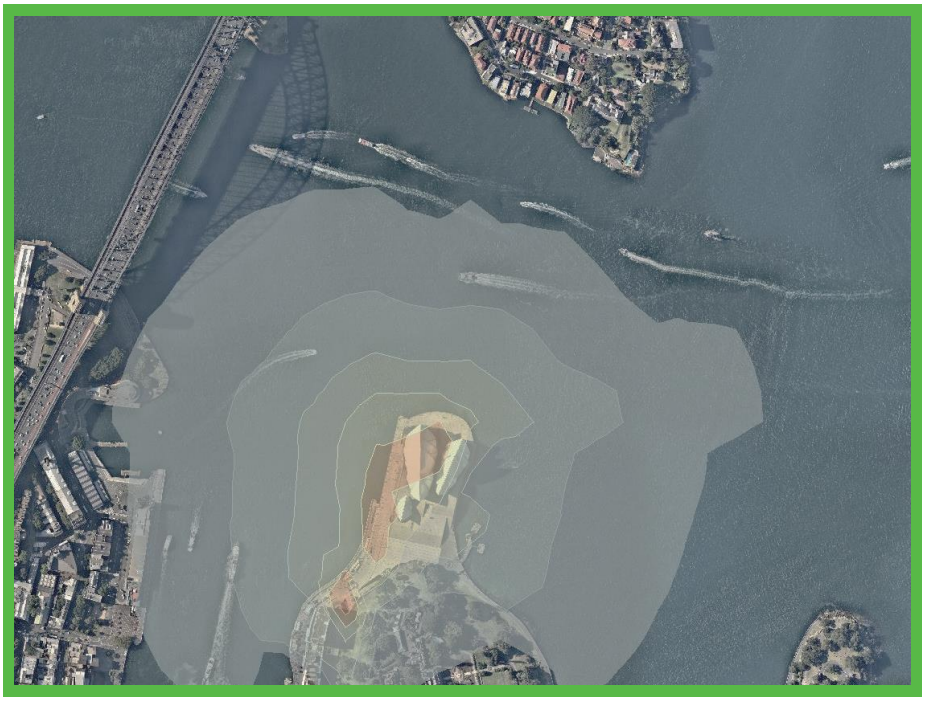
HIBBS
Excellence in Risk Management



| TAYLOR GROUP PTY LTD |

CONSTRUCTION NOISE AND VIBRATION MANAGEMENT SUB PLAN

REFERENCE NO. S11163-R01-CNVMSP-A1

SYDNEY OPERA HOUSE WESTERN RENEWAL PROJECT | 11 FEBRUARY 2020

Construction Noise and Vibration Management Sub Plan

Sydney Opera House, Bennelong Point, NSW 2000

Prepared for

Taylor Group Pty Ltd

Level 13, 157 Walker Street, North Sydney, NSW 2060

by

HIBBS & ASSOCIATES PTY LTD
Suite B, 255 Rawson Street,
Auburn NSW 2144,

P.O. Box 4266,
Homebush NSW 2140

www.hibbs.com.au

Telephone: (02) 9746 3244

Copyright © Hibbs & Associates Pty Ltd 2020

Our Reference: S11163-R01-CNVMSP-A1

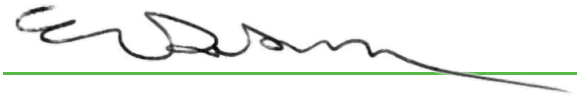
Prepared by:

Calvin Dunn
Acoustician

Toby Dudman
Principal Acoustician

Reviewed by:

Toby Dudman
Principal Acoustician



Date: 11 February 2020

Executive Summary

Condition B34 of the development consent for Sydney Opera House Trust's application for '*Upgrade to the Concert Hall and new Creative Learning Centre at the Sydney Opera House*' (SSD 8663) requires a Construction Noise and Vibration Management Sub-Plan (CNVMSP). The CNVMSP addresses all requirements of, and complies with, Consent Condition B34.

The predicted noise immissions are at least 30 dB and 12 dB below the warning NMLs for Kirribilli and Bennelong Apartments, respectively. Based on this, no additional mitigation is necessary beyond the good practice recommendations to minimise noise contained within the ICNG, Taylor's management plans and the relevant recommendations in SOH's Draft CMP and Arup's NIA.

Hibbs & Associates Pty Ltd © 2020

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

Hibbs & Associates Pty Ltd © 2020

1. Introduction

Condition B34 of the development consent for Sydney Opera House Trust's application for '*Upgrade to the Concert Hall and new Creative Learning Centre at the Sydney Opera House*' (SSD 8663) [1] requires a Construction Noise and Vibration Management Sub-Plan (CNVMSP). Condition B34 states:

> *CONSTRUCTION NOISE AND VIBRATION MANAGEMENT PLAN*
>
> *B34. Prior to the commencement of work, a Construction Noise and Vibration Management Plan (CNVMP) prepared by a suitably qualified person shall be submitted to the Certifying Authority. The CNVMP shall address (but not be limited to):*
>
> *(a) the EPA's Interim Construction Noise Guideline;*
>
> *(b) identify nearby sensitive receivers and land uses;*
>
> *(c) identify the noise management levels for the project;*
>
> *(d) identify the construction methodology and equipment to be used and the key sources of noise and vibration;*
>
> *(e) details of all reasonable and feasible management and mitigation measures to be implemented to minimise construction noise and vibration, including consideration of the practicability of the use of audible movement alarms of a type that would minimise noise impacts on surrounding sensitive receivers, without compromising safety;*
>
> *(f) be consistent with and incorporate all relevant recommendations and noise and vibration mitigation measures outlined in the 'Noise Impact Assessment' Rev B, prepared by Arup, dated 20 December 2018 and 'Draft Construction Management Plan – Sydney Opera House Concert Hall and Creative Learning Centre DA3 – SSD8663' Version 3.1 prepared by the Sydney Opera House Trust, dated August 2018;*
>
> *(g) ensure all potentially impacted sensitive receivers are informed by letterbox drops prior to the commencement of construction of the nature of works to be carried out, the expected noise levels and duration, as well as contact details for a construction community liaison officer; and*
>
> *(h) include a suitable proactive construction noise and vibration monitoring program which aims to ensure the construction noise and vibration criteria in this consent are not exceeded.*

The CNVMSP addresses all requirements of, and complies with, Consent Condition B34.

Table 1.1: Index to condition requirements

Condition	Section in CNVMSP
B34(a)	2.1
B34(b)	2.2
B34(c)	2.3
B34(d)	3

[1] NSW Government Department of Planning, Industry and Environment, 2019, *Opera House Concert Hall & Creative Learning Centre (SSD 8663), Draft Development Consent*

Hibbs & Associates Pty Ltd © 2020

Condition	Section in CNVMSP
B34(e)	4
B34(f)	4
B34(g)	5
B34(h)	6

Hibbs & Associates Pty Ltd © 2020

2. Background

2.1 Interim Construction Noise Guideline

The stated aim of the NSW Interim Construction Noise Guideline [2] (ICNG) is

> *to provide guidance on managing construction works to minimise noise with an emphasis on communication and cooperation with all involved in, or affected by, construction noise.*

The ICNG states its' objectives are to:

- Promote a clear understanding of ways to identify and minimise noise from construction works.
- Focus on applying all 'feasible' and 'reasonable' work practices to minimise construction noise impacts.
- Encourage construction to be undertaken only during the recommended standard hours unless approval is given for works that cannot be undertaken during these hours.
- Streamline the assessment and approval stages and reduce time spent dealing with complaints at the project implementation stage.
- Provide flexibility in selecting site-specific feasible and reasonable work practices in order to minimise noise impacts.

The ICNG states what actions the construction site should take at various levels of impact. In general, the ICNG opposes construction work outside normal daytime working hours. The noise impact is likely to be different at different times of the day, days of the week and during different phases of construction work. In addition, noise emissions from a construction site may vary significantly from one moment to the next. Psychological factors heavily influence human reaction to environmental noise. Consequently, NIAs have a high level of uncertainty. The ICNG emphasises community communication and feasible and reasonable work practices to minimise noise impacts over numerical noise limits.

The ICNG provides qualitative and quantitative assessment methods. The quantitative method determines Noise Management Levels (NMLs) relative to the Rating Background Levels (RBLs) at residences. The ICNG states:

> *Where noise from construction works is above the 'noise affected' levels presented below, the proponent should apply all feasible and reasonable work practices to minimise noise. The proponent should also inform potentially affected parties of the activities to be carried out, the expected noise impacts and duration.*

The ICNG provide the following explanations of *Feasible* and *Reasonable* in the context of the work practices required to minimise noise levels above the NMLs.

> *Feasible*
>
> *A work practice or abatement measure is feasible if it is capable of being put into practice or of being engineered and is practical to build given project constraints such as safety and maintenance requirements.*

[2] New South Wales & Department of Environment and Climate Change (2009) *Interim construction noise guideline*, Dept. of Environment and Climate Change, Sydney N.S.W.

Hibbs & Associates Pty Ltd © 2020

Reasonable

Selecting reasonable measures from those that are feasible involves making a judgment to determine whether the overall noise benefits outweigh the overall adverse social, economic and environmental effects, including the cost of the measure. To make such a judgement, consideration may be given to:

Noise level impacts

Noise mitigation benefits

Cost effectiveness of noise mitigation

Community views

2.2 Potentially Affected Sensitive Receivers

The nearest Potentially Affected Sensitive Receivers (PASR) are residences to the south (Bennelong Apartments at East Circular Quay) and to the north in the suburb of Kirribilli. Bennelong Apartments is about 260 m from the concert hall and partly screened by the southern sections of the Sydney Opera House. The residents of Bennelong Apartments are the only PASR that need to be included in the letterbox drop (refer section 5). The nearest residences in Kirribilli to the site are on the southern waterfront and about 550 m distant, across the harbour. Figure 2.1 shows these locations on an aerial photograph.

2.3 Noise Management Levels

SOH's Noise Impact Assessment (NIA) [3] conducted noise surveys at the nearest NSRs and calculated NMLs from these in accordance with the ICNG. The Construction Management Plan sets out work patterns as:

- 1030 hours to 1800 hours – General construction/no major noise generating activities
- 1800 hours to 2330 hours – Planning and quiet activities which are compatible with the live performances occurring in other venues within the site
- 2330 hours to 1030 hours – Works which will otherwise be disruptive to Opera House operations but not audible outside of the building

Based on this, only the NMLs for standard daytime working hours apply.

Table 2.1: Project Noise Management Levels

PASR	Kirribilli	Bennelong Apartments	Potts Point
Warning level, $L_{Aeq,15m}$ (dB)	61	65	58
Maximum Level, $L_{Aeq,15m}$ (dB)	64	68	61

[3] Arup (2018) *Sydney Opera House, Building Renewal Noise Impact Assessment for DA3 - SSD 8663 R07 Issue (Rev A) | 15 May 2018*

Hibbs & Associates Pty Ltd © 2020

Figure 2.1: Potentially Affected Sensitive Receivers

3. Sources

Appendix A contains a description of the construction methodology and schedule. Table 3.1 lists the key noise sources. The source noise levels are expressed as sound power levels for external sources and overall average diffuse internal sound pressure levels for internal activities. The source terms are cumulative and assume concurrent activities throughout the building. They assume tool use throughout the 15-minute assessment period. Therefore, they represent a commonly occurring upper emission level.

There are no sources of vibration likely to give rise to adverse vibration impacts offsite. While the concrete breakers generate high vibration at the point of impact, these levels will attenuate rapidly with distance due to the high mass foundations and substructures between the source and receptors.

Table 3.1: Noise Sources

Activity	Construction Equipment	Source Noise Level	Index (Unit)
External works	Hand tools to remove façade elements Occasional mobile crane and forklifts	98	L_{AW} (dB)
Internal demolition	Demolition saw Core drill Concrete breakers (handheld) Small excavators/bobcats/forklifts (electric). Bobcat with nibbler to remove staging Work platforms	96	$L_{Ap,in}$ (dB)
Internal works	Hand tools Small excavators/bobcats Work platforms	86	$L_{Ap,in}$ (dB)
Concreting (internal plant)	Vibrators	89	$L_{Ap,in}$(dB)
Concreting (external plant)	Concrete trucks Concrete pumps	107	L_{AW} (dB)
Waste handling/ removal	Funicular hoists and waste chutes	96	L_{AW} (dB)
Vehicles	Materials and waste trucks	109	L_{AW} (dB)

Key to Table 3.1:
L_{AW} Sound Power Level (point source)
$L_{Ap,in}$ Internal average diffuse sound pressure level

We have predicted the noise impacts at the nearest NSRs using the iNoise software package. This implements ISO 9613-2 supplemented by the meteorological correction terms contained within CONCAWE report 4/81. The model assumes 'hard' ground for all surfaces except for the Royal Botanical Gardens, which is modelled as 'soft' ground. The model assumes Pasquil Stability Class B, which is common for a sunny daytime with a mild breeze, and the prevailing wind direction (NW) for Sydney [4].

Table 3.2 lists the predicted noise impact separately for the works at the site (internal and external) and a delivery vehicle accessing the site from Macquarie Street. With reference to Table 2.1, the predicted noise immissions are at least 30 dB and 12 dB below the warning NMLs for Kirribilli and Bennelong Apartments, respectively.

[4] Bureau of Meteorology (2020) http://www.bom.gov.au/cgi-bin/climate/cgi_bin_scripts/windrose_selector.cgi?period=Annual&type=9&location=66037

Hibbs & Associates Pty Ltd © 2020

Table 3.2: Predicted noise impacts

Scenario	Source	Noise Immission, $L_{Aeq,15m}$ (dB) Kirribilli	Noise Immission, $L_{Aeq,15m}$ (dB) Bennelong (4th floor)	Noise Immission, $L_{Aeq,15m}$ (dB) Bennelong (9th floor)
Demolition	Delivery	9	51	48
	Building	31	40	40
	Total	**31**	**51**	**49**
Concreting	Delivery	9	51	48
	Building	26	50	50
	Total	**26**	**53**	**52**
Internal works	Delivery	9	51	48
	Building	19	35	35
	Total	**19**	**51**	**49**

Hibbs & Associates Pty Ltd © 2020

4. Mitigation

4.1 Work practices to minimise noise

As stated in section 2.1, The ICNG states:

> *Where noise from construction works is above the 'noise affected' levels presented below, the proponent should apply all feasible and reasonable work practices to minimise noise. The proponent should also inform potentially affected parties of the activities to be carried out, the expected noise impacts and duration.*

The predicted noise immissions are at least 30 dB and 12 dB below the warning NMLs for Kirribilli and Bennelong Apartments, respectively. Based on this, no additional mitigation is necessary beyond the good practice recommendations to minimise noise contained within the ICNG, Taylor's management plans and the relevant recommendations in SOH's Draft CMP and Arup's NIA.

4.2 Reversing signals

It would be practicable for Taylor to require the onsite plant and equipment to have suitable broadband movement alarms that can minimise noise impacts on surrounding sensitive receivers without compromising safety. We expect that this would minimise the noise impact to NSRs. It is not practicable for Taylor to require all vehicles attending site temporarily, particularly delivery and waste vehicles, to have broadband reversing signals because they would have little control over these vehicles.

4.3 Recommended mitigation

The following recommendations include those contained within:

- Taylor's Noise Management Procedure (NMP) [5]
- Taylor's Construction Management Plan (CMP) [6]
- Sydney Opera House Trust's Draft Construction Management Plan (DCMP) [7]
- Arup's Noise Impact Assessment (NIA)

<u>General</u>

i. Where possible, position and orientate noisy plant and equipment away from sensitive receivers.

ii. Ensure all construction activities are undertaken during approved working hours

iii. Prevent vehicles and plant queuing and idling outside the site prior to the morning start time.

iv. Prevent vehicles and plant idling when not in use.

<u>Complaints</u>

[5] Taylor Construction Group Pty Ltd (2019) *Noise Management Procedure*, SE-OP-04

[6] Taylor Construction Group Pty Ltd (2019) *Construction Management Plan – Western Renewal Project at Sydney Opera House Bennelong Point*

[7] Sydney Opera House, 2018, *Concert Hall and Creative Learning Centre, DA3 – SSD8663, Draft Construction Management Plan*

Hibbs & Associates Pty Ltd © 2020

v. If a noise or vibration-related complaint is received, report and investigate in accordance with the incident reporting and investigation procedure.

vi. Feedback on resolution of a complaint should be provided to the complainant where requested.

Temporary opening in the façade for access to the Concert Hall

vii. Provide a solid timber or steel door to close off the temporary opening in the façade for access to the Concert Hall.

viii. Provide door with gasket seals around the perimeter and a mechanism to hold the door closed

ix. Ensure that the door is kept closed except when needing to be open for access for plant and materials.

Reversing signals

x. Onsite plant and equipment in long-term use to have suitable broadband movement alarms.

Hibbs & Associates Pty Ltd © 2020

5. Letterbox drop

SOH will undertake the required letterbox drop. The residents of Bennelong Apartments at East Circular Quay will receive the letterbox drop.

- Contact telephone number is 1300 382 692
- Email address is constructionfeedback@sydneyoperahouse.com

Hibbs & Associates Pty Ltd © 2020

6. Monitoring programme

SOHT's Draft CMP states:

> *A noise logger will be installed and maintained which can be interrogated remotely by SOHT staff as well as SOHT's Contractor. The logger will also be required to automatically send a text message to SOHT's Contractor's representative on site once the 'warning' threshold is breached. The SOHT representative on site during the works will also be copied in with the warning texts.*

This provides a suitable proactive construction noise and vibration monitoring program. Taylor should designate an appropriate manager who will interrogate the logger at the start of each change in work schedule likely to change the overall site emissions materially and weekly during the noisiest works. As a minimum, this should be at the commencement of and during demolition and concreting works.

The noise logger should be installed at the PASR expected to have the highest noise immission level. That is at the northern façade of Bennelong Apartments. The noise logger should be installed on a balcony on, or as close as possible to the fourth floor. This is the same location as 'Location 1' of Arup's background noise monitoring. Figure 6.1 shows that location and is reproduced from Arup's report (Figure 2).

Figure 6.1: Noise logger location

Hibbs & Associates Pty Ltd © 2020

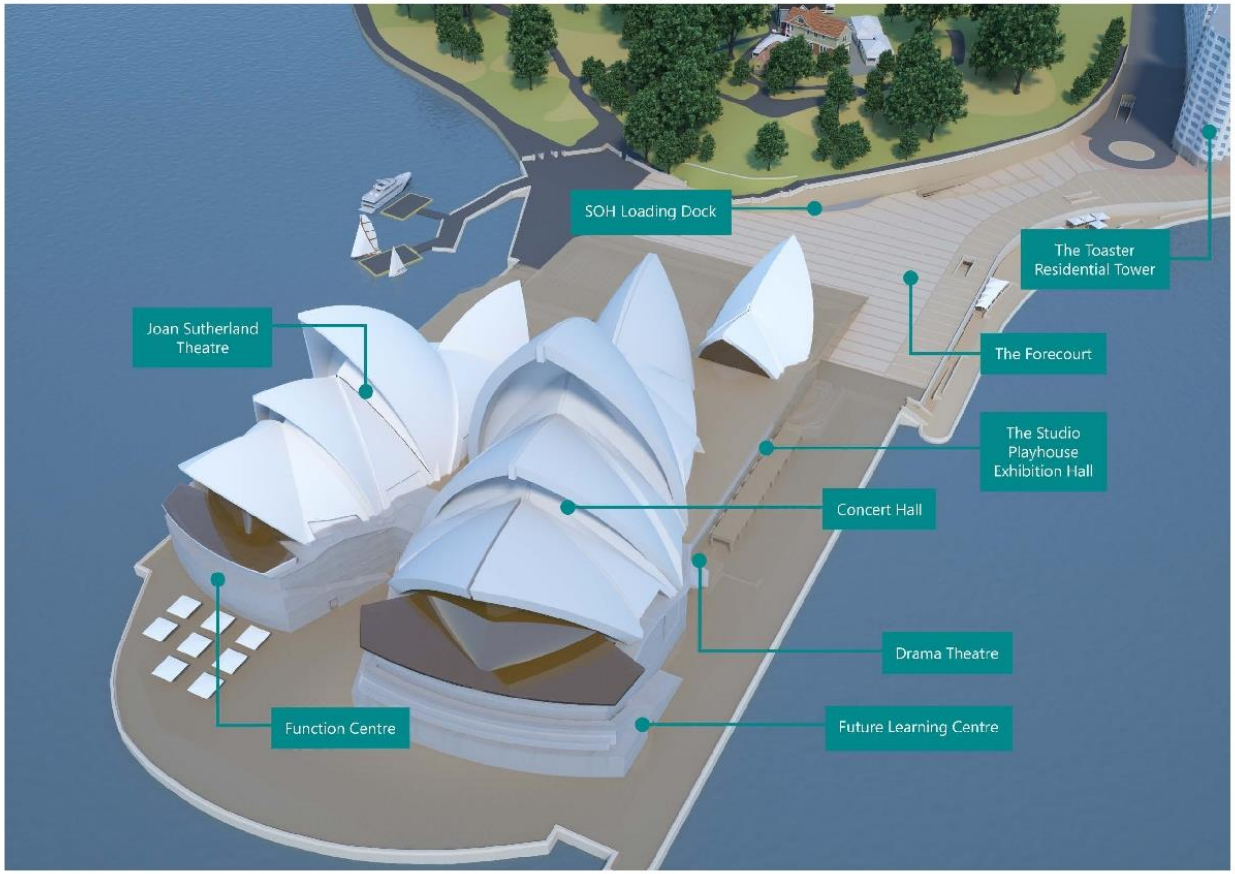
Appendix A Source data

Construction methodology and schedule

Hibbs & Associates Pty Ltd © 2020

Sydney Opera House – Western Renewal Project

Operating Venue

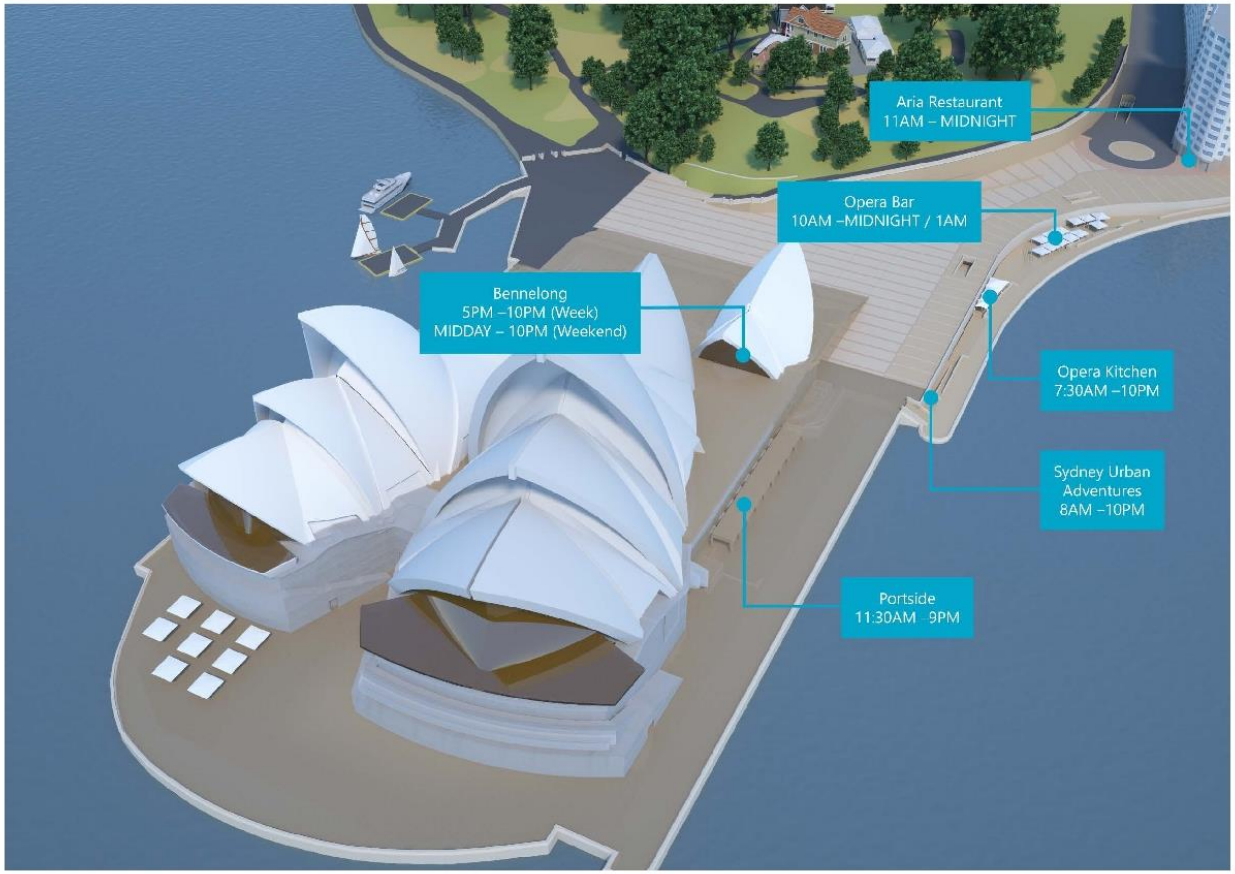


Taylor ■ Sydney Opera House - Western Renewal Project - Bennelong Point, Sydney

Hibbs & Associates Pty Ltd © 2020

Sydney Opera House – Western Renewal Project

Public Venue Operating Hours

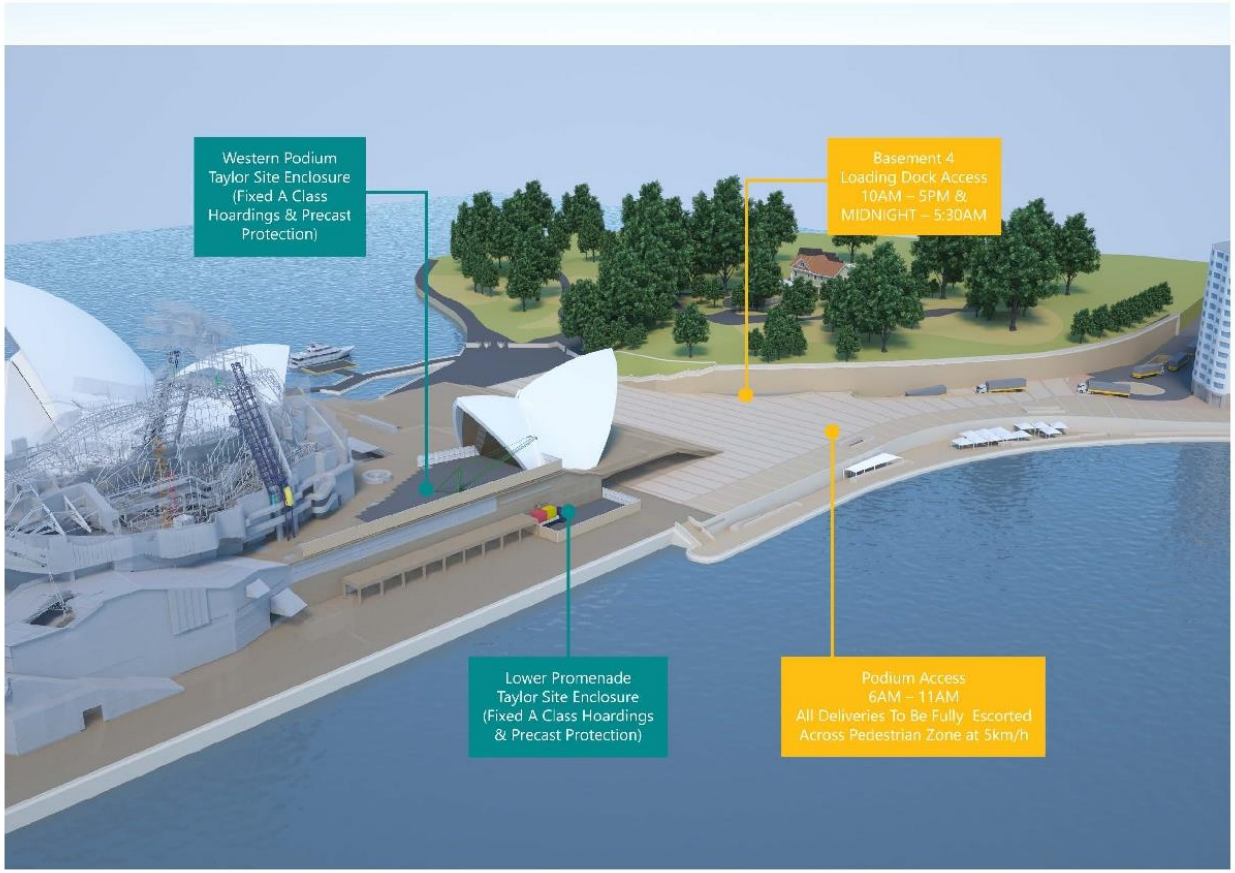


Taylor ■ Sydney Opera House - Western Renewal Project - Bennelong Point, Sydney

Hibbs & Associates Pty Ltd © 2020

Sydney Opera House – Western Renewal Project

Site Establishment – External Materials Handling Strategy

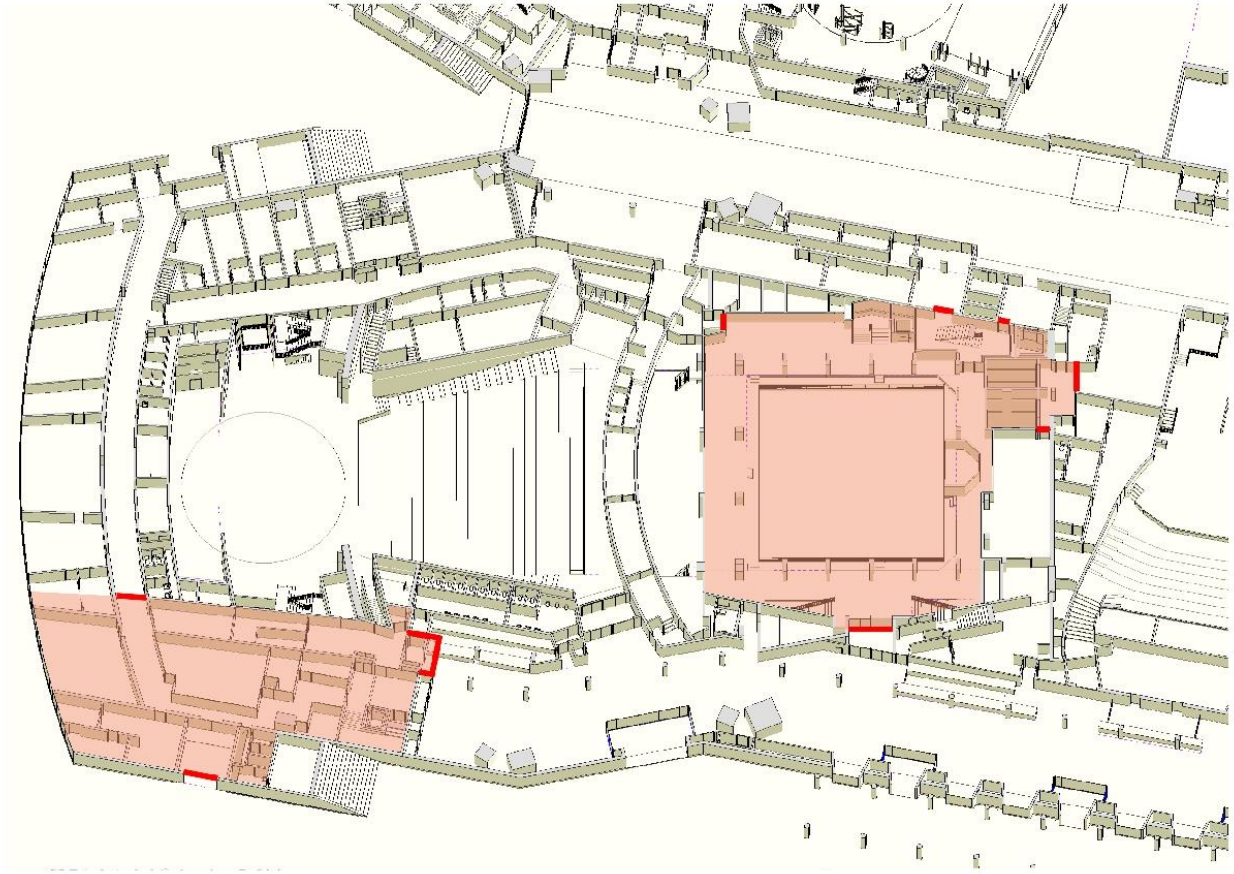


Taylor ■ Sydney Opera House - Western Renewal Project - Bennelong Point, Sydney

Hibbs & Associates Pty Ltd © 2020

Sydney Opera House – Western Renewal Project

Site Hoarding Lines & Worker Movements – Ground Floor including Creative Learning Centre

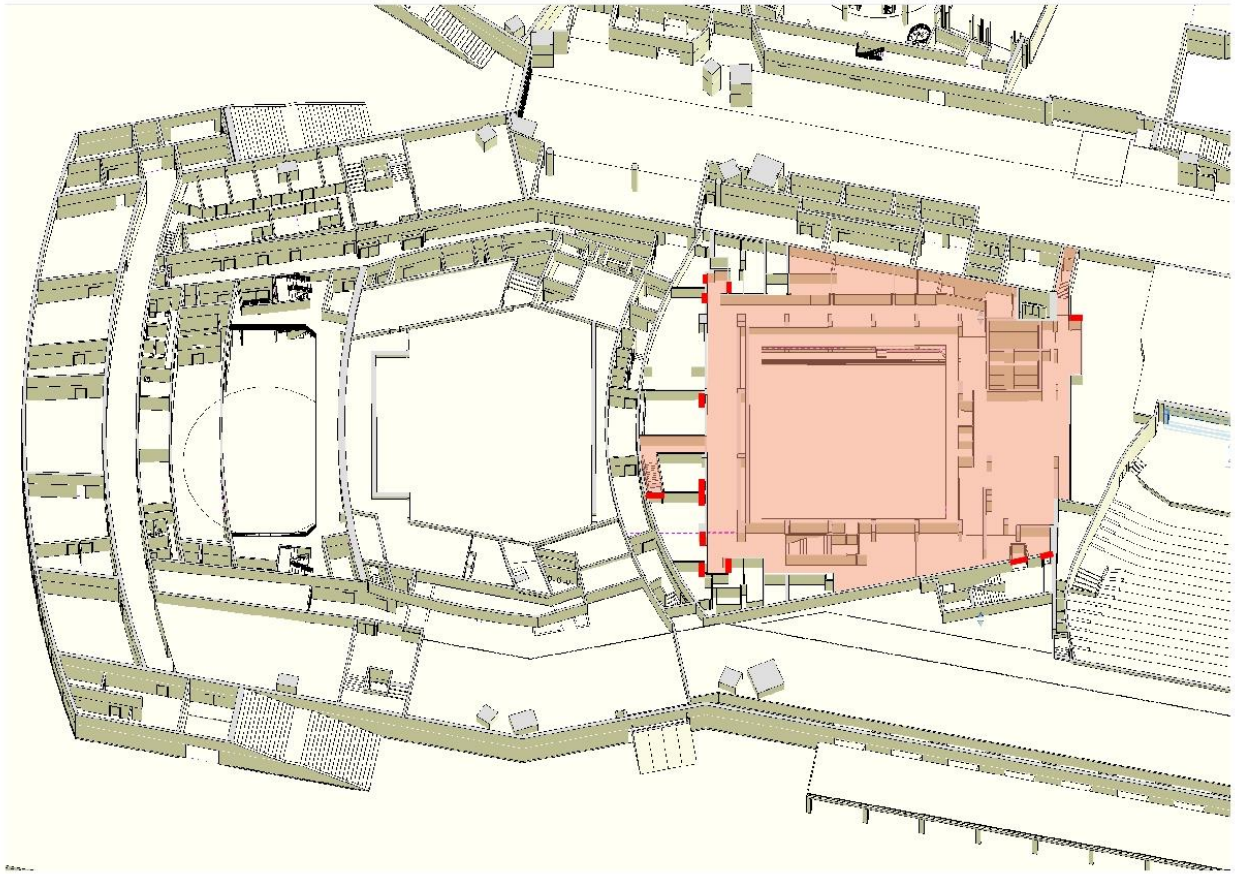


Taylor ■ Sydney Opera House - Western Renewal Project - Bennelong Point, Sydney

Hibbs & Associates Pty Ltd © 2020

Sydney Opera House – Western Renewal Project

Site Hoarding Lines & Worker Movements – Ground Floor Mezz

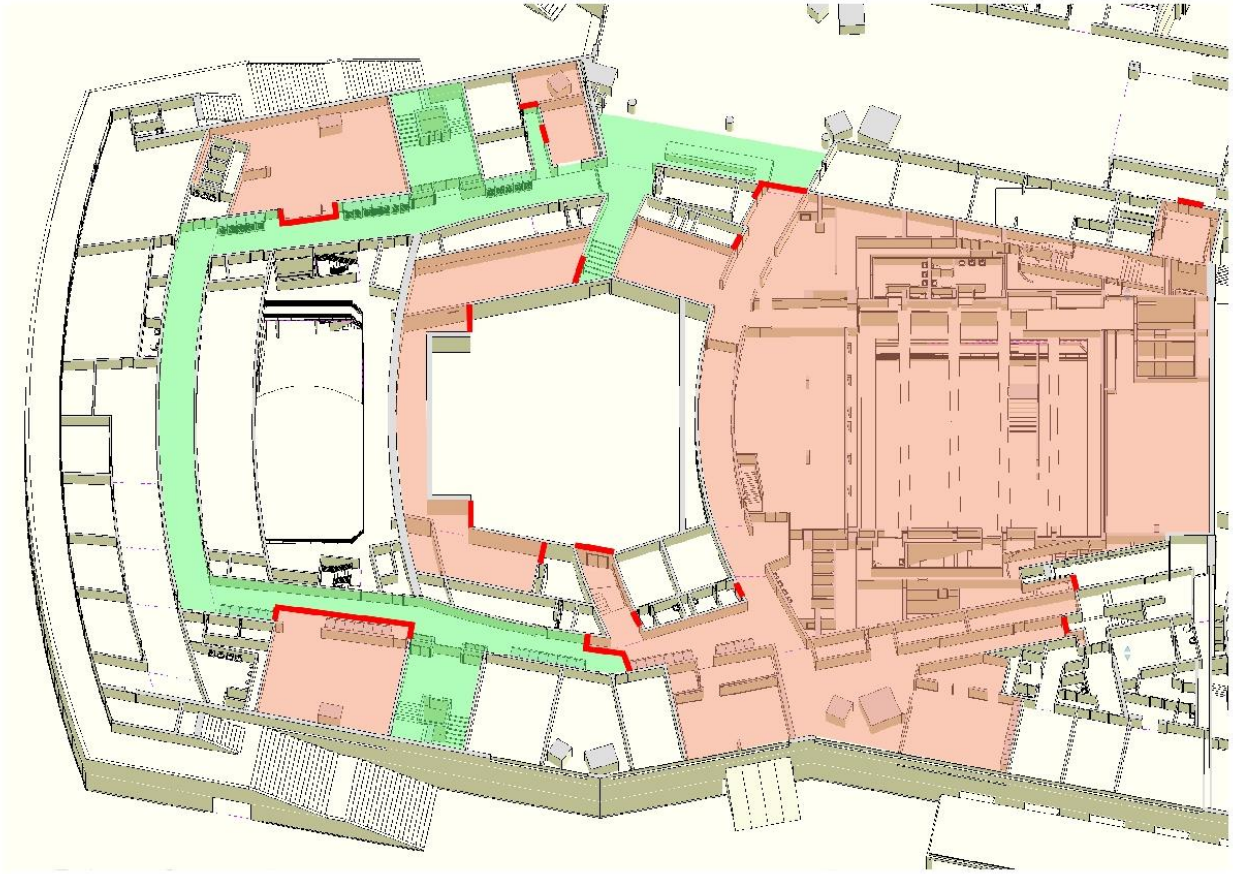


Taylor ■ Sydney Opera House - Western Renewal Project - Bennelong Point, Sydney

Hibbs & Associates Pty Ltd © 2020

Sydney Opera House – Western Renewal Project

Site Hoarding Lines & Worker Movements – Level 1

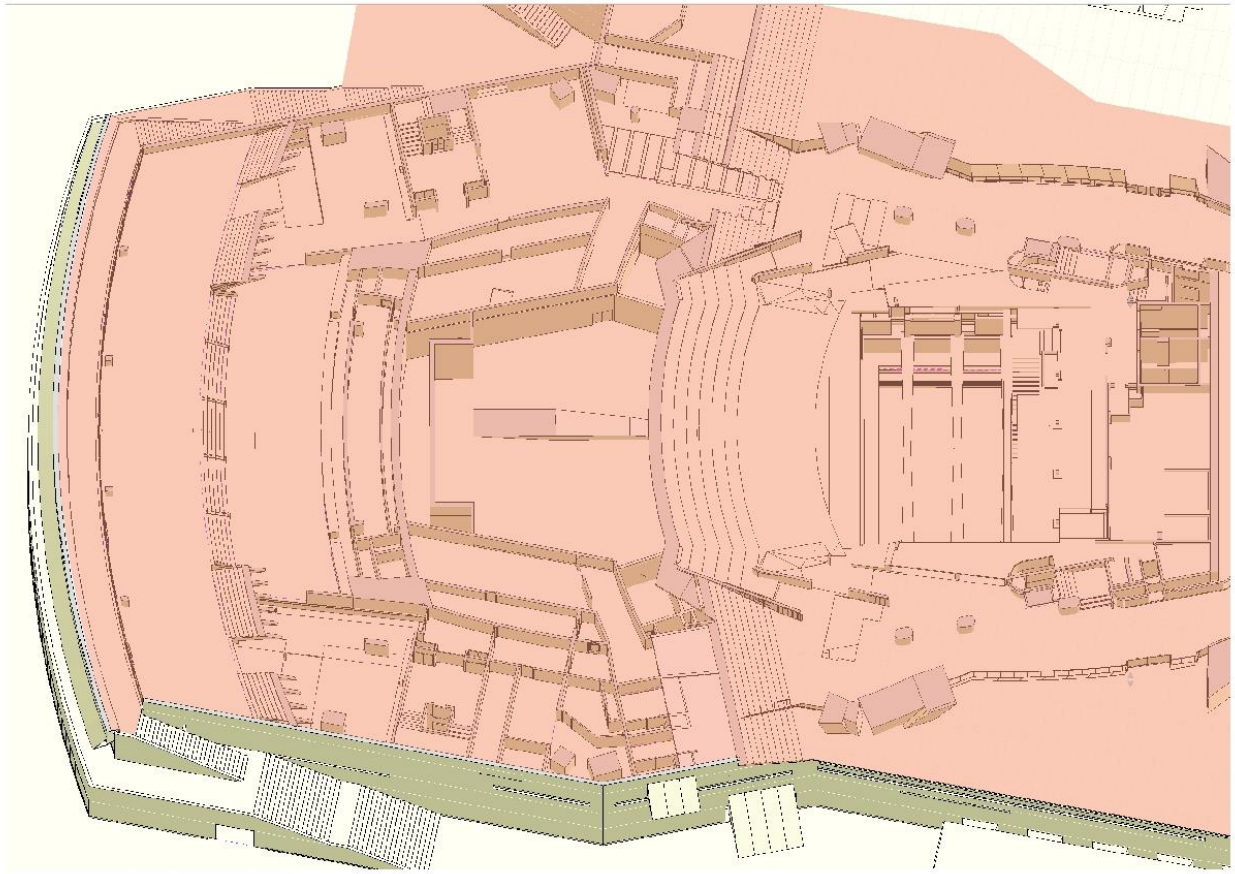


Taylor ■ Sydney Opera House - Western Renewal Project - Bennelong Point, Sydney

Hibbs & Associates Pty Ltd © 2020

Sydney Opera House – Western Renewal Project

Site Hoarding Lines & Worker Movements – Level 2

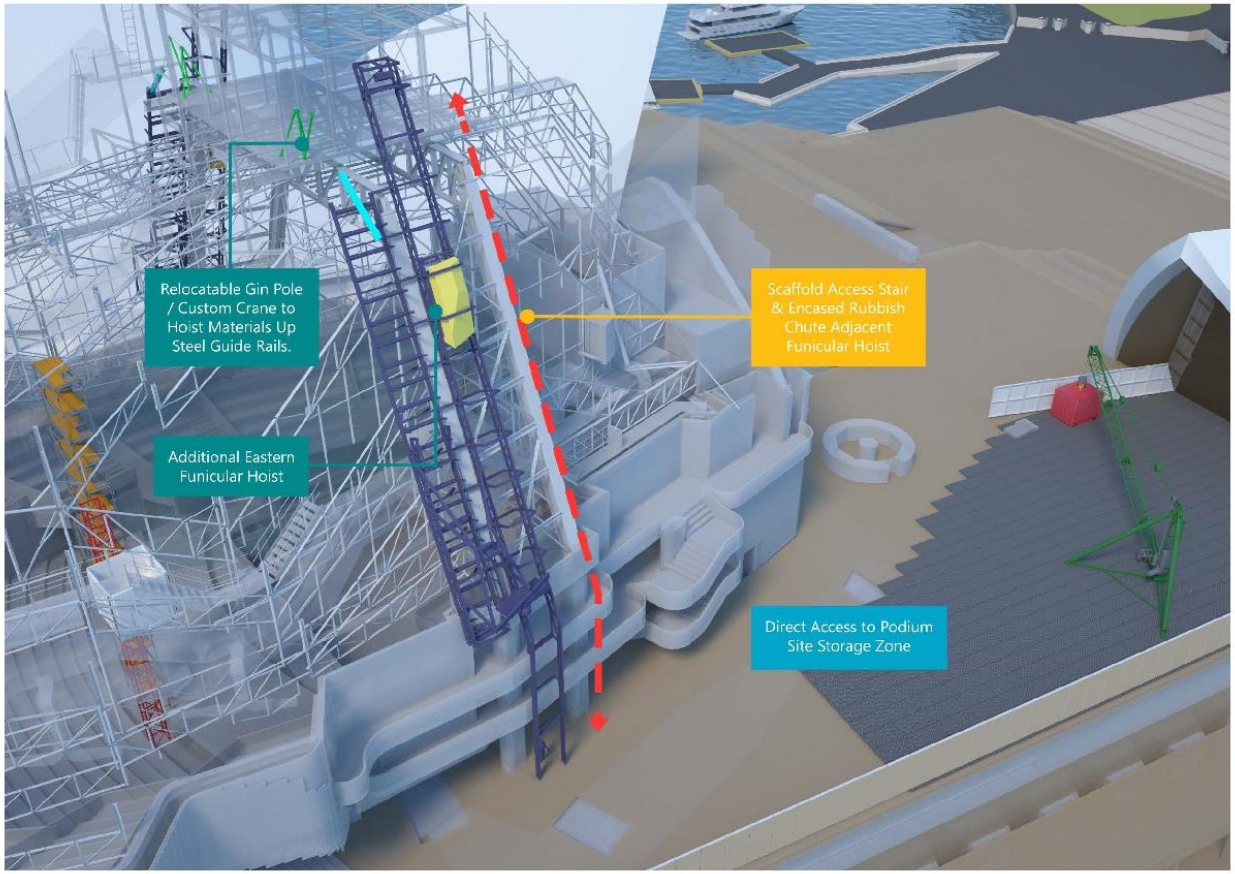


Taylor ■ Sydney Opera House - Western Renewal Project - Bennelong Point, Sydney

Hibbs & Associates Pty Ltd © 2020

Sydney Opera House – Western Renewal Project

OverStage Works – Funicular Hoist, Scaffold Stair & Rubbish Chute Arrangement



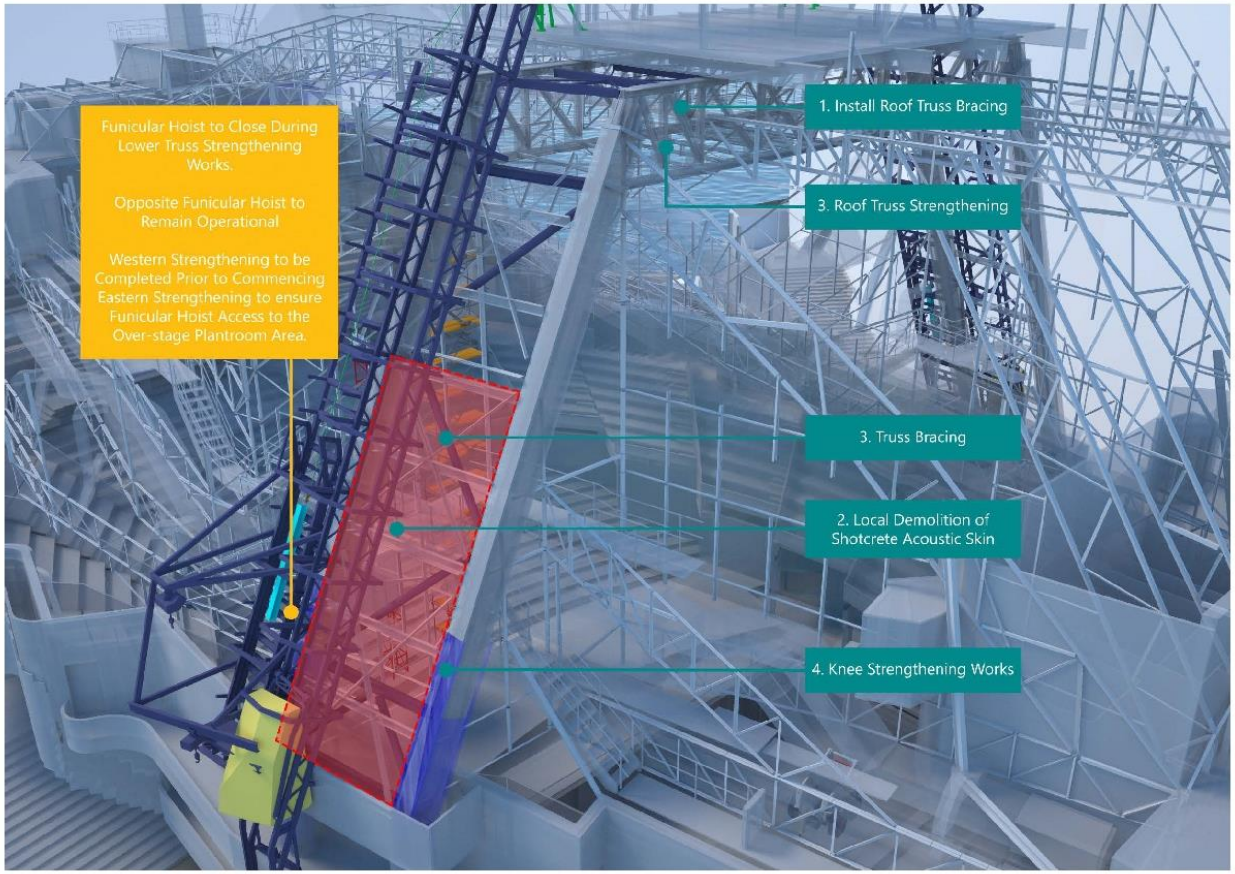
Taylor ■ Sydney Opera House - Western Renewal Project - Bennelong Point, Sydney

Hibbs & Associates Pty Ltd © 2020

Sydney Opera House – Western Renewal Project

OverStage Works – Lower Truss Strengthening Sequence

TAYLOR

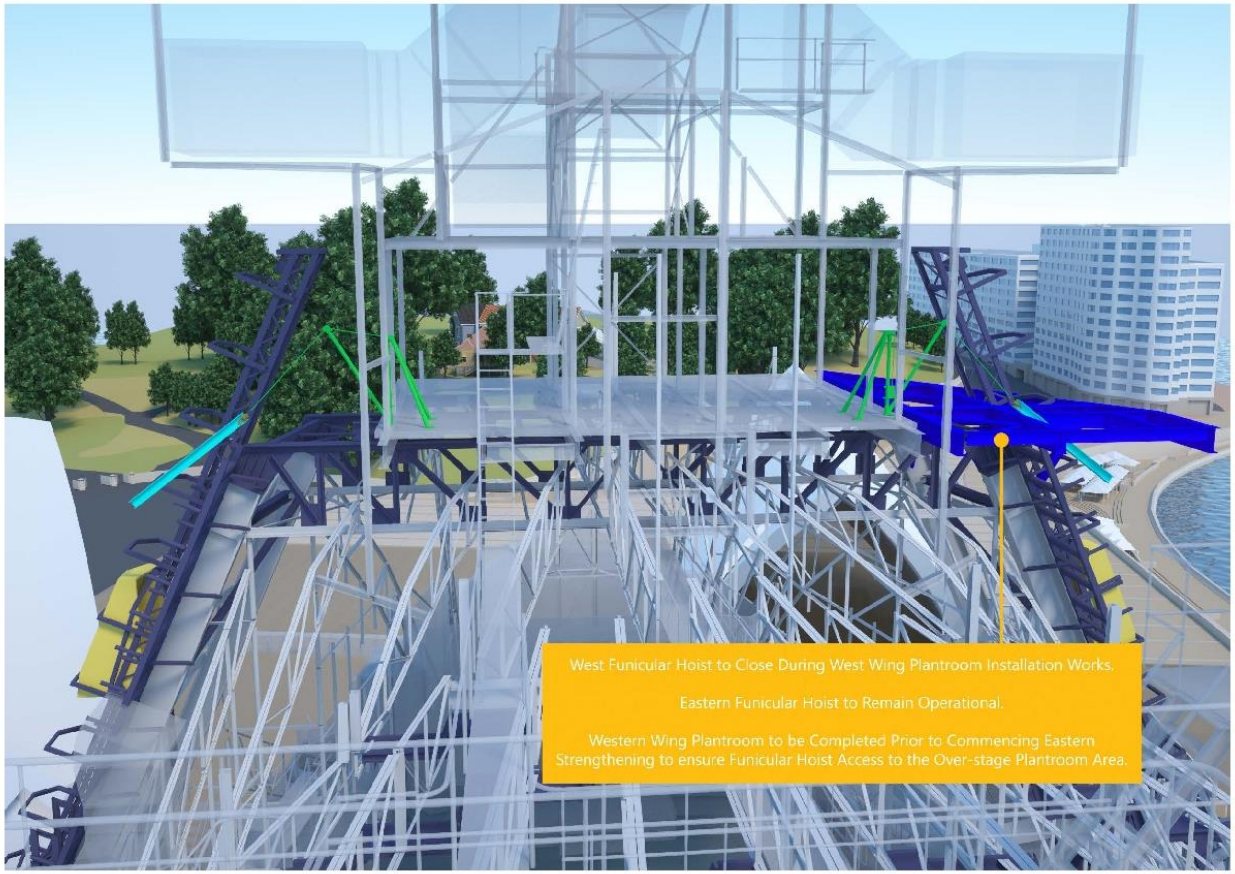


Taylor ■ Sydney Opera House - Western Renewal Project - Bennelong Point, Sydney

Hibbs & Associates Pty Ltd © 2020

Sydney Opera House – Western Renewal Project

OverStage Works – Upper Plantroom structure Sequence – Phase 1



Taylor ■ Sydney Opera House - Western Renewal Project - Bennelong Point, Sydney

Hibbs & Associates Pty Ltd © 2020

Sydney Opera House – Western Renewal Project

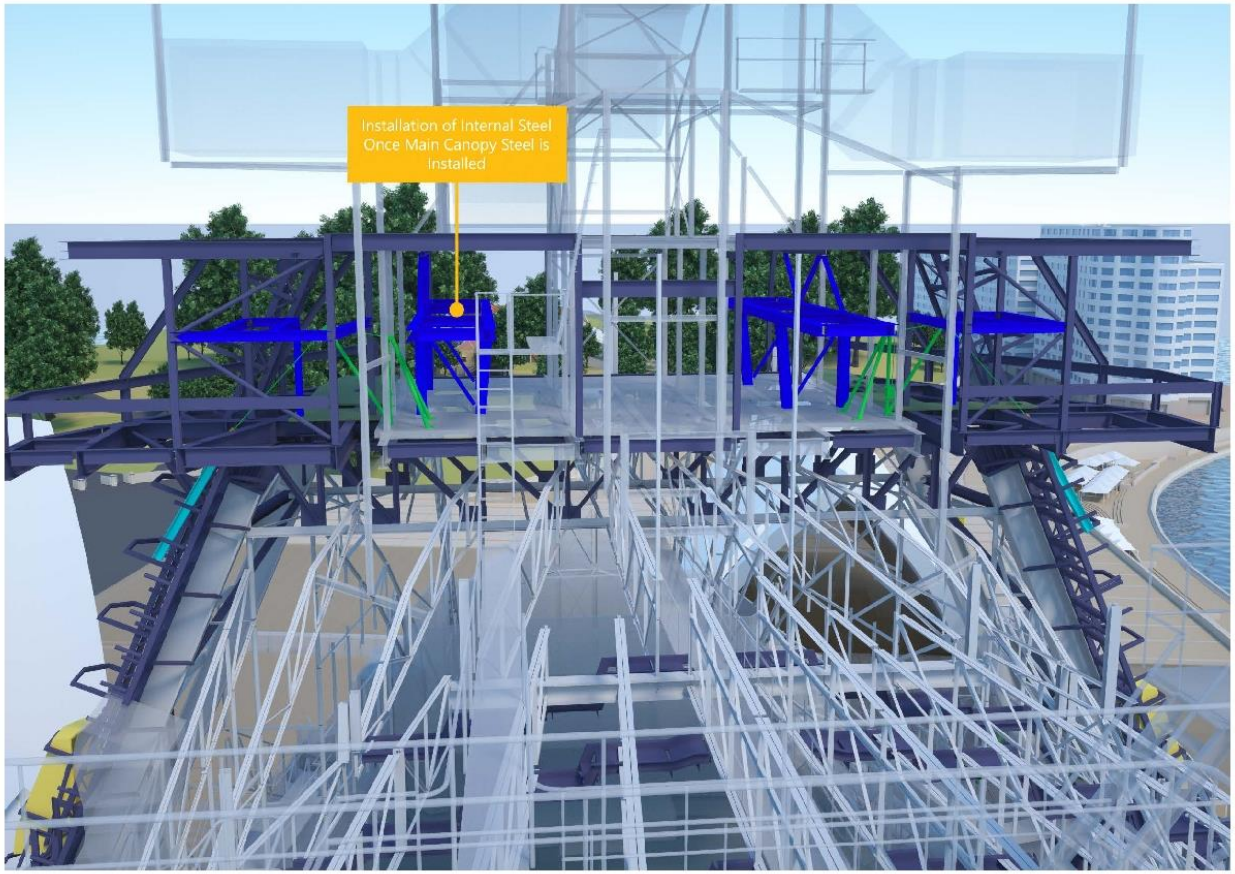
OverStage Works – Upper Plantroom structure Sequence – Phase 2

Taylor ■ Sydney Opera House - Western Renewal Project - Bennelong Point, Sydney

Hibbs & Associates Pty Ltd © 2020

Sydney Opera House – Western Renewal Project

OverStage Works – Upper Plantroom structure Sequence – Phase 3

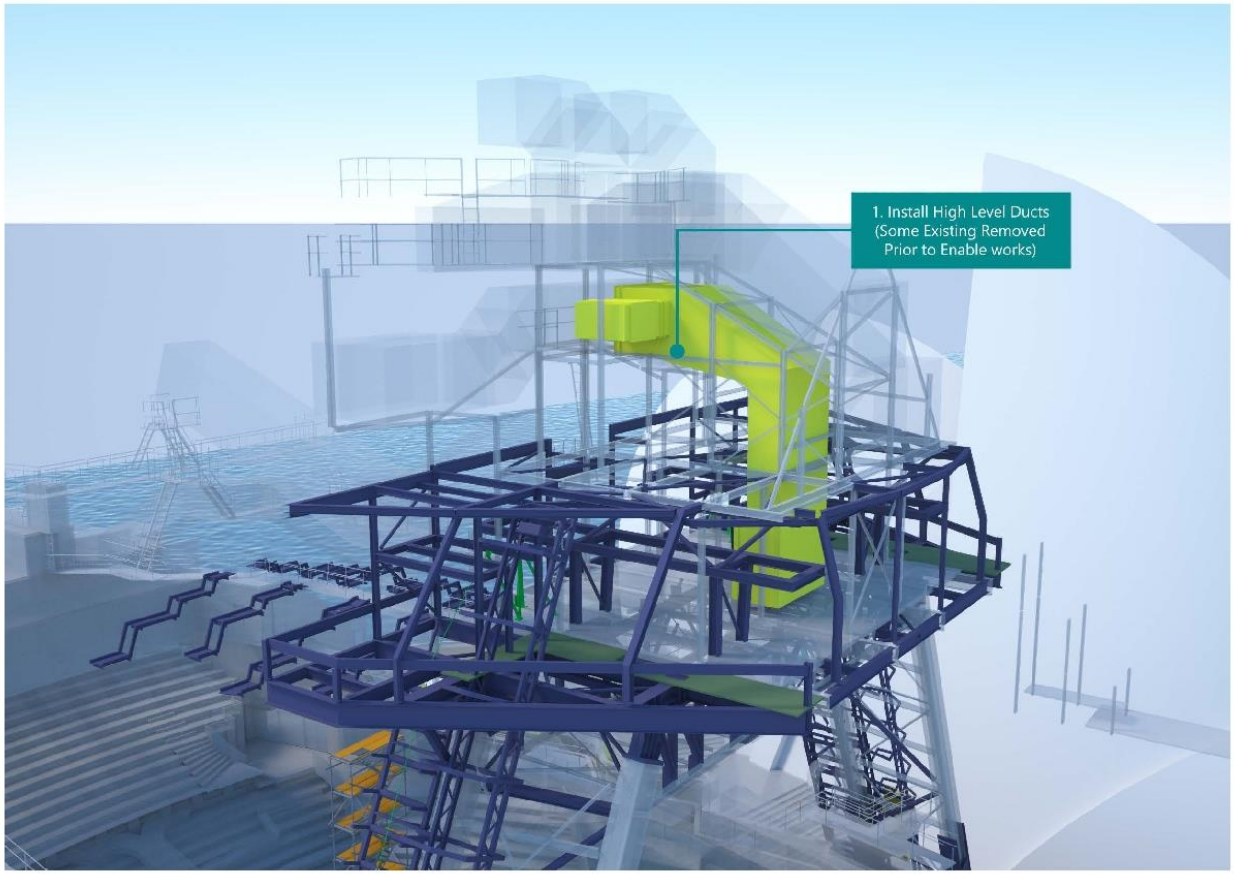


Taylor ■ Sydney Opera House - Western Renewal Project - Bennelong Point, Sydney

Hibbs & Associates Pty Ltd © 2020

Sydney Opera House – Western Renewal Project

OverStage Works – Plantroom Construction sequence – Phase 1

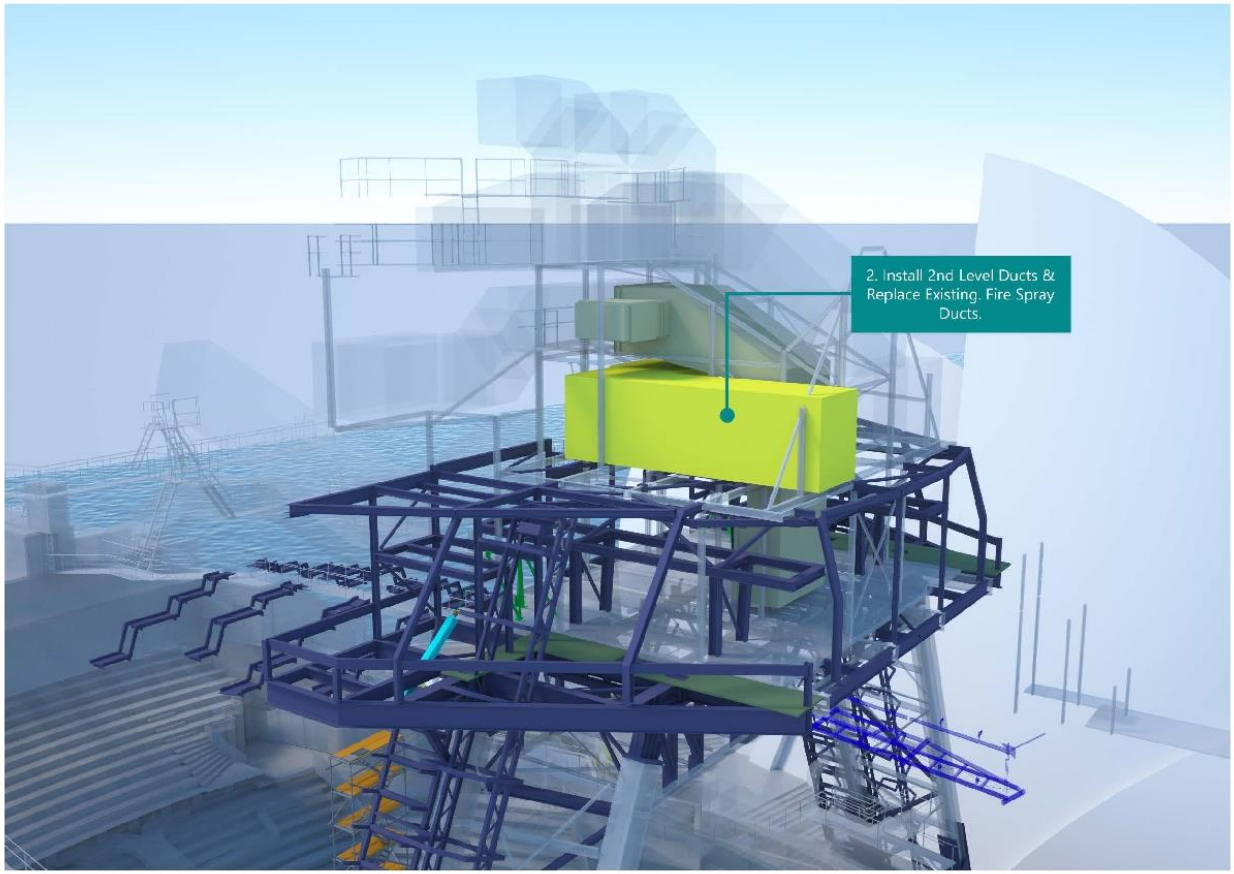


Taylor ■ Sydney Opera House - Western Renewal Project - Bennelong Point, Sydney

Hibbs & Associates Pty Ltd © 2020

Sydney Opera House – Western Renewal Project

OverStage Works – Plantroom Construction sequence – Phase 2

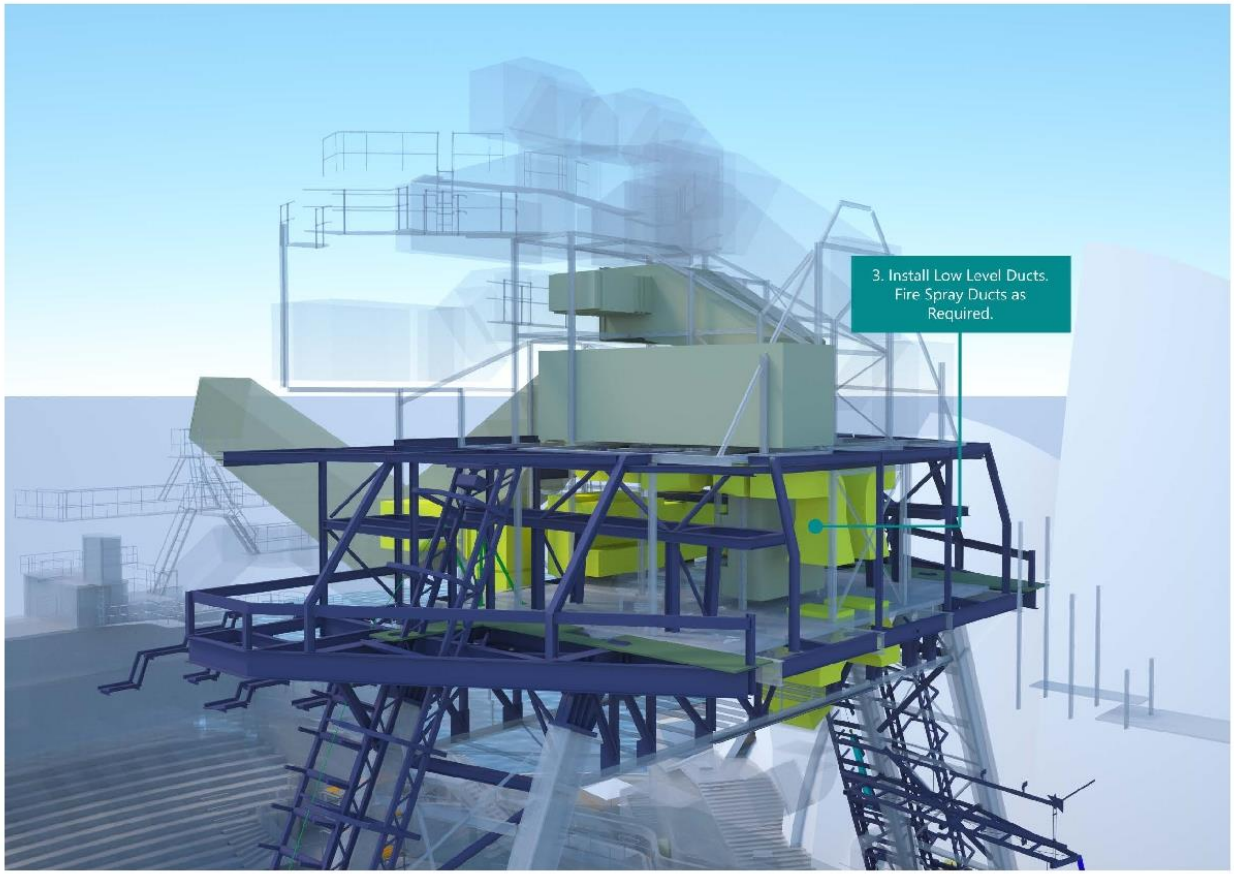


Taylor ■ Sydney Opera House - Western Renewal Project - Bennelong Point, Sydney

Hibbs & Associates Pty Ltd © 2020

Sydney Opera House – Western Renewal Project

OverStage Works – Plantroom Construction sequence – Phase 3

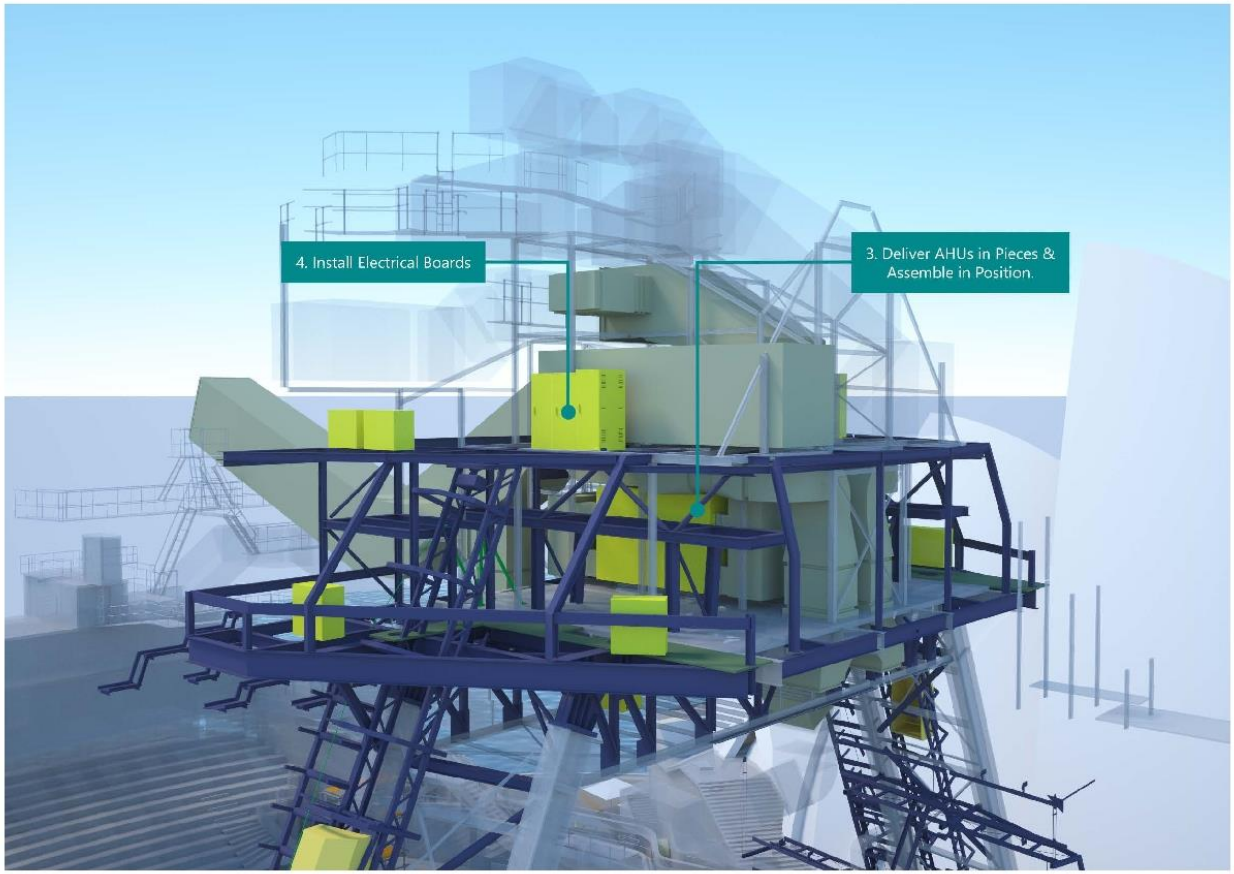


Taylor ■ Sydney Opera House - Western Renewal Project - Bennelong Point, Sydney

Hibbs & Associates Pty Ltd © 2020

Sydney Opera House – Western Renewal Project

OverStage Works – Plantroom Construction sequence – Phase 4

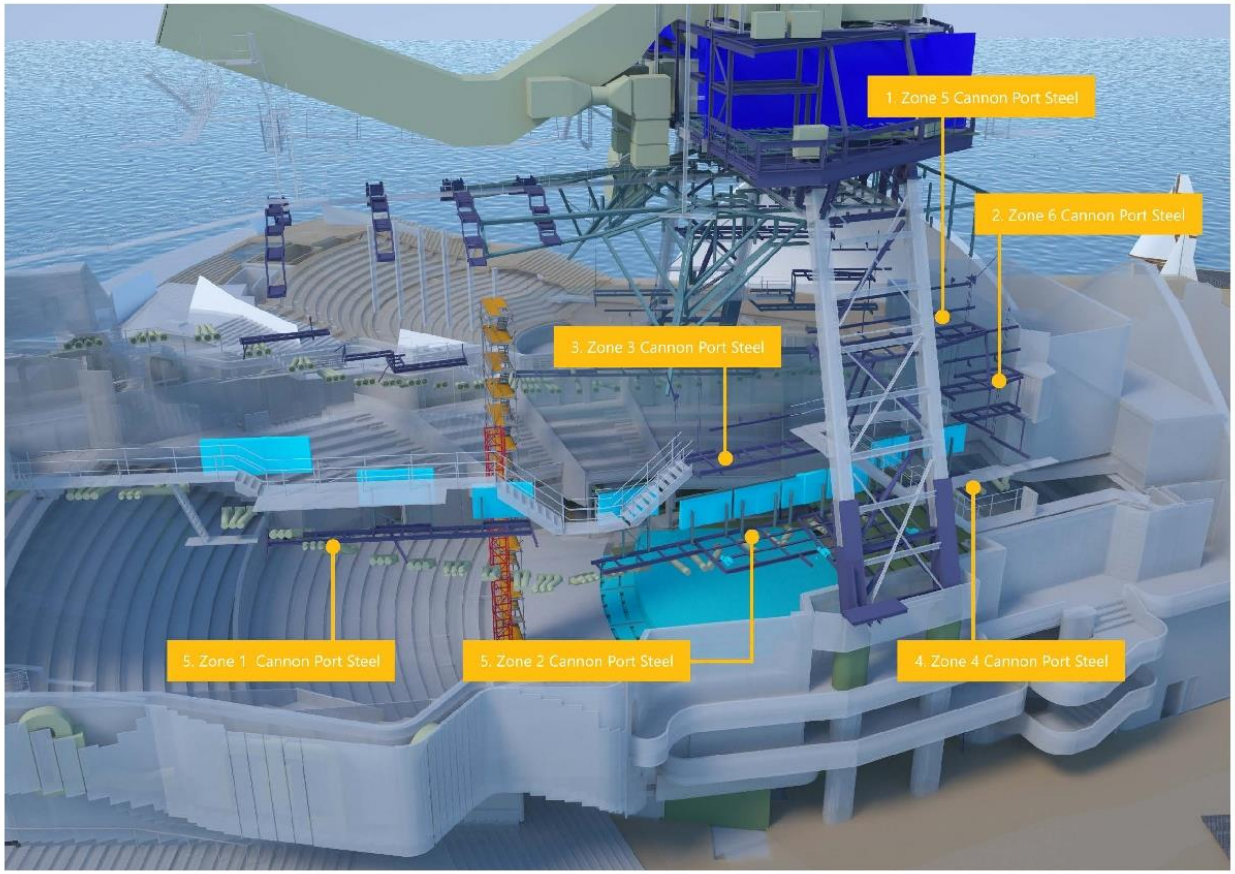


Taylor ■ Sydney Opera House - Western Renewal Project - Bennelong Point, Sydney

Hibbs & Associates Pty Ltd © 2020

Sydney Opera House – Western Renewal Project

OverStage Works – Cannon port Sequence – West

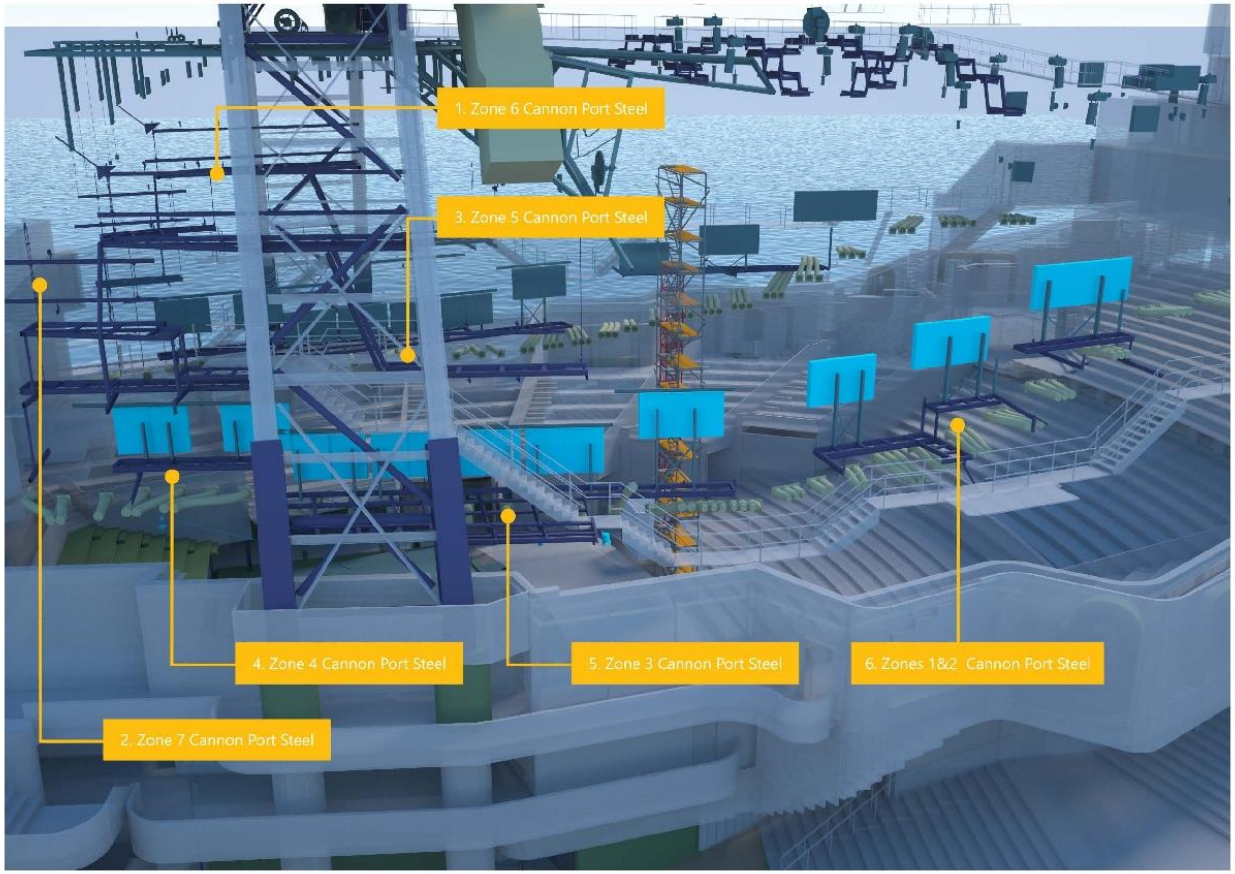


Taylor ■ Sydney Opera House - Western Renewal Project - Bennelong Point, Sydney

Hibbs & Associates Pty Ltd © 2020

Sydney Opera House – Western Renewal Project

OverStage Works – Cannon port Sequence – East

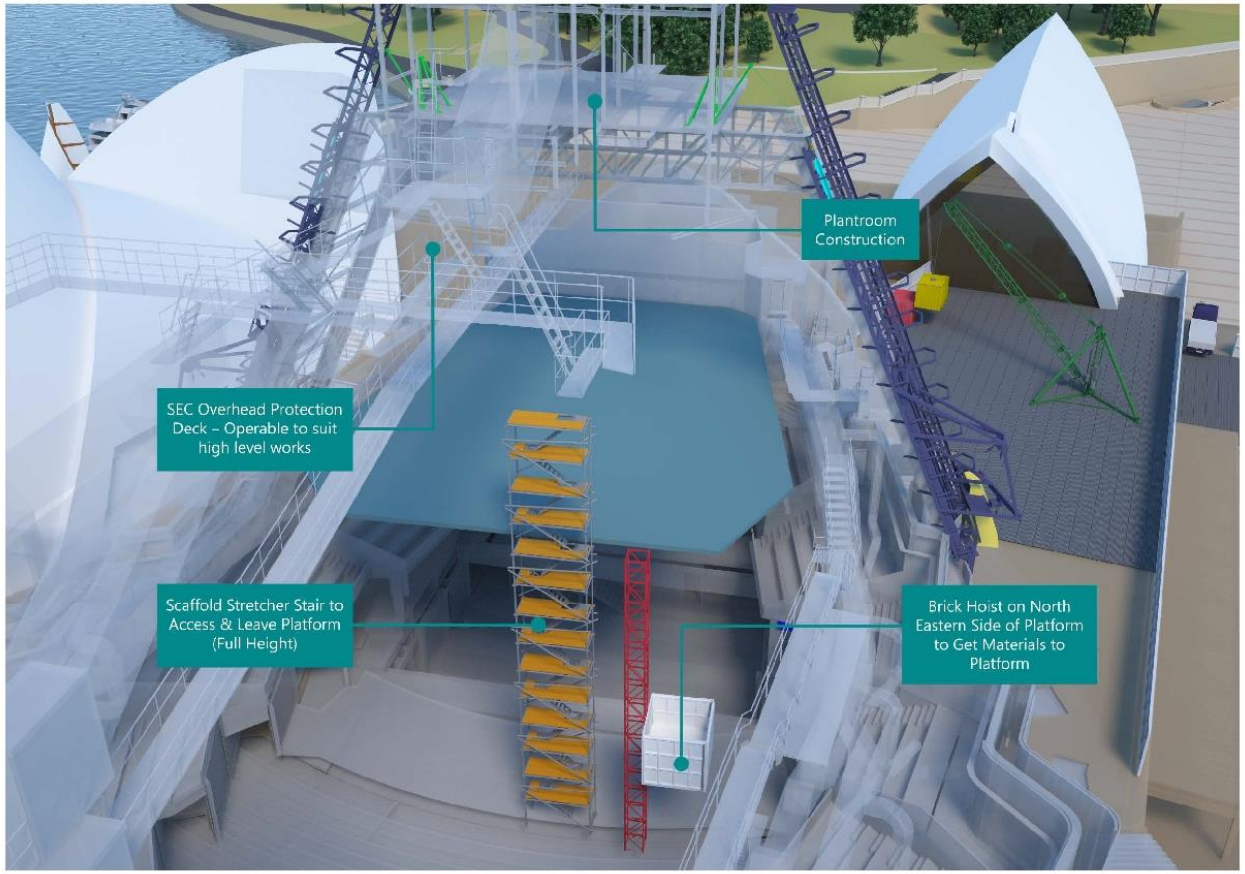


Taylor ■ Sydney Opera House - Western Renewal Project - Bennelong Point, Sydney

Hibbs & Associates Pty Ltd © 2020

Sydney Opera House – Western Renewal Project

Main Concert Hall – Secondary Overhead Gantry, brick hoist & scaffold

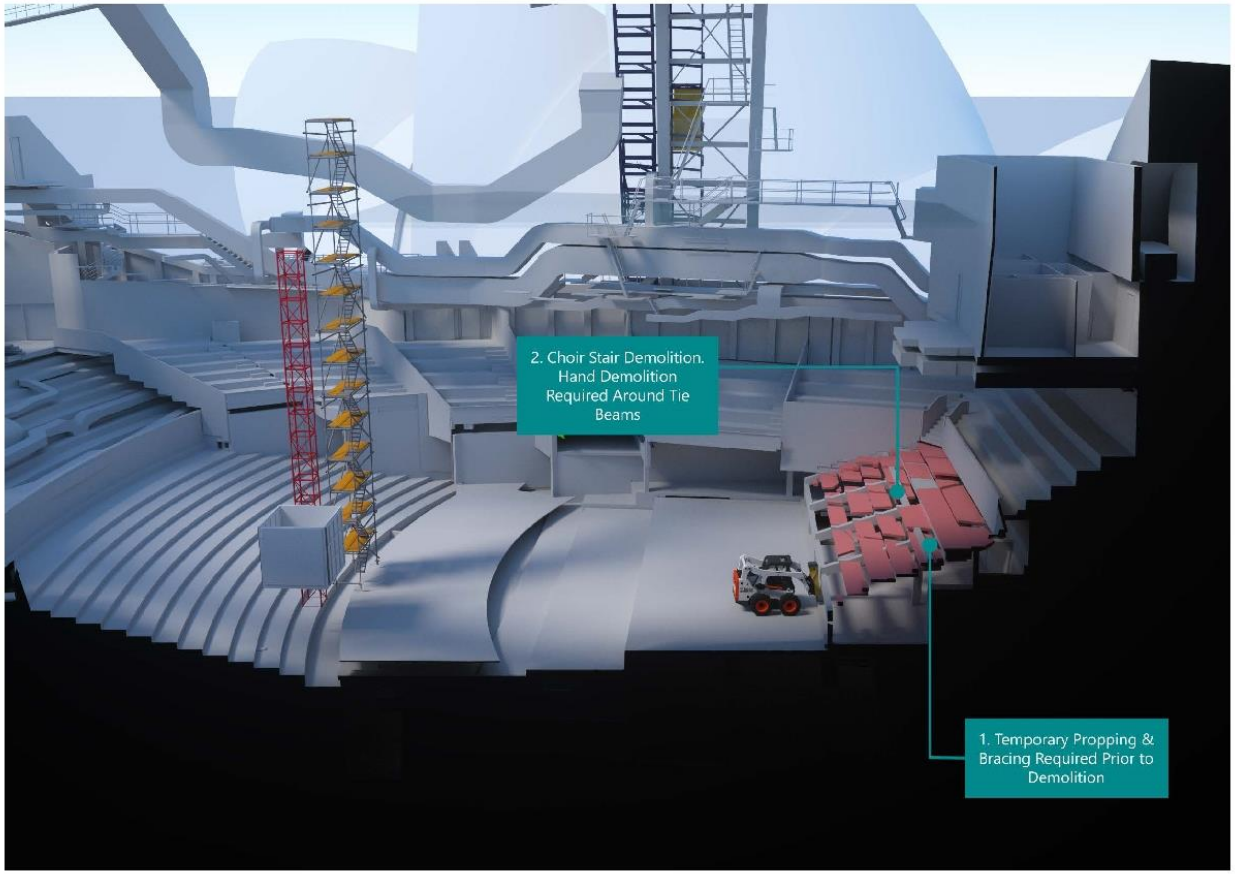


Taylor ■ Sydney Opera House - Western Renewal Project - Bennelong Point, Sydney

Hibbs & Associates Pty Ltd © 2020

Sydney Opera House – Western Renewal Project

Main Concert Hall – Choir Stall Demolition

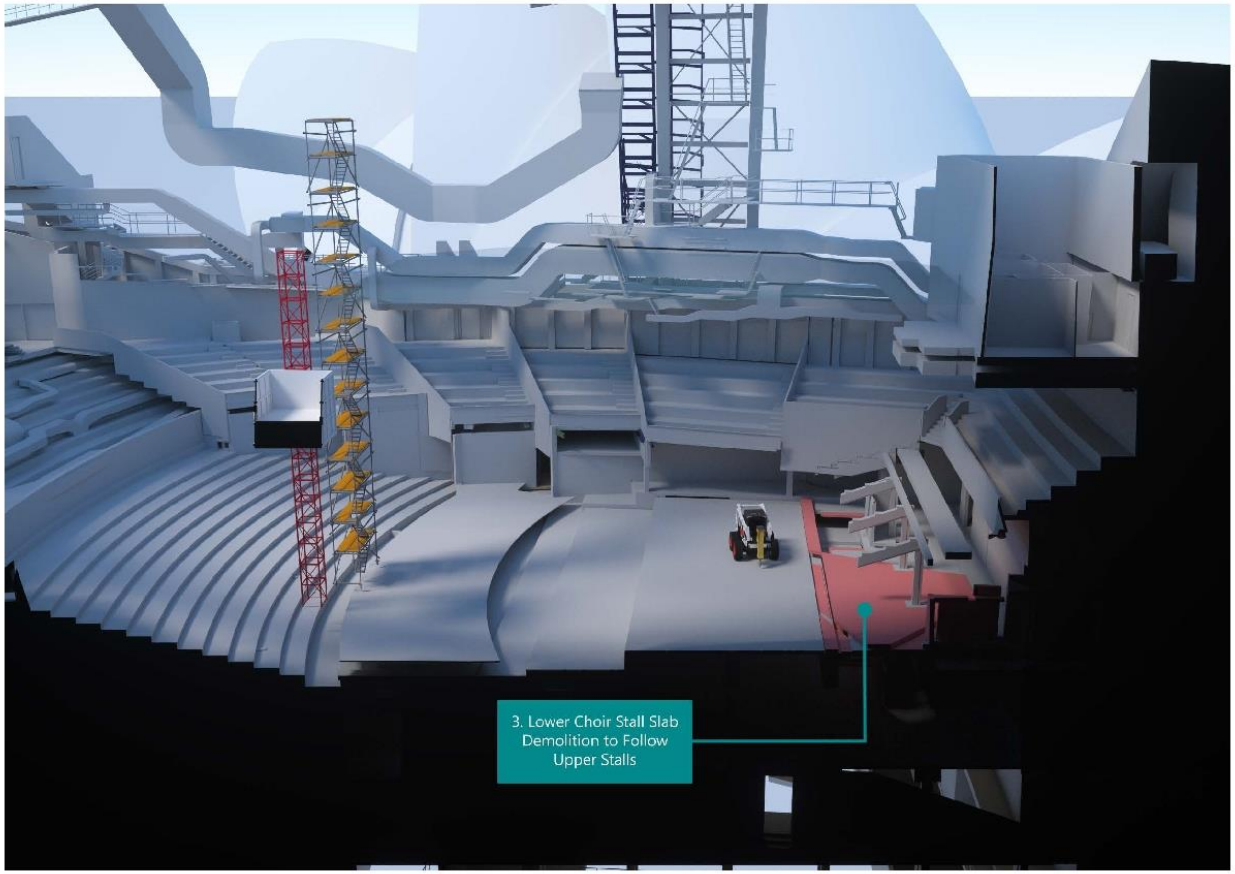


Taylor ■ Sydney Opera House - Western Renewal Project - Bennelong Point, Sydney

Hibbs & Associates Pty Ltd © 2020

Sydney Opera House – Western Renewal Project

Main Concert Hall – Stage Demolition – Phase 1 – Strip Out & Propping

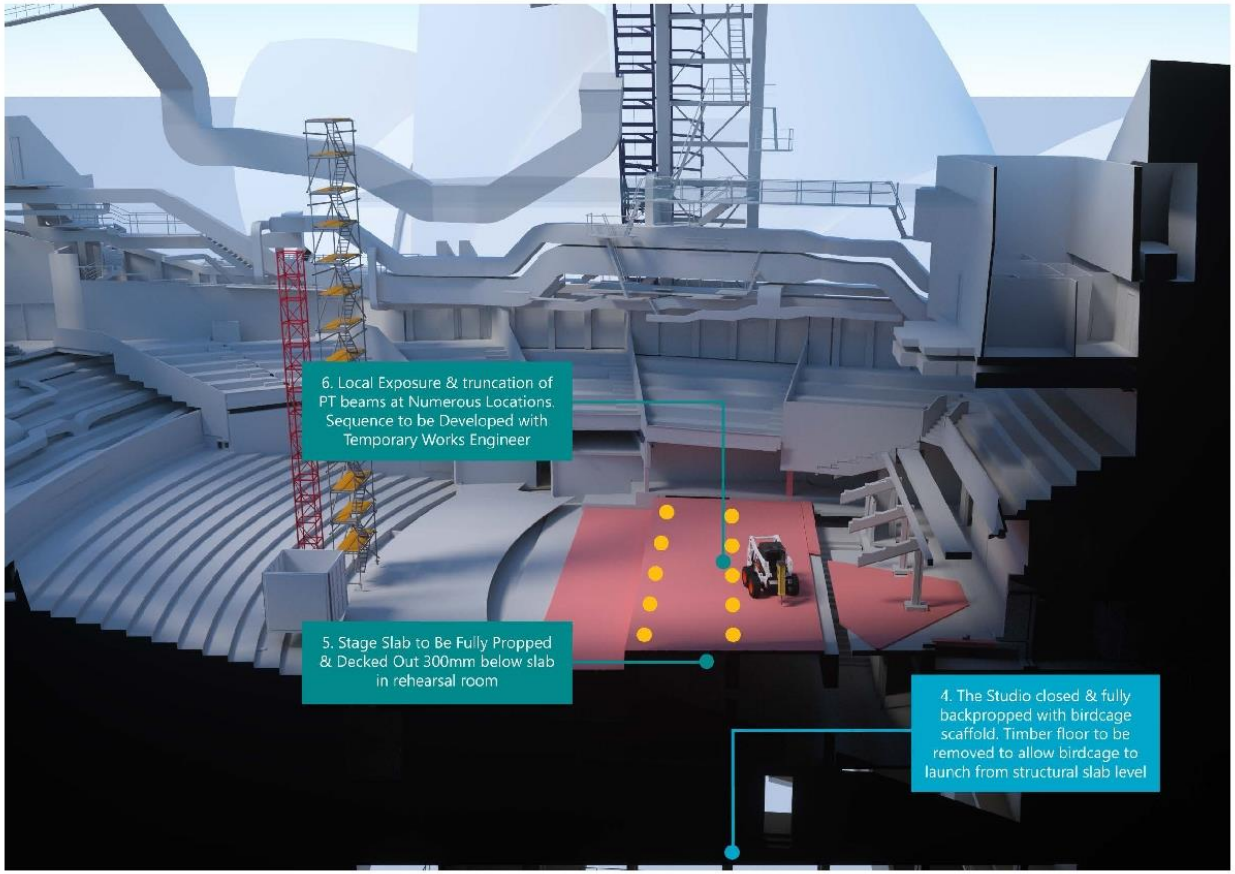


Taylor ■ Sydney Opera House - Western Renewal Project - Bennelong Point, Sydney

Hibbs & Associates Pty Ltd © 2020

Sydney Opera House – Western Renewal Project

Main Concert Hall – Stage Demolition – Phase 2 – Truncations

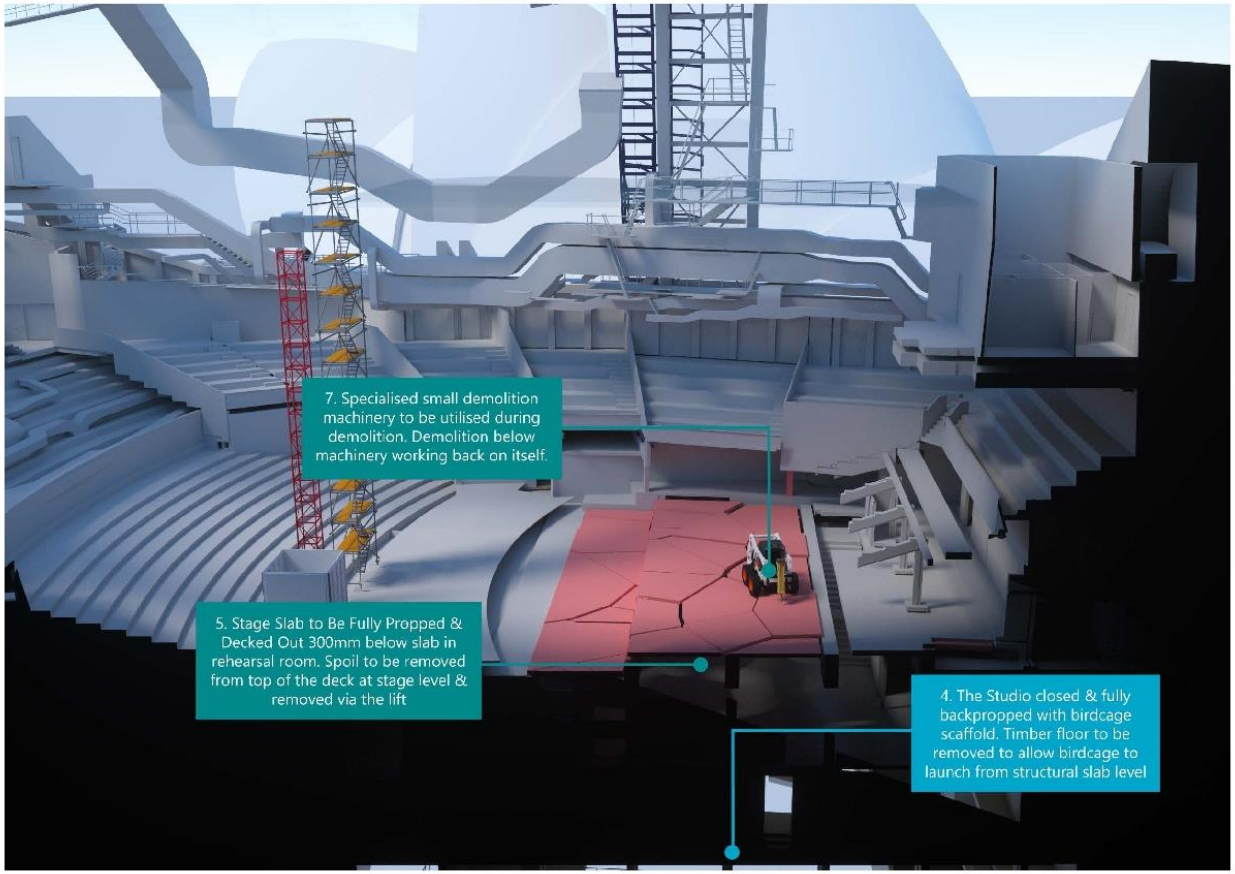


Taylor ■ Sydney Opera House - Western Renewal Project - Bennelong Point, Sydney

Hibbs & Associates Pty Ltd © 2020

Sydney Opera House – Western Renewal Project

Main Concert Hall – Stage Demolition – Phase 3 – Slab Demolition

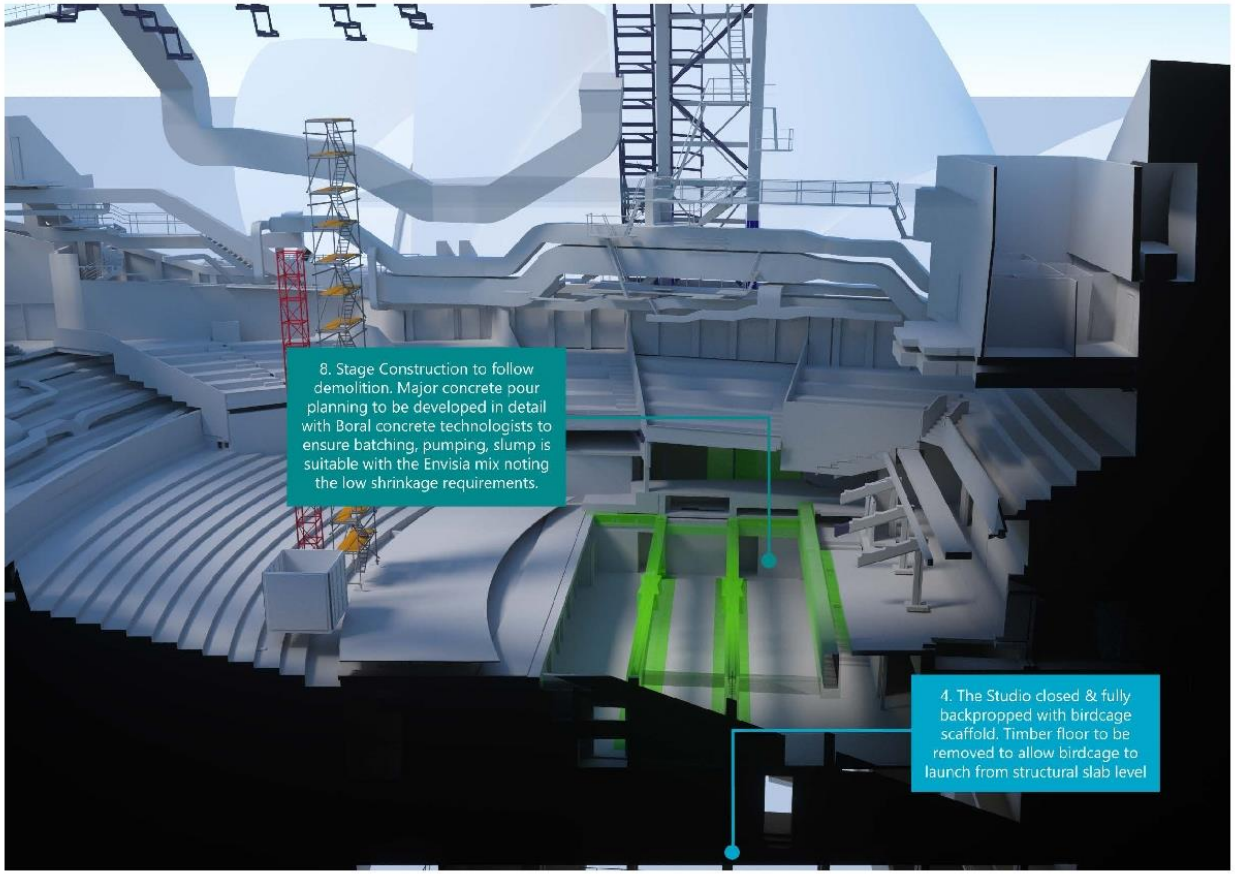


Taylor ■ Sydney Opera House - Western Renewal Project - Bennelong Point, Sydney

Hibbs & Associates Pty Ltd © 2020

Sydney Opera House – Western Renewal Project

Main Concert Hall – Stage Construction

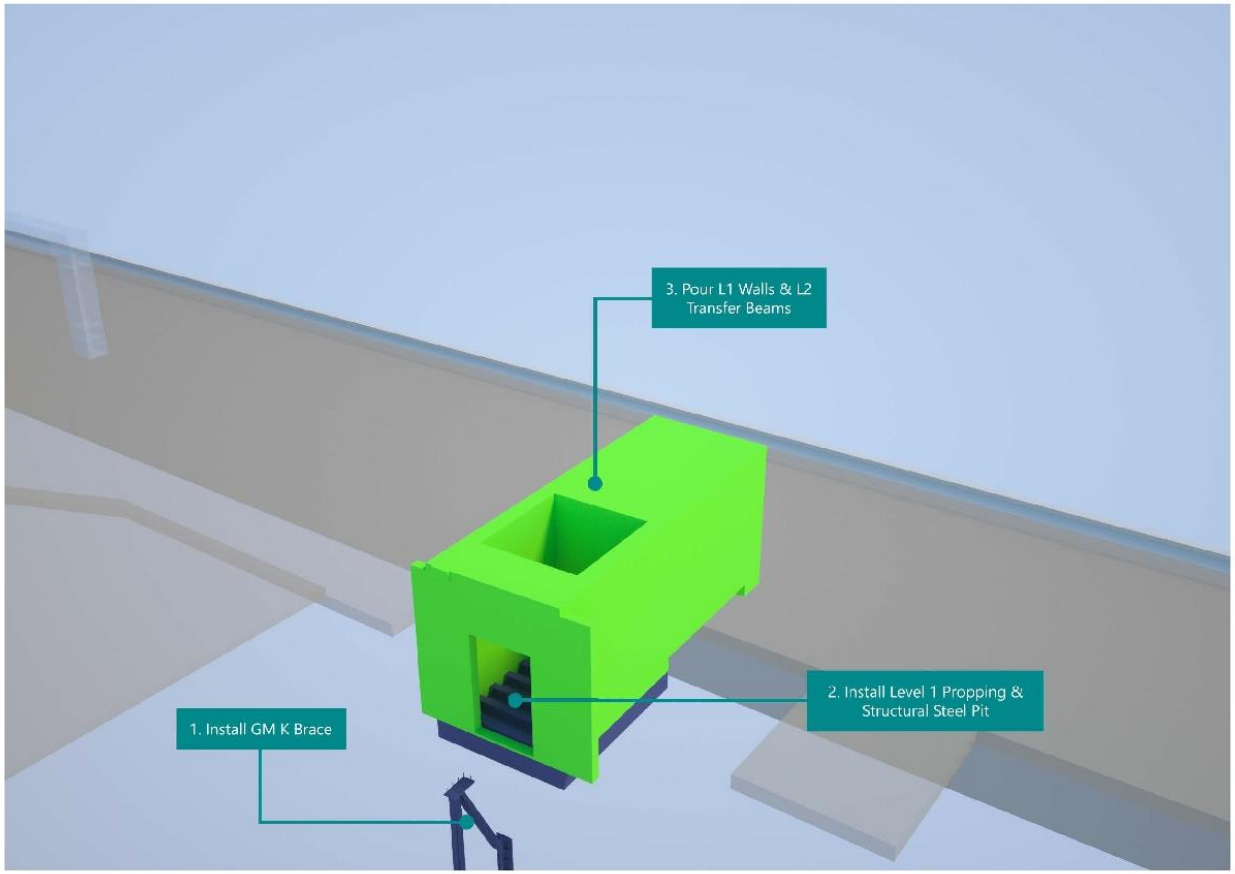


Taylor ■ Sydney Opera House - Western Renewal Project - Bennelong Point, Sydney

Hibbs & Associates Pty Ltd © 2020

Sydney Opera House – Western Renewal Project

DDA Upgrades – West Lift Sequence – Level 1

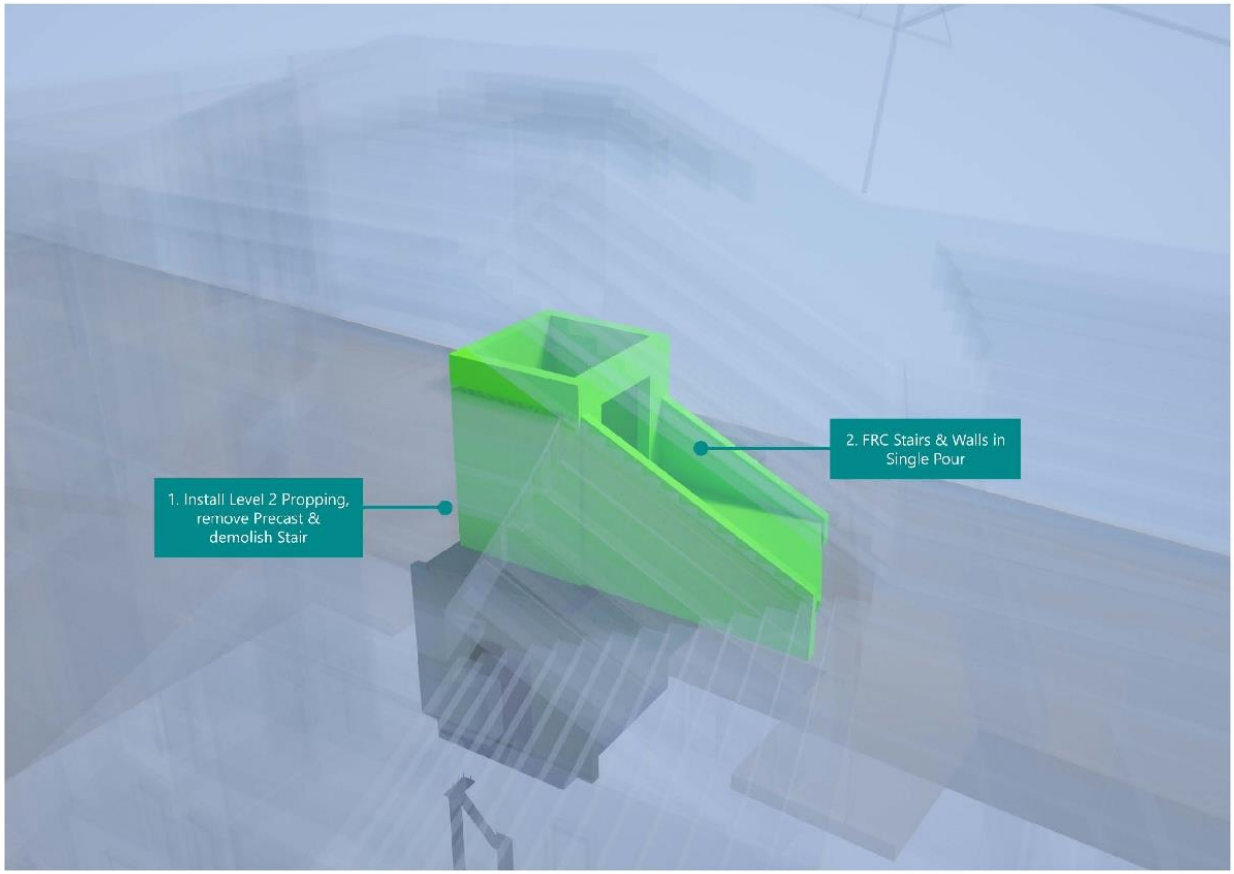


Taylor ■ Sydney Opera House - Western Renewal Project - Bennelong Point, Sydney

Hibbs & Associates Pty Ltd © 2020

Sydney Opera House – Western Renewal Project

DDA Upgrades – West Lift Sequence – Level 2

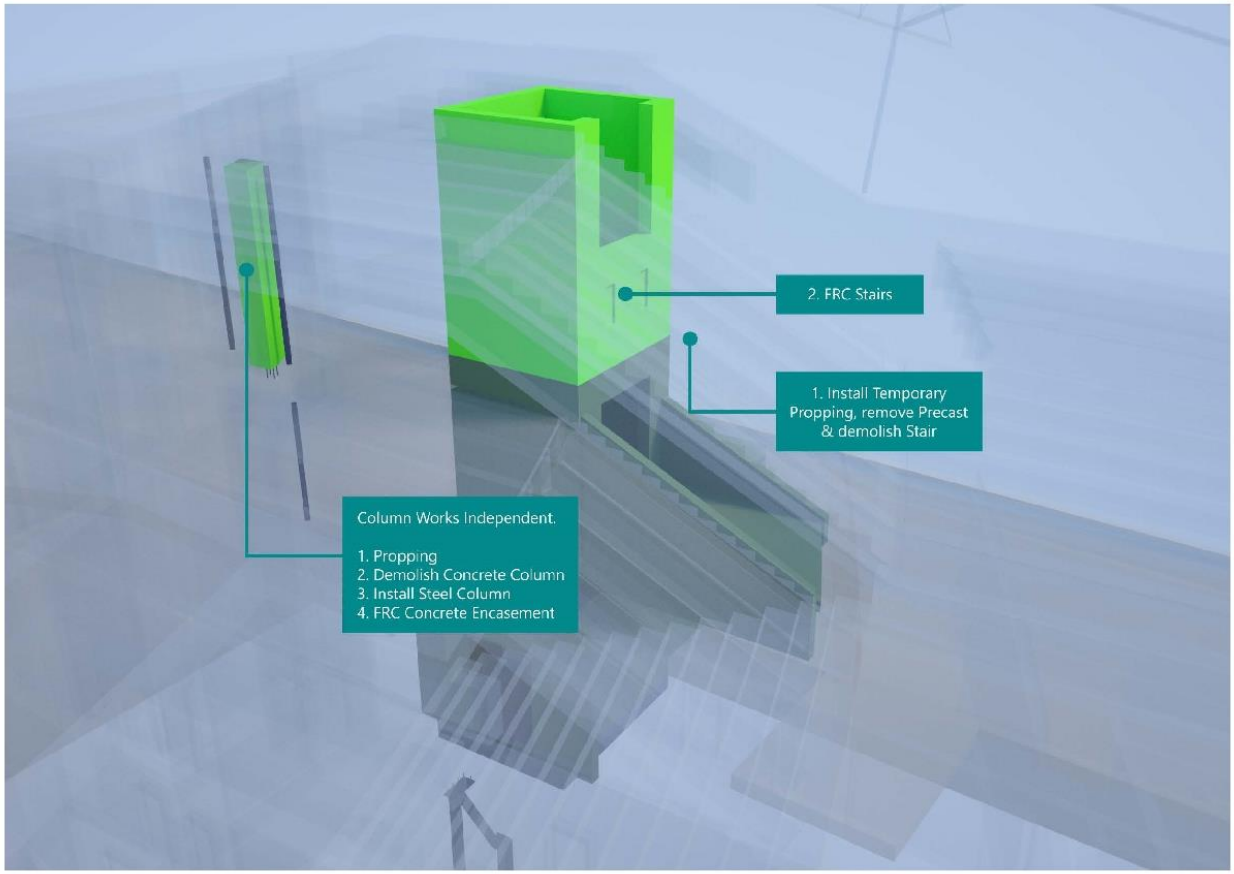


Taylor ■ Sydney Opera House - Western Renewal Project - Bennelong Point, Sydney

Hibbs & Associates Pty Ltd © 2020

Sydney Opera House – Western Renewal Project

DDA Upgrades – West Lift Sequence – Level 3

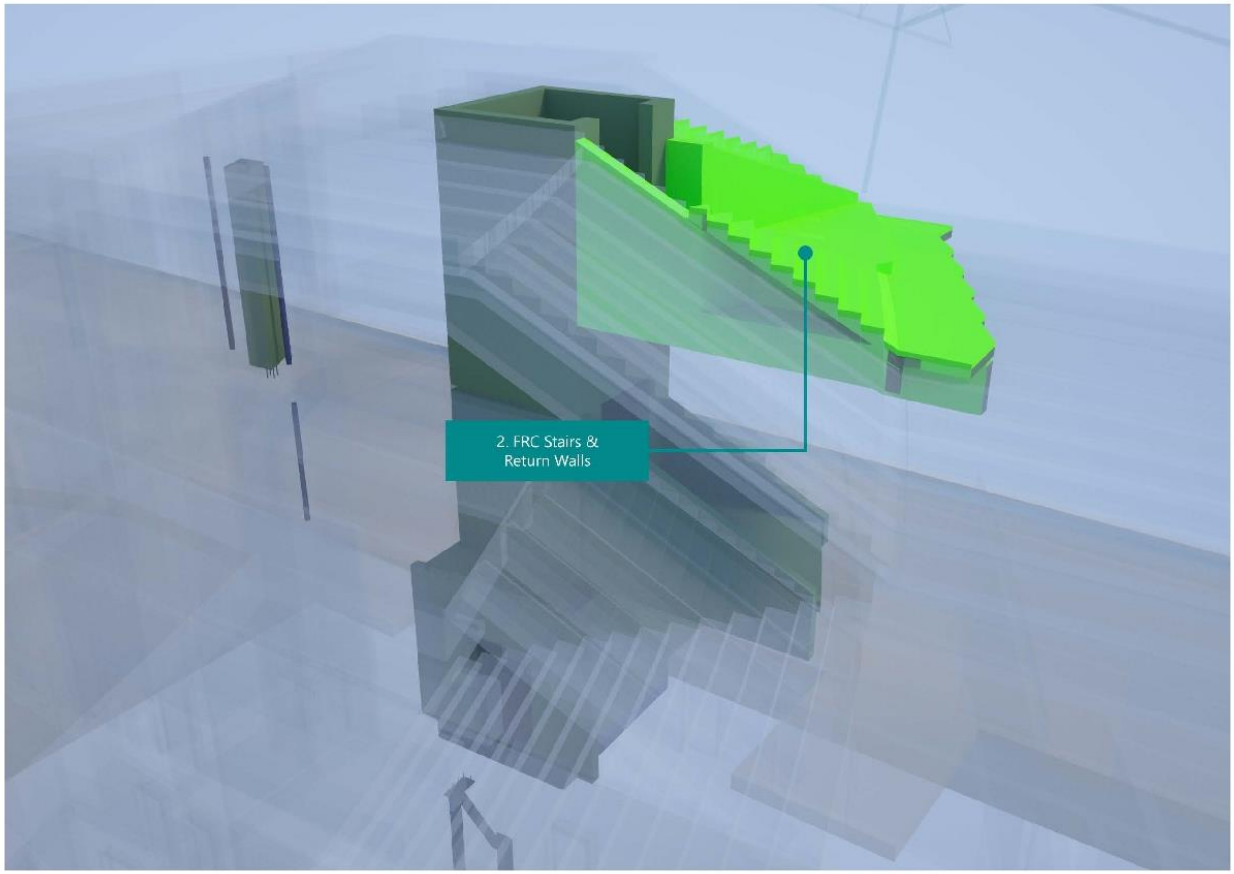


Taylor ■ Sydney Opera House - Western Renewal Project - Bennelong Point, Sydney

Hibbs & Associates Pty Ltd © 2020

Sydney Opera House – Western Renewal Project

DDA Upgrades – West Lift Sequence – Level 4

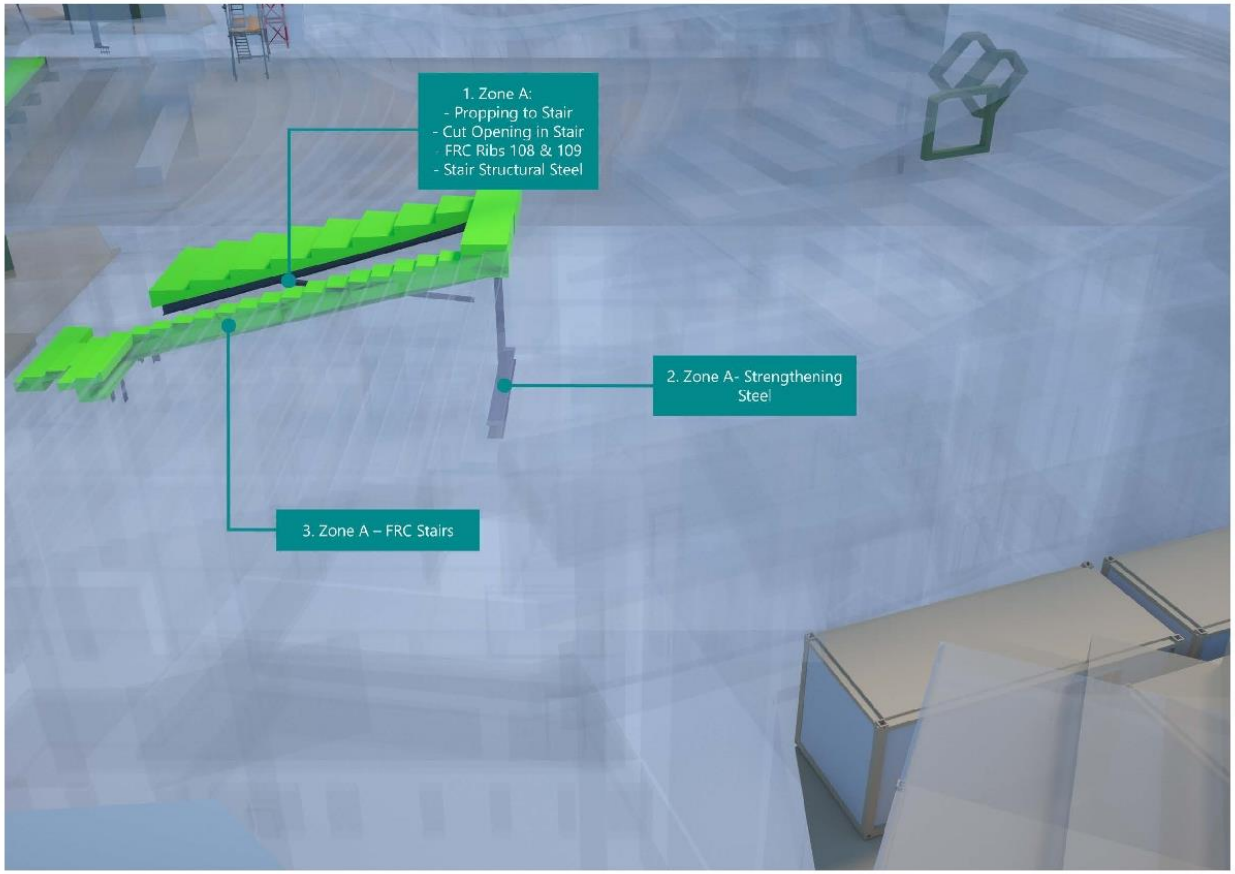


Taylor ■ Sydney Opera House - Western Renewal Project - Bennelong Point, Sydney

Hibbs & Associates Pty Ltd © 2020

Sydney Opera House – Western Renewal Project

DDA Upgrades – DDA Eastern Tunnel – Phase 1

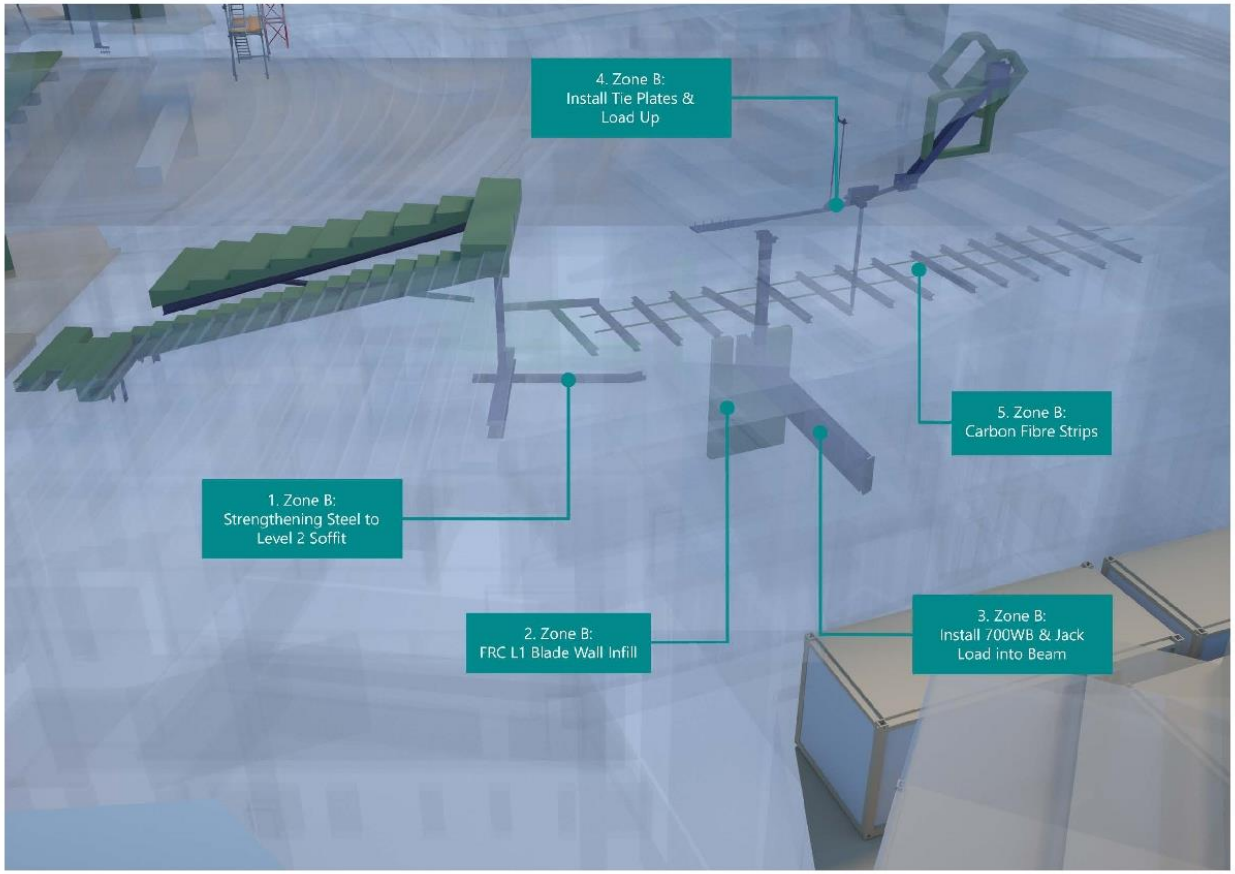


Taylor ■ Sydney Opera House - Western Renewal Project - Bennelong Point, Sydney

Hibbs & Associates Pty Ltd © 2020

Sydney Opera House – Western Renewal Project

DDA Upgrades – DDA Eastern Tunnel – Phase 2

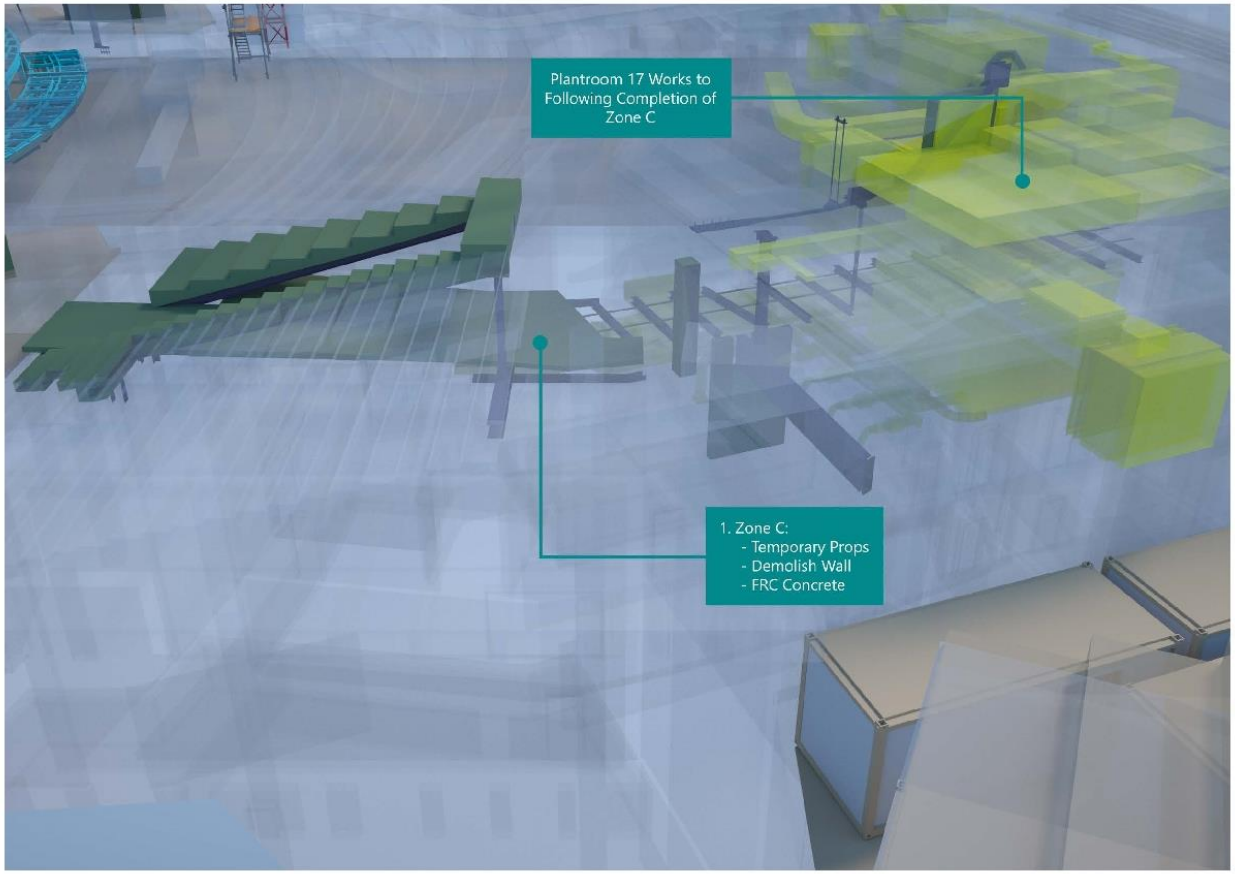


Taylor ■ Sydney Opera House - Western Renewal Project - Bennelong Point, Sydney

Hibbs & Associates Pty Ltd © 2020

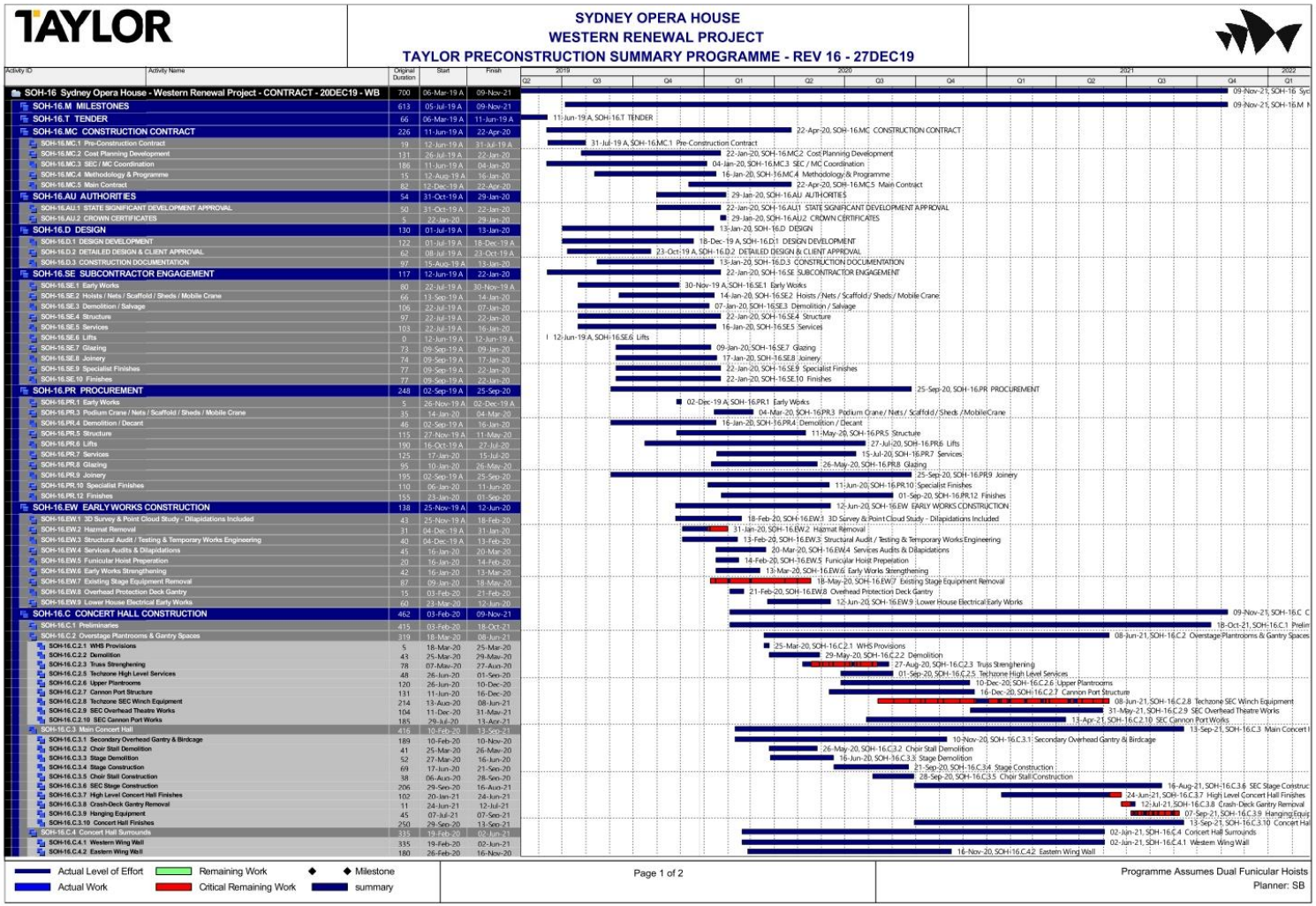
Sydney Opera House – Western Renewal Project

DDA Upgrades – DDA Eastern Tunnel – Phase 3

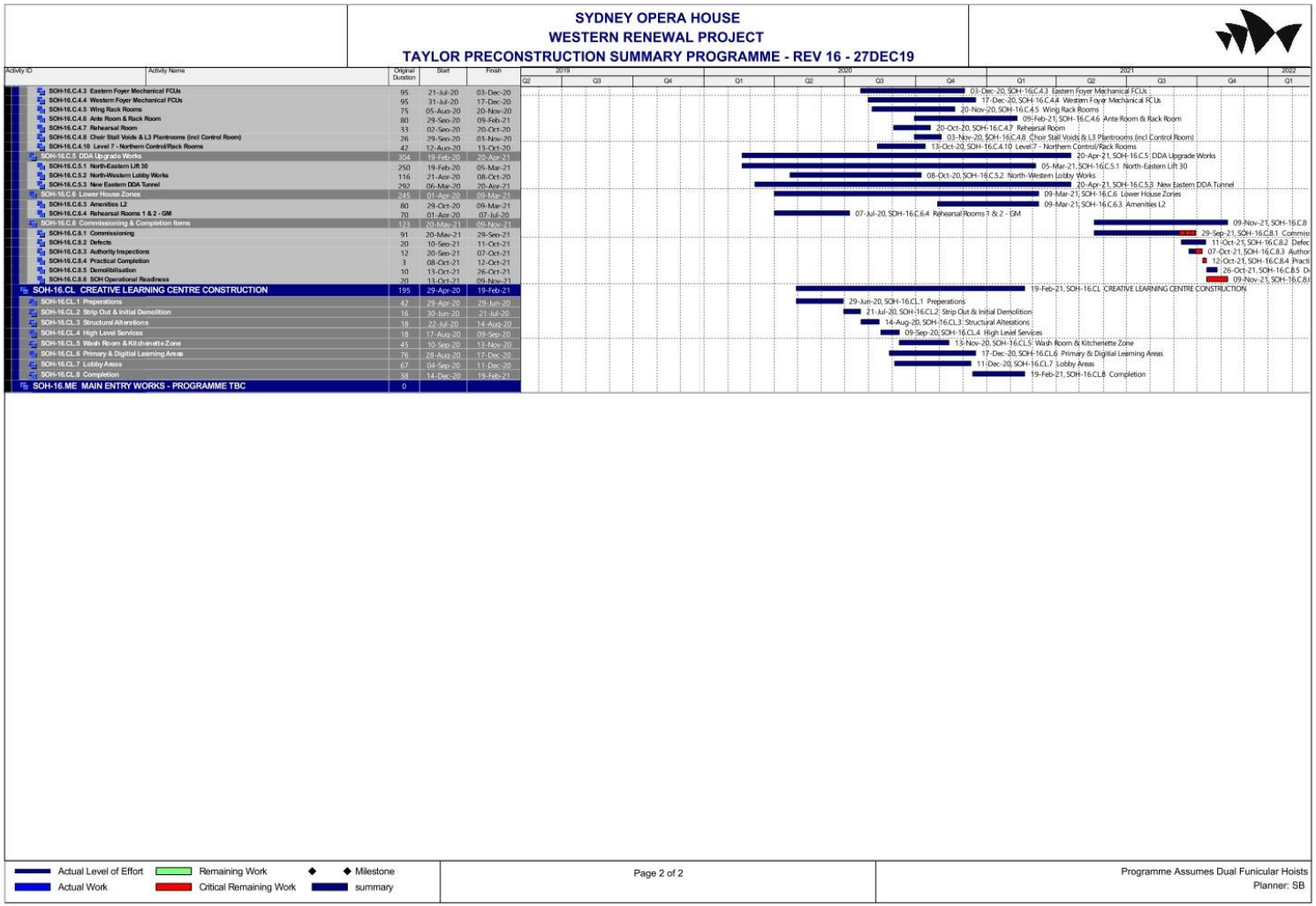


Taylor ■ Sydney Opera House - Western Renewal Project - Bennelong Point, Sydney

Hibbs & Associates Pty Ltd © 2020



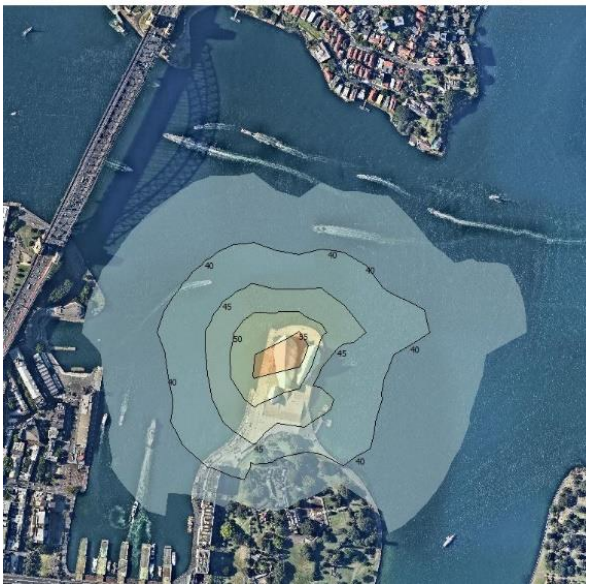
Hibbs & Associates Pty Ltd © 2020


SYDNEY OPERA HOUSE
WESTERN RENEWAL PROJECT
TAYLOR PRECONSTRUCTION SUMMARY PROGRAMME - REV 16 - 27DEC19
Activity ID
Activity Name
Original Duration
Start
Finish
2019
2020
2021
2022
Q2
Q3
Q4
Q1
Q2
Q3
Q4
Q1
Q2
Q3
Q4
Q1
SOH-16.C.4.3 Eastern Foyer Mechanical FCUs 95 21-Jul-20 03-Dec-20
SOH-16.C.4.4 Western Foyer Mechanical FCUs 95 31-Jul-20 17-Dec-20
SOH-16.C.4.5 Wing Rack Rooms 75 05-Aug-20 20-Nov-20
SOH-16.C.4.6 Ante Room & Rack Room 80 29-Sep-20 09-Feb-21
SOH-16.C.4.7 Rehearsal Room 33 02-Sep-20 20-Oct-20
SOH-16.C.4.8 Choir Stall Voids & L3 Plantrooms (incl Control Room) 26 29-Sep-20 03-Nov-20
SOH-16.C.4.10 Level 7 - Northern Control/Rack Rooms 42 12-Aug-20 13-Oct-20
SOH-16.C.5 DDA Upgrade Works 304 19-Feb-20 20-Apr-21
SOH-16.C.5.1 North-Eastern Lift 30 250 19-Feb-20 05-Mar-21
SOH-16.C.5.2 North-Western Lobby Works 116 21-Aug-20 08-Oct-20
SOH-16.C.5.3 New Eastern DDA Tunnel 292 06-Mar-20 20-Apr-21
SOH-16.C.6 Lower House Zones 245 01-Apr-20 09-Mar-21
SOH-16.C.6.3 Amenities L2 80 29-Oct-20 09-Mar-21
SOH-16.C.6.4 Rehearsal Rooms 1 & 2 - GM 70 01-Apr-20 07-Jul-20
SOH-16.C.8 Commissioning & Completion Items 113 07-Oct-21 09-Nov-21
SOH-16.C.8.1 Commissioning 91 26-May-21 29-Sep-21
SOH-16.C.8.2 Defects 20 10-Sep-21 11-Oct-21
SOH-16.C.8.3 Authority Inspections 12 20-Sep-21 07-Oct-21
SOH-16.C.8.4 Practical Completion 3 08-Oct-21 12-Oct-21
SOH-16.C.8.5 Demobilisation 10 13-Oct-21 26-Oct-21
SOH-16.C.8.6 SOH Operational Readiness 20 13-Oct-21 09-Nov-21
SOH-16.CL CREATIVE LEARNING CENTRE CONSTRUCTION 195 29-Apr-20 19-Feb-21
SOH-16.CL.1 Preperations 42 29-Apr-20 29-Jun-20
SOH-16.CL.2 Strip Out & Initial Demolition 16 30-Jun-20 21-Jul-20
SOH-16.CL.3 Structural Alterations 18 22-Jul-20 14-Aug-20
SOH-16.CL.4 High Level Services 18 17-Aug-20 09-Sep-20
SOH-16.CL.5 Wash Room & Kitchenette Zone 45 10-Sep-20 13-Nov-20
SOH-16.CL.6 Primary & Digitial Learning Areas 76 28-Aug-20 17-Dec-20
SOH-16.CL.7 Lobby Areas 67 04-Sep-20 11-Dec-20
SOH-16.CL.8 Completion 38 14-Dec-20 19-Feb-21
SOH-16.ME MAIN ENTRY WORKS - PROGRAMME TBC 0
03-Dec-20, SOH-16.C.4.3 Eastern Foyer Mechanical FCUs
17-Dec-20, SOH-16.C.4.4 Western Foyer Mechanical FCUs
20-Nov-20, SOH-16.C.4.5 Wing Rack Rooms
09-Feb-21, SOH-16.C.4.6 Ante Room & Rack Room
20-Oct-20, SOH-16.C.4.7 Rehearsal Room
03-Nov-20, SOH-16.C.4.8 Choir Stall Voids & L3 Plantrooms (incl Control Room)
13-Oct-20, SOH-16.C.4.10 Level 7 - Northern Control/Rack Rooms
20-Apr-21, SOH-16.C.5 DDA Upgrade Works
05-Mar-21, SOH-16.C.5.1 North-Eastern Lift 30
08-Oct-20, SOH-16.C.5.2 North-Western Lobby Works
20-Apr-21, SOH-16.C.5.3 New Eastern DDA Tunnel
09-Mar-21, SOH-16.C.6 Lower House Zones
09-Mar-21, SOH-16.C.6.3 Amenities L2
07-Jul-20, SOH-16.C.6.4 Rehearsal Rooms 1 & 2 - GM
09-Nov-21, SOH-16.C.8
29-Sep-21, SOH-16.C.8.1 Commis
11-Oct-21, SOH-16.C.8.2 Defec
07-Oct-21, SOH-16.C.8.3 Author
12-Oct-21, SOH-16.C.8.4 Practi
26-Oct-21, SOH-16.C.8.5 De
09-Nov-21, SOH-16.C.8.
19-Feb-21, SOH-16.CL CREATIVE LEARNING CENTRE CONSTRUCTION
29-Jun-20, SOH-16.CL.1 Preperations
21-Jul-20, SOH-16.CL.2 Strip Out & Initial Demolition
14-Aug-20, SOH-16.CL.3 Structural Alterations
09-Sep-20, SOH-16.CL.4 High Level Services
13-Nov-20, SOH-16.CL.5 Wash Room & Kitchenette Zone
17-Dec-20, SOH-16.CL.6 Primary & Digitial Learning Areas
11-Dec-20, SOH-16.CL.7 Lobby Areas
19-Feb-21, SOH-16.CL.8 Completion
Actual Level of Effort
Actual Work
Remaining Work
Critical Remaining Work
Milestone
summary
Page 2 of 2
Programme Assumes Dual Funicular Hoists
Planner: SB

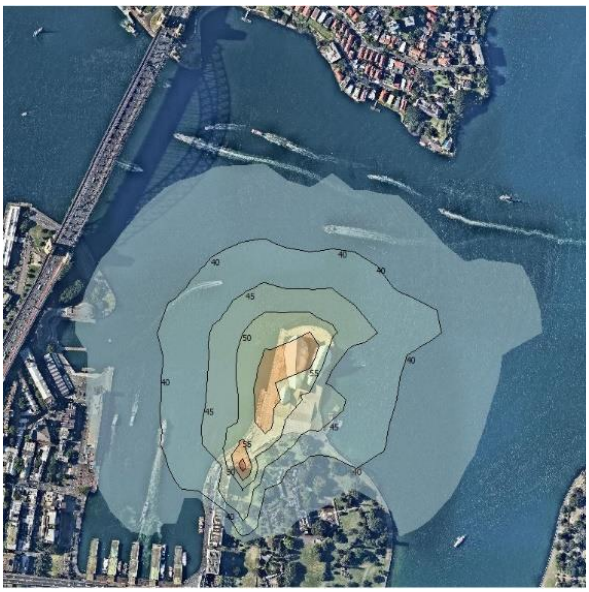
Appendix B Noise Impacts

Contour maps of predicted noise levels

Hibbs & Associates Pty Ltd © 2020

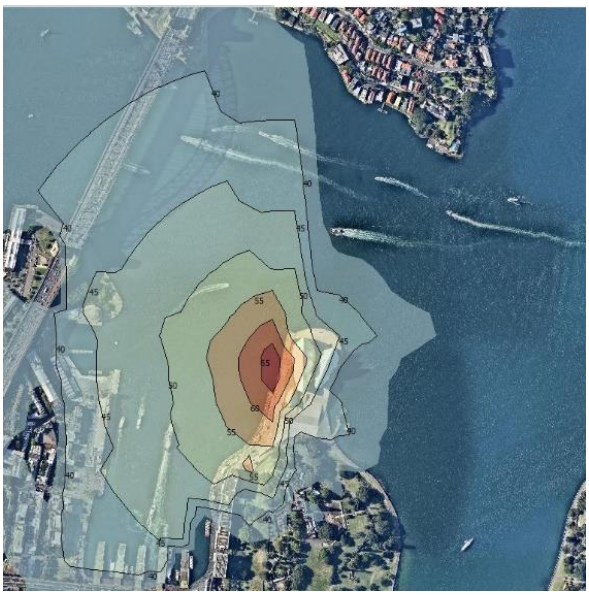


Site Works

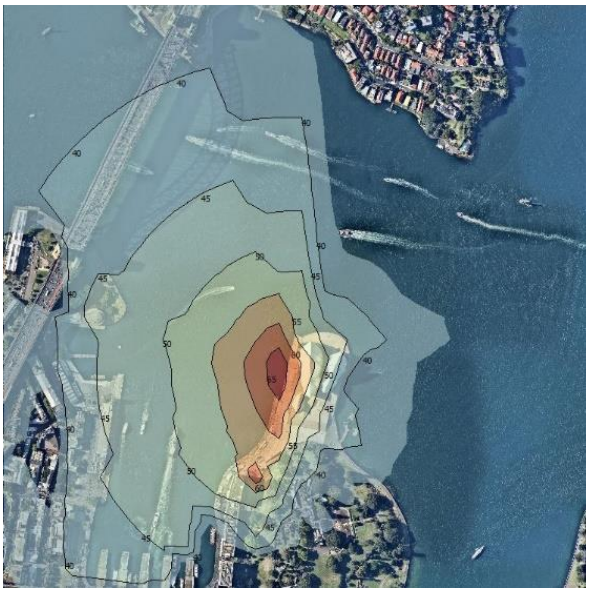


Site Works and delivery vehicle

Figure B.1: Noise Contours - Demolition



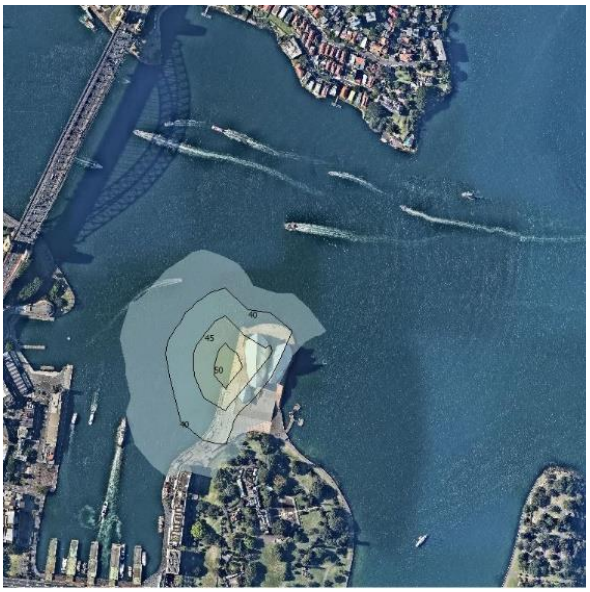
Site Works



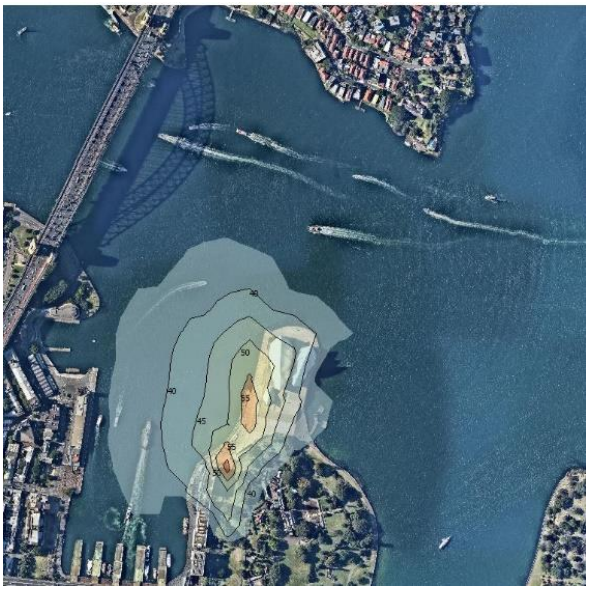
Site Works and delivery vehicle

Figure B.2: Noise Contours – Concreting

Hibbs & Associates Pty Ltd © 2020



Site Works



Site Works and delivery vehicle

Figure B.3: Noise Contours – Internal Works

Hibbs & Associates Pty Ltd © 2020

Quality • Service • Integrity

HIBBS
Excellence in Risk Management

HIBBS & ASSOCIATES PTY LTD

Suite B, 255 Rawson Street, Auburn NSW 2144
P.O. Box 4266, Homebush NSW 2140

P +61 2 9746 3244
E info@hibbs.com.au

ABN 12 608 093 134

www.hibbs.com.au