Arts NSW

Walsh Bay Arts Precinct

Sustainability Framework

Stage 2 SSDA

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Table of Contents

1.0 OBJECTIVES OF ASSESSMENT

1.1 Introduction

The Walsh Bay Arts Precinct (WBAP) Sustainability Framework has been developed as part of the Walsh Bay Arts Precinct Stage 2 State Significant Development Application (SSDA) and is based upon the key drivers identified by a number of invested parties during workshops and meetings, and in collaboration with arts representatives, architects and Arup. This framework is a requirement under the Conditions of Consent for the site.

WBAP has a vision of growing and developing to become the Arts destination hotspot on the Sydney Harbour foreshore. The masterplan includes the upgrading of theatre spaces and the overall precinct to bring the old wharf up to a contemporary arts facility.

This framework addresses the three key project objectives with regards to delivering a sustainable site:

- Activate the precinct with a unique cultural offering and visitor experience
- Rejuvenate a vital piece of Sydney's waterfront cultural heritage, providing inter-generational benefits for the people of NSW
- Provide facilities that better enable arts organisations to develop world class productions + experiences + deliver on their strategic visions

It is imperative the site achieves high standards of environmental sustainability. The Sustainability Framework responds to this desire and addresses seven key principles. These form the basis of the report:

- **Section 4 —*Energy efficiency and carbon***
- **Section 5—*Reduction of potable water***
- **Section 6—*Sustainable materials***
- **Section 7—*User comfort and well being***
- **Section 8—*Sustainable transport***
- **Section 9—*Sustainable in operation***
- **Section 10—*Social sustainability and community***

Current State

The Walsh Bay Art Precinct is currently a low-impact site with low energy demands due to a number of key elements in practice. The site currently uses:

- Photovoltaic cells to offset electric energy
- Primarily naturally ventilated spaces, with operable windows for occupant control
- Air conditioning for prime spaces only, where thermal comfort is demanded for business operation
- Heating only in certain spaces for occupant comfort
- The original materials of the finger wharfs, which maintain the heritage and history of the site. This also reduces the embodied energy of construction

Drivers

For a long time the arts have been among the leading forces in developing high-performance buildings and adopting sustainable principles. This interest has been motivated by a combination of factors, including practical and financial concerns with the long-time operation and ownership of facilities, the demand for advanced facilities and infrastructural capacities, growing environmental awareness from all users, the desire for a smarter and more comfortable space and the aspiration to develop a public profile in line with the increasing concern over climate change and resource limitations.

With those principles in mind, this Sustainability Framework looks at the WBAP in two ways: as a precinct and as specific spaces within individual buildings.

The framework has been developed to present the key design aspects to be implemented.

The following sections of this Sustainability Framework document in detail the discussions held and the reasoning for the recommendations provided in this summary.

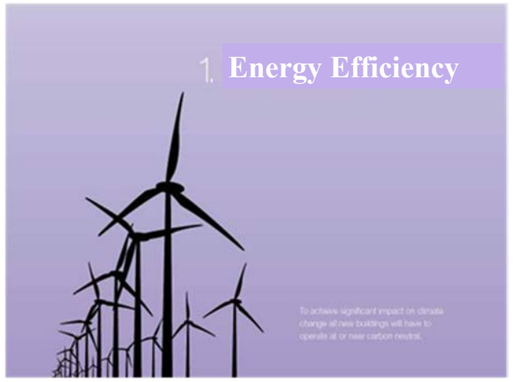
The framework also details the specific plans and practicality of the key drivers outlined in this executive summary. It outlines the intended design response to address the drivers.

Conclusions & Recommendations

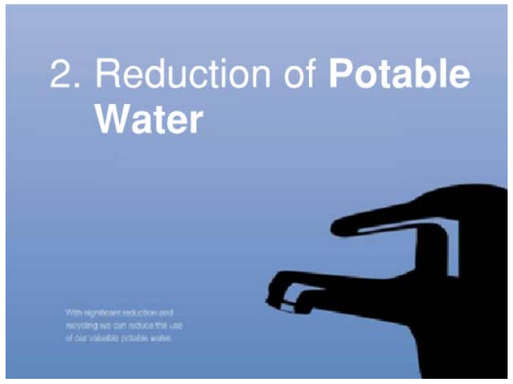
The Walsh Bay Arts Precinct is perfectly located in an area rich in natural resources and opportunities. As such, the performance of the buildings in this precinct can be improved through design based upon high standards of environmental sustainability.

The Sustainability Framework recommends a number of initiatives be included as a minimum in the Walsh Bay Arts Precinct. These are listed under each category over the page.

1.2 Recommendations

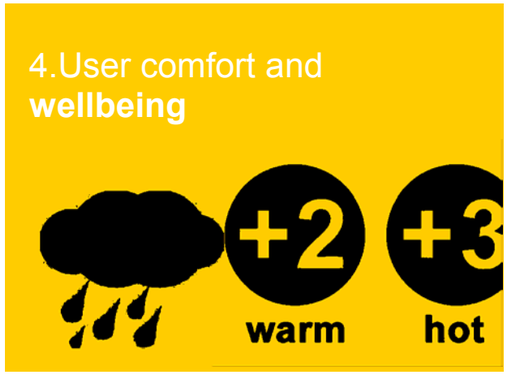


- ► Maximise Natural Ventilation and adoption of the adaptive comfort model
- ► Specify high efficiency systems, including innovative, site specific technologies
- ► Harbour Heat rejection/ heat absorption
- ► Provision for onsite Photovoltaic array



- ► Reduce potable water demand
- ► Efficient, low water use systems
- ► Optional future upgrade to collect and store rainwater for reuse
- ► Remove parking from Wharves to allow clean run-off of rainwater

- ► Maintain / restore existing heritage façade and structure
- ► Use opportunity to specific internal materials with low environmental impact
- ► Local and responsible sourcing



- ► User-specific design for each space
- ► Design to maintain/enhance air quality
- ► Reduce legionella risk by providing non-water based heat rejection
- ► Upgrade existing services and space quality
- ► Adopt adaptive comfort and transient space gradings
- ► Connect buildings and spaces to harbour views
- ► Ability for occupants to control windows
- ► High visual light levels to increase daylight levels

- ► On-site bicycle parking facilities for tenants and visitors
- ► Connect to Sydney City's current cycleways
- ► Link to harbour foreshore walk

- ► Maintain an operation plan beyond occupancy for ongoing works
- ► Minimize and recycle waste
- ► Provide long life LED lighting where possible
- ► Increase efficiency and comfort through on-going commissioning and awareness

- ► Create diversification of uses and interaction with the local community
- ► Open the commercial spaces up to the public domain
- ► Lighting of public spaces to provide secure, welcoming areas after hours

2.0 SITE AND PROJECT DESCRIPTION

2.1 The Site and Surrounds

The Walsh Bay Arts Precinct (WBAP) (the "site") generally comprises Pier 2/3, Pier 4/5 and its shore sheds which make up Wharf 4/5, as well as the adjoining waterway. The site has a street frontage to Hickson Road. The site is shown in Figures 1 and 2. The site is part of the Walsh Bay area which is located adjacent to Sydney Harbour within the suburb of Dawes Point. The site is located within the City of Sydney Local Government Area.

Walsh Bay is strategically located to the north of Sydney's CBD in the vicinity of major tourist destinations including the Sydney Harbour Bridge, the historic areas of Millers Point and The Rocks, Circular Quay and the Sydney Opera House. The Barangaroo redevelopment precinct is located immediately to the south-west.

Pier 2/3 is legally described as Lot 11 in DP 1138931 and Wharf 4/5 is legally described as Lot 65 in DP 1048377. The total area for these lots is 18,090sqm.

The land owner of the site is the Roads and Maritime Services (RMS). Both Pier 2/3 and Wharf 4/5 are occupied under various lease arrangements with Arts NSW, Department of Justice, primarily for arts and cultural uses.

The area of water that the project proposes to build over is also owned by RMS. Its land title description is Lot 12 in DP 1138931.

Walsh Bay comprises ten berths constructed between 1908 and 1922 for international and interstate shipping. These are collectively known as the Walsh Bay Wharves. The Walsh Bay Wharves Precinct is listed as an item on the State Heritage Register.

The Walsh Bay Wharves comprise the following:

- Pier One which contains the Sebel Pier One Sydney Hotel;
- Pier 2/3 the last remaining undeveloped pier (has previously received approval for cultural uses, temporary arts events and some commercial events);
- Wharf 4/5 which is occupied by the Sydney Theatre Company (STC), the Australian Theatre for Youth Program (ATYP), Sydney Dance Company (SDC), Bangarra Dance Theatre and the choirs comprising Gondwana, the Song Company and Sydney Philharmonia;
- Pier 6/7 which has been redeveloped for residential apartments and associated boat marina;
- Pier 8/9 which has been redeveloped for office uses; and,
- Shore sheds aligning Hickson Road which contain a range of commercial activities, including restaurants, bars, shops and offices

2.2 The Project

The approved Stage 1 development application comprised:

- A new waterfront public square between Pier 2/3 and Wharf 4/5;
- A series of new stairs and balconies on Pier 2/3 and Wharf 4/5 and modification to the roof of Pier 2/3;
- The inclusion of new tenancy spaces in Pier 2/3 and Wharf 4/5 for arts and cultural activities; and,
- The use of the precinct for arts festivals, events and pop-ups and associated uses, including restaurants, cafes and bars.

The WBAP Stage 2 State Significant Development Application seeks consent for construction works for the above to realise the WBAP project, as well as the proposed external alterations and additions to all of Wharf 4/5. It also seeks consent for new commercial and event uses in the precinct. Key aspects of the proposed development are outlined below :

Figure 1: Site Location (Source: Google Maps)

Early works

Early construction works comprising infrastructure upgrades, demolition, hazmat removal and sub structure works

Pier 2/3

Internal alterations and reconfiguration to provide for the following:

- Performance venues;
- Rehearsal rooms, production workshops, back of house facilities and offices;
- Function spaces, bars, cafes and foyer spaces extending onto external gantry platforms (balconies) providing breakout space for internal foyers and allowing views of outdoor performances;
- Mezzanine spaces for offices and back of house facilities;
- Upgrades to meet compliance with current BCA, DDA and fire codes;
- New lifts and stairs;
- Creation of new commercial tenancies and public toilets;
- Removal of some storey posts and beams to facilitate internal reconfiguration and new uses; and

2.0 SITE AND PROJECT DESCRIPTION

- Retention of a large proportion of the ground floor in its existing 'raw' heritage state for events and festivals including Sydney Writers' Festival and Biennale including venue and commercial hire.

External alterations and additions comprising:

- New balconies and external stairs for fire egress;
- New external lift for access;
- Installation of glazing in existing cargo sliding door openings and other solid panels on the eastern, western and northern elevations to allow for views into and out of the building;
- Roof penetrations within the central valley at the southern and northern end to accommodate new performance spaces and associated structural modifications including truss strengthening;
- Installation of ESD elements, such as photovoltaic panels and seawater heat exchange systems; and
- Raising of the external floor level on the eastern side by introducing a new raised deck and continuous set of stairs beyond the existing column line.

Wharf 4/5

Internal alterations and reconfiguration to the Bangarra Dance Theatre (BDT) tenancy to provide for the following:

- Upgrade of the main rehearsal and performance spaces;
- Upgraded foyer and exhibition space along the eastern frontage;
- Improved office space at mezzanine level including a new lift and stairs;
- Provision of a function space at ground level of the northern end of wharf with associated kitchen facilities; and
- New entrance and new glazing in bays of sliding cargo doors, opening up the foyer and main studio to the Pier 4 apron.

Minor internal alterations to the Sydney Dance Company (SDC) tenancy including:

- Reducing the existing workshop space to create a fifth dance studio; and
- Upgrading office and reception areas.

External alterations and additions to SDC comprising:

- Raising of timber wharf deck adjoining the SDC café and opening of facade with new glazing to activate the waterfront square.

Creation of new commercial tenancies and public toilets;

External fabric alterations around the Sydney Theatre Company (STC) tenancy comprising:

- Improved street entry at Hickson Road involving relocation of the stairs to allow for an improved landing and point of arrival to the STC;
- New 'gantry' balconies, stairs and lifts mid-wharf and at the end of the wharf to provide for improved accessibility and compliance with fire engineering solutions;
- Minor amendments to the existing façade to accommodate new entries and exits along the wharf;
- Roof penetrations within the central valley at two locations to accommodate theatre and workshop spaces and associated structural modifications including truss strengthening; and
- Reinstallation of existing photovoltaic panels where applicable.

Wharf 4/5 Shore Sheds

Internal alterations to reconfigure the choir spaces, including provision of a mezzanine for choir administration;

Creation of new commercial tenancies at ground and mezzanine levels; and

Provision of office space at ground level.

Public Domain

Construction of a new waterfront square comprising a deck on piled structure:

Shaded informal performance space on piled structure; and

Changes to existing levels and steps down to facilitate access between the existing apron and new waterfront square.

New Uses

Use of the precinct for arts festivals, events and pop ups as well as a range of activating uses such as retail, restaurants, cafes and bars.

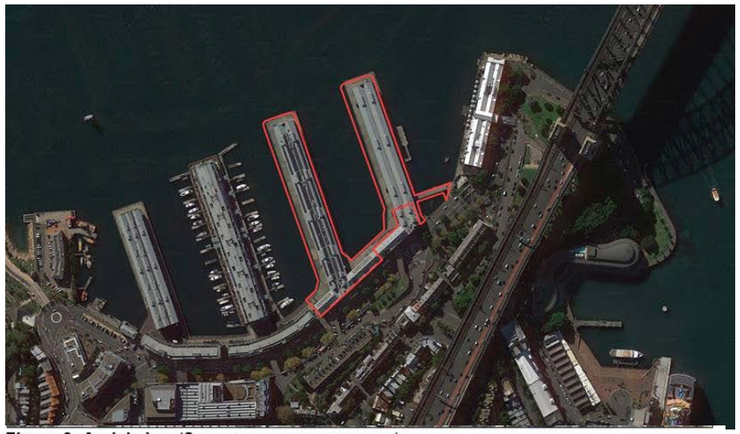


Figure 2: Aerial view (Source: www.nearmap.com)

3.0 DESIGN REQUIREMENTS & REGULATORY CONTEXT

The Director General Requirements (DGR), the Secretary's Environmental Assessment Requirements (SEARs) and tools used for guidance during design development of the WBAP proposal are outlined below:

3.1 Relevant Policies and Guidelines

The following planning provisions and codes apply to the Walsh Bay Arts Precinct with regards to the Ecologically Sustainable Design (ESD):

- National Construction Code (NCC) / Building Code of Australia (BCA) 2016
- Environmental Planning and Assessment Regulation, 2000

Two tools have been used as reference in designing ESD initiatives and performance standards. While the project is not held to these, each have been influential in the Masterplan,

- City of Sydney LEP 2012
- Green Building Council of Australia Green Star Credit targets.

3.1.1 Environmental Planning and Assessment Regulation (EPA)

The Director General Requirements states that "ESD principals as defined in Section 7(4) Schedule 2 of the Environmental Planning and Assessment Regulation 2000) will be incorporated in the design, construction and ongoing operation of the development". This document states:

(4) The principles of ecologically sustainable development are as follows:

a. The precautionary principle, namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:
(i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and
(ii) an assessment of the risk-weighted consequences of various options,

b. Inter-generational equity, namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations,

c. conservation of biological diversity and ecological integrity, namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration,

d. Improved valuation, pricing and incentive mechanisms, namely, that environmental factors should be included in the valuation of assets and services, such as:
(i) polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,
(ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste, environ mental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.

The intent of these principles serves as the foundation of this report, with the intent to minimise damage done to the environment.

3.1.2 NCC/BCA 2016

The NCC/BCA requirements pertaining to ESD are in Section J—Energy Efficiency of Volume 1. This sets minimum energy benchmarks which must be exceeded for the mechanical conditioning of spaces and addresses the performance of any new fabric and building services.

Since the award of the Stage 1 SSD, a strategy for addressing Section J has been developed in collaboration with the BCA certifier. In summary, this is as follows:

- The building contains a mixture of classes namely; Class 5 Office/Admin, Class 6 Retail also Class 9b Assembly building.
- All *new building works* will need to comply with the requirements of Section J. Where there are no new works to the external façade it need not be upgraded.
- Any external fabric upgrades being nominated are considered voluntary and not strictly required for Section J in terms of fabric compliance.
- Any improvements to existing sealing is considered voluntary and not subject to Section J requirements.
- Any replacement fabric (e.g. new window or the like) is considered *new building works* and must comply with Section J.
- Any new building services are considered *new building works* and must comply with Section J.

Although considered voluntary, fabric upgrades in conditioned areas are recommended, within the constraints of the heritage context, in order to maintain comfort in the air-conditioned areas and exercise environmentally and socially responsible design.

The specific design response recommended to address Section J is outlined in the following section *4.0 ESD REQUIREMENTS—ENERGY* and in summary, is as follows:

- Ensure opaque envelope of air conditioned spaces meets the performance requirements of Section J Part J1 Building Fabric (within heritage constraints)
- Ensure any new glazed areas and any new building services systems meet the performance requirements of Section J
- Where practically possible, upgrade the existing façade to minimise air leakage / air infiltration

3.1.3 Green Star

The project aspires to achieve a Green Star rating and is in discussion with the Green Building Council of Australia to determine how this could be achieved for the bespoke, heritage building.

3.2 Summary

The Walsh Bay Arts Precinct endeavours to go above and beyond the baselines outlined to achieve a carefully thought-out, considerate and intelligent design. The initiatives targeted are discussed throughout the report, and have been grouped into the seven principles listed in the introduction.

4.0 ESD REQUIREMENTS—ENERGY

4.1 Introduction

The design for reducing the energy and carbon impact of the WBAP is commensurate with the concepts below.

Load Reduction - through efficient lighting fittings such as LEDs being specified in the site. High quality glazing where windows are to be replaced, providing insulation and sealing to fully conditioned spaces (where heating and cooling is provided) in line with Section J requirements.

Passive Systems - by naturally ventilating corridors and transient spaces where possible. Mixed mode spaces reduce the air conditioned hours and take advantage of the mild climate in Sydney

Active Systems - specified plant equipment is high-efficiency to reduce energy associated with conditioning

Energy Transfer - Harbour heat rejection provides a method for increasing efficiency of heat, reducing the carbon footprint of the building

Renewables - installing provision for photovoltaics on the roof to offset the electrical demand for heating / cooling systems, including any future tenant demands

Offsets - Are not proposed in this project, but would be required to reduce the site energy and carbon emissions to net zero. This can be achieved by buying green power during operation

Where possible and economic, the existing infrastructure will be maintained to reduce capital costs. This is the recommended design response for Wharf 4/5, where currently the level 1 office spaces utilise air cooled refrigerant systems to provide heating and cooling. These systems are to be retained where possible, with minor ductwork alterations.

4.2 Conditioning of Spaces

The needs of each space differ significantly across the site. A blanket rule for all spaces is not appropriate - the best outcome for one organisation may not be appropriate for others. To provide the best outcome, each space will be designed to meet the specific amenity, comfort and energy needs of the site. When possible, natural ventilation is preferred, and mixed mode provided over fully air conditioned spaces.

By providing a number of naturally ventilated spaces, energy consumption of the building can be reduced. The added benefits include allowing for the retaining of the heritage façade, reducing construction waste and material consumption.

A condenser water pipework loop is be considered to serve spaces that may require cooling for future tenant fitouts. This is intended to allow future flexibility and remove the need for tenants to install air cooled condenser units to the heritage façade.

4.3 Section J Considerations

Although not required for Section J compliance, the fabric envelope of conditioned spaces (those that are to be mechanically heated and cooled) will be made to comply with the minimum performance requirements of Part J1 Building Fabric.

To achieve this, any replacement windows will be upgraded, the spaces will be sealed and insulation is to meet the Deemed-to-Satisfy requirements of Part J1.

An improved fabric in line with Section J performance requirements is necessary in order for the new mechanical systems to be able to maintain temperatures. Without this improvement, the mechanical systems would be limited by the code requirements for auxiliary system pumping and fan powers with the result that temperatures could not be controlled to the desired range.

Source: heatray by celmec

Overhead radiant heating or temporary free standing heaters will be considered for occupant amenity during winter conditions in the *Commercial Events/Art Space*

Mechanical equipment is to be selected to exceed the Minimum Energy Performance Standards (MEPS) and the criteria outlined in Section J.

Any new glazing on site will need to meet the BCA Section J requirements.

4.4 Commercial Events/Arts Space

The Commercial Events/Arts Space is to be used intermittently throughout the year for commercial and arts events. The space will be naturally ventilated and subject to internal fluctuations in temperature and humidity in line with the external weather conditions. Should heating be required on particularly cold days, it can either be provided by way of a fixed solution such as a high level radiant system. Alternatively, a temporary solution such as removable free standing heaters could be employed if and when required.

Although not required, the project will, where practically possible, seal the façade in this location to reduce air leakage when such a heating system is operating. It will also act to reduce air infiltration which can drive heating demands.

4.0 ESD REQUIREMENTS—ENERGY

4.6 Initiatives

4.6.1 Natural Ventilation

Natural ventilation is the preferred servicing option, where a high air velocity of fresh air will temper the air in the space. This will serve as a viable solution for all spaces that do not require significant acoustic treatment.

Servicing strategies are discussed in greater detail in section 7.

4.6.2 High Efficiency Systems

High-efficiency systems can be installed to reduce energy in the HVAC system design. The simplest way to reduce the loads is through quality equipment. This is driven in the first instance by construction code requirements, which demand a minimum efficiency.

Efficient systems can reduce the overall operating cost significantly, and see a relatively short payback period on the original investment. The equipment for Walsh Bay Arts Precinct should be selected to exceed the Minimum Energy Performance Standard (MEPS) / Section J minimum requirements.

4.6.3 Onsite Renewables

Onsite renewables are an excellent way to reduce the energy consumption of the site. The location is ideal for taking advantage of natural sources of power such as unblocked sunlight.

The provision of photovoltaics (PV) is currently proposed. As a minimum, the infrastructure to support a future photovoltaic array is included in the design. The PV array will be able to offset the electrical energy consumption of the project and offer capacity for future tenancy system offsets. The maximum available roof space will be allocated to PV. Connection to existing PV array on Wharf 4/5 will be explored.

4.6.4 Harbour Heat Rejection

Harbour heat rejection is an incredibly efficient and spatially minimalist way to allow air conditioning heat rejection. The system rejects heat to (or absorbs heat from) the harbour - almost an energy free system. It is currently recommended for the project.

The operational costs associated with the process are limited to maintenance and pumping costs, making this a viable long term option. This also removes potable water consumption through evaporative cooling and allows the roof line to remain unencumbered by plant equipment.

4.6.5 Solar hot water

Solar hot water heating uses the sun's heat to provide heated water to the site. This is much more energy efficient than traditional boilers. The heated water required on site is minimal enough to make this a viable option. Other variants could include water-source heat pumps, which extract heat from the harbour. Alternatively, PV panels can be used to offset heating hot water demands

4.7 Concept Design Summary

- ► Incorporate natural ventilation design strategies into all non-performance/thermally critical spaces in the development where appropriate
- ► Provide mixed-mode ventilation strategies for offices and other appropriate locations as a preference over full air conditioning
- ► Maintain as much of the existing structure, façade and form as possible to reduce the embodied energy consumption of materials
- ► Window upgrades to meet minimum performance requirements as per BCA Section J
- ► Re-use spill air from auditoria to temper surrounding spaces
- ► Meter large energy uses individually
- ► Target high efficiency mechanical services equipment. In excess of minimum MEPS / Section J
- ► Provide infrastructure as a minimum to support photovoltaics to offset building energy demands and create capacity for future tenancy systems (maximum available roof space)
- ► Use LED light fixtures where possible to extend lamp life and reduce energy costs
- ► Install occupancy sensors and dimmable lighting where appropriate

5.0 ESD REQUIREMENTS—WATER

5.1 Introduction

In Australia, water has long been considered a precious and high-demand resource, essential for all living things. Fresh water supplies are increasingly affected by a range of factors including catchment locations, contaminated sources, drought and rising demand. Australia remains the driest inhabited continent in the world with the third largest per capita water consumption rate. Demand for water is fast outstripping supply in many major cities.

In addition to reducing the demand for water, efficient use of water in buildings can save building owners money in operational costs.

The ESD strategy surrounding water is about the responsible reduction of potable water consumption, and where possible increasing the quality of water in the surrounding harbour.

5.2 Initiatives

5.2.1 Rainwater Tanks

Rainwater tanks that collect fresh run-off from the roofs of the buildings can have significant positive impacts on the total consumption of potable water. The systems do require space to store the run-off. Rainwater is currently collected from the roof of Wharf 4/5 and stored in a tank located under the pier.

A second rainwater tank is to be considered for Pier 2/3, with infrastructure as a minimum to facilitate the later inclusion of a storage tank.

5.2.2 Efficient Fixtures

Low flow fittings and high Water Efficiency Labelling and Standards (WELS) rated fixtures will minimise the potable water demand on the site. This is a simple and inexpensive way to reduce the impact of potable water consumption and can be retrofitted to parts of the development that will remain unchanged.

5.2.3 Harbour Heat Rejection

Harbour heat rejection will save on the use of evaporation in the heat rejection phase. This system will also allow the roof line to be uncompromised by heat rejection systems, unlike the air cooled condenser unit. This system is currently recommended for the project.

5.2.4 Solar Hot Water

Solar hot water heating uses the sun's heat to provide heated water to the site. This is much more efficient (in terms of energy) than traditional boilers. The heated water required on site is minimal enough to make this a viable option.

This will be considered for future retrofit, however does not form part of the water or greater ESD strategy for this stage.

5.2.5 Stormwater Water Runoff

Stormwater runoff from the piers may carry with it a number of pollutants that damage marine life and the Sydney Harbour's water quality. Parking on the piers has already been removed, which will increases the quality of water runoff.

Image: seawater cooling coil installation, Woolloomooloo & heat exchanger

Harbour Heat rejection is an incredibly efficient way of transferring energy, which also consumes no potable water in the heat rejection method.

5.3 Concept Design Summary

- Specify water efficient fixtures to all fittings, including retrofits. This include WELS rated products as follows:
  - 3 L/half flush, 4.5L/ full flush WCs
  - 1 L/flush Urinals
  - 4.5 L/min Taps
  - 7.5 L/min Showers
- Provide Harbour Heat Rejection
- Provision for rainwater tank & infrastructure to pier 2/3 to facilitate later installation of storage tank
- Consider solar heating for domestic hot water as a future retrofit

6.0 ESD REQUIREMENTS—MATERIALS

6.1 Introduction

The production and use of building materials can have serious impacts on the environment. Energy is used to extract, produce and transport building materials; natural resources are exploited to be used in building materials; the industrial production process of the materials causes pollution (e.g. fly ash from cement production); and when the material ends up as waste, it becomes difficult to process.

The environmental impact from building materials is reduced by limiting the quantities of virgin building materials used in projects and choosing those produced in the least harmful way when using virgin building materials.

The heritage façade is to be maintained, as is the form and structure of the building. Where fixes and updates are required, these are to be of the least damaging materials relevant to the function of the precinct.

6.2 Embodied Energy & The Precinct

Embodied Energy (EE) is one of several factors contributing to the environmental impact of building projects. In terms of energy consumption over a reasonable life cycle period (e.g. 50 years), the embodied energy usually represents about 20-30 per cent of energy consumption while the operating energy accounts for the remainder.

EE is the energy required to provide a product, both directly and indirectly through all processes upstream (i.e. traceable backwards from the finished product to consideration of raw materials). It represents the sum of all energy inputs, which may even include those required in the disposal phase.

The WBAP will maintain as much of the existing form and features as possible, which is important for maintaining the heritage listed façade, hence maintaining the embodied energy in-situ.

6.3 Fitout

The focus for integrated and future fitouts should be to reduce the environmental impact of materials through careful selection. Low-impact materials are becoming increasingly common and sought after in the market, allowing a simpler implementation than ever before.

The fitout should target achieving the criteria set out in the Green Star Rating Tools for Indoor Environment Quality and Materials. While no formal rating is being targeted in this project, the criteria outlined provide a framework which will define best practice.

The following list describes the ideal targeted outcomes:

- Procure paints, sealants, fitout items and floor coverings with low levels of Volatile Organic Compounds
- Procure wooden articles that have either low or no formaldehyde
- Flooring and wall coverings selected with no PVC or best practice PVC
- Timber is re-used, recycled or FSC-AU certified where possible

Image: FSC certified timber and Australian made products should be considered

AUSTRALIAN MADE®

Responsibly and locally sourced materials reduced the environmental impact products incorporated into the project.

6.0 ESD REQUIREMENTS—MATERIALS

6.4 Initiatives

6.4.1 No CFC/HCFC or Halons

Not using chlorofluorocarbons (CFC) / hydro-chlorofluorocarbons (HCFC) or Halons in the HVAC system's refrigerants and fire retardant systems is common practice. The ozone depletion potential of these products render their use irresponsible, and in many cases illegal.

This is a base provision that must be met as part of any responsible plan. All refrigerants will have an Ozone Depletion Potential of zero.

6.4.2 Asbestos Removal

As with the above, asbestos use is not permitted in the site. Where asbestos has been found in the site audit, it is to be remediated in line with current Australian Standards.

Any remediation is to be performed by trained, qualified professionals.

6.4.3 Low-VOC Paints, Sealants, etc.

The use of materials with a low level of Volatile Organic Compounds (VOC) should be implemented where possible. VOCs are often considered a health risk to humans in high quantities and their use should be minimised.

Maximum acceptable levels should be defined before procurement and imposed on all products used through the construction and installation of fitouts.

6.4.4 Recycled Materials

Where possible, recycled materials are preferred over new materials. The obvious advantages include increasing the life of the product, and therefore reducing the embodied energy associated with their use.

Elements removed from the existing building will be salvaged and stored for future reuse.

6.4.5 Responsible Timber

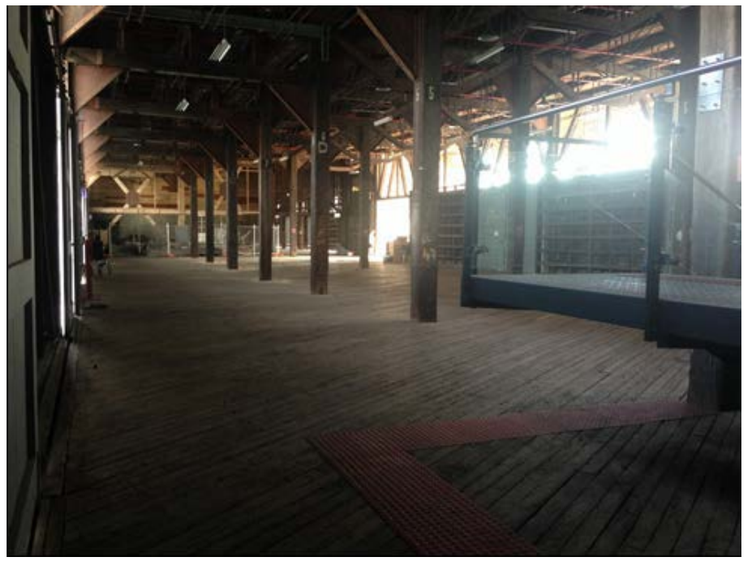
Certified timber, such as Forest Stewardship Council (FSC), source timber from sources that protect waterways, wildlife, forests and communities. Where possible, timber products should come from certified sources or recycled timber should be used.

6.4.5 Locally Sourced

Locally sourced products help both the local economy and reduce the embodied energy associated with transportation. Where possible, locally sourced products should be preferred.

6.4.6 Building Retention

The existing façade is to be maintained. The existing structure and finishes shall be where possible given a 'light touch', reducing the virgin material consumption of the project's



The Commercial Events/Arts Space in its raw state

6.5 Concept Design Summary

- Maintain the form and materials of the existing building. It is recommended that the current leaky façade is fixed where practicable to extend its life and to reduce discomfort issues
- All work is to be carried out in accordance with the Australian Icomos Burra Charter
- A hazardous materials survey has been conducted for the site to ensure any asbestos, lead or polychlorinated biphenyls found will be remediated prior to construction works in accordance with relevant standards
- Specify refrigerants with an ozone-depleting potential of zero
- Carpets, fitout items, paints, adhesives and sealants should be low VOC in accordance with Green Star Design & As Built tool
- Timber to be from recycled source or FSC or PEFC certified with full Chain of Custody where possible. No wood products to contain formaldehyde, in accordance with Green Star Design & As Built tool

7.0 ESD REQUIREMENTS—USER COMFORT & WELLBEING

7.1 Introduction

Daylight provides occupants with a healthier environment that will have direct impact on productivity and wellbeing. A major benefit of providing good daylight quality is a reduction on energy consumption due to a reduction on the operation of artificial lighting systems. Providing a visual connection with the external environment also improves workspace quality for increased productivity levels.

To maximise daylight levels, where glazing is required to be replaced, a minimum Visual Light Transmission (VLT) of 70% is recommended if it can be demonstrated it complies with Section J. Where possible, the lantern design should be optimised to achieve high daylight levels in the spaces directly below.

Recognising that each space type has its own environmental conditions will enable the right ventilation strategy to be implemented to maintain thermal comfort and air quality whilst reducing energy consumption. The Sustainability Framework proposes different spaces within the WBAP adopt an adaptive comfort strategy so that as occupants move from an outdoor space and gradually transition into a indoor and more controlled environment the criteria will change resulting in further reduction of energy use and increase in the use of passive approaches to achieve comfort conditions.

The specific strategies for maximising user comfort and wellbeing are addressed together with the building services report. Each space's method of deriving comfort is a factor of the servicing strategy.

7.2 Space Conditioning Strategy

The following servicing strategies are provided throughout the Walsh Bay Arts Precinct:

7.2.1 Natural Ventilation

The space is not directly controlled and considered an unconditioned space. Where possible, windows openings should be sized to provide ventilation.

7.2.2 Ventilation

An exhaust or supply fan is provided to circulate air. This is unconditioned, e.g. internal bathrooms, kitchens, etc.

7.2.3 Full Air Conditioning

Offices are served by a fan coil unit in the ceiling void, and chilled/heated water recirculated to a plant. Outdoor air is provided by a supply air fan. Auditoria and performance spaces conditioned have a dedicated air handling unit, with its own outdoor air fan and exhaust air.

7.2.4 Mixed Mode

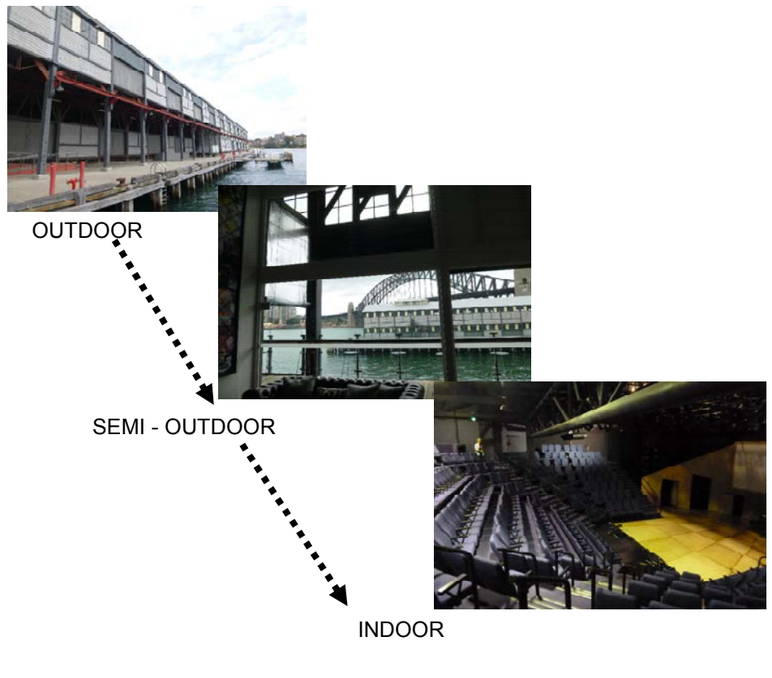
Mixed mode offices have systems for full air conditioning and operable windows where possible to allow the spaces to operate naturally ventilated when the outdoor conditions permit.

7.2.5 Heated

Heated spaces are either by radiant or full air distribution depending on the space.

7.2.6 Cold Shell

A condenser water pipework loop will be provided to serve spaces that may require cooling to be installed in the future by tenants.



7.3 Commercial Events / Arts Space Strategy

The Commercial Events / Arts Space is to be used intermittently throughout the year for commercial and arts events. During winter, it is expected that conditions may become thermally uncomfortable for occupants due to low ambient air temperatures and high air infiltration resulting from the existing façade being unsealed.

Initial assessment of the predicted winter temperatures in this space has been conducted to inform the percentage of hours occupants may feel thermally uncomfortable. Options for radiant heating were compared against existing conditions (no heating) to understand the extent of this benefit.

Full details of this assessment are contained within the Appendices. The table following provides a summary of the results. Operative temperature, Predicted Mean Vote (PMV) and Predicted Percentage Dissatisfied (PPD) are the metrics presented to understand the level of expected comfort within the space.

Note that radiant heating is assumed with varying thermal capacity: 15 W/m2; 45 W/m2; 100 W/m2.

Predicted hours below 16°C and 18°C is shown to give an indication of how well the space could be maintained at these target temperatures, which are considered to offer reasonable comfort to occupants in this type of space during winter.

The operative temperature ranges highlighted in the table should be considered with respect to the intended leasing profiles of the space. If at completion of the project, the Arts Space is not immediately heated, the tenant would expect to feel temperature ranges as shown in Scenario 1 results during winter.

If heating is introduced tenants could expect to feel warmer during winter months in this space which could extend intended leasing profiles.

		Scenario			
		1	2	3	4
		No Heating	15W/m²	45W/m²	100W/m²
Outdoor air temp °C	Min	9.6	9.6	9.6	9.6
	Average	14.9	14.9	14.9	14.9
	Max	22.0	22.0	22.0	22.0
Operative air temp °C	Min	10.5	11.3	12.8	16.3
	Average	14.4	15.5	17.6	19.6
	Max	19.6	20.0	21.7	21.4
PMV	Min	-1.7	-1.6	-1.3	-0.7
	Average	-0.8	-0.7	-0.3	0.0
PPD	Average	22%	17%	10%	5%
	Maximum	60%	53%	41%	16%
Occupied Hours below:	16°C	83%	60%	30%	13%
	18°C	98%	92%	54%	21%

1. Assumes winter heating only
2. Overhead radiant panels assumed - TBC in coordination with mechanical services systems
5 ACH assumed as rate of infiltration

Scenarios 3 and 4 (45 and 100 W/m2 of thermal heating) offer reasonable operative temperature ranges and reduced number of hours below 16°C. Even with only 15W/m2 of thermal heating, the average operative temperature is predicted to be 16°C. However, over half of occupied hours (60%) will fall below a target temperature of 16°C.

It is worth noting that other non-conditioned spaces within the development that are also adjacent to existing façade are expected to be subject to similar temperature profiles. For example, occupants within the central shared foyer of Pier 2/3 should also expect to feel cooler temperatures during winter. The eastern exposure could also lead to increased internal temperatures during peak summer compared to outside. As with the Events / Arts Space, tenants of these types of spaces would need to be aware of expected temperature profiles.

7.3.1 Events / Arts Space Concept Design Summary

- ► It should be a tenant driven decision on whether to introduce heating to the space.
- ► If existing conditions are considered acceptable, then as a minimum the fabric should be sealed to reduce air leakage / infiltration.
- ► Consider a staged approach, where no heating is provided initially and feedback during operation is sought regarding operational comfort
- ► Provision for PV array on the roof would help to offset any future installation of space heating in this location if it is determined that is it is required
- ► The final heating strategy would need to be finalised in coordination with the mechanical system design

7.4 Additional Comfort Initiatives

7.4.1 Maximised Daylight

Maximising the daylight increases occupant wellness as well as reducing the need for artificial lighting. Increase glazing in lanterns if possible within heritage and Section J constraints.

7.4.2 Increased Views

Increased views have the obvious advantages of increased value, and occupant comfort. The extent of this will be limited, considering the heritage status of the façade, however, new windows are proposed in a chequer board pattern.

7.4.3 Local Outdoor Shade Structures

Simple shade structures can reduce the radiant temperature in a space significantly. Shades provide comfort islands to users, increasing the usability of the domain in periods of significant heat.

7.4.4 Individual Space Design

Designing each space individually guarantees the most suitable outcome for each space. It also removes the risk and costs of including unnecessary plant and services equipment

7.4.5 Health (Reduced Legionella Risk)

Use of harbour heat rejection allows the site to have no water-based cooling towers. Cooling towers provide bacteria a chance to grow, increasing the risk of Legionella. Harbour heat rejection significantly reduces this risk compared to traditional water-based heat rejection methods.

7.5 Concepts Review Summary

- Maximise the area of workspace with access to natural daylight and views to the outdoors
- Consider user-operable windows to increase outdoor air
- High Visual Light Transmission (VLT) glazing selection where possible
- Space-specific temperature requirements
- Consider space heating to Commercial Events / Arts Space, or provision for future installation. As a minimum, seal the façade in this area where practical to improve thermal comfort whilst understanding the heritage implications
- Optimise lanterns to maximise daylight levels if possible

8.0 ESD REQUIREMENTS—TRANSPORT

8.1 Introduction

Motor vehicles in general, and the use of private cars in particular, are responsible for many forms of pollution. Global warming is directly affected by motor vehicle use due to the high amounts of energy required to build cars and supporting infrastructure and services, as well as the fuels that in turn lead to greenhouse gas emissions within exhaust fumes. Car exhaust fumes also increase the levels of polluting particles in the air, which are a contributing cause of asthma and other respiratory illnesses.

There is a need to maximise alternative transport options if the use and environmental impact of car commuting is to be reduced. Options available may include trains, buses, light rail and trams, water-based transport such as ferries, as well as pedestrian and cycling opportunities. Of all of these alternatives, walking is the most 'sustainable', with no associated embodied energy or pollutants; cycling is similarly not polluting the environment.

8.2 Initiatives

8.2.1 Public Transport

Taking advantage of Sydney's existing network is a simple and effective way to increase the use of public transport to the space.

8.2.2 Bicycle facilities

Providing safe, secure bicycle parking for all users of the space will encourage sustainable transport options to the space.

These spaces should be provided in a combination of covered, dedicated areas and on grade outside the site. They should serve both tenants and visitors.

Bicycle racks will be provided securely within the site and on grade for ease of all users

8.2.3 Interconnectivity

Connecting services, and connecting the cycle path to the existing foreshore allows tourists and cyclists to include the precinct as part of any tour. It also enhances the users experience of accessing the space.

This will become part of interlinking the precinct to the Sydney Harbour foreshore.

The Green Travel Plan for the site will be used to guide design of sustainable transport initiatives.

8.3 Concept Design Summary

- ► Designated Bicycle Parking for tenants, visitors and the community
- ► Encourage public modes of transportation
- ► Provide a space for information about travel options
- ► Connect cycle ways to Sydney's cycle network where possible

9.0 ESD REQUIREMENTS—OPERATION

9.1 Introduction

The operation plan surrounds simplifying and reducing required maintenance as much as possible. The key concepts surround proper planning at the inception stage to reduce ongoing maintenance required.

9.2 Initiatives

9.2.1 Recycling

Recycling of materials can reduce the embodied energy and extend the product life of many products. This is also a simple measure that can be placed around the site at minimal cost by providing recycling bins.

9.2.2 Knowledge Sharing

Sharing knowledge is a great way to help the local community and guests take responsibility for their actions. Informatics is a way of informing people of the affects of their actions which is a great way to curb poor practice.

9.2.3 Ongoing Maintenance

Ongoing maintenance is an important part of continuing sustainability. Over time, products lose efficiency and performance if they are not maintained.

9.2.4 Waste Management Plan

Implementing a detailed waste management plan is crucial to the success of the sustainable operation. This includes setting targets and striving to meet them. Refer to the Arup Waste Management Plan prepared for the SEARs.

9.2.5 Public Event Waste Management

The principles of the Waste Wise Events Guide issued by the Department of Environment and Conservation NSW can be followed to ensure waste minimisation occurs during public events. Engagement of tenants and event planners using the public space will encourage implementation of the principles given in the guide.

9.2.6 Tracking and Monitoring

Sub metering on major water and energy uses can assist in commissioning, driving efficiency and discovering water leaks. It is also great for trend setting, benchmarking and understanding energy and water use.

9.3 Concept Design Summary

- Develop an ongoing tuning/ commissioning strategy to provide an efficient running building
- Develop the Waste Management Plan for the site
- Identify maintenance and replacement requirements
- Locate recycling bins throughout the precinct with instructions on proper use of what can and cannot be recycled
- Develop an Environmental Management Plan commensurate with the Green Star Rating Tools

10.0 ESD REQUIREMENTS—COMMUNITY ENGAGEMENT

10.1 Introduction

The site achieves engagement with the greater community through its landmark location on Sydney's harbour foreshore and the welcoming layout of the precinct. The strategies for engagement are centred about maximising the usability and amenity of the space.

10.2 Initiatives

10.2.1 Social Spaces

Bars, restaurants, cafés, theatres and public domain are great ways to bring people to the precinct outside of shows. The local community can be encouraged to use the area for social reasons, transforming the precinct into one of the places to be. The development of the Waterfront Square serves as an extension to the WBAP social spaces.

10.2.2 Space Hire

Using the precinct for markets and functions will increase knowledge of the precinct. This can also be a revenue stream out of hours.

10.2.3 Extended Hours

Opening the space up to out of hours use for TAFE style classes, evening dance classes and the like is a great way to extend the usefulness of the buildings.

10.3 Concepts Review Summary

- Space use to encourage the local community, through open gathering spaces, cafes, theatres and the public domain.
- Space hire for markets, festivals, functions and the like to increase the use and knowledge of the precinct.
- Open buildings to the public domain
- Lighting the space at night to provide an encouraging and secure location.

Lighting up areas of the waterfront square increases security at night and makes the space welcoming. Image: Hammer Hall, Melbourne

APPENDIX A - CONCLUSION AND FRAMEWORK MATRIX

The following sustainability framework is designed to influence decisions regarding initiatives discussed in this document.

This document is intended to serve as a reference going forward. It is to be used as a benchmark and will be referred to when making decisions about the WBAP.

Note that some initiatives are subject to further investigation when the project moves into more detailed design. These initiatives are indicated with “Maybe” in the targeted column. The project will seek to investigate the feasibility of these initiatives within the heritage constraints of the project.

If the project was to register for a formal Green Star rating, these principles would form the basis of the strategy for achieving this.

The framework also contains an approach to ongoing tracking of the project progress in relation to the sustainability targets. This includes nominating the specific design response to address the target, identifying the party responsible for enacting this and listing the documentation expected to be provided as evidence of target completion. The framework is designed to ensure that the initiatives are being embedded at each stage of the project. The tracking system will note if the right documentation has been sighted at each phase.

Note that when the project moves into construction phases, the Contractor will become responsible for providing documentation demonstrating compliance with the framework.

The framework should be read as illustrated below.

Walsh Bay Arts Precinct, Sustainability Framework

Date 27.06.16
Revision Draft 1
Phase Concept

Is the project targeting the initiative?

Document tracking

Strategy	Intention	Design Requirements	Design Response	Benefits and Background	Targeting	Owner	Required evidence	PHASE 1 Concept: Received	PHASE 1 Concept: Comments
Energy and Carbon									
Strategy	**Intention**	**Design Requirements**		**Benefits and Background**					
Greenhouse Gas Emissions	Reduce Greenhouse Gas Emissions through passive design approach, vernacular architecture and energy efficiency of buildings in operation	► Optimise building massing and orientation where possible to respond to local climate conditions and optimise opportunity for passive strategies (natural daylighting, natural heating & cooling, natural ventilation) ► Look for opportunities to improve the facade (insulation, sealing etc.) even in non-conditioned spaces ► Energy performance to Meet NCC DTS Compliance for Part J1 & J2	Opaque façade shall be upgraded to meet Section J Part J1 Building Fabric in all spaces where cooling is delivered i.e. insulation to R2.8	Reduce greenhouse gas emissions associated with the energy consumption in operation and associated operational costs	Y	Arch	Architect drawing and / or specification nominating opaque fabric performance requirements	Y	e.g. "Needs amending"
			Any new glazing in spaces where cooling is delivered shall meet Section J Part J2 Glazing i.e. comply with NCC Glazing Calculator.		Y	Arch	Architect drawing and / or specification nominating glazing performance requirements	Y	e.g. "Acceptable"
			Where practically possible, sealing of existing facade shall be improved to minimise air leakage / infiltration. This shall occur to any spaces where heating or cooling is delivered.		Y	Arch	Architect drawing and / or specification nominating where make good sealing shall take place	Y	"Acceptable"

Sustainability category & design initiative

Specific design response

Benefit to implementing initiative

Responsible party & required document

FRAMEWORK

TRACKING

Walsh Bay Arts Precinct, Sustainability Framework

Date 04.11.16
Revision RevB
Phase Concept

Extent TBC e.g. no. of motion sensors TBC
To be consider further in next stage

									PHASE 1 Concept	
Category	Strategy	Intention	Design Requirements	Design Response	Benefits and Background	Targeting	Owner	Required evidence	Received	Comments
	Energy and Carbon									
	Strategy	**Intention**	**Design Requirements**	**Design Response**	**Benefits and Background**					
Energy & Carbon	**Greenhouse Gas Emissions**	Reduce Greenhouse Gas Emissions through passive design approach, vernacular architecture and energy efficiency of buildings in operation	► Optimise building massing and orientation where possible to respond to local climate conditions and optimise opportunity for passive strategies (natural daylighting, natural heating & cooling, natural ventilation) ► Look for opportunities to improve the facade (insulation, sealing etc.) within the constraints of the heritage context ► Energy performance to Meet NCC DTS Compliance for Part J1 & J2	Opaque façade shall be upgraded to meet Section J Part J1 Building Fabric in all spaces where cooling is delivered i.e. insulation to R2.8	Reduce greenhouse gas emissions associated with the energy consumption in operation and associated operational costs	Y	Arch	Architect drawing and / or specification nominating opaque fabric performance requirements	e.g. Y	e.g. "Needs amending"
				Any new glazing in spaces where cooling is delivered shall meet Section J Part J2 Glazing i.e. comply with NCC Glazing Calculator.		Y	Arch	Architect drawing and / or specification nominating glazing performance requirements	e.g. Y	e.g. "Acceptable"
				Where practically possible, within the constraints of the heritage context, sealing of existing facade shall be improved to minimise air leakage / infiltration. This shall occur to any spaces where heating or cooling is delivered.		Y	Arch	Architect drawing and / or specification nominating where make good sealing shall take place	e.g. Y	"Acceptable"
Energy & Carbon	**Efficient HVAC Systems/ Passive Design**	Provide passive systems wherever possible, and simple, decentralised systems where not	►Target Minimum Energy Performance Standards (MEPS) for any installed systems or NCC Section J target for services ►Naturally ventilate spaces where appropriate ►Adopt mixed mode systems with adaptive comfort plus physiological cooling through air movement. ► Use of Harbour Heat Rejection in place of conventional cooling towers/ air cooled condensers	Overall installed systems will exceed Minimum Energy Performance Standards (MEPS) or NCC Section J target for services by 20%	Any installed systems should be simple, cost effective and low maintenance in order that they can be easily maintained using local tradesperson. Best practice surrounds eliminating the requirement for systems where possible. A closed loop harbour heat rejection system has the potential to reducing ongoing energy consumption and minimise acoustic and heritage impacts. It also reduces water consumption associated with cooling towers.	Y	Mech	Mechanical specification nominating minimum performance standards for equipment or energy model of performance		
				Natural ventilation to be adopted in the following spaces: Pier 2/3 - Public foyer (heating only to be provided) - Commercial arts space (heating only to be provided) Central link between piers - Public foyer Opening area to served floor area to be confirmed by ESD. (Initially recommend 5%)		Y	Mech Arch	Mechanical drawing showing absence of ventilation systems.		
								Architect drawings showing operable window location (Confirmation by ESD consultant on appropriate opening capacity)		
				Mixed mode systems to be installed in the following spaces Wharf 4/5 Wharf 4/5 - Studios adjacent to facade - Green Room adjacent to façade - Any office / admin adjacent to facade Pier 2/3 -Green room adjacent to façade - Any office / admin adjacent to facade - Boardroom adjacent to facade - ATYP rehearsal (all rooms except ATYP Performance) - Bell rehearsal (all rooms) - ACO Green room adjacent to facade (ACO rehearsal & auditorium full AC) Central link between piers - Rehearsal space - Any office / admin spaces adjacent to façade Pending acoustics requirements - sealed shutter system or the like for areas with high acoustic performance requirements. To be coordinated. Recommended min. 2% opening area to floor area served to facilitate natural ventilation mode		Y	Mech Arch	Mechanical drawings / specification showing ductwork to mixed mode areas		
								Architect drawings showing operable window location (2% opening area/floor area served demonstrated on Architectural drawings)		
								Acoustic specification nominating acoustic systems to mixed mode areas		

Walsh Bay Arts Precinct, Sustainability Framework

Date 04.11.16
Revision RevB
Phase Concept

Extent TBC e.g. no. of motion sensors TBC
To be consider further in next stage

										PHASE 1 Concept	
Category	Strategy	Intention	Design Requirements	Design Response	Benefits and Background	Targeting	Owner	Required evidence		Received	Comments
				Harbour Heat Rejection to be installed		Y	Mech	Mechanical drawings / specification nominating harbour heat rejection system			
Energy & Carbon	**Peak Energy Demand Reduction**	Reduce peak demand on energy infrastructure	►Reduce peak load by 15-30% through use of passive design, efficient fittings and onsite generation	Peak load to be reduced by 15-30% through use of passive design, efficient fittings and onsite generation via PV array	Reduce peak demand on energy supply infrastructure	Y	Mech Elec	Mechanical specification nominating system performance for e.g. chiller, fans, pumps with energy model to demonstrate using JV3 method			
								Electrical drawing showing PV infrastructure			
Energy & Carbon	**Lighting strategies**	Reduce artificial lighting energy consumption	►Use LED light fixtures where possible to extend lamp life and reduce re-lamping costs and waste. ►Design lighting levels accordingly with the use of the space and daylight availability. Perimeter zones to have dimmable lighting on separate control to internal lighting zones. ► Install occupancy detection for lighting areas in the building. Provide sensors for all individual spaces. ► Reduce max NCC Section J lighting power density by min of 40%	LED light fixtures to be used throughout where possible, as a minimum in back of house, front of house spaces. May be exceptions where not cost effective in specialised spaces such as theatre performance spaces. TBC how external lighting to be managed with respect to public spaces. Final extent TBC with ESD.	These initiatives will encourage lighting systems to be designed in accordance with space use and daylight availability whilst reducing unnecessary energy expenditure and therefore cutting carbon emissions.	Y	Elec Lighting	Electrical drawing / specification showing LEDs are nominated throughout OR Lighting drawing / specification showing LEDs are nominated throughout	NA at this stage	
				Dimmable controls to be installed in the following light locations: - TBC with Ltg / Elec however areas such as foyers and daylit spaces are recommended and back of house / office areas		Y	Elec Lighting	Electrical drawing / specification showing location of dimmable fixtures OR Lighting drawing / specification showing location of dimmable fixtures	NA at this stage		
				Occupancy detection sensors to be installed in areas that are infrequently occupied; - TBC with Ltg / Elec however toilets, store rooms, and temporary use spaces are recommended and back of house / office areas - Time clocks may be more appropriate for external public space lighting		Y	Elec Lighting	Electrical drawing / specification showing location of motion sensors OR Lighting drawing / specification showing location of motion sensors	NA at this stage		
				Reduce max NCC Section J lighting power density by min. of 30-40% in areas such as office, corridors, back of house		Y	Elec Lighting	Electrical drawing / specification showing number and type of fixtures in each space and lighting power for each fixture & calculations demonstrating that the lighting power density on average is reduced by 40% across the project OR Lighting drawing / specification showing number and type of fixtures in each space and lighting power for each fixture & calculations demonstrating that the lighting power density on average is reduced by 40% across the project	NA at this stage	
Energy & Carbon	**Energy Sub-Metering**	Facilitate ongoing management of energy consumption	► Install sub-metering site-wide for substantive energy uses within each building with an effective mechanism for monitoring energy consumption data ►The following energy uses should be metered separately regardless of the size of equipment load: Chillers, Boilers, AHU's, Pumps, lighting as a minimum. ► For each building, provide sub-metering separately for each tenant's lighting and separately for power	Energy sub-metering to be installed to allow for tracking of the following where installed: - chiller - boiler - AHUs - pumps - separate lighting & power	Measuring the energy use by occupants within a building highlights differences in energy use, allowing building managers to fine tune operations to minimise consumption and identify problems at an early stage. It also provides infrastructure that can be used by real-time feedback systems that can be used to display energy consumptions to educate users	Y	Mech Elec	Mechanical drawing / specification showing where energy sub-meters have been nominated	NA at this stage		
								Electrical drawing / specification showing where energy sub-meters have been nominated	NA at this stage		
				A system is to be installed that it is connected to the energy sub-metering network and is capable of monitoring and displaying the building's energy performance on at least a monthly basis. This could be a BMS or the like, depending on appropriateness for scale and type of building.		Y	Mech / BMS / Building Owner	Mechanical, BMS or similar specification nominating the system that has been specified and demonstrating that it is connected to the sub-metering network and is capable of monitoring and displaying the building's performance on at least a monthly basis	NA at this stage		
	Water										
	Strategy	**Intention**	**Design Requirements**		**Benefits and Background**						

Walsh Bay Arts Precinct, Sustainability Framework

Date 04.11.16
Revision RevB
Phase Concept

Extent TBC e.g. no. of motion sensors TBC
To be consider further in next stage

									PHASE 1 Concept	
Category	Strategy	Intention	Design Requirements	Design Response	Benefits and Background	Targeting	Owner	Required evidence	Received	Comments
Water	**Potable Water Efficiency**	To reduce potable water consumption by building occupants	► All sanitary fixtures and fittings to be water efficient: All toilet flush - 5 Star WELS rated All urinals - 5 Star WELS rated All indoor taps to be 5/6 Star WELS rated All showerheads to be 6 Star WELS rated	The following fixtures will be installed to all areas to meet WELS rating requirements: Toilet flush - 3 L/ half flush, 4.5 L/ full flush Urinals - 1 L/flush Indoor taps - 4.5 L/min Showerheads- 7.5 L/min	The aim of these initiatives is to reduce potable water consumption by firstly minimising waste of potable water through efficient fixtures. Capturing rainwater is a potential sustainable initiative for the building and waste water treatment and reuse reduces the consumption of potable water for uses that don't need this level of treatment such as cooling towers and WC flush.	Y	Hyd Arch	Hydraulic drawings / specification nominating the flow rates of all fixtures and fittings	NA at this stage	
								Architectural fixtures / fittings schedule nominating the products that have been specified	NA at this stage	
Water	**Water Metering**	To monitor and manage water consumption	► Install water meters for all major water uses in individual buildings including the following as a minimum (where installed): • Bathrooms • Showers • Evaporative rejection systems • Rainwater supply ► Provide a mechanism for monitoring water consumption data and to alert the facilities management of any changes in water consumption trends such as leaks during the building's operation (through BMS)	Water sub-metering to be installed for the following: - Bathrooms - Showers (where separate from bathrooms) - Evaporative rejection system (if installed) - Rainwater tank (if installed)	Measuring the water use by occupants within a building highlights differences in water use, allowing building managers to fine tune operations to minimise consumption and identify problems at an early stage. It also provides infrastructure that can be used by real-time feedback systems that can be used to display water consumptions to educate users.	Y	Hyd	Hydraulic drawings / specification showing where water sub-meters have been nominated. If rainwater tank installed, drawing and specification showing size and where it is nominated	NA at this stage	
				A system is to be installed that it is connected to the water sub-metering network and is capable of monitoring and displaying the building's water performance on at least a monthly basis. This could be a BMS or the like, depending on appropriateness for scale and type of building.		Y	Mech / BMS / Building Owner	Mechanical, BMS or similar specification nominating the system that has been specified and demonstrating that it is connected to the sub-metering network and is capable of monitoring and displaying the building's performance on at least a monthly basis	NA at this stage	
Water	**Stormwater and Landscape Irrigation**	Improve quality of site stormwater runoff and reduce potable water consumed by landscape irrigation	►Consider passive water quality treatment (e.g. edge swales or the like) installed to treat water runoff from site before it enters the harbour. ►Consider collaboration with other foreshore developments (Barangaroo) which are re-seeding the sea floor ► Any landscaping to be xeriscape (drought tolerant plant species that do not require irrigation to survive)	Explore potential for edge swales or the like (e.g. planting) to treat water runoff from site before it enters the harbour. Subject to any installation of landscape areas.	Water sensitive urban design (WSUD) improves the quality of the local waterways by treating water before it reaches the sea and reducing runoff during rain events to slow the flow into stormwater systems. Vegetation absorbs runoff water, which prevents harmful pollutants from negatively effecting the local aquaculture. Xeriscape gardens are low maintenance and demand minimal water which will contribute to water conservation strategies.	Maybe	Arch L.Arch	Site drawings showing the landscaping that has been incorporated to treat water		
				Landscaping, if present on site, to be xeriscape (drought tolerant plant species that do not require irrigation to survive)		Maybe	Arch L.Arch Hyd	Landscape drawings and planting schedule showing the nominated planting selection around site		
								Hydraulic drawing showing no irrigation is provided		
Water	**Domestic Hot Water**	Reduce carbon and energy associated with the heating of water for domestic uses	► Size solar panel roof area to meet 100% of domestic hot water demand in peak summer. Provide gas boosted heating to supplement demand during winter (if hot water heating demand grea enough to demand gas system).	Provide infrastructure for solar thermal array on roof if hot water heating demand is great enough or offset through use of PV array	Reduce carbon associated with domestic hot water heating	Maybe	Hyd / Elec	Hydraulic drawings / specification showing size and location of the thermal array or PV array		

Walsh Bay Arts Precinct, Sustainability Framework

Date 04.11.16
Revision RevB
Phase Concept

Extent TBC e.g. no. of motion sensors TBC
To be consider further in next stage

									PHASE 1 Concept	
Category	Strategy	Intention	Design Requirements	Design Response	Benefits and Background	Targeting	Owner	Required evidence	Received	Comments
	Sustainable Materials									
	Strategy	**Intention**	**Design Requirements**		**Benefits and Background**					
Sustainable Materials	**Internal materials**	Reduce health impacts associated with material finishes and assemblies across the precinct	► Install low VOC materials finishes. ► For paints, VOC limits shall be in accordance with the Good Environmental Choice Australia (GECA) standard GECA-23-2005. ► For adhesives and sealants, VOC limits shall be in accordance with the limits adopted by the South Coast Air Quality Management District (California, USA) Rule 1168. ► Carpet VOC levels shall be in accordance with the Good Environmental Choice Australia (GECA) standard GECA-50-2010 v2 for Carpets. Other floor coverings shall be in accordance with GECA 25-2010 v2 for Floor Coverings. ► Fitout items VOC levels shall be in accordance with the Good Environmental Choice Australia (GECA) standard GECA-28-2010 v2 for Furniture & Fittings ► All engineered wood products specified in the project meet Green Star Design & As Built v1.1 stipulated formaldehyde limits (particleboard, plywood, Medium Density Fibreboard (MDF), Laminated Veneer Lumber (LVL), High-Pressure Laminate (HPL), Compact Laminate and decorative overlaid wood panels)	For all paints applied as internal finishes, VOC limits shall be in accordance with the Good Environmental Choice Australia (GECA) standard GECA-23-2005.	Adhering to emission limits for VOCs minimises the risk of adverse health effects that can be caused when these substances are released at room temperature from internal materials.	Y	Arch	Architect specification and schedule nominating paint selection demonstrating it meets the correct certification for each paint	NA at this stage	
				For all adhesives and sealants used in the project, VOC limits shall be in accordance with the limits adopted by the South Coast Air Quality Management District (California, USA) Rule 1168.		Y	Arch	Architect specification and schedule nominating the requirements for adhesives and sealants and demonstrating it meets the correct certification	NA at this stage	
				All carpets installed in the project shall have VOC limits in accordance with the Good Environmental Choice Australia (GECA) standard GECA-50-2010 v2 for Carpets. Other floor coverings shall be in accordance with GECA 25-2010 v2 for Floor Coverings.		Y	Arch	Architect specification and schedule nominating carpet selection demonstrating it meets the correct certification	NA at this stage	
				All Fitout items VOC levels shall be in accordance with the Good Environmental Choice Australia (GECA) standard GECA-28-2010 v2 for Furniture & Fittings		Y	Arch	Architect specification and schedule nominating all fitout items demonstrating they meets the correct certification	NA at this stage	
				All specified internal engineered wood products shall be in accordance with the Green Star Design & As Built v1.1 limits for Formaldehyde		Y	Arch	Architect specification and schedule nominating all internal finishes and fitout items demonstrating they meets the correct certification	NA at this stage	
							ESD	ESD Specification clause in tender documentation nominating the requirement for this initiative in its entirety	NA at this stage	
Sustainable Materials	**Resource Efficiency**	Reduce embodied energy and resource depletion associated with the project	► Adopt a site wide strategy for resource efficiency: -Refuse materials that are not needed (dematerialisation) -Reduce materials that are (dual purpose cladding) -Reuse & recycle materials wherever possible (timber, steel, aggregate, flyash) -Rebuy wherever possible (reclaimed furniture)	A site wide strategy for resource efficiency shall be implemented	Following the principles of resource efficiency ensures materials are only installed where necessary. It also encourages the use of reused and recycled material content to reduce the embodied energy of the final material.	Maybe	ESD	Document outlining approach to resource efficiency adopted for the project	NA at this stage	
Sustainable Materials	**Recycled material content**	Prolong the useful life of existing products and materials and encourage the uptake of products with recycled content		Site wide, the project shall target: - 5% by cost of fitout items have at least 20% recycled content or are reused (extent TBC)	Construction waste makes up around 40% of all waste generated within Australia. Reusing products or sourcing recycled materials reduces the amount of waste going to landfill	Maybe	QS Arch	Quantity Surveyor summary table demonstrating that criteria is met	NA at this stage	
								Architect schedule demonstrating the materials that contribute to this criteria have been specified in the project	NA at this stage	
Sustainable Materials	**Local material sourcing**	To reduce embodied energy associated with transportation of materials		20% by cost of all construction materials, including fitout items, shall be sourced from the local area (within 1500Km of site, if feasible). (extent TBC)	Sourcing building materials within close proximity from site limits the carbon associated with transportation, promotes support of local businesses and maximises the chance of being able to readily replace any materials during ongoing maintenance.	Maybe	QS Arch ESD	Quantity Surveyor to provide memo to confirm this is feasible.		
								Architect schedule demonstrating the materials that contribute to this criteria have been specified in the project.	NA at this stage	
								ESD Specification clause in tender documentation nominating the requirement	NA at this stage	

Walsh Bay Arts Precinct, Sustainability Framework

Date 04.11.16
Revision RevB
Phase Concept

Extent TBC e.g. no. of motion sensors TBC
To be consider further in next stage

										PHASE 1 Concept	
Category	Strategy	Intention	Design Requirements	Design Response	Benefits and Background	Targeting	Owner	Required evidence		Received	Comments
Sustainable Materials	**Timber**	To encourage the use of reused timber and timber sourced from forests whose conservation values are not degraded	►95% (by cost) of all timber used is from a reused source or is certified by a scheme accredited by FSC International or PEFC and has a full Chain of Custody (CoC)	95% (by cost) of all timber used shall be from a reused source or is certified by a scheme accredited by FSC International or PEFC and has a full Chain of Custody (CoC) TBC extent of applicability given heritage constraints e.g. around pier replacements	Ensures that biodiversity and existing forests are not compromised by illegal-harvesting practices.	Y	Arch QS ESD	Quantity Surveyor summary table demonstrating that criteria is met		NA at this stage	
								Architect schedule demonstrating the timber that contributes to this criteria have been specified in the project.		NA at this stage	
								ESD Specification clause in tender documentation nominating the requirement		NA at this stage	
Sustainable Materials	**PVC**	Reduce the environmental and health impacts of PVC by encouraging the use of PVC that adheres to Best Practice Guidelines	►90% (by cost) of PVC products & PVC containing products that meet the Best Practice Guidelines for PVC in the Built Environment	90% (by cost) of PVC products & PVC containing products that meet the Best Practice Guidelines for PVC in the Built Environment	Ensuring Best Practice Guidelines are adhered to reduces the environmental and health impacts associated with PVC manufacturing	Y	Arch QS ESD	Quantity Surveyor summary table demonstrating that criteria is met		NA at this stage	
								Architect schedule demonstrating the timber that contributes to this criteria have been specified in the project.		NA at this stage	
								ESD Specification clause in tender documentation nominating the requirement		NA at this stage	
Sustainable Materials	**Zero Ozone Depletion Potential**	To encourage practices that minimise the environmental impacts of refrigeration equipment		All refrigerants will have an ozone-depleting potential of zero	Environmental impacts from refrigerants leaking into the atmosphere can be minimised as far as possible	Y	Mech	Mechanical specification noting that all refrigerants will have ODP of zero		NA at this stage	
Sustainable Materials	**Hazardous Materials Survey**	Reuse previously developed land and remediate contaminated land / buildings	A comprehensive hazardous materials survey is carried out in accordance with the relevant Environmental and Occupational Health and Safety (OH&S) legislation. Hazardous materials are to be stabilized, or removed and disposed of.	A comprehensive hazardous materials survey is to be carried out in accordance with the relevant Environmental and Occupational Health and Safety (OH&S) legislation. Any identified asbestos, lead or PCBs are to be stabilized, or removed and disposed of in accordance with best practice guidelines.	Minimises exposure to and encourages effective remediation of hazardous materials in order that an existing building can be repurposed	Y	Building Owner	Copy of Contract documentation requiring Hazmat Survey is to be completed in accordance with the requirements		NA at this stage	
								Evidence that HazMat survey was conducted and any remediation works completed before construction began		NA at this stage	
	User Comfort & Wellbeing (Indoor)										
	Strategy	**Intention**	**Design Requirements**		**Benefits and Background**						
User Comfort & Wellbeing (Indoor)	**External Views and visual comfort**	To provide occupants with a visual connection to the external environment	►Increased windows and visual light transmittance to encourage visual comfort	Doorways to East, West elevations shall be replaced with glazing. Note - glass selection to encourage natural light but constrained to within heritage and Section J requirements.	A visual connection with the external environment improves workspace quality, increased productivity and occupant satisfaction. Other benefits include an increased rental price for tenancies.	Y	Arch	Architect drawings and specification nominating glazing type			
User Comfort & Wellbeing (Indoor)	**Environmental conditions (wider temperature range)**	To provide a range of spaces with a mix of environmental conditions to maintain thermal comfort with reduced energy consumption	► Define temperature ranges and ways of controlling it appropriate to each space, use and activity e.g. provide a suitable mix of outdoor unshaded, outdoor shaded, semi-indoor and indoor spaces to suit a range of environmental conditions and class formats, with relaxed temperature bands where appropriate: - Outdoor, unshaded - temperature range 10-35 degrees C - Outdoor, shaded, wind baffle (cafe, commercial/arts space) - temperature range 15-30 degrees C - Semi-indoor / outdoor (rehearsal, workshops, etc.) - temperature range 18-28 degrees C - Indoor semi-conditioned (Various offices) - temperature range 19-36 degrees C - Indoor conditioned theatres, boardroom, critical spaces (21-24°C) - Indoor naturally ventilated where possible (corridors, circulation, breakout) - Indoor mixed mode (some offices where required, recording studios)	The spaces are controlled to meet the user needs as follows: - Naturally ventilated spaces - as per outdoor air temperatures. Where heating only provided, heating to >16 deg C. - Mixed mode rehearsal / office spaces - 21-24 degrees C when A/C operating, outdoor air temp in NV mode. - Performance spaces (ATYP, ACO auditorium) - fully AC to 21-24 deg C.	Some dance classes and the like could be taken outdoors whilst more controlled office work can be undertaken in conditioned spaces. Providing a range of spaces increases variety and occupant satisfaction and also allows environmental conditions to be relaxed where appropriate. Acceptable operative temperature ranges for naturally conditioned spaces based on studies undertaken by the American Society of Heating, Refrigerating, and Air-conditioning Engineers (ASHRAE). Such a range indicates the “adaptive comfort” range that most (i.e. either 80 or 90 percent) would find acceptable. By adjusting temperature ranges for buildings according to such methodology, the building can save energy and decrease operational use on the mechanical system.	Y	Mech	Mechanical specification nominating design criteria and controls for each space type.			
User Comfort & Wellbeing (Indoor)	**Daylight (internal)**	To maximise daylight penetration into the floor plate, improving indoor visual quality and reducing tenant lighting energy consumption.	► Target maximising daylight through increased window area, skylights and the like ►Skylights to increase natural light into the space and reduce artificial lighting energy, to target 2.5% daylight factor in affected spaces	Spaces below lanterns shall receive 2.5% daylight factor at floor level	One of the main benefit of providing good daylight quality to a building is a reduction on energy consumption due to a reduction on the operation of artificial lighting systems. Daylight will also provide office occupants with a healthier environment that will have direct impact on productivity and wellbeing.	Y	Arch ESD	Architect drawings and specification nominating glazing type of lanterns		NA at this stage	
								ESD summary table of expected daylight within spaces served by lanterns		NA at this stage	
	Sustainable Transport										
	Strategy	**Intention**	**Design Requirements**		**Benefits and Background**						

Walsh Bay Arts Precinct, Sustainability Framework

Date 04.11.16
Revision RevB
Phase Concept

Extent TBC e.g. no. of motion sensors TBC
To be consider further in next stage

									PHASE 1 Concept	
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Sustainable Transport	**Public Transport**	To encourage responsible and carbon-minimal forms of transport for users to the site	► Systems are interconnected to the Sydney CBD public transport network ► Provide no car parking spaces to encourage other forms of transport	Signs shall be provided indicating connection to Sydney bike routes	Public transport is many times less carbon intensive than individual cars.	Y	Arch	Architect drawings showing signposts to Sydney CBD cycle route	NA at this stage	
				No car parking will be provided		Y	Arch	Architect drawings showing absence of car parking		
Sustainable Transport	**Cyclist Facilities**	To facilitate the use of bicycles by occupants and visitors	► Provide secure bicycle storage for staff and additional spaces for visitors to the precinct in line with Green Travel Plan recommendations ► Provide showers for staff users (target 1 per 10 bicycle parking spots) ► Provide changing facilities adjacent to showers ► Provide one secure locker per bicycle space in the changing facility	Bike parking spaces to be in line with Green Travel Plan recommendations. Adequate showers, change facilities nd locker storage to be provided	Bicycle facilities encourage users to reduce the use of fossil fuel vehicles. Sustainable benefits are not limited to a reduction in fossil fuel consumption and in greenhouse gas emissions. It includes social benefits in a regional scale such as reduction in traffic and road accidents as well as positive impact on wellbeing and health of the population. Sydney is provided with a variety of cyclist lanes and facilities. Providing demand for this infra- structure can potentially encourage public sectors to invest in that area to finalise connections between campus location and the CBD	Y	Arch	Architect drawings showing location of facilities		

Walsh Bay Arts Precinct, Sustainability Framework

Date 04.11.16
Revision RevB
Phase Concept

Extent TBC e.g. no. of motion sensors TBC
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									PHASE 1 Concept	
Category	Strategy	Intention	Design Requirements	Design Response	Benefits and Background	Targeting	Owner	Required evidence	Received	Comments
	Operation									
	Strategy	**Intention**	**Design Requirements**		**Benefits and Background**					
Operation	**Recycling Waste Storage**	To provide facilities that encourage and facilitate the recycling of waste	► A dedicated storage area shall be provided for the separation and collection of recyclables including cardboard, plastics, metals, cooking oil, organic materials (compost). ► Separate recycle bins to be distributed throughout the precinct adjacent to general waste bins with clear instructions on the type of waste that can be recycled. ► Bins and storage areas to be easily accessible to all users and recycling waste handling companies.	A waste storage area shall be provided that is readily accessible for council waste collection. The area shall have a separate, designated space for the separation and collection of recyclables including: - paper & cardboard - glass - plastic - organics - cooking oil (for retail tenancy use) Required area for accommodating separate waste streams TBC by waste consultant.	Reducing Operational waste will reduce pressure to landfills. It will also help on occupant's environmenta education and awareness.	Y	Arch Waste	Architect drawings showing location of facilities. Waste management report to confirm storage sizes		
				Separate bins for recycling and general waste shall be provided in each separate tenancy. Bins shall accommodate these waste streams as a minimum: - landfill - paper & cardboard - glass - plastic - organics - any other specific waste stream as required by tenant		Y	Arch Waste	Architect drawings and schedules showing location / nomination of bins for the precinct	NA at this stage	
Operation	**Construction Waste Management**	Minimise the amount of construction waste going to disposal	► Implement a Waste Management Plan (WMP) for construction works. ►Target 90% of demolition and construction waste to be reused or recycled. Retain waste (quarterly) reports to ensure targets are met ►Ensure the WMP includes a section on erosion and sedimentation to ensure construction works do not pollute surrounding areas	Both Demolition and Main Works Tender to include requirement that the Contractor develops and complies with WMP and retains quarterly reports for demonstrating that the targets are being met.	Construction and demolitions are responsible for numerous impacts – from site disturbance, pollution, waste generation, water and energy use. Minimising these impacts through responsible actions can result in: •Reduced raw material use; •Reduced energy and water consumption; •Improve process efficiency; •Reduced disposal costs; •Reduced waste to landfill	Y	Building Owner ESD	Tender Phase - Copy of tender documentation nominating the requirements the Contractor must meet	NA at this stage	
								ESD Specification clause in tender documentation nominating the requirement	NA at this stage	
				A WMP shall be developed that addresses: -Construction waste management -Outlines how to achieve 60% recycling rate for demolition / construction waste -Addresses erosion / sedimentation of construction works to avoid polluting the surrounds		Y	Building Owner	Construction Phase - Copy of the Waste Management Plan addressing the criteria	NA at this stage	
Operation	**Environmental Management Plan**	Minimise environmental impacts of all sources during construction stage.	► Ensure an Environmental Management Plan (EMP) for the construction works is implemented in accordance with Section 3 of the NSW Environmental Management System guidelines 2009.	Tender to include requirement that the Contractor develops and complies with EMP requirements and issues reports for demonstrating that the EMP is being successfully implemented	Having a standardised method such as the ISO 14001 can help to minimise the environmental impacts of construction in a measured way.	Y	Building Owner ESD	Tender Phase - Copy of tender documentation nominating the requirements the Contractor must meet	NA at this stage	
								ESD Specification clause in tender documentation nominating the requirement	NA at this stage	
				An EMP shall be developed by the Contractor that complies with Section 3 of the NSW Environmental Management System guidelines 2009		Y	Building Owner	Construction Phase - Copy of the Environmental Management Plan and report outlining how the EMP has been addressed during construction including a compliance matrix of how the criteria is fulfilled	NA at this stage	
Operation	**Commissioning and building tuning plan**	Ensure all building services operate to optimal design potential	► Ensure new buildings are fully commissioned within one year of operation.	Tender to include requirement that the Contractor fully commissions the project within one year of operation. A Commissioning Plan should be in place that outlines pre-commissioning and commissioning activities have been performed based on approved standards and guidelines (refer to GBCA Green Star Design & As Built v1.1)	Ensuring an effective commissioning and building tuning plan is in place can ensure installed systems and building fabric operates efficiently and as intended. The plan can eliminate misunderstandings and enable occupants and facility managers to understand the best way to operate the building to reduce operational costs.	Y	Building Owner	Tender Phase - Copy of tender documentation nominating the requirements the Contractor must meet	NA at this stage	
				Tender to include requirement that there is a Building Tuning Commitment in place with the Contractor, including a commitment to perform quarterly adjustments and measurement for the first 12 months after occupation.		Y	Building Owner ESD	Tender Phase - Copy of tender documentation nominating the requirements the Contractor must meet	NA at this stage	

Walsh Bay Arts Precinct, Sustainability Framework

Date 04.11.16
Revision RevB
Phase Concept

Extent TBC e.g. no. of motion sensors TBC
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									PHASE 1 Concept	
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								ESD Specification clause in tender documentation nominating the requirement	NA at this stage	
				Contractor to provide record of commissioning that takes place for all systems within the project within one year of operation.		Y	Building Owner	Post Construction Phase - Contractor to provide extracts from the commissioning report demonstrating that comprehensive commissioning activities have been performed.	NA at this stage	
				Contractor to provide record of building tuning that takes place for all systems within the project within one year of operation.		Y	Building Owner	Post Construction Phase - Contractor to provide extracts from the quarterly building tuning reports demonstrating that comprehensive measurements and adjustments have been performed.	NA at this stage	
Operation	**Efficient equipment selection**	Ensure any new equipment to be installed is energy efficient	►Select energy efficient appliances, fixtures, equipment, whitegoods (if any), etc.	Tenancies shall ensure that installed fridges, freezers, washers, dryers, microwaves are within 1 star of the highest available on the market	Selecting the most energy efficient equipment reduces operational costs and minimises associated carbon emissions.	Y	Arch	Architect specification / schedules nominating performance of appliances where included in base build scope	NA at this stage	
							Building Owner	Contract documentation showing tenants must install appliances within 1 star of the highest available on the market	NA at this stage	
Operation	**Building Services Procurement**	Ensure services are procured based on considering the life cycle cost and environmental impact associated with operation, replacement and maintenance		Select systems based on LCC analysis looking at the NPV (Net Present Value) over a maximum 3 year period. Consideration to include capital, operational, maintenance, churn and replacement over the systems period assessed.	Equipment is procured in a way that considered long term impacts in terms of capital, operational, maintenance, churn and replacement over the systems life time (e.g., Life Cycle Cost Analysis conducted).	Maybe	Mech Elec Hyd	Summary report and calculations demonstrating an LCC has been performed and how the outcome informed the specification of equipment for the project	NA at this stage	
Operation	**Green Orientation and ongoing education**	Encourage transfer of information to new and ongoing users to optimise the sustainable performance of the precinct		Draft a Building Users Guide to inform all new users of the building commitment to sustainability. Guide is to highlights the sustainability aspects of the project and nominates initiatives relevant to the user e.g. bike facilities, recycling bins, mixed mode and/or natural ventilation operation etc. It should include how the Guide will be made accessible to tenants.	Buildings can be designed and constructed in the most sustainable manner but once occupied, even the most sustainable building can perform poorly if the users do not fully understand it should be used. Facilitating an ongoing understanding of how the building should perform empowers occupants to better operate their facilities. It can create behavioural changes by highlighting how individual actions contribute to resource consumption and energy use.	Y	ESD Arch Building Owner	Tender Phase - Draft copy of the Building Users Guide	NA at this stage	
				Contractor / building owner to issue a Final version of the Building Users Guide to inform all new users of the building commitment to sustainability. Guide is to highlights the sustainability aspects of the project and nominates initiatives relevant to the user e.g. bike facilities, recycling bins, mixed mode and/or natural ventilation operation etc. It should include how the Guide will be made accessible to tenants		Y	Contractor Building Owner	Post-Construction Phase - Final copy of Building Users Guide	NA at this stage	
	Social and Community									
	Strategy	**Intention**	**Design Requirements**		**Benefits and Background**					
Social and Community	**Public performance feedback system / Informatics**	Monitor and communicate resources use		Install display screen in public area that shows monthly / annual water & energy consumption	Promotes environmental education and awareness amongst occupants and the broader community.	Maybe	Arch	Architect drawings showing location of display screens	NA at this stage	
							Elec	Electrical drawings infrastructure in place to connect display screens	NA at this stage	
Social and Community	**Out of hours use**	Maximise building use and provide additional facility to local community	►Use buildings for e.g. evening classes, weekend workshops. ►Provide community with access to cafes, studios, facilities and bars at weekends and after hours ►Establish precinct as a main hub for events in Sydney to attract the community into the campus. (Art and music Festivals, moonlight cinema, markets)	The buildings shall accommodate public festivals (Vivid, Writers Festival) during non-typical working hours, in which the facilities & amenities will be operational.	Providing the precinct with out of hours flexibility maximises the use of the new facilities and gives back to the community.	Y	Building Owner	Operational profiles / leasing profiles or the like demonstrating the accessibility of the facilities during out of hours	NA at this stage	
Social and Community	**Community space**	Contribute to community wellbeing		10% of the waterside precinct NLA (space between buildings) shall be dedicated to the community for e.g. public art installation, public events.	Allocating a part of the grounds to a community engages locals with the development and offers something back to locals.	Maybe	Arch Building Owner	Architect drawing showing location and size of community space		

Walsh Bay Arts Precinct, Sustainability Framework

Date 04.11.16
Revision RevB
Phase Concept

Extent TBC e.g. no. of motion sensors TBC
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									PHASE 1 Concept	
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	Benchmarks and targets									
	Strategy	**Intention**	**Design Requirements**		**Benefits and Background**					
Benchmarks and targets	**Sustainability Framework**	Facilitate ongoing management and monitoring of sustainability drivers	►Monitor Energy, Water and Waste use ► Target % reduction established using existing targets	An energy and water target for the precinct shall be developed	Target-setting is a strategic process to establish performance goals for energy, water, and waste. Establishing a baseline and a target performance facilitates ongoing management of the campus to ensure it operates as efficiently as possible, reducing the resource demand of the precinct and community as a whole.	Y	ESD	A summary report of the energy and water targets for the project shall be issued	NA at this stage	
Benchmarks and targets				Quarterly reports by the Facilities Management team during operation shall be issued to determine if the building is operating in line with the targets	Target-setting is a strategic process to establish performance goals for energy, water, and waste. Establishing a baseline and a target performance facilitates ongoing management of the campus to ensure it operates as efficiently as possible, reducing the resource demand of the precinct and community as a whole.	Y	Building Owner FM	Quarterly reports noting the energy and water consumption of the building, how it compares to the targets and remediation actions taken	NA at this stage	