

Sydney Theatre Company

STC 50

SEARS – Ecological Sustainable Design Report

ESD Report

Issue 2 | 4 November 2016

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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Arup
Arup Pty Ltd ABN 18 000 966 165



Arup
Level 10 201 Kent Street
PO Box 76 Millers Point
Sydney 2000
Australia
www.arup.com

ARUP

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Executive summary

This report has been produced in response to the Secretary's Environmental Assessment Requirements Application Number SSD 7561 on behalf of The Sydney Theatre Company in support of the State Significant Development Application.

This report addresses issues required for a SSD and specifically responds to Key Point 8 of the Plans and Documents section of the Secretary's Environmental assessment Requirements, which reads:

- Identify how the development will incorporate ESD principles in the design, construction and ongoing operation phases of the development, and include innovative and best practice proposals for environmental building performance.

And dot point 8, which reads:

- Ecological Sustainable Design (ESD)

Conclusion

This report identifies the ESD strategies that are being developed in the design, the construction and the ongoing operational phases of the development.

Overall the following hierarchy has been used to optimise ESD performance:

- Step 1: Fully optimise passive systems to improve natural ventilation, passive heating and good daylight levels. This can be demonstrated by retaining the existing passive strategies for naturally ventilating and daylighting of the Wharfs public gathering spaces and common areas.
- Step 2: Select energy efficient building services plant that is controlled in response to the passive systems such as daylight response artificial and mixed mode ventilation.
- Step 3: Fully optimise the solar system to use the harvested energy on site as much as possible and then export.
- Step 4: Monitor operational performance and provide a mechanism for continued improved building tuning and performance.

The Wharf has a complex mix of environments due to the changing functionality of the building over the day and night and the requirement to absorb very high peak energy conditions. This project also has a unique opportunity that the design team can work directly with STC's operations team which has led to the development of innovative sustainable infrastructure provisions and not having to provide large amplifications to the incoming power supply and other utility services. An example of this is that the power supply to the wharf would normally have to be increased considerably to accommodate the new proposed peak load conditions but we have worked with the STC to develop a diversity strategy resulting in a considerably reduced peak load requirement.

The STC team has also been working with the broader Walsh Bay Arts Precinct team to identify ESD strategies that can apply to both projects.

Overall the project aims are to achieve high levels of sustainability and have adopted and improved the Wharfs previous ESD initiatives of optimising the use of the solar panels, recycling rainwater and passive naturally ventilating a large portion of the wharf. The areas that will have to be air conditioned due to function and acoustics will be served using the latest high efficiency building services systems.

1 Introduction

Project Overview

Since the repurposing of Wharf 4/5 (The Wharf) for STC more than 30 years ago, there has not been a significant refurbishment and consequently the existing STC facilities are at the end of their useful life. The lack of proper acoustic treatment in theatre and rehearsal spaces is inadequate for contemporary theatre operations and the outdated approach to accessibility and workplace conditions do not meet modern day community expectations for public buildings. In summary the original fit out has not kept pace with the Company's changing operations over the past 30 years and accordingly is in need of significant change.

The key aims and objectives of the proposed STC internal fit out and refurbishment works are to meet STC's current operational needs and strategic goals and to future proof the company by:

- Creating new, distinctive and flexible theatre spaces commensurate with the Company's position as one of the world's leading theatre companies
- Increasing public space, improve access and visitor amenities
- Increasing saleable seating inventory and revenue earning capacity for long term sustainability
- Reducing running costs
- Improving the staff and user experience
- Improving back of house and technical facilities by providing modern workspaces which are fit for purpose, safe and efficient
- Respecting and enhancing the heritage and architectural value, and
- Creating a world class set of facilities for Australia.

To achieve these objectives the subject works will be undertaken in conjunction with the STC external works which form part of the Walsh Bay Arts Precinct SSDA (SSD 7689).

The proposed internal upgrade of the Sydney Theatre Company's facilities at Wharf 4/5 Walsh Bay will comprise internal alterations and reconfiguration of spaces and uses as outlined below:

Ground level

- New box office / ticketing area at southern end of wharf and administration / staff areas

Mezzanine

- Additional offices at southern end of wharf

Level 1 (Main Floor)

- The co-location of Wharf 1 and 2 Theatres to create two distinct performance spaces that are flexible in seating configuration and use. The new theatres will comprise:
 - A new multi-format flexible studio space (Wharf 1 Theatre) with seating for 350 – 450 and additional height over the seating and stage areas for the rigging of technical equipment.
 - A new studio theatre space (Wharf 2 Theatre auditorium) with retractable or removable seat with a capacity of 150-200 seats in various configurations.
 - New public display space and formal meeting area to south of Wharf 2 Theatre mid wharf with an atrium over
- Upgrade to existing restaurant and bar area at northern end of wharf and terrace balcony including back of house areas
- Improved rehearsal and dressing room spaces and introduction of more flexible spaces including:
 - Co-located rehearsal spaces with shared back of house area
 - Provision for two set up floors at the southern end of the wharf with back of house area to allow transportation of sets to the theatres
- Administration, costume and props areas within the shore sheds

Level 2 (mezzanine)

- Administration area and meeting rooms
- Provision of a new multi-purpose function room with balcony with capacity for 120 persons at the northern end of the wharf overlooking the restaurant and the harbour

Level 3 (under roof)

- Lighting bridge and technical area

Other works

- The removal of the existing fire tunnel within the building and associated reconfiguration of the space into the new layout as above plus addition of new fire stairs
- Improvements to acoustics, amenities and back of house and plant areas / facilities,
- Relocation, reconfiguration and improvements to administration areas centrally within the wharf
- Upgrade of services and infrastructure; and
- New loading and access arrangements to improve movement arrangements between technical and production areas.

The proposal provides for an increase in theatre capacity from existing 550 persons to a maximum of 650 persons in the combined Wharf 1 and 2 theatres. It also provides for a new multi-purpose public/event space with combined capacity for 200 persons over and above the existing Theatre Bar capacity of 500 persons. Accommodation for administrative staff will also increase from existing to a maximum of 200.

Works are as illustrated in detail on the architectural plans prepared by HASSELL.

2 SEARs Issues Addressed

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3 Ecological Sustainable Design (ESD)

As a summary the design has been developed to achieve best practice performance standards for energy efficiency, water conservation, waste reduction and material efficiency whilst maintaining high levels of indoor environmental quality and occupant comfort.

The following ESD initiatives are proposed and will be monitored throughout the design, construction and ongoing operation of the project.

3.1 Electrical Services

Initiative	Proposed ESD Strategy
External lighting	External lighting will be provided to some external areas in accordance with AS/NZS1158 and CPTED. External lighting will be controlled via light sensors. LED lighting options will be assessed based on life cycle analysis in order to develop the most appropriate external lighting solution.
Efficient internal lighting systems	Generally LED luminaires are proposed throughout. A review is also being carried out to determine the most energy efficient and functional lighting for the specialist Theatre lighting. Lighting levels will be provided according to AS/NZS 1680.
Switching systems	It is proposed to provide a centralised lighting controls system to provide time clock management and daylight control.
Emergency exits	Emergency and exit lighting will be in accordance with AS/NZS 2293.1, and will be designed to minimise ongoing maintenance and costs. This is proposed to be achieved through the following: - Centrally monitored system with automated self-testing; - Long life LED luminaires; - Individual long-life batteries; - Wide area coverage luminaires.
High quality materials	Minimising the amount of PVC cabling where possible.
Energy	All sub meters will be linked to the BMS system to monitor

Initiative	Proposed ESD Strategy
monitoring	energy consumption. There will be a continual monitoring of monthly energy consumption and building tuning to optimise energy performance. The BMS will also monitor energy usage compared to solar energy generated.

3.2 Mechanical Services

Initiative	Proposed ESD Strategy
Central systems	The buildings heating and cooling requirements shall be supplied by a new high efficiency roof mounted air cooled chiller and boiler replacing the existing air cooled condensers on the roof.
Secondary systems	This plant will supply chilled water and heating to all air handling units (AHU's) and fan coils units (FCU's). Energy efficient variable speed drives will be provided for the AHU's and FCU's will be supplied with highly efficient EC/DC motors to improve energy efficiency.
Type of refrigerants	Zero ODP and Low GWP refrigerants shall be specified in the design.
Passive heating and cooling techniques	Passive conditioning techniques where applicable, to reduce the overall air conditioning loads. Use of high performance glazing, where appropriate and high levels of insulation for the air conditioned spaces.
BMS system	Building Management System (BMS) to schedule and optimise plant efficiency. The air-conditioning system to be designed to either shut down or be set to a wider temperature control band, when a space is unoccupied.
Air handling	Units shall be selected with economy cycle where appropriate.

Initiative	Proposed ESD Strategy
systems	

3.3 Hydraulic Services

Initiative	Proposed ESD Strategy
Efficient water fixtures and fittings	Low flow taps and fixtures will be used throughout and will be supplied by the recycled rainwater.
Hot water system	The buildings heating hot water requirements shall be met by way of a series high efficient gas fired boilers and recycled solar hot water panels
Hot water pipework	Additional insulation is provided for the domestic hot water pipework insulation in excess of section J 7.2 minimum requirements. The thicker insulation (38mm) will achieve a 26% reduction in energy losses when compared with the industry standard 25mm thickness.
Water metering	All water sub meters are connected to the BMS to monitor water consumption and to provide an early indication of any water leaks.

3.4 Architectural

Initiative	Proposed ESD strategy
Passive systems	A high portion of the transient public areas and the workshops are natural ventilated and provide tempered conditions. These existing passive strategies will all be retained with the circulation corridors providing excellent access to natural daylight and ventilation.
Façade performance to meet section J	The section J envelope for the project will be around the internal insulated boxes that are acoustically isolated and are proposed to be air conditioned in an efficient way.

Initiative	Proposed ESD strategy
Material	Consideration will be given to the selection of environmental friendly alternative materials for the new building work. This will include the selection of environmentally friendly insulation products, low formaldehyde materials and FSC timber selection.
Waste	Innovations in waste technology area being assessed that can be integrated into a precinct wide waste recycling strategy. Minimum waste recycling targets will be specified for the demolition and construction work.

4 Conclusion

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