

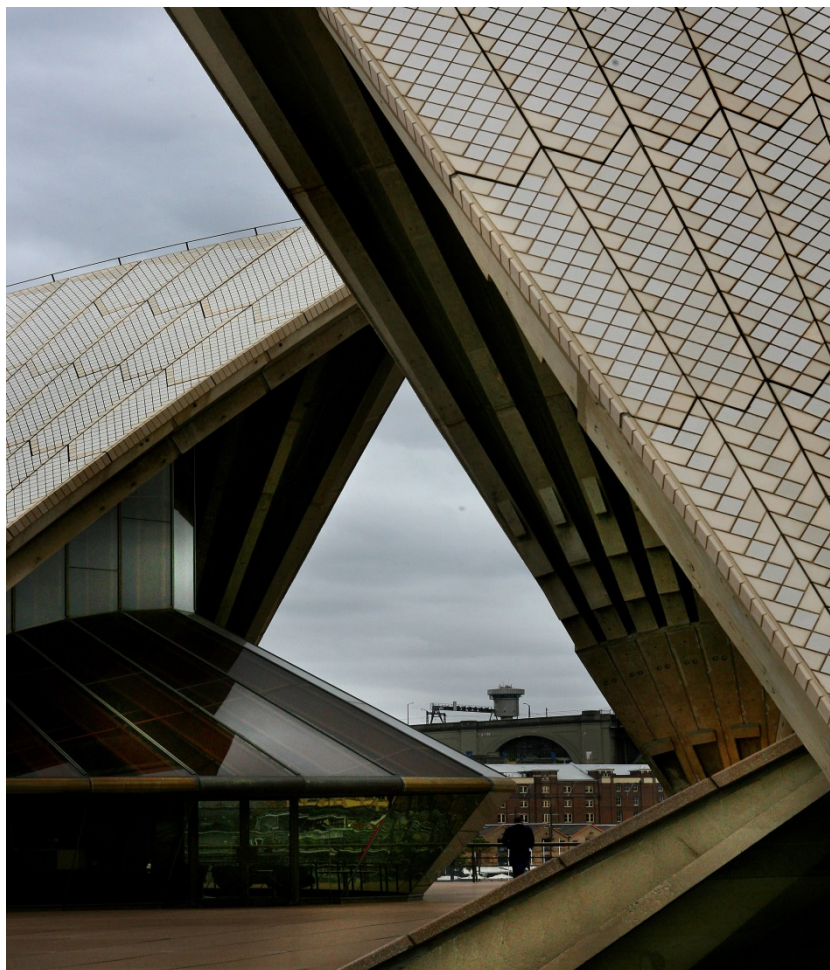


Sydney Opera House

Creative Learning Centre, Under the Steps and Southern Foyers

DA2b

Construction Management Plan



Version 2.0: October 2016



Document Verification

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1 INTRODUCTION

This package of works will provide dedicated facilities within the Opera House for creative learning as well as provided upgrades to parts of the Opera House which have much different function and requirements than when the spaces were initially opening.

For the first time, children and young people will have a dedicated space at the Opera House to play, experiment and learn in a building that embodies creativity and innovation. The Creative Learning Centre will host workshops, creative-play activities, talks and performances, and will also include a separate space for a permanent digital classroom. The focus is to improve visitor experiences and expand the delivery of learning programs.

The Under the Steps project will transform the area under the Monumental Steps into a vibrant, welcoming, car-free entrance and meeting place. This space has become the 'front door' for performers, contractors and also members of the public and should be characterised by the impressive architecture of the rest of the building.

Finally the Southern Foyers incorporate new bars are to be located in front of the great timber carcasses of the Concert Hall and Joan Sutherland Theatre, as well as much needed additional seating.

This report addresses the key construction activities, waste management and safety aspects of the projects. The identified methodology, procedures and details described in this report are indicative, and will be refined by the Contractor engaged to undertake the project prior to commencing construction. This methodology has been developed to provide a basis for assessment of the environmental impacts of the project.



2 PROJECT DESCRIPTION

The project is part of the Stage 1 Renewal of the Sydney Opera House, and key projects as identified by the NSW Government in conjunction with the Opera House. They are programmed to be undertaken after the proposed upgrade works to the Joan Sutherland Theatre, the Function Centre and the Entry Foyer.

This package of works is collectively being assessed as DA2b as part of the Renewal Stage 1 works at the Sydney Opera House.

The proposals vary in their location and scope, as detailed below.

2.1 Creative Learning Centre

The main Creative Learning Centre space (designated previously as offices and meeting rooms) will be configurable into three smaller spaces and take advantage of an adjoining kitchenette, children's toilet facilities and storage.

The Creative Learning Centre will effectively extend the Western Foyer to the north and provide more equitable access to the Concert Hall Northern Foyer via Lift 9 which is adjacent to the Creative Learning Centre. The project incorporates the following items;

- Transform existing office space in the building's north-western corner into a permanent home for the Opera House's world-renowned Children, Families and Creative Learning Program;
- Host workshops run by artists, Opera House resident companies and creative-learning specialists to inspire young people, from ages five to 18;
- Use the latest digital technology to allow students from Punchbowl to the Pilbara to work with artists in programs spanning drama, music, maths, science, literature, history, Indigenous Australia and other study areas;
- Enable students to work together wherever they are to foster creativity, problem-solving and innovative thinking skills;
- Teach students how to create their own broadcasts; and
- Offer activities for families on weekends with talks, performances and programs designed to give children a rich artistic experience and push their creative boundaries.

2.2 Under the Steps

Under the Steps incorporates the following items;

- Transform the area under the Monumental Steps into a welcoming arrival zone, both as a meeting place and as a transition zone for visitors as they move from the outside to the inside of the building;
- Realise Jørn Utzon's vision for art in this space through digital art walls; and
- Improve the safety, look and amenity of the area by providing seating and paving it with the Opera House's signature granite panels.

2.3 Southern Foyers

The Southern Foyers project is designed to consider the Southern Foyers in the context of the other projects which are being completed as part of Stage 1 Renewal to develop a common language from the spaces Under The Steps, the entry foyers and the southern foyers to both the Concert Hall and the Joan Sutherland Theatre. Conceptually this is to better evoke a "step up" in the progression from the Entry Foyer anticipating the theatres' experiences beyond.



Southern Foyers incorporates the following items;

- Provide a patron experience complementary with the Entry Foyers and their services;
- Review Southern Foyers' circulation and maximise comfortable seating arrangements for ticketed theatre patrons whilst taking full advantage of the views;
- Ensure bar, merchandising and service areas are accessible;
- Provide merchandise, storage, bar and food service zones to northern walls of both Foyers.
- Comply with accessibility requirements (including AMP).
- Provide increased usable area for events in Foyers.



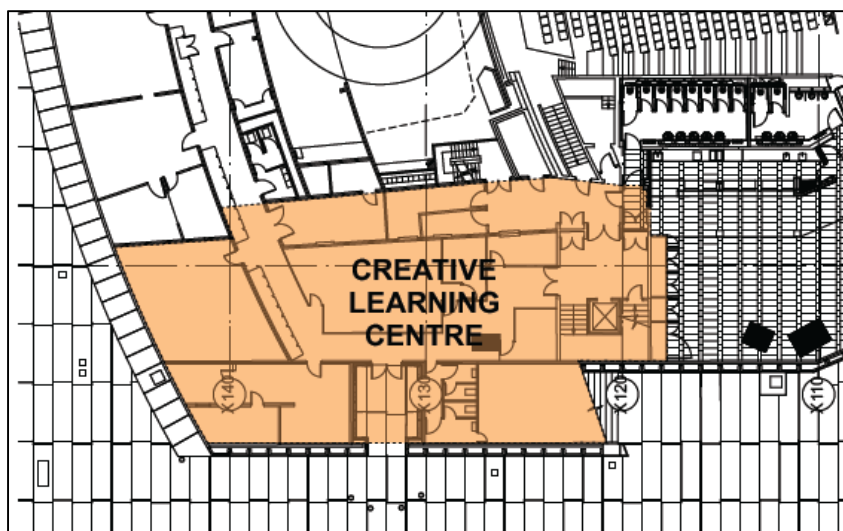
3 PROJECT AREAS

These projects are spread across the House in the following locations;

Creative Learning Centre;

Creative Learning Centre (CLC) is located on the Northern Western corner of the Opera House.

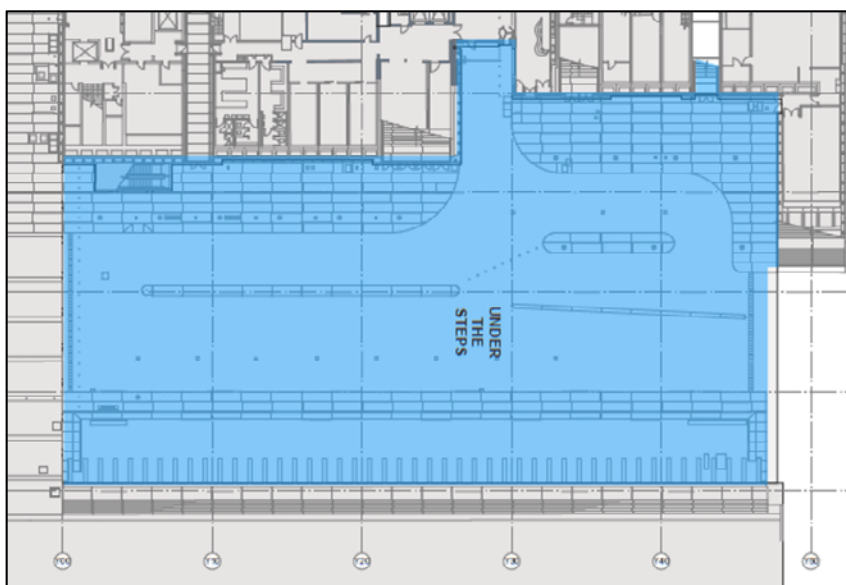
The CLC is proposed to have direct access off the Northern and Western broad walks as well as from the Western Foyers.



The CLC is entirely contained within the building façade line however there are minor proposed changes to the façade to access the Northern Broad walk. Typically the works will be able to isolated at discrete positions at existing structural points providing separation between construction and operational zones.

Under the Steps;

Under the Steps (UTS) is located in the existing vehicle concourse under the monumental steps to the South of the building.

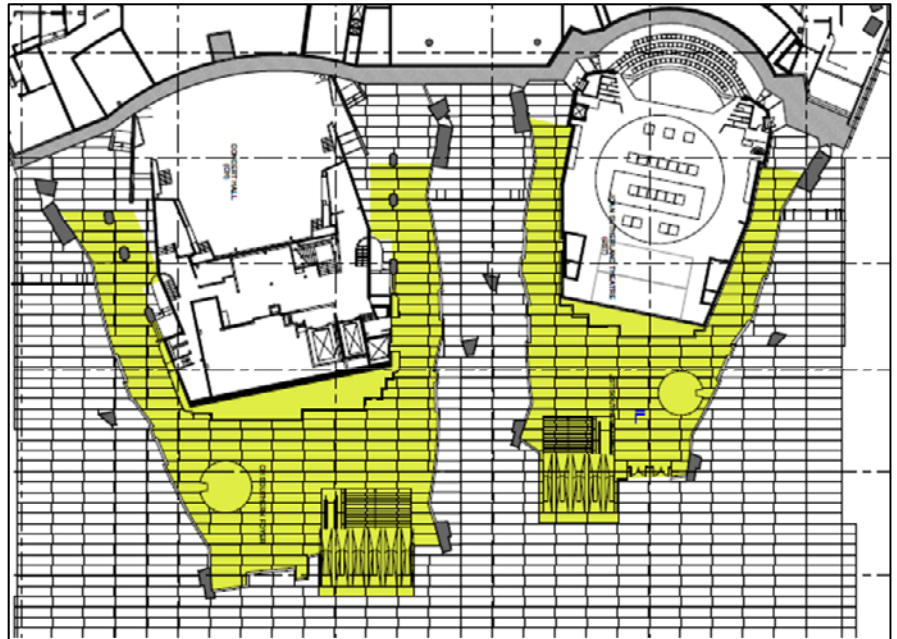


The UTS project is all contained external to the building façade and will have interfaces with the entrance to lift 17 (accessible entrance), Bennelong Restaurant, entry foyer stairs (both concert hall and Joan Sutherland Theatre), and the central passage.



Southern Foyers;

The Southern Foyers are located to the south of both the Concert Hall and the Joan Sutherland Theatre's.



The Southern Foyers works are entirely contained within the building façade and are proposed to be complete in whilst the works to both halls, i.e. Concert Hall and Joan Sutherland Theatre, are being completed.

The project will use construction hoardings in order to delineate construction zones and provide a consistent look and feel to works.. Additional hoardings will be provided as required to the external broad walks for the creative learning centre works and the southern foyers function centre works to separate construction works from members of the general public. Where required these hoardings will be acoustic to assist with noise control, this will be determined in consultation with the contractor and the noise report, undertaken by Arup.



4 CONSTRUCTION

The following construction methodology and associated details and procedures are indicative and will be refined by the Contractor engaged to undertake the project prior to commencing construction. This methodology has been prepared by Sydney Opera House to provide a basis for assessment of the environmental impacts of the project.

4.1 Construction Methodology

The project works can be described in the following components:

- Creative Learning Centre
- Under the Steps
- Southern Foyers

(a) Creative Learning Centre

As an overview these works include:

- Typically medium/ light demolition works will be undertaken to remove the internal dividing walls within existing offices spaces. This also includes introduction of set downs in concrete slabs for inclusion of wet areas.
- Any existing heritage items, such as the Peter Hall 'wobblies', will be retained in order to be re-used as part of the fit out works and also other Renewal projects.
- Typically light construction of new space locations therefore no heavy machinery required, i.e. mobile accessible work platforms etc required.
- Services will be required to penetrate the structure to service re-configured wet areas however this is generally small in nature and low impact.
- New openings will be made in the external, northern facing glazed façade to accommodate two new double doors. Also the existing entry lobby on the western façade will be retained however the granite pavers regraded and doors relocated to create an entry lobby.
- Existing fit out items and original structure will be retained or reused to take into consideration heritage requirements.

Typically works will be carried out with light/ medium construction methods to protect the façade and other internal elements. Externally works will be limited to with amendments to the northern glazed façade and the western entry lobby the only interface points with the general public.

(b) Under the Steps

As an overview these works include:

- The works generally require the removal and storage for future use of the following items;
 - Existing granite paving
 - Precast granite cladding (including tilted panels)
 - 'Hall Ball' pole lights & pendant lights
 - Bronze coloured fibreglass bench seats and bronze bus stop pillar.
- Permanent demolition is proposed for the bitumen road way which can likely be completed with light construction vehicles (i.e. bobcat and light trucks) There will be interface with the way that materials are delivered, removed and installed in this space and how they are delivered across the southern broad walk.



- Medium sized craneage will be required for the installation of the proposed digital art screens however this installation is constrained by the underside of the monumental steps.
- The biggest construction piece will be the laying and fixing of the granite pavers through this zone which once again will have a relatively small construction impact in terms of equipment/ noise or dust.
- Typically new services are being installed through the space and therefore elevated work platforms will be required throughout construction.

Typically works will be carried out with light/ medium construction methods to remove existing bitumen and replace with services and granite pavers throughout the space. The works will be external to the building façade but with a simple hoarding line, at either end of the monumental steps, these can be isolated from the general public.

(c) Southern Foyers

As an overview these works include:

- Typically the demolition required to these spaces is light and not a large scope of works. This is anticipated to be largely completed with hand tools or small machinery (i.e. bobcat) for the removal of the circular bars.
- Façade works are anticipated in the Joan Sutherland Southern Foyer to accommodate fire engineering requirements.
- Due to construction constraints it is anticipated that the construction of the new bar sections may be completed 'pre- fabricated' and brought to site in sections that are installed on site. This therefore lends itself to more limited access platforms and hand tools.
- Protection will be extensive to protect existing surfaces and internal linings.

Typically works will be carried out with light construction methods for both the demolition and installation of the southern foyer works. Some minor interventions are proposed to the façade but generally the works are contained within the existing building façade.

(d) Construction Duration and Timing

Work elements will be completed during other concurrent works (associated with Renewal);

- Creative Learning Centre is proposed to be built after the Joan Sutherland Theatre is completed and prior to the Concert Hall works commencing.
- Under the Steps is proposed to be undertaken after the Joan Sutherland Theatre and entry foyer works have been completed, but prior to the Concert Hall works.
- Southern foyers are currently being programmed to be completed concurrently with their associated halls (i.e. the JST southern foyer with the JST works and the Concert Hall southern foyer with the concert Hall works) works.

(e) Construction Works

Throughout the construction of these works it is proposed that the other functions around the House continue to function with as little disruption as possible. To facilitate the daily operations of Sydney Opera House noisy work shifts will be scheduled overnight, wherever possible.

To achieve the works within planned closure periods for the theatre and to mitigate disruption to the ongoing operations of the Opera House the works will be undertaken 24 hours a day and 7 days a week in the following shift pattern:

- 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
- 10:30-18:00 – no major noise but general construction, allowing daily SOH operations (i.e. matinee's)

This proposal to work 24/7 in controlled shifts, outside standard construction hours, is consistent with previous approvals granted for works on the site and is crucial to the delivery of the project within the closure timeframe.

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 Sydney Opera House and the surrounding neighbours. The works will be completed in accordance with City of Sydney Code of Practice for Construction Hours/Noise 1992 and Australian Standard 2436-2010 Guide to Noise Control on Construction, Maintenance and Demolition Sites.

4.1.e.1 Construction Noise Management Plan (CNMP)

The Opera House recognises noise issues affecting nearby neighbours during external works. Therefore Arup have been engaged to provide direction during the design phase on the implications of construction works on nearby neighbours, refer to the Noise Impact Assessment completed by Arup.

The Opera House will enforce that their Contractor identifies mitigation measures for external construction work in a Construction Noise Management Plan (CNMP) prior to works commencing on site.

Noise Mitigation:

This CNMP will consider, as a minimum, all mitigation proposed by Arup in their Noise Impact Assessment. This includes:

- CNMP to be reviewed by SOH and their noise consultants prior to approval and implementation on site
- CNMP will be audited by SOH during construction
- The SOH Contractor will also be required to coordinate the Renewal Program to avoid cumulative effects of concurrent construction projects
- The Contract with the SOH Contractor includes a clause allowing SOH to disallow any equipment that it considers to be excessively noisy
- Where the Arup Noise Impact Assessment identified potential exceedances of the Noise Affected Level (NAL) the Managing Contractor will be required to develop mitigation measures which reduce the NAL or program the works, around SOH daily activities in order to remain within the proposed noise affected level
- Only in extreme circumstances with SOH allow exceedances of the proposed noise affected level, as allowed in the *Interim Construction Noise Guideline* (Department of Environment and Climate Change, 2009)

4.1.e.2 Noise Monitoring

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

The following noise limits will be applied:

Receiver	Time Period	Warning level, $L_{Aeq(15min)}$	Maximum Level, $L_{Aeq(15min)}$
Bennelong Apartments	Day (standard hours)	65 dB	68 dB
	Day (outside hours)	60 dB	63 dB
	Evening	59 dB	62 dB
	Night	50 dB	53 dB



Kirribilli	Day (standard hours)	61 dB	64 dB
	Day (outside hours)	56 dB	59 dB
	Evening	54 dB	57 dB
	Night	48 dB	51 dB
Potts Point	Day (standard hours)	58 dB	61 dB
	Day (outside hours)	53 dB	56 dB
	Evening	53 dB	56 dB
	Night	47 dB	50 dB

The maximum level has been developed by Arup (Refer Noise Impact Assessment August 2016) though the process outlined by the *Interim Construction Noise Guideline* (Department of Environment and Climate Change, 2009), as applicable for State Significant Developments.

Should any complaints be received that cannot be resolved by cessation of works, attended acoustic monitoring will be undertaken to validate the remote logger data and address specific work practices and locations to better alleviate noise complaints from that particular activity. Following identification that all noise levels have returned to being below the above maximum levels the monitoring will revert back to remote monitoring.

4.1.e.3 Notification to Residents

The Opera House will manage the notification of nearby residents which informs them of the nature of the works, the duration and the extent of works being undertaken. 24hr contact details will be provided to allow complaints to be logged and addressed as soon as possible by the Opera House and the Managing Contractor.

4.2 Workforce

The size of the workforce is dependent on the specific construction methodology and sequencing employed by the Contractor engaged to undertake the works and is unable to be identified at this stage. An indicative peak construction workforce is estimated to be approximately 70-90 persons.

4.3 Construction Equipment

A definitive list of proposed construction equipment is not currently available as this would be dependent on the specific methodology and sequencing used by the Contractor engaged to undertake the works. The following is an indicative list of the equipment that may be used during construction:

- Jackhammers
- Concrete saws
- Mobile crane (small such as Maeda)
- Semi-trailers for delivery of materials
- Dump trucks for removal of rubble
- Concrete trucks
- Concrete pumps
- Concrete vibrators



- Cherry pickers and Elevated work platforms
- Hand power tools
- Elevated work platforms

4.4 Construction Impacts

(a) Safety and the Public

The Opera House is to continue operations as normal during the construction period. The majority of the works will be confined within the building envelope. Where public areas are affected by the works such as on the Northern Broadwalk with the Creative Learning Centre and the vehicle concourse for the under the steps work they will be enclosed by construction hoardings and sealed off from public access.

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.

Due to the location of the under the steps works the contractor will also considered staged access to the stage door to ensure that any interface between the public, Sydney Opera House staff, performers and the building activities will be minimal.

4.4.a.1 Circulation Impacts

This package of works is largely contained within building envelope and therefore interface and effect on circulation for the general public should be minimal. It is a priority of the Opera House to ensure the public, SOH staff and performers are safe throughout and will be a key factor in the staging and planning of construction activities.

Deliveries and removal of materials will be mainly via the new underground loading dock, which will not be affected by the proposed works. It is envisaged that wherever possible the loading dock will be used for construction deliveries and to supply the site with materials/ equipment. The exception to this approach will be for oversized items which will be managed via delivery across the Forecourt. In order to limit the impact on circulation and pedestrians it is anticipated that these works will be completed overnight.

4.4.a.2 Pedestrian Access

Ensuring the safety of the public, SOH staff and performers will be a key factor in the staging and planning of construction activities. The works are largely internal and therefore the interface with pedestrians should be minimal.

The Northern Broad walk is likely to be affected by the installation of the new doorways into the façade and materials handling into the creative learning centre. This will be a similar implication on the vehicle concourse and the southern foyer for the under the steps project. It is proposed that appropriate hoardings will be installed to ensure ongoing access to this area of the Opera House. It is however anticipated that the Broad walk will need to be closed for safety reasons at some stage of the construction. These closures will be kept to a minimum and/or done overnight to facilitate public access around the building.

Prior to commencing construction the Contractor engaged to undertake the works will prepare a fully detailed works staging strategy which addresses appropriate access and circulation impacts which ensures safety of public and patrons.

(b) Noise and Vibration

Noise and vibration associated from the works will be mitigated in consultation with the Contractor and the acoustic consultant, and measures such as discrete construction techniques (i.e. cutting rooms), isolation by acoustic hoardings and off site manufacture will all be explored to limit impacts of noise and vibration of the Sydney Opera House site or its neighbours.



An initial assessment of the construction noise impacts associated with the works has been completed by Arup in August 2016. It proposed the following mitigation measures;

- Regularly train workers and contractors (such as at toolbox talks) to use equipment in ways to minimise noise
- Ensure site managers periodically check the site and nearby residences for noise problems so that solutions can be quickly applied
- Avoid the use of radios or stereos outdoors during night time works
- Avoid the overuse of public address systems
- Avoid shouting, and minimise talking loudly and slamming vehicle doors, especially during night time works
- Use non-“beeper” reversing/movement alarms such as broadband (non-tonal) alarms or ambient noise-sensing alarms
- Turn off all vehicles, plant and equipment when not in use
- Use residential-grade mufflers on plant
- Ensure all doors/hatches are shut
- Conduct work behind temporary hoardings/screens wherever possible. Site hoardings should be located as close to the noise source as possible, and should be as high as feasible considering the structural support of the hoarding. Site hoardings may not be effective at screening noise to upper floors of sensitive receivers, but can be an effective noise mitigation measure for receivers located on lower floors.
- Provide resilient damping material on bin trucks or receptacles to minimise impact noise from materials loaded on truck
- Avoid metal-to-metal contact on equipment wherever possible
- Fit mufflers/silencers to pneumatic tools (e.g. breakers)
- Use dampened bits on impulsive tools such as jackhammers to avoid “ringing” noise
- Avoid dropping materials from height
- Use of concrete pulverisers or “munchers” as a lower-noise alternative to concrete breakers

These measures are considered reasonable and prior to commencing construction the Contractor will be required to prepare a Construction Noise and Vibration Management Plan and determine where noise and vibration loggers will need to be placed to monitor construction activity. The engagement of a consultant will be considered to provide ongoing monitoring throughout the construction.

(c) Access and Traffic

Vehicle movements will be within standard construction hours (7am-6pm), however some vehicle movements may occur outside of these times. The impact of traffic on Macquarie Street being limited to construction deliveries and removals. There will be no contractor parking provided on site, with contractors directed to public transport or the nearby Opera House carpark. Note there will be no standing of construction vehicles along Macquarie Street; this will be monitored by the Opera House gatehouse.

All deliveries and removals from site will be via the underground loading dock, accessed from Macquarie Street, with the exception of oversized items. Oversized items which will be delivered to the site will be undertaken at off peak periods (i.e. overnight) at time periods agreed with the contractor and the SOH facilities.

The Contractor will be required to produce and adhere to a Traffic Management Plan which will have the following headline requirements;



- Vehicle movements on the Forecourt will be managed by accredited traffic controllers.
- Vehicle movements will be separated from the general public to ensure minimal interface with pedestrians across the site.
- Large deliveries and vehicle movements will be managed through a process, such as disruption notice, which is to be approved by SOH prior to large vehicle movements/ deliveries. This will also help to coordinate ongoing activities within the House.

General public access will still be maintained via the vehicle concourse, via controlled entry at the gatehouse, for the duration of the works to provide less mobile person's access to the site.

A breakdown of the forecast construction vehicle movements for the project is included below in figure 1.



TIME OF DAY	ICNG TIME OF DAY	Proposed Construction Traffic (note traffic movements are not cumulative)
22:00	NIGHT OUTSIDE HOURS 22:00-07:00	<u>Approximate Traffic Movements: 1-3</u> Limited to oversize deliveries, to accept deliveries onto SOH Forecourt where vehicles are Oversize/ Overmass (in accordance with RMS requirements) Mitigation: - Bennelong Apartment residents to be notified as part of construction consultation meetings and via existing communications forums. - Vehicle movements limited to oversized vehicles and craneage movements for oversized items onto the podium. - Noise mitigation measures on construction vehicles ('quackers' not beepers- as per ICNG guidelines) - No contractor personal vehicle parking provided on site. - Vehicles booked through SOH loading dock platform Mobiledock . This prevents large quantities of vehicle movements concurrently.
23:00		
00:00		
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00	STANDARD HOURS 07:00-18:00	<u>Approximate Traffic Movements: 5-20 (throughout morning and afternoon)</u> Typical Construction Traffic; deliveries (materials & equipment), rubbish removal Mitigation: - Typically vehicles and materials will be received in the underground loading dock - Bulk of vehicles moving in standard construction hours (residents not trying to sleep) - No contractor personal vehicle parking provided on site. - Noise mitigation measures on construction vehicles ('quackers' not beepers- as per ICNG guidelines) - Vehicles booked through SOH loading dock platform Mobiledock . This prevents large quantities of vehicle movements concurrently.
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00	EVENING HOURS 18:00-22:00	<u>Approximate Traffic Movements: 1-5</u> Limited Construction Traffic; limited deliveries (materials & equipment), limited rubbish removal Mitigation: - Typically vehicles and materials will be received in the underground loading dock in standard construction hours to service the evening/ night construction shifts. - Bulk of vehicles moving in standard construction hours - No contractor personal vehicle parking provided on site. - Noise mitigation measures on construction vehicles (quackers not beepers- as per ICNG guidelines) - Vehicles booked through SOH loading dock platform Mobiledock . This prevents large quantities of vehicle movements concurrently.
19:00		
20:00		
21:00		

Figure 1- Predicted Construction Vehicle Movements



(d) Air Quality

The project has the potential to generate dust from demolition works. Measures will be taken to ensure that the dust is localised within the construction zone. A dust management plan will be prepared by the Contractor engaged to undertake the works prior to commencing construction. Refer also to section (f) Waste for the management of asbestos and associated dust control methods.

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.

(e) Water Quality

All necessary measures will be taken to control potential impacts from external works on Sydney Harbour. This will be managed by the development of a Construction Environmental Management Plan by the Contractor which will be reviewed and approved by the Sydney Opera House. The Contractor will be required to carefully consider the construction technique to avoid potentially affecting the water quality of the harbour, the proposed works do not pose a major threat to the harbour however.

Where work is required adjacent to the harbour the practices will be highlighted in the Construction Environmental Management Plan. Appropriate controls, monitoring and mitigation measures, such as sediment controls, 'wet-vacuuming' or off-site removal of the item to undertake the works. will be investigated to limit the possibility of contamination of groundwater/ harbour as a result of the construction works.

(f) Waste

It is expected that the following waste will be generated during construction:

- 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

The management of waste will be 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'. The figure below illustrates the hierarchy for management of wastes.

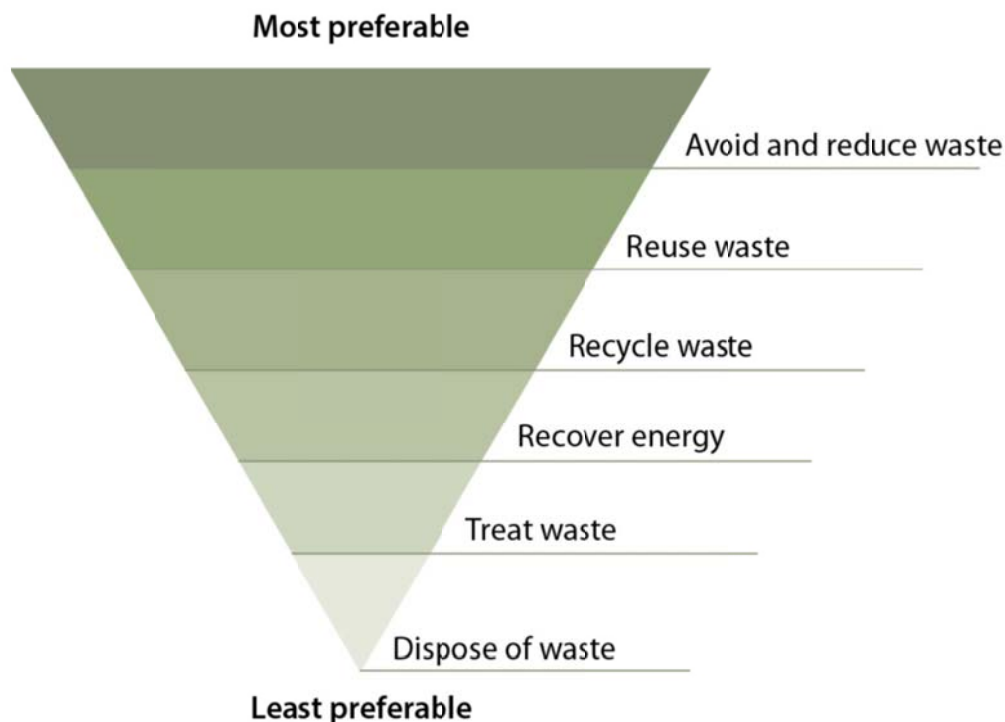


Figure 2- Waste Management Hierarchy

The proposed waste management measures for the project are as follows:

- Concrete materials – recycle materials and/ or dispose to appropriately licensed landfill
- Steel and steel cable – recyclable materials will be collected separately and recycled
- Redundant winches and control equipment – recyclable materials will be collected separately and recycled
- Services waste – Recycling bins will be provided on site. Recyclable materials will be collected separately and recycled
- General waste – Recycling bins will be provided on site. Recyclable materials will be collected separately and recycled

A fully detailed Waste Management Plan will be developed by the Contractor engaged to undertake the project. The plan will be framed using the waste management hierarchy principles outlined above. The plan will be prepared prior to construction commencing and will be consistent with the Waste Avoidance and Resource Recovery Act 2001 and the 'Waste Classification Guidelines'.

The plan will:

- Identify requirements for waste avoidance, reduction, reuse and recycling
- Provide procedures for handling, stockpiling and reuse of wastes
- Provide procedures for disposal of hazardous materials
- Identify disposal sites as well as transport options



4.4.f.1 Construction Environmental Management Plan

Sydney Opera House maintains an Asbestos Management Procedure to which the successful Contractor will be required to also adhere, or build upon.

As part of this procedure the Opera House maintains a Hazardous Materials Register which documents all asbestos contaminated materials (ACM), hexavalent chromium and lead paints within the building. The 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).

As well as the Opera House documentation the removal and disposal of any hazardous materials must 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.

4.5 Other Construction Plans

Prior to commencing construction the Contractor engaged to undertake the works will prepare in conjunction with SOH the following documents:

- Construction Environmental Management Plan
- All relevant safety documentation, including Safe Work Method Statements

(a) Construction Environmental Management Plan

A Construction Environmental Management Plan will be prepared and implemented. The plan will outline environmental management practices and procedures to be followed during site preparation and construction. The plan will cover the environmental protection practices, resources and sequence of activities required to comply with relevant environmental legislation, conditions of any applicable licences, approvals and permits.

The plan will be prepared in accordance with Guideline for Preparation of Environmental Management Plans (DIPNR 2004) and include:

- A description of activities to be undertaken on the site during site preparation and construction stages of the project
- Details of construction impacts as per section 4.4 *Construction Impacts*.
- Statutory approvals and other obligations that would be fulfilled during site preparation and construction
- Details of how the environmental performance of the site preparation and construction works will be monitored, and what actions will be taken to address adverse environmental impacts. In particular the following environmental performance issues will be addressed:
 - Measures to minimise impacts to heritage
 - Measures to minimise the discharge of sediment and other pollutants to land and/or water drainage systems during construction
 - Measures to monitor and control noise emissions during construction and commissioning
 - Measures to manage traffic and site access during construction
- A description of roles and responsibilities for all relevant employees involved in the construction of the project
- Complaints handling procedures during construction



(b) Safety Documentation

A Safety Management Plan and Safe Work Method Statement will be provided explaining the delivery and installation of the project whilst ensuring the surrounding heritage fabric. An indicative description of the methodology likely to be adopted to construct the works is provided in this report and referred documentation. This is based on the available stage of the design documents.

Once the detailed schematic documentation is complete the Contractor engaged to undertake the works will develop a detailed safe work method statement which addresses the various activities to be undertaken during the construction phase, and ensures the safety of the site fabric, construction personnel and all relevant stakeholders.



5 Conclusion

This report provides an indicative construction methodology and associated procedures, which identify how the project may be constructed and how the various environmental issues may be addressed.

This document outlines the minimum requirements for the construction of the works associated with DA2b and will be expanded upon by the successful contractor for the works on site. Largely these works are contained within the building footprint and can be serviced via the underground loading dock, reducing their impact on the general public, throughout their construction.

This document coupled with contractor involvement and development of plans such as Construction Environmental Management Plan, Safety Management Plan, Noise & Vibration Construction Plan, Traffic Management Plan and Waste Management Plan will provide a robust framework from which to deliver the proposed works.