13 Planning principles for the Sydney Harbour Catchment

Clause 13 sets out the planning principles which apply to land within the Sydney Harbour Catchment. These principles generally relate to the protection of the natural environmental qualities and scenic character of the harbour and its catchment.

The proposed Concert Hall and Creative Learning Centre works are largely internal works within the Sydney Opera House. External works include:

- alternations to glazing to accommodate two new lifts relating to the Concert Hall and the provision of a new ventilation hood at the western podium elevation
- relocation of double doors on western façade and new access ramp to the Creative Learning Centre

As outlined in Section 6.3, these are relatively minor external elements which do not add to the bulk or scale of the building and which will not impact on views to or from the Opera House or the scenic character of the harbour. The redefinition of the vehicle concourse as a primarily pedestrian space and associated upgrades represent an overall improvement to the appearance of the space and the Sydney Opera House.

Clause 14 Planning principles for the Foreshores and Waterways Area

Clause 14 sets out the planning principles for the Foreshores and Waterways Area. These principles generally supplement the principles of Clause 13 and, in addition, to the protection of the natural environment and scenic qualities of the harbour, includes principles relating to public access to and along the foreshore and opportunities for maritime related uses and public boating facilities along the foreshore.

The proposed works are largely contained within the Sydney Opera House and construction activities will be managed to minimise their interface with the public. The proposed development will also have minimal impacts on external publicly accessible land and areas of the Sydney Opera House.

Clause 15 Planning principles for heritage conservation

Clause 15 sets out the principles for the protection of heritage items and places and views associated with heritage items in and around Sydney Harbour. As outlined in Section 6.2, the heritage impacts of the proposed works have been considered in detail in a HIS and have been assessed as acceptable.

Clause 21 – 27 Matters for consideration

These clauses set out the matters to be addressed prior to the grant of consent for development within the Foreshores and Waterway Area and relate to a range of matters, including:

- *Biodiversity and environmental protection (clause 21)* – the development site does not contain any threatened or vulnerable species, populations, communities or significant habitats. Construction and ongoing operations will be managed in accordance with the Mitigation Measures outlined in this EIS, ensuring no significant indirect impacts on the surrounding environment. As discussed in Section a biodiversity assessment (BDAR) waiver was subsequently on 9 April 2018 and is discussed in Section 5.5;
- *Public access to and use of the foreshores and waterways (clause 22)* - the proposed works are largely contained within the Sydney Opera House and will have minimal impacts on external publicly accessible land and areas of the Sydney Opera House.
- *Maintenance of a working harbour (clause 23)* – not relevant
- *Use of the waterways (clause 24)* – not relevant
- *Scenic quality (clause 25)* – proposed external works are minor elements which do not add to the bulk or scale of the building and which will not impact on views to or from the Opera House or the scenic character of the harbour.
- *Protection of views (clause 26)* – as above.
- *Boat storage facilities (clause 27)* – not relevant.

Part 5 Heritage Provisions

This Part sets out provisions relating to the protection of the World Heritage values of the Sydney Opera House, including the establishment of a buffer zone around the site and protection of views and vistas to the Opera House.

As outlined in Section 5.1, the HIS accompanying this EIS addresses the proposed development against the World Heritage Values of the Sydney Opera House and concludes that the proposed works will not threaten or diminish the Outstanding Universal Values that enshrine the Sydney Opera House on the World Heritage List.

5.6.4 Draft State Environmental Planning Policy (Environment)

The draft State Environmental Planning Policy (Environment) proposes to:

- consolidate seven existing SEPPs relating to the environment (including the Harbour SEPP) into one SEPP
- simplify the planning rules for a number of water catchments, waterways and urban bushland
- update planning rules to reflect changes that have occurred since the creation of the original policies.

The draft SEPP was exhibited from 31 October 2017 to 31 January 2018.

The proposal has been assessed against the draft SEPP and the conclusions of the assessment against the Harbour SEPP (Section 5.6.3) are considered to continue to apply.

5.7 Sydney Local Environmental Plan 2012

The proposal is located on land zoned B8 Metropolitan Centre under the *Sydney Local Environmental Plan 2012* (SLEP 2012). The relevant provisions of the B8 zone are detailed below:

Zone B8 Metropolitan Centre

1 Objectives of zone

- *To recognise and provide for the pre-eminent role of business, office, retail, entertainment and tourist premises in Australia's participation in the global economy.*
- *To provide opportunities for an intensity of land uses commensurate with Sydney's global status.*
- *To permit a diversity of compatible land uses characteristic of Sydney's global status and that serve the workforce, visitors and wider community.*
- *To encourage the use of alternatives to private motor vehicles, such as public transport, walking or cycling.*
- *To promote uses with active street frontages on main streets and on streets in which buildings are used primarily (at street level) for the purposes of retail premises.*

2 Permitted without consent

Nil

3 Permitted with consent

Child care centres; Commercial premises; Community facilities; Educational establishments; Entertainment facilities; Function centres; Information and education facilities; Passenger transport facilities; Recreation facilities (indoor); Registered clubs; Respite day care centres; Restricted premises; Roads; Tourist and visitor accommodation; Any other development not specified in item 2 or 4

4 Prohibited

Nil

As the proposed works primarily relate to development for the purposes of a "entertainment facility" they are permissible with consent in the B8 Metropolitan Zone.

Clause 6.21 of SLEP 2012 relates to design excellence and states that development consent must not be granted to development unless, in the opinion of the consent authority, the proposed development exhibits design excellence.

In considering whether development to which this clause applies exhibits design excellence, the consent authority must have regard to a range of matters (clause 6.21(4)). These are addressed in the table below.

Matter	Comment
(a) <i>whether a high standard of architectural design, materials and detailing appropriate to the building type and location will be achieved,</i>	<p>The proposed works are largely internal, with the exception of:</p> <ul style="list-style-type: none"> • alternations to glazing to accommodate two new lifts relating to the Concert Hall and the provision of a new ventilation hood at the western podium elevation

Matter	Comment
	<ul style="list-style-type: none"> relocation of double doors on western façade and new access ramp to the Creative Learning Centre <p>As outlined in Section 6.3, these are relatively minor external elements which will employ a consistent design language and materials with the existing building.</p> <p>As, outlined above, the works will not adversely impact on the built form or visual character of the Opera House.</p>
(b) <i>whether the form and external appearance of the proposed development will improve the quality and amenity of the public domain,</i>	<p>The proposed works will not add to the bulk or scale of the building or result in any encroachments on or loss of the public domain.</p> <p>Accordingly, there will be no negative impacts on the quality or amenity of the public domain.</p>
(c) <i>whether the proposed development detrimentally impacts on view corridors,</i>	<p>The proposed works will not add to the bulk or scale of the building and will not detrimentally impact on views to or from the Sydney Opera House.</p>
<p>(d) <i>how the proposed development addresses the following matters:</i></p> <ul style="list-style-type: none"> (i) <i>the suitability of the land for development,</i> (ii) <i>the existing and proposed uses and use mix,</i> (iii) <i>any heritage issues and streetscape constraints,</i> (iv) <i>the location of any tower proposed, having regard to the need to achieve an acceptable relationship with other towers (existing or proposed) on the same site or on neighbouring sites in terms of separation, setbacks, amenity and urban form,</i> (v) <i>the bulk, massing and modulation of buildings,</i> (vi) <i>street frontage heights,</i> (vii) <i>environmental impacts, such as sustainable design, overshadowing and solar access, visual and acoustic privacy, noise, wind and reflectivity,</i> (viii) <i>the achievement of the principles of ecologically sustainable development,</i> (ix) <i>pedestrian, cycle, vehicular and service access and circulation requirements, including the permeability of any pedestrian network,</i> 	<ul style="list-style-type: none"> (i) As the proposed works generally relate to enhanced patron facilities at the Sydney Opera House, the site is suitable for the proposal. Potential impacts of the proposal on the site and surrounds are considered in Section 6. (ii) The proposed works do not alter the existing uses of the Sydney Opera House. (iii) Heritage impacts are considered in detailed in the HIS at Appendix 11 and Section 5.1 of the EIS. (iv) N/A (v) The proposed works do not add to the bulk or mass of the building. The new door on the northern façade and alterations to the glass facades of the Northern Foyers are consistent with the existing façades in terms of scale, form and use of matching materials. (vi) N/A (vii) The proposed works will not result in any adverse environmental impacts such as overshadowing, visual and acoustic privacy, noise, wind or reflectivity. Construction impacts and proposed mitigation measures are considered in detail in Section 6.5. (viii) A detailed consideration of ESD measures to be incorporated into the proposal and ESD principles is contained in Section 6.9. (ix) The proposed works will not negatively impact on pedestrian, cycle or vehicular access and movement. Alternative vehicle access arrangements will include the use of the loading dock for service vehicles and drop off at the gate house.

Matter	Comment
(x) <i>the impact on, and any proposed improvements to, the public domain,</i> (xi) <i>the impact on any special character area,</i> (xii) <i>achieving appropriate interfaces at ground level between the building and the public domain,</i> (xiii) <i>excellence and integration of landscape design.</i>	(x) The proposed works will not add to the bulk or scale of the building or result in any encroachments on or loss of the public domain. Accordingly, there will be no negative impacts on the quality or amenity of the public domain. (xi) The Sydney Opera House is located to the immediate north of the Circular Quay Special Character Area. The proposed works are minor and will not impact on this area. (xii) The proposed works will not impact on ground level interfaces and the public domain. (xiii) The proposal does not entail any landscaping works.

Table 12: Assessment against clause 6.21(4) of Sydney LEP 2012

Clause 6.21(5) of SLEP 2012 also states that consent cannot be granted for certain development unless a competitive design process has been held. However, under clause 6.21(6), a competitive design process is not required under subclause (5) if the consent authority is satisfied that such a process would be unreasonable or unnecessary in the circumstances or that the development meets certain criteria.

As the proposal involves only minor external alterations which have been assessed as having no significant impact on the design character or heritage values of the Sydney Opera House, it is considered that a competitive design process is unreasonable or unnecessary.

In this regard, it is noted that the project architects were appointed through a competitive tender process and that the proposed works have been subject to a rigorous review process by the Opera House's heritage architect, the Eminent Architects Panel and Conservation Council at both schematic and concept design stages.

It is also noted that in terms of clause 6.21(6), the proposal:

(a) involves only alterations or additions to an existing building

The proposed works largely comprise internal works, with only minor external alterations to the Sydney Opera House.

(b) does not significantly increase the height or gross floor area of the building

The proposed works do not add to the height or gross floor area of the building.

(c) does not have significant adverse impacts on adjoining buildings and the public domain

As outlined in this EIS, the proposal involves only minor external works which will not impact on any nearby buildings or areas of public domain.

(d) does not significantly alter any aspect of the building when viewed from public places

The proposed external works are relatively minor elements which do not add to the bulk or scale of the building and which will not impact on views to or from the Opera House or the scenic character of the harbour.

On the basis of the above, it is submitted that a competitive design process is not warranted for the proposal.

5.8 Development Control Plans

In relation to *Sydney Development Control Plan (DCP) 2012*, which supplements SLEP 2012 and provides more detailed guidance, clause 11 of the SRD SEPP states that DCPs do not apply to SSD. Accordingly, as the Sydney DCP does not apply to the proposal, it has not been specifically considered in this EIS.

6 Environmental Planning Assessment

6.1 Overview

In assessing the potential impacts of the development and merits of the proposal the following matters were considered:

- the Secretary's Environmental Assessment Requirements (SEARs)
- agency comments
- relevant environmental planning instruments, policies and guidelines
- relevant provisions of the EP&A Act, including the objects of the Act
- relevant documents related to the project including the technical documents forming this Environmental Impact Statement.

6.2 Heritage

The HIS prepared by Design 5 Architects contained in Appendix 11 provides a detailed assessment of each of the key elements of the Concert Hall and Creative Learning Centre including the impact of the works on the site's significant heritage values, including its World Heritage status.

The following key documents form the basis for the HIS:

- *Matters of National Environmental Significance – Significant Impact Guidelines 1.1, EPBC Act 1999, Department of the Environment 2013*
- *Sydney Opera House Conservation Management Plan, 4th Edition*
- *Utzon Design Principles.*

Further, the HIS has been prepared in accordance with the principles and processes of the *Australia ICOMOS Burra Charter 2013* and the NSW Heritage Office guideline *Statements of Heritage Impact* (revised 2002).

6.2.1 World Heritage Values

The HIS notes that the Sydney Opera House was inscribed on UNESCO's World Heritage List (WHL) in 2007 for its Outstanding Universal Value (OUV) and as a "*masterpiece of human creative genius*" under criterion (i) of the Operational guidelines for the implementation of the World Heritage Convention.

The HIS further notes that the proposed works will have negligible impact on the architecture and setting of the Sydney Opera House and result in improved amenity in affected areas that should enhance the standing of the Opera House as an architectural icon.

The Concert Hall works will greatly improve access to the Concert Hall side of the Sydney Opera House, enabling a wider section of society to use and experience the facilities, particularly those with reduced mobility.

The proposed Creative Learning Centre will enhance the ability of the Sydney Opera House to engage with and promote the performing arts.

Combined with the JST, TMP, SAVE, and Function Centre (subject to separate development application approvals), these projects will enhance the patron experience and performance and operational capability of the Sydney Opera House to continue to host and celebrate world standard performance art. The proposal will therefore help sustain the iconic international standing of this Opera House – a key part of its OUV.

The HIS concludes that the proposed works will have significant but ultimately overall positive impacts and thus not threaten or diminish the OUV that enshrine it on the World Heritage List.

6.2.2 National Heritage Values

The HIS considers the proposed works against the relevant criteria of the National Heritage List, as summarised in the table below:

National Heritage List (NHL) Criteria	HIS Comment (Design 5 Architects)
<p>NHL Criterion A Events, Processes <i>The place has outstanding heritage value to the nation because of the place's importance in the course, or pattern, of Australia's natural or cultural history.</i></p> <p>Relevant key values from National Heritage values:</p> <ul style="list-style-type: none"> • <i>"The Sydney Opera House represents a masterpiece of modern architectural design, engineering and construction technology in Australia."</i> • <i>"It is a national icon that has become an internationally recognised symbol of modern Australia and of Sydney, Australia's largest city"</i> • <i>"The challenges involved in executing the design inspired innovative developments in technologies, construction engineering and building methods in Australia, creating the building's distinctive form, fabric and structural systems."</i> • <i>"a seminal role in Australia's performing arts history, enhancing the cultural vitality of the nation and continuously attracting nationally and internationally recognised performers from around the world"</i> 	<p>Concert Hall Renewal Project <i>The Concert Hall renewal project will not have any adverse impacts on these values and will potentially enhance the ability of the Sydney Opera House to attract national and internationally recognised performers with its improved functionality, acoustic performance and accessibility. With changing standards and public expectations, these works, particularly the substantially improved access for patrons, will ensure the Opera House retains its status as Australia's pre-eminent performing arts centre.</i></p> <p>Creative Learning Centre <i>The proposed works to accommodate the new Creative Learning Centre will have no adverse impact on these values. The Creative Learning Centre will retain and respect the significant contribution of Peter Hall in completing and fitting out the Podium, and enhance the ability of the Opera House to engage with and promote the performing arts to younger generations.</i></p>
<p>NHL Criterion B Rarity <i>The place has outstanding heritage value to the nation because of the place's possession of uncommon, rare or endangered aspects of Australia's natural or cultural history.</i></p> <p>Relevant key values from National Heritage values:</p> <ul style="list-style-type: none"> • <i>"The Sydney Opera House is a cultural icon that has no counterpart in Australia. With its distinctive sail-like concrete shell roofs standing boldly upon a massive</i> 	<p>Concert Hall Renewal Project and Creative Learning Centre <i>The projects included in this application will not have any adverse impacts on these values and will likely enhance the Opera House's recognition and respect as a performing arts centre accessible to all.</i></p>

National Heritage List (NHL) Criteria	HIS Comment (Design 5 Architects)
<p><i>granite-faced platform, located prominently on the Sydney Harbour foreshore, the Sydney Opera House is the most widely recognised building in Australia, and one of the most definitive national architectural icons of the twentieth century. It is also a rare example of a national cultural centre that has gained widespread recognition and respect as a performing arts venue."</i></p>	
<p>NHL Criterion E Aesthetic characteristics <i>The place has outstanding heritage value to the nation because of the place's importance in exhibiting particular aesthetic characteristics valued by a community or cultural group. Relevant key values from National Heritage values:</i></p> <ul style="list-style-type: none"> • <i>"With its distinctive sail-like concrete shell roofs standing boldly upon a massive granite-faced platform, located prominently on the Sydney Harbour foreshore, the Sydney Opera House is the most widely recognised building in Australia, and one of the most definitive national architectural icons of the twentieth century."</i> • <i>"The building's ability to emotionally move people and invoke a strong aesthetic response is enhanced by the experience of approaching, entering and moving around the building and surrounds."</i> • <i>"The large forecourt and sweeping podium steps prepare the visitor for the majestic quality of the soaring internal spaces including the folded concrete beams throughout the building, and the reinforced radial cranked beams in the northern foyers. These are complemented by the vast coloured glass panels in the main foyers of the Concert Hall and Opera Theatre wings, through which the harbour and city views reinforce the building's magnificent setting."</i> • <i>The distinctive interiors including the foyers surrounding the major auditoria, the Reception Hall (now the Utzon Room), the Box Office foyer, and the Bennelong Restaurant designed by Utzon and Peter Hall, enhance the relationship between the interior and exterior of the building."</i> 	<p>Concert Hall Renewal Project <i>The proposed works in this Concert Hall project will not impact on the iconic architecture of the Opera House when viewed within its context and setting. The works will have some impact on the experience of moving around within the eastern side foyer and Northern Foyer of the Concert Hall, but this relates to the visual interruption of the ascending flight of stairs in the side foyer, and the outer ends of the broad sweep of steps and cranked beams across the northern foyer. In both cases, the location and design of the insertions have been selected to minimise visual intrusion into the space and not interrupt the relationship of these spaces with the harbour setting. Alterations required to Peter Hall's glass walls to accommodate the lifts sit within their existing geometry and upper surface and should remain unnoticed on completion, both internally and externally.</i></p> <p><i>It is important to note that the genesis of the Level 2 passage and Lifts 29 and 30, is in Utzon's original design, and since his re-engagement with proposals to address accessibility issues in the 2001 Strategic Building Plan, and then in the 2005 Gold Book scheme for the Opera Theatre renewal.</i></p> <p><i>With these insertions, the experience of these spaces, their power, drama, and grandeur, will be available to people who may never have been able to access them before. This is completely in line with Utzon's original concepts, and the identified National Value: The building's ability to emotionally move people and invoke a strong aesthetic response .. enhanced by the experience of approaching, entering and moving around the building and surrounds.</i></p> <p><i>The greatest impact will be on the fabric of the precast granite paving and stair, and on 8 radial cranked beams at each end of the Concert Hall Northern Foyer. However, these</i></p>

National Heritage List (NHL) Criteria	HIS Comment (Design 5 Architects)
	<p><i>impacts on fabric must be considered in relation to the substantial improvements on function and accessibility.</i></p> <p><i>The impacts of proposed functional and acoustic upgrades within the Concert Hall auditorium on national aesthetic values are discussed below under Criterion F.</i></p> <p><i>Creative Learning Centre</i> <i>The works to accommodate the Creative Learning Centre will retain and respect the significant contribution of Peter Hall and enhance the ability of the Opera House to engage with and promote the performing arts to younger generations. They will have no impact on the aesthetic values identified in the National Heritage listing.</i></p>
<p>NHL Criterion F Creative or technical achievement <i>The place has outstanding heritage value to the nation because of the place's importance in demonstrating a high degree of creative or technical achievement at a particular period.</i></p> <p>Relevant key values from National Heritage values:</p> <ul style="list-style-type: none"> <i>"In every aspect it is a structure at the leading edge of endeavour."</i> <i>The 'hybrid' interior spaces of the Sydney Opera House reflect the creative genius of both Utzon and Todd, Hall and Littlemore, who completed the building and interior finishes after Utzon's departure. The major public spaces with outside views, for example were designed by Utzon (and completed by Peter Hall) to be finished in natural materials, textures and colours similar to those on the exterior of the building in order to bring the outside inside (Kerr 2003, 69)."</i> <i>"the creation of sensory experiences to bring pleasure to the building's users, particularly the experience of approaching, mounting the grand staircase to the podium, passing through the low ribbed box office, up to the foyers flanking the auditoria with their harbour views, and the climax of the performance itself. 'Both ideas were...reinforced by Utzon's application of counterpointing techniques using light and dark tones, soft and hard textures and richly treated warm and cool interior colours.'"</i> <i>"The interior spaces designed by Peter</i> 	<p><i>Concert Hall Renewal Project</i> <i>The Concert Hall renewal project will generally retain and respect these values.</i></p> <p><i>While acknowledging there will be some negative impacts to fabric in regard to introduction of Lifts 29 and 30 and the consequent cutting of a number of the significant cranked beams in the Concert Hall Northern Foyer, and the diminished width of the stairs in the Concert Hall eastern side foyer resulting from the new passageway on Level 2, the overall impacts to accessibility will be positive. Utzon's original concepts will be strengthened and made accessible to a broader public than before, and Peter Hall's contributions will be retained and respected in back-of-house areas.</i></p> <p><i>It is important to note that Utzon's original concept and indeed the structure of the Podium, included a passage in both side foyers on Level 3 in a similar location, but slightly closer to the glass walls. Since his re-engagement in 1999, Utzon proposed a lift in both Northern Foyers along with other proposals to address accessibility issues in the 2001 Strategic Building Plan, and then in the 2005 Gold Book scheme for the Opera Theatre renewal, he proposed side foyer passages to link the Northern Foyer on both Levels 2 and 3. This current proposal, therefore, closely accords with Utzon's concepts and intent.</i></p> <p><i>The acoustic upgrades to the Concert Hall auditorium will have high impacts on a limited amount of significant fabric and on key views</i></p>

National Heritage List (NHL) Criteria	HIS Comment (Design 5 Architects)
<p><i>Hall, including the major auditoria known as the Concert Hall and Opera Theatre, and the minor performance spaces, performers' and staff areas, and rehearsal rooms, known collectively as 'Wobbly Land' because of the distinctive 'U' shaped timber panelling, demonstrate the distinctive design solutions that made the Opera House a functioning performing arts centre in the 1970s, and reflect the prevailing aesthetic values, building standards, and financial constraints of the day."</i></p>	<p><i>towards the grand organ and adjacent areas of the faceted ceiling. There will be some impact on the character of the original Hall interior, however this is considered acceptable given the potentially high positive impact in the overall acoustic performance and functionality of the Concert Hall. The acoustic interventions on the sidewalls have been specifically designed to be retractable so as to be hidden from view when not in use. Generally, the proposed interventions reference Hall's palette of materials and colours of white birch, brush box, and his signature magenta colour for the Concert Hall. The curved shape and profile of the suspended 'petal' over-stage reflectors have been resolved to provide optimal acoustic performance while retaining partial views to the Grand Organ, and can be rotated or flown upwards depending on the acoustic needs of the performance type.</i></p> <p><i>Due to the solid nature and extent of the over-stage reflectors, it will not be possible to light the stage from the circular 'crown' as is done presently. This will be achieved by suspended lighting arrays between the acoustic reflectors and via suspended lighting trusses over the stalls.</i></p> <p><i>Visual impacts from these new elements are acknowledged as not insubstantial, but the mock-ups and acoustic testing have confirmed that improvements in the acoustic performance of the Concert Hall will be considerable. The proposed acoustic design has also been through a rigorous peer review process that supported the proposed changes. The visual impacts are therefore considered necessary if this venue is to maintain its status as a world class performance venue.</i></p> <p><i>In order to minimise visual clutter, the set-up for each performance should deploy the minimum technical and acoustic equipment and be flown out or removed when not in use. This includes suspended speaker clusters and lighting. This is an ongoing housekeeping and management issue for the Opera House and the performing companies who use the Concert Hall. Policy 8.4 in the CMP addresses this issue.</i></p> <p><i>The proposed upgrade of the air-conditioning system for the Concert Hall involves replacement of the existing air delivery system</i></p>

National Heritage List (NHL) Criteria	HIS Comment (Design 5 Architects)
	<p><i>in the ‘cannon-port’ openings with a more efficient diffuser system in approximately the same or similar locations. Acoustic considerations also require openings such as these to be blocked wherever possible. It is proposed to infill the openings with matching plywood and fit new diffusers within the patched area to minimise impact on the original fabric. Works should be detailed and executed to ensure this is achieved and discordant patches are avoided.</i></p> <p><i>Additional air diffusers are required in the Concert Hall in the lower horizontal sections of the ceiling over the boxes. This will improve patron comfort and more evenly distribute the air supply. The proposed design utilises longer and finer diffusers and should be visually recessive, sitting comfortably with the configuration of existing diffusers.</i></p> <p><i>While there are many parts to the proposed interventions in the Concert Hall, they have all been designed with the aim of respecting the technical and aesthetic excellence of Peter Hall’s original design. It is our assessment that when these works are completed, this will be achieved.</i></p> <p>Creative Learning Centre <i>The proposal to retain and strengthen significant features by both Utzon and Hall, including unpainted off-form concrete walls and the white birch moulded timber ‘wobbly’ wall and ceiling panels, will retain and respect these national values. The character and qualities of these original features will be highlighted by the works and demonstrated to those who use and experience this important education facility.</i></p>
<p>NHL Criterion G Social value <i>The place has outstanding heritage value to the nation because of the place’s strong or special association with a particular community or cultural group for social, cultural or spiritual reasons.</i></p> <p>Relevant key values from National Heritage values:</p> <ul style="list-style-type: none"> • <i>“building’s role as a cultural icon is also derived from the numerous performances conducted there (100,000 since 1973), and the place’s role as a focal point for community events. The Sydney Opera House is a mecca for both Australian and</i> 	<p>Concert Hall Renewal Project and Creative Learning Centre <i>The proposed projects in this application will strengthen the core function of the Opera House as a nationally significant performing arts centre and provide greater opportunity for public engagement with and appreciation of, its iconic architecture and structure.</i></p> <p><i>The Concert Hall renewal project should strengthen the Sydney Opera House’s role as a cultural icon accessible to all, and potentially enhance its ability to attract both national and international visitors and performers.</i></p>

National Heritage List (NHL) Criteria	HIS Comment (Design 5 Architects)
<i>international visitors to Sydney, attracting over 100 million visitors since the opening in 1973".</i>	<i>The Creative Learning Centre will enhance the ability of the Opera House to engage with and promote the performing arts to younger generations, both locally and nationally. This will strengthen its association with the performing arts and wider community.</i>
<p>NHL Criterion H Significant people <i>The place has outstanding heritage value to the nation because of the place's special association with the life or works of a person, or group of persons, of importance in Australia's natural or cultural history.</i></p> <p>Relevant key values from National Heritage values:</p> <ul style="list-style-type: none"> • <i>"The Sydney Opera House is directly associated with Jørn Utzon"</i> • <i>"The design of the interiors was completed by Todd, Hall and Littlemore after the departure of Utzon in 1966. The general experience of the interiors of the Sydney Opera House is one of majestic spaces defined by strong structural forms."</i> • <i>"It was, however, widely acclaimed as Utzon's creation, with the outstanding contribution by Hall, Todd and Littlemore in turning his masterpiece into a fully functioning performing arts centre.</i> • <i>"The engineering firm on the project, Ove Arup and Partners, and the building contractors, M.R. Hornibrook, both made important contributions to the realization of Utzon's project.</i> 	<p>Concert Hall Renewal Project <i>This project affects Peter Hall's most important and accomplished interior – the Concert Hall. The works proposed respect the character, materials and finishes selected by Hall and strengthen its status as a world class performance venue in the Opera House complex.</i></p> <p><i>While a limited amount of the fabric in the eastern side and Northern Foyers will be affected by the works, the proposed Level 2 passage and Lifts 29 and 30 are consistent with Utzon's concepts and will provide greater access and opportunity for visitors and patrons to appreciate the original majesty of the reinforced concrete structure, the product of both Utzon and Arup's genius and the work of the contractor, Hornibrook.</i></p> <p>Creative Learning Centre <i>With the proposed use of Hall's white birch 'wobbly' panels in the fitout of the Creative Learning Centre, this project will strengthen the connection with Peter Hall for spaces within the Podium. The work of Utzon will also be referenced in the fitout (exposed and painted concrete walls). In summary, this project will provide visual links to the Opera House's original architect as well as those that completed the project.</i></p>

Table 13: Assessment against National Heritage Values (Source: Design 5 Architects)

In summary, the HIS acknowledges there will be some negative impacts to the significant fabric and spaces arising from the Concert Hall Renewal project. Further, the proposed functional and acoustic upgrades will result in some adverse visual impacts. However, the accessibility, functional and acoustic related works in the Concert Hall and its foyers will strengthen the core function of the Opera House as a performing arts centre and will have an overall positive impact on its National Heritage values. The impacts are considered necessary if this venue is to maintain its status as a world class performance venue.

Regarding the Creative Learning Centre, the HIS considers the project will have a negligible impact on the external architecture and setting of the Opera House and no adverse impact on its National Heritage values.

6.2.3 State Heritage Values

The HIS also considers the proposed works against the State Heritage Register criteria, as summarised in the table below. The extracts from the SHR values, under each of the criteria below, summarise and draw attention to those aspects of significance that are relevant to the assessment of heritage impact of the suite of proposed projects in this application.

SHR Criteria	HIS Comment (Design 5 Architects)
<p>SHR criterion a) Historical significance <i>An item is important in the course, or pattern, of NSW's cultural or natural history.</i></p> <p>Relevant key values from SHR values:</p> <ul style="list-style-type: none"> <i>The Sydney Opera House has historical significance as a modern architectural masterpiece, recognised internationally as a symbol of Sydney and Australia</i> 	<p>Concert Hall Renewal Project and Creative Learning Centre</p> <p><i>There are no significant historical values from the SHR listing that are impacted by this proposal.</i></p>
<p>SHR criterion b) Associative significance <i>An item has strong or special association with the life or works of a person, or group of persons, of importance in NSW's cultural or natural history.</i></p> <p>Relevant key values from SHR values: <i>"its success as a performing arts centre has been described as 'spectacular' partly because of the building's 'ability to attract great artists from all over the world'</i></p> <ul style="list-style-type: none"> <i>Many significant people are associated with the construction of the Sydney Opera House, including Eugene Goossens, Joe Cahill, Jørn Utzon, Eero Saarinen and Ove Arup.</i> <i>its success as a performing arts centre has been described as 'spectacular' partly because of the building's 'ability to attract great artists from all over the world'.</i> 	<p>Concert Hall Renewal Project and Creative Learning Centre</p> <p><i>The significant associations with Jørn Utzon, Ove Arup, and Peter Hall of Hall, Todd & Littlemore will be strengthened and better appreciated with these projects.</i></p> <p><i>The Concert Hall renewal project will potentially enhance the ability of the Sydney Opera House to attract national and internationally recognised performers with the improved functionality, acoustic performance and accessibility. Similarly, the Creative Learning Centre project will enhance the Opera House's ability to engage with and inspire future generations of performers. These aspects have a direct and positive impact on the standing and reputation of the Opera House as a performing arts venue.</i></p>
<p>SHR criterion c) Aesthetic significance <i>An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW.</i></p> <p>Relevant key values from SHR values:</p> <ul style="list-style-type: none"> <i>Its public spaces and promenades have a majestic quality endowed by powerful structural forms and enhanced by vistas to the harbour and the city.</i> <i>Its aesthetic quality is largely attributed to the 1957 prizewinning design by Jørn Utzon.</i> <i>Its aesthetic quality was also enhanced by the high-quality completion work by Hall, Todd & Littlemore, by the technical support given throughout by the internationally renowned engineering firm of Ove Arup &</i> 	<p>Concert Hall Renewal Project</p> <p><i>While acknowledging there will be high negative impacts on fabric in regard to the introduction of Lifts 29 and 30 and the consequent cutting of a number of the significant cranked beams in the Concert Hall Northern Foyer, and the diminished width of the stairs in the Concert Hall eastern side foyer resulting from the new passageway on Level 2, the overall impacts with regard to accessibility of the Concert Hall and its foyers for a broader section of the public will be positive. The soaring majestic quality of the fan shaped roof shell pedestals and ribs and their association with both Utzon and Arup remain unaffected. The western side foyer stair and the majestic qualities of its space and structure with views towards Circular Quay and the Harbour</i></p>

SHR Criteria	HIS Comment (Design 5 Architects)
<p>partners, and finally by M.R. Hornibrook, the contractor of stages two and three (Kerr, 2003, 32).</p> <ul style="list-style-type: none"> • Widely recognised as a masterpiece of twentieth century architecture, the Sydney Opera House combines an expressive freedom of form with the precise technology of the machine age. • It has scientific and technical significance for the ways in which its construction continually pushed engineering and building technologies to the limit. • Australian architectural historian Max Freeland stated: "This Sydney Opera House was a voyage of architectural and engineering discovery in which new oceans were charted, new frontiers of knowledge and technology were conquered and the resources of science and technology were employed to solve design, erection and quality of finish problems beyond the capacity of conventional method. 	<p>Bridge will remain unaffected, except for the addition of a central handrail.</p> <p>The proposed functional and acoustic upgrades within the Concert Hall auditorium will result in some adverse visual impacts on the significant character of the Concert Hall auditorium. However Peter Hall's design aesthetic and choice of materials and finishes will be respected by these changes.</p> <p>These impacts arise primarily because of the non-transparent nature of the proposed automated over-stage reflectors and their increased coverage, combined with the associated over-stage and fore-stage lighting that must be suspended at the same level. Depending on viewing position, these will partially mask views from the auditorium towards the grand organ and the faceted ceiling above. This will be most evident from the stalls and the front of the circle.</p> <p>These visual impacts are acknowledged as not insubstantial, but the mock-ups and acoustic testing, as well as the peer review process, have confirmed that improvements in the acoustic performance of the Concert Hall should be considerable. These impacts are therefore considered necessary if this venue is to maintain its status as a world class performance venue.</p> <p>Operable acoustic reflectors in the side walls of the white birch ceiling have been mocked up and tested as an important part of the suite of enhancements for non-amplified acoustic performance within the Concert Hall space. While quite visible in themselves when deployed, they should not detract from the strong geometric character of Peter Hall's interior. It is proposed that these will only be deployed during the actual performance.</p> <p>In order to minimise visual clutter, the set-up for each performance should deploy the minimum technical and acoustic equipment and be flown out or removed when not in use. This includes speaker clusters and lighting. This will be an ongoing housekeeping and management issue and has already been discussed in relation to CMP Policy 8.4.</p> <p>The Concert Hall frequently presents performances that use acoustic amplification.</p>

SHR Criteria	HIS Comment (Design 5 Architects)
	<p><i>These require acoustic dampening and the drapes used to achieve this are currently deployed manually and often in an ad-hoc manner, resulting in visual impacts on the quality and character of the space. Acoustic treatments for amplified performances proposed in this application include retractable acoustic drapes on side walls and box fronts as well as retractable drapes suspended from the ceiling crown. These will result in high but transient impacts to the character of Hall's original interior of the Concert Hall. However it is noted that for many amplified performances, the auditorium is often darkened during performance and the overall impacts in terms of acoustic performance should be positive.</i></p> <p><i>Changes required within the auditorium to accommodate additional wheelchair positions at mid-circle level (Level 4), involve removal / modification to brush box walls at the rear of the seating in the boxes, but in reality these changes will have only minimal visual impact on the quality and character of the space and Peter Hall's design regime will be respected. Some existing seating will be altered to enable sections to be removable to accommodate these wheelchair positions, implemented only as required to cater for specific demand for each performance. A number of rows of seating will be refurbished to provide improved fire resistance and acoustic performance. These changes should have minimal impact on the character, material and configuration of the seating.</i></p> <p><i>The automated stage risers, providing a concentric tiered arrangement have been mocked up and successfully tested in performance. Changes below the stage to accommodate the automation of these risers will not impact on significant fabric or spaces. This work is considered a positive change and will provide a more 'intimate' stage setting, improve sightlines from the auditorium, and improve functionality of the stage.</i></p> <p><i>The proposed upgrade of the air-conditioning system for the Concert Hall involves removal of the existing 'cannon-port' air delivery system and replacement with a more efficient diffuser system in approximately the same or similar locations. Works should be detailed to minimise impact on the fabric and avoid discordant patching of the existing plywood linings.</i></p>

SHR Criteria	HIS Comment (Design 5 Architects)
	<p><i>Alterations to the Back-of-House performers' areas, including dressing rooms, toilets, corridors and assembly rooms, to improve access and functionality, will generally have minimal heritage impact. Additional refinement during the Tender Documentation phase is required to ensure that the design incorporates/reinstates Hall's palette of materials and finishes for back-of-house areas. While the enlargement of the prompt and opposite-prompt side wings will require reconfiguration of the walls to the eastern and western side foyers and entry doors to the stalls, these changes continue Hall's geometry and palette of materials and finishes, and are considered acceptable and appropriate.</i></p> <p><i>Utzon's original design concepts will be strengthened and made accessible to a broader public than before, and Peter Hall's contributions will be retained and respected in the Concert Hall auditorium, foyer and back-of-house areas.</i></p> <p>Creative Learning Centre <i>The proposal to retain and highlight significant features by Peter Hall within the area of the Creative Learning Centre, including bronze framed glazing and the white birch moulded timber 'wobbly' panels, will retain and respect these aesthetic values.</i></p>
<p>SHR criterion d) Social significance <i>An item has strong or special association with a particular community or cultural group in NSW for social, cultural or spiritual reasons.</i></p> <p>Relevant key values from SHR values:</p> <ul style="list-style-type: none"> <i>The Sydney Opera House is of social significance as an internationally recognised symbol of Sydney, one of Australia's leading tourist attractions and a focal point for community events. It is also widely admired by Sydneysiders, and can be seen to contribute importantly to the sense of place in the Sydney CBD.</i> <i>As a world-class performing arts centre, the Sydney Opera House has enhanced the cultural vitality of the nation.</i> <i>In offering this remarkable accessibility to a broad public, Sydney Opera House can be seen to be fulfilling Cahill's hope that it would be "a monument to democratic nationhood".</i> 	<p>Concert Hall Renewal Project <i>The Concert Hall Renewal Project should strengthen the reputation of Sydney Opera House as a world-class performing arts centre enhancing Australia's cultural vitality.</i></p> <p><i>The accessibility projects in particular will make the Concert Hall and its foyers more accessible to an even broader public, and potentially strengthen its ability to fulfil Cahill's hopes.</i></p> <p>Creative Learning Centre <i>The proposed creation of a dedicated Creative Learning Centre within the Podium at Broadwalk level, will enhance the ability of the Opera House to engage with and promote the performing arts to younger generations, both locally and nationally. This will strengthen its association with the performing arts and wider community and its important role in the cultural vitality of the nation.</i></p>

SHR Criteria	HIS Comment (Design 5 Architects)
SHR criterion e) Research potential <i>An item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history.</i> Relevant key values from SHR values: <i>none relevant</i>	Concert Hall Renewal Project and Creative Learning Centre <i>There are no significant research potential values identified from the SHR listing that are impacted by this proposal.</i>
SHR criterion f) Rarity <i>An item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history.</i> Relevant key values from SHR values: <ul style="list-style-type: none"> <i>It is an exceptional landscape (and seascape) monument because of its quality as a sculpture in the round, both day and night, and because of the appropriateness of its design to its setting and the picturesque quality of the setting.</i> 	Concert Hall Renewal Project and Creative Learning Centre <i>The ability of the Sydney Opera House, (as an exceptional architectural monument in response to its harbour setting), to attract visitors and performers from all over the world will be enhanced with these projects by the improved amenity, accessibility and patron comfort offered by the proposed works.</i>
SHR criterion g) Representativeness <i>An item is important in demonstrating the principal characteristics of a class of NSW's cultural or natural places; or cultural or natural environments.</i> Relevant key values from SHR values: <ul style="list-style-type: none"> <i>... an internationally recognised building representative of major performance arts centres.</i> <i>It is outstanding because of its innovative design appropriate both to its entertainment functions and to its harbour-side setting, and because of the esteem in which it is held in Australia and internationally.</i> <i>Its success as a performing arts centre has been described as 'spectacular' partly because of the building's 'ability to attract great artists from all over the world'.</i> 	Concert Hall Renewal Project and Creative Learning Centre <i>...the ability of the Sydney Opera House to attract visitors and performers from all over the world will be enhanced by the Concert Hall and Creative Learning Centre projects by the improved amenity, functionality, accessibility, patron comfort and public engagement offered by the proposed works. This will in turn enhance the esteem in which The Sydney Opera House is held nationally and internationally.</i>

Table 14: Assessment against State Heritage Values (Source: Design 5 Architects)

In summary, the HIS considers the proposed functional and acoustic upgrades within the Concert Hall auditorium will result in some adverse visual impacts from the proposed over-stage acoustic reflectors, associated stage lighting and speaker arrays on the significant character of the Concert Hall auditorium. However, the visual impact is considered necessary if the venue is to continue to be a world class performance venue.

Regarding the Creative Learning Centre, the HIS considers the project will retain and respect the significant contribution of Peter Hall in fitting out the Podium interiors and completing the project. Further, the project will strengthen its association with the performing arts and wider community.

6.2.4 Conservation Management Plan

The Sydney Opera House Conservation Management Plan (CMP) 4th Edition was endorsed by the NSW Heritage Council in 2017. The CMP identifies and defines the significant values of the Sydney Opera House and then formulates policies framed to retain these values. The HIS has assessed in detail the impact of the Concert Hall and Creative Learning Centre works in terms of significant values, overarching policies, significant elements and operation and management considerations.

The HIS acknowledges the proposed works will affect significant parts of the Sydney Opera House. Notwithstanding, the works proposed as part of both the Concert Hall Renewal and Creative Learning Centre have been guided by the principles outlined in the CMP and an understanding of what has been done in the past.

While it is acknowledged that a number of aspects of the Concert Hall project will have substantial impacts on the existing fabric, as well as significant spaces, the HIS concludes the proposal comply with the policies and guidelines contained in the CMP and will provide significant benefits including improved acoustic performance and functionality.

6.2.5 Utzon Design Principles

The HIS's assessment of the proposal against the relevant Utzon Design Principles is summarised in the table below:

Relevant Utzon Design Principle Quote	HIS Comment (Design 5 Architects)
<p><i>Need to adjust to changing standards</i> <i>"So what was good back in the 60's was okay then, but as people develop and as music develops, as our perception of music and place develops, our demands become higher and this development will probably in the future change a lot of features of the Opera House simply because you need to adjust to instruments, as such."</i> (UDP page 52)</p>	<p><i>Jørn Utzon clearly did not see the technical aspects of this building as frozen in time. He foresaw that adjustments would be needed to meet audience expectations and changing standards. The suite of projects in this application, particularly those that are part of the technical upgrade of performance spaces, respond to this same principle.</i></p>
<p><i>Heavy and light</i> <i>"The difference in character of the two components forming the building, the massive and imposing base, and the light and graceful shells on top of it..."</i> (UDP page 70)</p> <p><i>Solidity of base is important</i> <i>"If you open the sides of the base to create daylight... then suddenly the base becomes an office building, and that will reduce drastically the dramatic expression of the Opera House."</i> (UDP page 50)</p>	<p><i>The importance of the visual solidity of the podium is clearly articulated in the first quote and a warning about introducing more openings in the second quote. The scale, proportion, configuration and detail of the proposed new ventilation hood in the west wall of the podium has been guided by these principles and matches the original adjacent. This principle is respected.</i></p>
<p><i>Beautiful experience oriented in the harbour</i> <i>"...People have a beautiful experience entering and walking up the stairs and entering the auditoria, while they are all the time oriented in the beautiful harbour and have the views of the spectacular Sydney Harbour setting."</i> (UDP page 59)</p> <p><i>Being in another world</i></p>	<p><i>These quotes describe Utzon's intended character for the foyer spaces leading to and surrounding the major auditoria.</i></p> <p><i>This character in the Concert Hall side and northern foyers is retained and respected in the proposed works within these spaces.</i></p>

Relevant Utzon Design Principle Quote	HIS Comment (Design 5 Architects)
<p><i>"This feeling of moving upwards was a determining factor in the shaping of the large platform."</i></p> <p><i>"The patrons will receive on their way to the theatre halls an impression of restful and dignified surroundings with a generous spacious layout." (UDP page 59)</i></p> <p><i>Feeling detached from the city</i> <i>"During intermission you remain around the auditorium and can retain the feeling of being in another world."</i></p> <p><i>"After the performance the bars and lounges will present for the patrons a second opportunity to enjoy these views and will underline their feeling of being detached from the city in a world of its own." (UDP page 60)</i></p> <p><i>Spans expressed by ribs and folds</i> <i>"This resulted in a building where all spans are clearly expressed by ribs and folds." (UDP page 78)</i></p>	<p><i>The proposed tunnel on Level 2 of the CH eastern side foyer intrudes on the width of the stair, however the dignity of surroundings and sense of ascent is retained. It is important to note that this tunnel is very close to the location of a tunnel originally proposed by Utzon and built, albeit located on one level above, and closed over due to the program changes after his departure in 1966.</i></p>
<p><i>Cultural symbol</i> <i>"The conception and the design of the Sydney Opera House is based on... the desire to create a building which will form a home for those activities essential to the cultural life of a big city." (UDP page 62)</i></p> <p><i>Inspiration to artists</i> <i>"When completed, the Sydney Opera House will serve as a home for the cultural activities of the city and will inspire artists and technicians to present to the public the highest quality performance for many years to come." (UDP page 62)</i></p>	<p><i>Presentation of the performing arts is at the very heart of this building, as is the pursuit of excellence. The proposed projects in this application, particularly the accessibility projects, will allow the Opera House to pursue both these objectives and be available to a wider section of the community than it has ever been before. Likewise, the acoustic and functional upgrades in the Concert Hall will ensure it continues to be able to present 'the highest quality of performance for many years to come.'</i></p>
<p><i>Disabled access</i> <i>"For patrons unable to walk, there will be provided special elevators to take them direct to the auditorium level in the vicinity of the seating."</i></p> <p><i>"A total of ten lifts will service the Opera House, each lift being carefully located for a specific purpose. Lift No.1 with landings at the 12', 30' and 42' levels has a primary function of transporting disabled persons from ground floor level to the auditorium level. (Major Hall)."</i></p> <p><i>"Lift No.2 in the stage area (Minor Hall) has the primary function of carrying a total of 16 disabled persons from ground level to auditorium level with one intermediate stop." (UDP page 69)</i></p>	<p><i>These Utzon quotes, the first from his 1965 Descriptive Narrative, describe the intended access to the auditoria for patrons with mobility issues. The change in program after his departure and the decision to close the Central Passage to the public, meant this would no longer be a front-of-house approach. The works proposed in this application are intended to address this problem for the Concert Hall and its associated foyers. These works will result in some negative impacts to significant fabric and spaces, however their location and configuration have been carefully designed to minimise these impacts. Further detail resolution should minimise them even further.</i></p>

Relevant Utzon Design Principle Quote	HIS Comment (Design 5 Architects)
	<p><i>The Concert Hall plays a key role in the suite of venues provided at the Opera House. If the ability of the building to house and present performance art is not extended to those with impaired mobility, the place will be diminished and Sydney Opera House will potentially lose its international status as a performing arts venue.</i></p> <p><i>By undertaking these projects, the Opera House will demonstrate excellence, responsibility and generosity to those patrons and performers that have previously been excluded because of their impaired mobility. This responsibility and generosity was originally intended and proposed by Utzon himself.</i></p>
<p><i>Concrete and Ply</i> <i>"The walls will show the concrete as it was constructed, contrasting with the moulded plywood panels which form the components of the furniture and fixings."</i> <i>"The cubicles themselves for coats and toilets are made of moulded plywood panels in contrast to the impression of severity left by the structure."</i> <i>(UDP page 71)</i></p>	<p><i>These quotes refer primarily to the character of back-of-house spaces within the podium and are from Utzon's 1959 description of his intended fitout. It is now clear that Peter Hall followed Utzon's ideas and principles in his fitout of these spaces.</i></p>

Table 15: Assessment against relevant Utzon Design Principles (Source: Design 5 Architects)

6.2.6 Conclusion and recommendations

The HIS considers the proposed works will have an overall positive impact on the Outstanding Universal Values that enshrine Sydney Opera House on the World Heritage List or its National or State heritage values. The proposed works are expected to improve the ability of the Opera House to cater for tourists as well as patrons and engage them in a diverse range of performing arts activities at the house, including for children, thereby strengthening its role in Australia's cultural vitality and as a world renowned performing arts centre.

The HIS concludes the proposed works are generally consistent with the Utzon Design Principles and the policies contained in the CMP. The HIS recommends further design resolution and detailing on all components of the proposal be undertaken in close consultation with the Opera House's heritage architect, Eminent Architects Panel and Conservation Council.

6.3 Built Form, Urban Design and Visual Impacts

The proposed works are largely internal, with the exception of:

- alternations to glazing to accommodate two new lifts relating to the Concert Hall and the provision of a new ventilation hood at the western podium elevation
- relocation of double doors on western façade and new access ramp to the Creative Learning Centre

Issues regarding potential built form, urban design and visual impacts of these elements are considered below.

6.3.1 Concert Hall

The SOH Accessibility Masterplan 2015 identified the lack of publicly accessible pathways for wheelchair users to the Concert Hall. In response, various locations within the Northern Foyer were studied for the installation of two new lifts, with a key goal to minimize the visual impact on the space and maximize the operational capacity to move wheelchair patrons within the constraints of the existing building.

Following consideration of the options new lifts are proposed at the eastern and western extremity of the foyers. The proposed locations have the least impact on the existing building fabric, integrate with the existing building aesthetic and maintain clear legible circulation paths. The proposed lifts:

- minimise the visual impact on the existing stair structure
- have minimal impact on the existing glass roof structure or structural beams
- comprise glass lift car and lift shaft enclosures to maximize transparency
- use bronze cladding and floor finishes consistent with existing finishes in the Northern Foyer.

Both lift 29 and 30 result in external alterations to existing glazing. However, this intervention is considered minor in nature, sympathetic in design and due to its location, within the existing undulation of the Northern Foyer's glazing, is unlikely to be readily visible or noticeable.

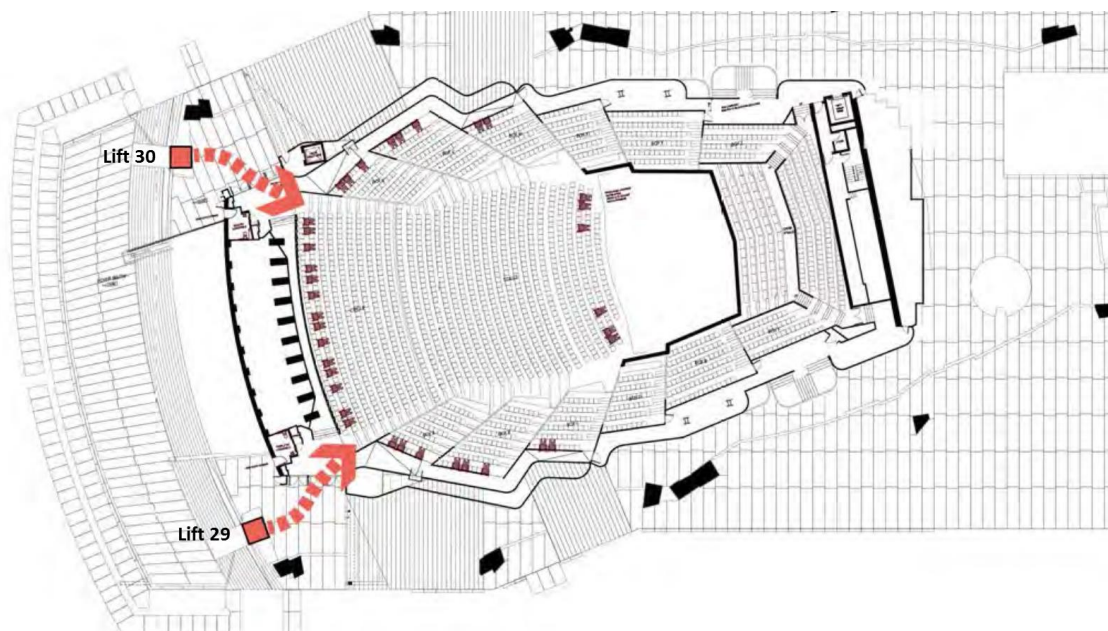


Figure 22: Comparison of the existing (left) and proposed (right) level 4 Lift 30 (Source: ARM Architecture)

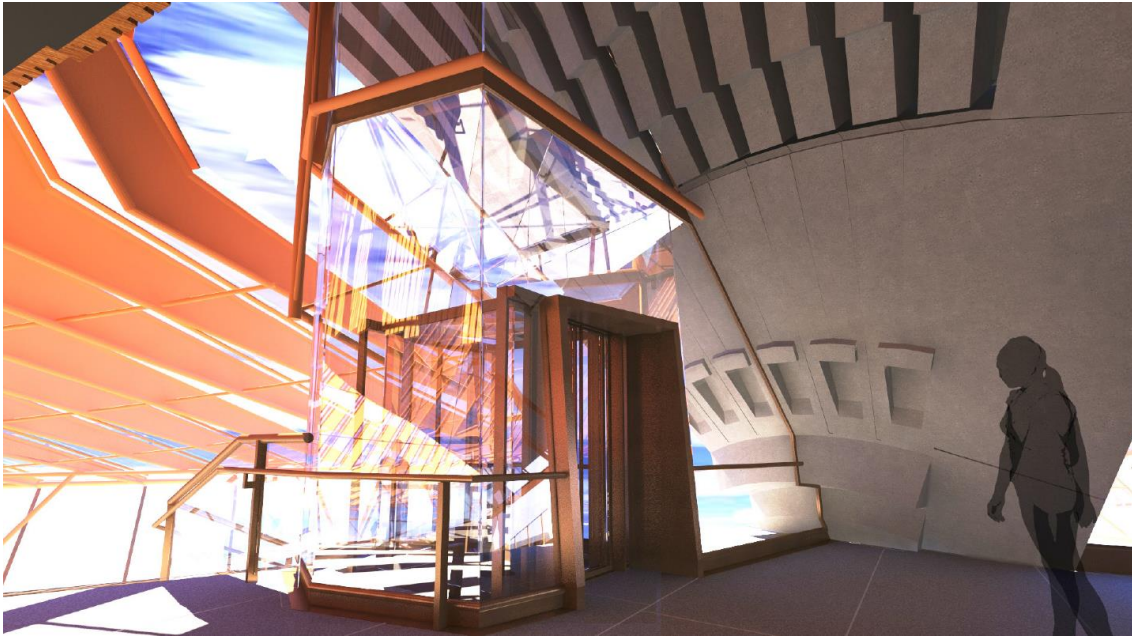


Figure 23: Level 4 Lift 30 entry (Source: ARM Architecture)

There are three granite hoods located on the western elevation (northern end) of the Opera House podium at ground and first floor levels. Two located above entrances and the other for ventilation intake.

The proposal seeks approval to modify the western podium elevation to accommodate a new plant room air exhaust hood. The requirement for the new hood is due to the relocation of an existing plant room on the eastern side of the Concert Hall to accommodate the new accessible passage at Level 2.

The proposed new hood has been carefully designed to be identical to the existing hooded intake adjacent to it and is therefore not considered to have any adverse visual impacts (Figure 24). This is similar to the eastern elevation of the SOH where there are two existing hooded ventilation openings.

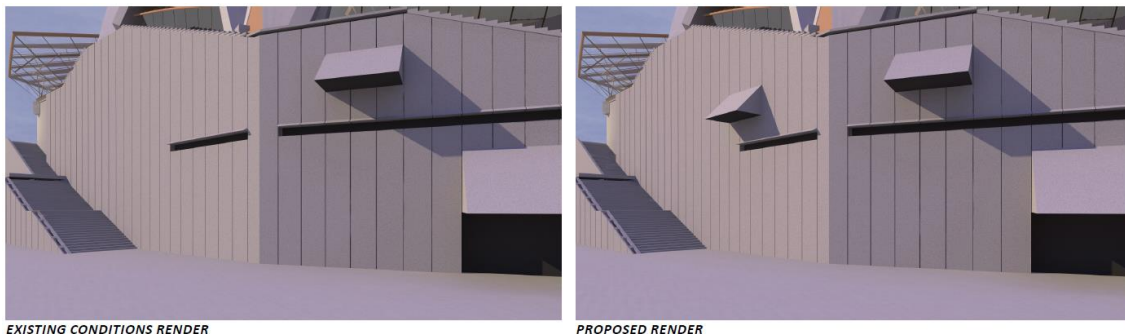


Figure 24: Comparison of the existing (left) and proposed (right) ventilation hoods at the western podium elevation (Source: ARM Architecture)

The HIS has also carefully considered the heritage impacts of external works and concludes the works would not have an adverse impact on heritage fabric, significance or the overall appearance or setting of the Opera House.

6.3.2 Creative Learning Centre

The proposed works to adapt the space presently occupied by existing office/staff meeting rooms largely consists of internal works to create efficient open spaces and providing appropriate lighting, audio/visual equipment and associated works to accommodate a new Creative Learning Centre. These works include the careful consideration of the form and function of the immediate and adjoining areas to open-up and improve these spaces and improve general accessibility.

To ensure appropriate access and accessibility is provided to the Creative Learning Centre the existing entrance on the western elevation will be amended by relocating / bringing forward the entrance door (within the existing aperture) and provide a new granite accessibility ramp (Figure 25).

The proposed external works are minor in nature, will facilitate improved accessibility and all materials will match the existing materials. The proposal changes would not have an adverse visual impact or impact on the character or appearance of the Opera House.

The HIS has also carefully considered these external impacts in relation to the heritage impacts and concludes that these external works will have a negligible impact on the architecture and setting of the Opera House.

6.3.3 Conclusion and recommended mitigation measures

The proposed external alterations, including lifts, air exhaust hood and revised western entry are minor in nature and, as outlined above, will not adversely impact on the built form or visual character of the Sydney Opera House. All other changes to the Concert Hall and Creative Learning Centre are internal. The proposed mitigation measures in relation to built form and visual impacts are closely inter-related with the heritage assessment and recommended mitigation measures (Section 7).

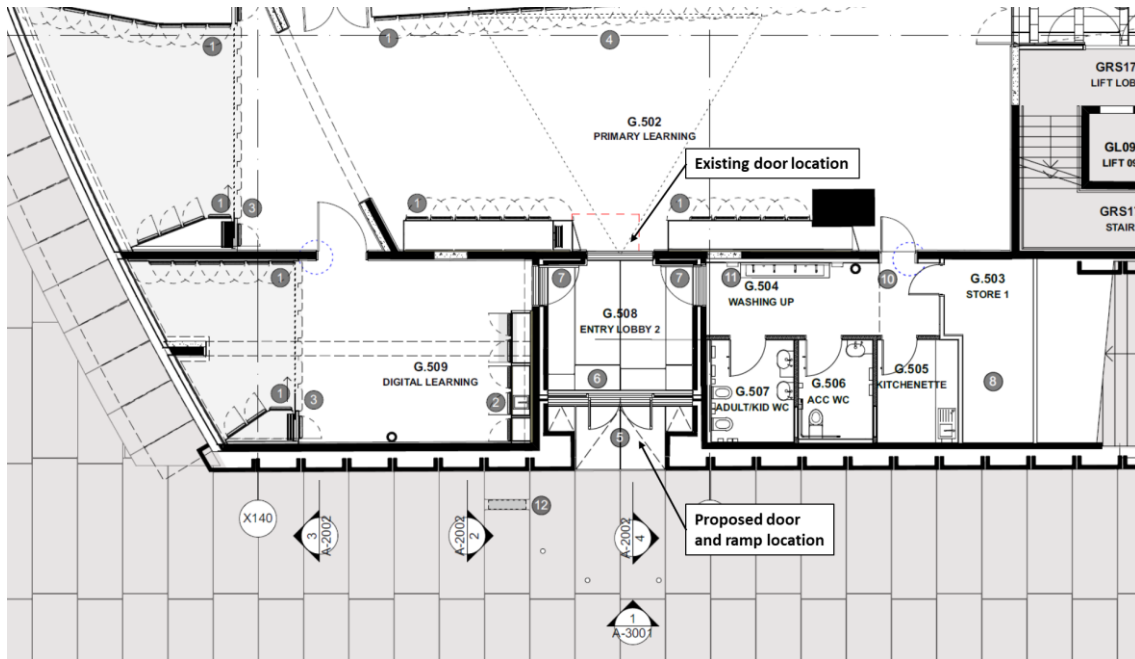


Figure 25: View within the Creative Learning Centre to the Northern Board Walk (Source: TZG)

6.4 Lighting

The proposed lighting for the Concert Hall comprises the augmentation of the existing stage lighting from the ceiling crown with new lighting arrays suspended between the acoustic reflectors for both amplified and non-amplified performances.

The proposed lighting arrays will partially mask views towards the grand organ and the drama of the faceted ceiling above, including the central crown element. The HIS notes that the proposed lighting will result in some adverse visual impacts but considers that these works are acceptable as they arise from the acoustic improvements and will enable positive acoustic impacts.

The proposed lighting for the Concert Hall comprises internal lighting works and will be contained within the building (no new external lighting or façade lighting works are proposed) and will not have an adverse impact on the appearance of the Sydney Opera House.

The proposed lighting for the Creative Learning Centre comprises internal lighting works and will be contained within the actual space (no external lighting or façade lighting works are proposed) and will not have an adverse impact on the appearance of the Sydney Opera House.

The proposed lighting for the Creative Learning Centre is internal, will not be readily visible from the surrounding area and will not have an adverse impact on the appearance of the Opera House.

6.5 Access and Circulation

iAccess Consultants have prepared two separate access reports (Appendix 14) for the Concert Hall and Creative Learning Centre components of the proposal.

These access reports review the proposed works against relevant legislation, codes and standards, including:

- *Disability Discrimination Act 1992*
- *Disability (Access to Premises - Buildings) Standards 2010*
- *National Construction Code (NCC 2015)*
- *AS1428.1:2009 Design for access and mobility - General requirements for access - New building work*
- *AS1428.2:1992 Design for access and mobility - Enhanced and additional requirements - Buildings and facilities*
- *AS1428.4.1:2009 Design for access and mobility - Means to assist the orientation of people with vision impairment - Tactile ground surface indicators*
- *AS1428.5:2010 Design for access and mobility - Communication for people who are deaf or hearing impaired*

These reports conclude that the implementation of the proposed works provide accessible access as nominated in the NCC Performance Requirements. The reports generally demonstrate compliance with the statutory requirements of the Disability (Access to Premises – Buildings) Standard and provide a checklist of compliance for the project architects in the on-going detailed design process.

In light of the above assessment, the proposal works are considered to provide for equitable and accessible access.

6.6 Construction Management

The SOHT has prepared a *Construction Management Plan* (Appendix 6) which addresses the key construction activities, waste management and safety aspects of the projects.

The key elements of the Construction Management Plan (CMP) are summarised below:

6.6.1 Public safety and access

The Sydney Opera House will continue normal operations during the construction period. However, as the majority of the works will be confined within the building, there will be minimal interface with and effect on publicly accessible areas. Where public areas are affected by the works, such as on the external Broadwalks and the southern foyers, they will be enclosed by construction hoardings and sealed off from public access.

The CMP states that the successful contractor will be required to address the detailed requirements of circulation and pedestrian interfaces with the construction work faces throughout the program of works.

The proposed works will also have minimal impacts on external publicly accessible land and areas of the Sydney Opera House. Deliveries and removal of materials will be mainly via the underground loading dock, except for any oversized items which may need to be transported across the forecourt.

Prior to commencing construction, the successful contractor will be required to prepare a fully detailed works staging strategy which addresses appropriate access and circulation impacts which ensures safety of public and patrons.

6.6.2 Noise and vibration

Arup has undertaken a Noise Impact Assessment (NIA) of the proposed Concert Hall and Creative Learning works which is provided at Appendix 15. The NIA identifies the nearest noise sensitive receivers potentially affected by the works as residential properties at Kirribilli to the north of the site, the Bennelong Apartments to the south of the site and residential properties to the east at Potts Point.

The assessment has shown that construction noise as a result of the proposal is not likely to have any adverse impact on noise sensitive receivers around the site as construction noise levels will not be excessive and are below the relevant noise level criteria.

The NIA concludes that the proposed works would not have a detrimental impact on the nearest noise sensitive receivers. However, to minimise potential for noise nuisance, the following recommendations are made:

- Construction works shall be undertaken in accordance with the hours of construction (refer to Section 3.3 of this EIS)
- all mitigation measures outlined in the NIA be implemented
- prior to commencing construction, it is recommended that a Construction Noise Management Plan (CNMP) be prepared to identify mitigation measures for work being undertaken during construction.

6.6.3 Traffic and access

PTC has prepared a Construction Pedestrian and Traffic Management Plan (CPTMP), which is provided at Appendix 7. The CPTMP includes an assessment of the potential traffic and pedestrian impacts during construction and includes the following mitigation measures in order to appropriately manage traffic and access issues during construction:

- Vehicle movements will be in accordance with the construction hours (refer to Section 3.3 of this EIS) and would be split approximately between day and night works, in compliance with working hour restrictions and will be managed to occur outside of 6:00am to 10:00am and 3:00pm to 7:00pm to minimise disruption to the local road network
- All construction traffic shall enter and leave the site from Macquarie Street. Construction vehicle access along the boardwalk and forecourt areas (if required) would be limited to night-works where practical. There will be no contractor parking provided on site, with contractors directed to public transport or the nearby Opera House carpark
- All deliveries and removals from site will be via the underground loading dock, accessed from Macquarie Street, and no trucks will be queued or parked in the surrounding public streets
- General public access will be maintained along Macquarie Street and the entire Sydney Opera House public perimeter. Vehicle spotters would be used to escort each truck movement across any pedestrian areas and caution signs shall be erected prior to any truck movements in these areas

- the majority of construction vehicles are predicted to range from small to heavy rigid vehicles up to 12.5 m. The Applicant will apply for special permit from the City of Sydney for the use of any vehicles that may exceed 12.5 m in length
- works sites shall be appropriately barricaded, separated and supervised while works are occurring, and work compounds, materials and equipment shall be secured when not in use
- The Applicant will consult with the businesses and residents within the immediate locality (500 m radius), via mail drops, to provide an overview of the construction activities and appropriate contact details.

6.6.4 Air quality

The proposed works may generate dust from demolition. A dust management plan will be prepared by the Contractor engaged to undertake the works prior to commencing construction to ensure appropriate measures are taken to ensure that the dust is localised within the construction zone.

Construction plant and equipment selected will be suitable for an internal construction environment to ensure no impact on air quality within the work site, or the Opera House.

6.6.5 Water quality

As the proposed works are largely internal with only limited works to the exterior of the Sydney Opera House, there is no expected run off or sedimentation that would impact on the water quality of Sydney Harbour.

Notwithstanding, all necessary measures will be taken to control potential construction impacts on the Harbour. A Construction Environmental Management Plan will be prepared by the contractor which will be required to outline construction techniques to avoid potentially affecting the water quality of the harbour and include, where relevant, mitigation measures such as sediment controls, 'wet-vacuuming' or off-site removal of potential contaminants.

6.6.6 Waste and hazardous materials

Wastes that may be generated during construction include:

- Brick / concrete materials
- Steel
- Lighting, fittings and electrical equipment
- Redundant control equipment, plant and electrical boards
- Services waste such as wiring, pipe cut offs and sheet metal cut offs
- General waste from construction activities such as packaging, scraps and paper

Waste will be managed in accordance with relevant NSW legislation and the principles of the waste management hierarchy as set out in the *NSW Waste Avoidance and Resource Recovery Strategy 2014-21*.

Waste will be recycled where possible and a fully detailed Waste Management Plan (WMP) will be prepared by the successful contractor.

The SOH maintains an Asbestos Management Procedure, which will be implemented during construction works, and maintains a Hazardous Materials Register, which documents all

asbestos contaminated materials (ACM), hexavalent chromium and lead paints within the building. Any hazardous materials are managed by the *Sydney Opera House Asbestos Risk Management Plan* (Hibbs & Associates Pty Ltd 2013) and the *Sydney Opera House Hazardous Materials Action Plan* (2015).

Removal and disposal of any hazardous materials will comply with all relevant laws, regulations and guidelines including, but not limited to, *Protection of the Environment Operations Act 1997*, *Protection of the Environment Operations (Waste) Regulation 2014* and *Protection of the Environment Operations (Illegal Waste Disposal) Act 2013*.

6.6.7 Conclusion and recommended mitigation measures

Construction works will largely occur within the Sydney Opera House and generally serviced via the underground loading dock, reducing their impact on the general public, throughout demolition and construction periods.

A comprehensive CMP has been prepared by the SOHT to outline how construction will be managed and no significant residual construction impacts are anticipated. The key construction mitigation measures are proposed, which are considered adequate in addressing any impacts that may arise during the construction phase of the development.

6.7 Operational Noise

The NIA prepared by Arup (Appendix 15) considers the potential noise impacts resulting from the operation of the Concert Hall and Creative Learning Centre on the surrounding locality.

The NIA notes that activities within the:

- Concert Hall would not result in noise disturbance and noise breakouts would be controlled by the existing double-skin structural envelope and the improved acoustic and operational conditions (proposed within this application). In addition, low-noise plant has been selected and calculations indicate plant noise will be below the recommended limits of the Industrial Noise Policy.
- Creative Learning Centre will take place internally in a fully air conditioned space and are not expected to have any impact on the external environment or noise sensitive receivers.

There are no operational noise impacts arising from the use of the Concert Hall and Creative Learning Centre and therefore no specific restrictions or mitigation measures are proposed or considered necessary.

6.8 Building Code of Australia

The EIS is supported by a *Building Code of Australia (BCA) Capability Statement* prepared by Group DLA (Appendix 16). The Statement notes that compliance with the BCA for the proposed works will be able to be achieved by a combination of compliance with the deemed-to-satisfy (DTS) provisions and the Performance Requirements.

It confirms that matters pertaining to compliance with the BCA will be suitably assessed by the appointed Certifying Authority prior to the issue of the Crown Building Works Certificate in accordance with Clause 98 of the EPAR and Section 6.28 of the EP&A Act.

An *Overarching Fire Strategy* has also been prepared by ARUP (Appendix 17) to provide a guiding approach to fire safety and which concludes that the building's level of fire safety would not be diminished through the various renewals projects and further enhancement to safety can be achieved.

6.9 Ecologically Sustainable Development

The EIS is supported by a *Sustainable Design Report* (SDR) prepared by Cundall (Appendix 18).

The SDR outlines that the *Sydney Opera House Environmental Sustainability Plan* (ESP) 2017-2019 sets out sustainability targets to be achieved by 2023, with the key relevant targets including:

- 20% energy savings by 2023.
- 7% reduction in carbon footprint by 2019.
- Water efficiency ratings for all fitouts equal or above NSW Government Resource Efficiency Policy.
- 80% construction waste reduction
- all stages of the Building Renewal projects demonstrate industry best practice in environmental sustainability.

The SDR outlines that in order to achieve these targets, the key sustainability principles summarised in the table below have been considered throughout the Building Renewal Program.

Sustainability Principle	Initiatives
Minimise greenhouse gas emissions and provide low carbon energy sources	<ul style="list-style-type: none"> • Upgrade existing or install new energy efficient LED light fittings. • Install lighting control system to reduce energy consumption • Select fans with variable speed drives (VSD) motors to reduce fan energy consumption. • Connect to upgraded building control management system (BCMS) to control HVAC systems efficiently. • Connect heating and cooling equipment to the Sydney Opera House central plant system which is being renewed in 2017 to improve energy efficiency.
Improve indoor environment quality	<ul style="list-style-type: none"> • The project aims to achieve industry best practice in IEQ in line with Green Star Performance criteria for indoor air quality, internal noise levels, thermal and lighting comfort.
Reduce environmental impact by sourcing sustainable building materials	<ul style="list-style-type: none"> • The project will use CFC free polyurethane insulation and low PVC insulation for cabling and conduits. • The project team will consider the sourcing and forest certification schemes of timbers used for the Renewal Projects.
Promote environmental management	<ul style="list-style-type: none"> • The Contractor will be required to have an Environmental Management System (EMS) certified in accordance with the NSW Government EMS standard, • A detailed and project specific Environmental Management Plan (EMP) will be developed by the Contractor engaged to undertake the project.

Sustainability Principle	Initiatives
	<ul style="list-style-type: none"> The project aims to demonstrate best practice environmental risk management in contracts and implementation.
Reduce demolition waste from site	<ul style="list-style-type: none"> The project team will work towards a fully integrated demolition waste management strategy and target to achieve a minimum 80% diversion from landfill for all waste resulting from the project works in construction. The project will undertake an audit of existing materials and identify which materials can be reused or recycled. The project team will work towards reuse of existing building materials or services whenever possible to reduce the volume of demolition waste. A detailed Waste Management Plan will be developed by the Contractor engaged to undertake the project. The plan will be prepared in accordance with relevant NSW legislation and the principles of the waste management hierarchy as set out in the NSW Waste Avoidance and Resource Recovery Strategy 2014-21.
Responsibly manage and dispose hazardous materials.	<ul style="list-style-type: none"> The project will implement the Sydney Opera House Asbestos Risk Management Plan (Hibbs & Associates Pty Ltd 2013) and the Sydney Opera House Hazardous Materials Action Plan (2015) for management and disposal of hazardous materials. Sydney Opera House will maintain a Hazardous Materials Register which documents all asbestos contaminated materials (ACM), hexavalent chromium and lead paints within the building. Removal and disposal of any hazardous materials will comply with all relevant laws, regulations and guidelines including, but not limited to, Protection of the Environment Operations Act 1997, Protection of the Environment Operations (Waste) Regulation 2014 and Protection of the Environment Operations (Illegal Waste Disposal) Act 2013.
Reduce potable water consumption	<ul style="list-style-type: none"> Water efficiency ratings for all fixtures and fittings equal to or better than NSW Government Resource Efficiency Policy requirements in line with the SOH ESP.
Protect culture and heritage	<ul style="list-style-type: none"> All proposed design initiatives will consider the impact of all works in respect of the Utzon Design Principles and Sydney Opera House's Conservation Management Plan.

Table 16: Sustainability principles and initiatives (Source: Cundall)

In addition, the proposed development is considered to be consistent with the 5 key ESD principles as shown in the table below:

ESD Principle	Consistency
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 proposal is supported by technical reports which conclude that there is no risk of adverse environmental impacts, subject to appropriate management, during construction and operational stages. It is considered that through adherence to the proposed mitigation measures the proposal will not result in serious impact to the environment.
Integration Principle	

ESD Principle	Consistency
The decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations.	The works have been developed to integrate the short and long term effects of economic, environmental and social considerations for the Sydney Opera House. In particular, the works will ensure the Opera House continues to provide world class patron events and spaces for celebratory events, which meet modern access requirements.
Intergenerational Equity	
Present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generation	The proposal has been developed to directly benefit current and future generations in that it provides for on-going use of the Sydney Opera House for events and functions and will provide a revenue stream for the funding of performances and other events at the site, without adversely impacting on the heritage significance of the building.
Biological Diversity	
The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making.	The development site does not contain any threatened or vulnerable species, populations, communities or significant habitats. Construction and ongoing operations will be managed in accordance with the Mitigation Measures, ensuring no significant indirect impacts on the surrounding environment.
Valuation and Pricing of Environmental Resources	
Improved valuation, pricing and incentive mechanisms and environmental factors should be included in the valuation of assets and services.	The cost of infrastructure and measures to ensure an appropriate level of environmental performance on the site has been incorporated into the cost of the works. In addition, the level of waste will be appropriately managed during the construction stage.
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 proposal is supported by technical reports which conclude that there is no risk of adverse environmental impacts, subject to appropriate management, during construction and operational stages. It is considered that through adherence to the Mitigation Measures outlined in Section 7 the proposal will not result in serious impact to the environment.

Table 17: Consideration of the proposal against ESD principles

On this basis of the above assessment, the proposal is considered to be consistent with the principles of ESD.

6.10 Biodiversity

A Biodiversity Statement has been prepared by Cumberland Ecology and provided at Appendix 12. The statement has considered the entire land area covered by the Sydney Opera House, the interior of the building and surrounding area.

The subject site is an entirely artificial landscape, where a peninsula jutting into Sydney Harbour has been transformed by the construction of the Opera House. No garden beds, trees or native vegetation occur on the site.

Site inspection by Cumberland Ecology has confirmed that no threatened flora species exist on site and there are no records of threatened flora species present within a 500 m radius of the subject site.

No threatened fauna species exist on site. A limited number of threatened fauna species are known to occur within 500 m of the site including the Grey-headed Flying Foxes, Albatrosses and Fur Seals.

As there is no vegetation, threatened flora or fauna on site and as the proposal would not have any impact beyond the site of the works it is concluded that the proposal will not have a significant impact on biodiversity values. Accordingly, DP&E and OEH have formally advised that under section 7.9(2) of the BC Act a BDAR is not required as part of this SSD application.

7 Environmental Risk Assessment

This section provides an environmental risk analysis to identify potential environmental impacts associated with the proposal and proposed mitigation measures, as required by the SEARs.

Risk type	Potential risk	Mitigation Measures
Heritage conservation	Works impact on the heritage values of the Sydney Opera House.	<ul style="list-style-type: none"> All design details are to be carefully coordinated, resolved and detailed as part of the design development and documentation process. Modification and reinstallation of Peter Hall's wobbly panels (to be removed from affected spaces for the Creative Learning Centre) in a new and dynamic configuration once these spaces have been altered.
Built form, urban design and visual impacts	The proposed works will adversely impact on the built form and surrounds of the Opera House and negatively impact on views to the Opera House	<ul style="list-style-type: none"> External alterations including the Creative Learning Centre door and Concert Hall lifts treatments will use consistent design language and materials. Doors, door finishes and hardware within the creative learning spaces should retain and respect the Hall regime, rather than the Utzon regime within the Western Foyer. On-going advice and input from the Opera House's heritage architect and the approval of the Eminent Architects Panel and Conservation Council during the design development and documentation process.
Public safety and access	Disruptions to pedestrian circulation and potential safety impacts from demolition and construction works	<ul style="list-style-type: none"> Public areas affected by the works such as the Northern Broad Walk and vehicle concourse will be enclosed by construction hoardings and sealed off from public access. Prior to commencing construction, the successful contractor will be required to prepare a fully detailed works staging strategy which addresses appropriate access and circulation impacts which ensures safety of public and patrons. Vehicle deliveries and movements will be via the underground loading dock to ensure no impact on public movement and circulation in areas external to the building.
Traffic and Access	Impacts on network efficiency, surrounding amenity and pedestrian circulation	<ul style="list-style-type: none"> Vehicle movements will be in accordance with the construction hours and where appropriate would be split approximately between day and night works to limit disruption to the local road network

Risk type	Potential risk	Mitigation Measures
		<ul style="list-style-type: none"> All deliveries and removals from site will where possible be via the underground loading dock, There will be no standing of construction vehicles along Macquarie Street. General public access will still be maintained via the vehicle concourse for the duration of the works. A Construction Traffic Management Plan will be prepared by the successful contractor.
Air Quality	Potential dust and odour generation	<ul style="list-style-type: none"> Construction plant and equipment selected will be suitable for an internal construction environment to ensure no impact on air quality within the work site, or the Opera House. Further, a dust management plan will be prepared by the contractor engaged to undertake the works prior to commencing construction.
Water quality	Works impact on the waters of Sydney Harbour	<ul style="list-style-type: none"> A Construction Environmental Management plan will be prepared by the contractor and outline construction techniques to avoid potentially affecting the water quality of the harbour and include, where relevant, mitigation measures such as sediment controls, 'wet-vacuums' or off-site removal of the item to undertake the works.
Noise and vibration	Works impact on the amenity of neighbouring properties	<ul style="list-style-type: none"> Construction works will be generally contained within the building and therefore generally not audible outside of the building. Works will be scheduled to minimise impacts on the on-going operations of the Opera House. Construction vehicles will utilise the underground loading dock. Operation noise will be carefully managed by the SOHT in accordance with the findings of the Noise Report
Waste and hazardous materials	Volumes and types of waste generated by works generate adverse environmental and/or health impacts	<ul style="list-style-type: none"> Waste will be managed in accordance with relevant NSW legislation and the principles of the waste management hierarchy as set out in the <i>NSW Waste Avoidance and Resource Recovery Strategy 2014-21</i>. Waste will be recycled where possible and a fully detailed Waste Management Plan will be prepared. Any hazardous materials will be managed in accordance with the relevant Management and Action Plans.

Risk type	Potential risk	Mitigation Measures
		<ul style="list-style-type: none"> Removal and disposal of any hazardous materials will comply with all relevant laws, regulations and guidelines.

Table 18: Environmental Risk Assessment

8 Conclusion

This EIS has been prepared to assess the environmental, social and economic impacts of the Concert Hall and Creative Learning centre works at the Sydney Opera House.

This EIS addresses the matters outlined in the SEARs issued by DP&E on 28 August 2017 and has been prepared in accordance with the requirements of Schedule 2 of the EPAR. It addresses all relevant strategic and statutory documents, policies and instruments, assesses potential environmental impacts and outlines proposed mitigation measures to address these impacts.

This assessment demonstrates that the proposed works can be undertaken without any significant impact on the heritage values of the Sydney Opera House or on the amenity and environment of the locality.

These two key projects will improve the accessibility and functionality of the Opera House, while allowing for innovation and creativity through the re-use and re-imaging of existing spaces, in particular, the:

- Concert Hall component enhances and improves patron access and modernises the technical and operational capability of the Concert Hall to provide for the operational demands in the future
- Creative Learning Centre component uniquely reimagines the existing space to provide artistic learning for future generations, through careful design that is sensitive to the heritage qualities for the building

The proposed works are therefore essential to the Sydney Opera House's ability to provide a World Class venue that will meet the evolving needs of the venue to educate future generations in the arts as well as improve patron experiences to meet contemporary operational, accessibility and WHS standards.

It is therefore concluded that the proposal is in the public interest and warrants approval for the following key reasons:

- the proposed works are an essential component of the Sydney Opera House Building Renewal Program, which is aimed at maximising its economic and cultural contribution to NSW, improving the operational efficiency of the building and ensuring compliance with modern building, accessibility and WHS requirements;
- the proposed works are supported by a detailed HIS which concludes that they will have an overall positive impact on the World, National or State Heritage values of the Sydney Opera House and will comply with the Sydney Opera House CMP and the *Utzon Design Principles*;
- the proposed works will not lead to any unacceptable impacts on residential properties in terms of noise, light spill or other amenity impacts;
- the proposed works will have no significant impacts in terms of waste management, hazardous materials, pedestrian access and safety, traffic and access and air quality; and
- the proposal will also incorporate several ESD measures and will comply with the BCA requirements.