

ESD OPPORTUNITIES

Executive Summary

The public ownership of the site is in the custody of NSW Health and Leichhardt Council is the planning consent authority. Callan Park comprises public land overlooking Iron Cove in Sydney Harbour and is protected by the Callan Park (Special Provisions) Act 2002. It was acquired in the 1870's for the specific purpose of constructing a mental asylum which later became Rozelle Psychiatric Hospital. The hospital closed in April 2008 and at present many buildings on the site are vacant.

The Callan Park site in Rozelle provides potential for an integrated design approach achieving an innovative ecologically sustainable development, providing healthy workplaces and learning experiences while reducing the ecological impact and operating costs of the development.

It is impractical to use available environmental rating tools over the whole site, such as NABERS and Green Star rating schemes, because they are only applicable to educational, health and commercial buildings, not necessarily to open space, community or recreational facilities, so we would recommend setting targets for energy, water and waste reduction compared to the original use of the existing buildings.

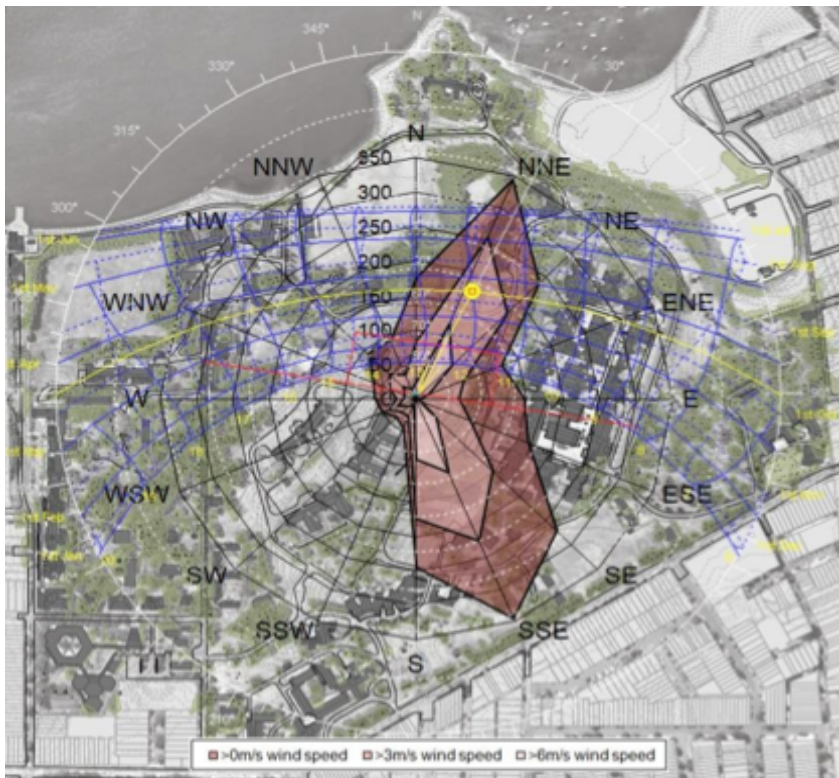
The challenges ahead in terms of sustainable design, will be in agreeing reduction targets for the master plan and establishing appropriate benchmarks, particularly for disused areas. Constraints imposed by the Callan Park Act and heritage conservation may also impede on applying ESD principles to existing buildings and open space. Other risks include maintaining the ESD principles and performance through future development, applying them to existing use (particularly heritage items) and operation by tenants.

The site provides many opportunities to incorporate ESD principles into the design of new buildings, the refurbishment of disused buildings, the operation of existing buildings and throughout the open space areas. Site-wide strategies for establishing and meeting energy, water and waste reduction targets, stormwater reuse and treatment, renewable energy, encouraging alternative transport and increasing ecological land value are complemented with initiatives for the construction and operation of buildings on the site. Buildings and refurbishments are to be designed and operated for energy efficiency, to minimise the negative impacts of materials use, to provide a high level of indoor environment quality and for potable water conservation.

It is expected that energy, water and landfill waste reduction targets would be set for new build, existing and open space areas aiming towards zero carbon and water neutrality at some time in the future if they are not attainable now. It is also anticipated that numerical targets or performance controls be set to maintain indoor environment quality, reduce site emissions and ensure sustainable material selections in line with and exceeding the requirements of the Leichhardt DCP.

Strengths

- Potential for integrated design approach achieving an innovative ecologically sustainable development
- Provide a healthy workplace and learning experience
- Reduce the ecological impact and operating costs of the development
- Because of low percentage of built area there is potential for a self sufficient site in terms of energy and water use
- Opportunities for optimisation of passive design – making the most of daylight availability, solar access and natural ventilation



The predominant winds for Sydney are from the north east in summer with cooler winds coming from the south east. Very hot winds in summer and very cold winds in winter come from the west.

The wind rose diagram (pink) shows the number of hours, when temperatures are suitable for natural ventilation, for each wind direction for different wind speeds.

An annual sunpath diagram (blue) has also been overlaid showing the location of the sun throughout the year. The autumn equinox is shown.

Constraints

- Financial constraints
- Unknown use for buildings on site making it difficult to benchmark
- Applying ESD principles to existing buildings, particularly those with heritage significance
- Existing location and orientation of buildings (or footprints – Callan Park Act) may restrict passive design opportunities
- Large site area with great distance between buildings prohibits centralised systems
- Green Star rating schemes are only applicable to educational, health and commercial buildings, not necessarily to open space, community or recreational facilities. Similarly, NABERS and BASIX only apply to some development types.

Opportunities

The site presents many opportunities, particularly for any new buildings or refurbishments. Some of the initiatives may be retrofitted into existing buildings and others apply to the open spaces areas.

Site - reduce site impacts by:

- Minimising stormwater runoff through retention and reuse for landscape irrigation
- Providing appropriate stormwater treatment in line with water sensitive urban design principles such as gross pollutant traps, sediment traps, permeable paving and sand filters and/or oil and grease traps where necessary
- Minimising negative impacts such as reflected glare
- Encouraging alternative transport through low levels of on-site car parking and provision of bicycle spaces and lockers
- Provide a renewable energy electric shuttle bus for transport around the site
- Establishing energy and water reduction targets compared to the existing use (when occupied)
- Consider renewable energy where appropriate – ie, solar powered external lighting
- Increasing ecological land value and biodiversity by introducing wetlands and mangroves and remediating any contaminated land
- Encourage community gardens for local food production and permaculture education

Energy efficiency initiatives that will reduce greenhouse gas emissions include:

- Natural ventilation or mixed mode ventilation strategies where appropriate
- Energy efficient facade with low thermal load transmission
- For larger buildings energy efficient chillers and air handling units with variable volume control
- Ability to turn off A/C and lighting in functional areas when not in use
- Energy sub-metering and energy end use reporting
- Incorporating new building services systems which are significantly more energy efficient than the existing building services systems
- Building management control system to optimise building performance
- Exposed thermal mass to maximise potential for night flush
- A focus on commissioning of building services and handover
- Education of building use for facilities management and tenants

Materials and resources - minimise negative impacts by:

- Reusing existing structure and facade where possible
- Implementing a construction waste management plan with a target of reusing or recycling 80% of construction and demolition waste by weight
- Sustainably sourced plantation or recycled timber preferred, avoid rainforest and old growth forest timber
- Minimise use of PVC where appropriate
- Removal of known sources of hazardous materials
- Implementing an operational waste management plan
- Specifying zero ozone depletion potential refrigerants and insulants

Indoor environment quality - provide a high level by:

- High levels of daylight and maximised thermal comfort from high performance glazing
- T5 lighting with flicker-free electronic ballasts on automatic timer control
- CO2 sensing to ensure high levels of fresh air
- Low VOC emission paints, sealants and carpets and low formaldehyde composite
- timber products

Water - reduce potable water consumption through:

- Water efficient fittings including 4 star WELS toilets and 5-6 star WELS taps
- Rainwater collection and reuse for toilet flushing
- Water metering and end use consumption reporting

Risks

- Contamination of stormwater runoff from sewer overflow
- Difficulty of establishing benchmarks with no existing and unknown future use
- Establishing targets that are too costly to achieve
- Maintaining the ESD principles and performance through future development, applying them to existing use (particularly heritage items) and operation by tenants

Expectations

We expect that energy, water and landfill waste reduction targets would be set for new build, existing and open space areas. We suggest that zero carbon and water neutrality, if not attainable now, at some time in the future, could be achieved with some site-wide energy infrastructure and water management strategies if this is important to the community.

It is anticipated that numerical targets or performance controls be set to maintain indoor environment quality, reduce site emissions and ensure sustainable material selections in line with and exceeding the requirements of the Leichhardt DCP.

Energy For energy reduction, the immediate target should match best practice at 40% reduction of greenhouse gas emissions compared to the existing traditional use, aiming to achieve a zero carbon site by 2050 through passive design, energy efficiency and renewable energy

Water For potable water reduction, the immediate target should match best practice at 60% reduction of potable water compared to the existing traditional use, aiming to achieve water neutrality by 2050 through water efficiency, rainwater collection and stormwater reuse.

Waste For landfill waste reduction, a construction and demolition recycling target should be set, according to best practice, at 80%. Operational targets of 50% recycling should be targeted throughout, with a view to approach only 10-20% landfill waste by 2050.

Materials Controls should be placed on materials selection, with hazardous materials such as asbestos removed from site, recycled or reused construction materials preferred, PVC alternatives should be used where possible, low emission materials and finishes, all refrigerants and insulants are to be zero ozone depletion potential, use of sustainably sourced timber and no rainforest or old growth timber.

IEQ For new buildings and refurbishments, high levels of indoor environment quality should be achieved through provision of 2% daylight factor to more than 30% of the area, natural or mixed mode ventilation, and low emission materials (see above).

- Emissions Air and water quality on the site should be maintained or improved through minimising on-site car traffic and encouraging pedestrian and bicycle use. A renewable energy electric shuttle bus could provide transport around the site. Stormwater should be treated in line with the Leichhardt DCP.
- Land ecology Areas for local food production and biodiversity should be determined. Community gardens for local food production and education should cover 2% of the site area. 3% should be dedicated to wetlands that can filter stormwater run-off and provide habitats for more species.

Bibliography

Arup (2007), Callan Park Land Use Plan – ESD Notes, 28 November 2007
Building Code of Australia, Section J Energy Efficiency
Callan Park (Special Provisions) Act 2002
Construction and Demolition Recycling Directory
Leichhardt Development Control Plan 2000
Leichhardt Development Control Plan 38 Avoid, Reuse, Recycle
Leichhardt Development Control Plan 42 Contaminated Land Management Leichhardt Local Environmental Plan 2000
Leichhardt Stormwater Drainage Code (draft) 1995
State Environmental Planning Policy 56 – Sydney Harbour Foreshores and Tributaries
Waste Planning Guidebook for Development Applications