

# Principle 7: Materiality

The material selection strategy aims to minimise the broader environmental impact of the development through selection and use of lower impact materials. The key aspects to the materials selection are:

Consider Life Cycle Impacts of material selections and choose materials that are durable and long lasting;

Select materials that are certified, reused, recycled content or have chain of custody agreements; and

Use offsite prefabricated construction where practical.

The buildings will utilise a considered palette of natural materials including sandstone and timber, to compliment the natural landscape, but also create an appropriate "timeless" contemporary expression through the use and assembly of carefully proportioned and expressive forms that embody the natural topography of the existing landscape.

There is the opportunity to explore the use of sustainably farmed, locally sourced timber species. There is also the possible reuse of materials from site such as sandstone or use "cut" material to form rammed earth walls. This will reduce construction waste and embodied environmental impact of the structure. For structural elements, timber will be used where practical. Where concrete is required an efficient design will be used to minimise material usage and consideration will be given to using lower carbon concrete (e.g. through reduced Portland cement) and recycled aggregate and water.

The use of modular construction fabricated off site will be investigated where possible. Modular constructions are fully transportable building components, factory built and delivered. Modular construction can help minimise site disturbance and provide significant savings in cost and embodied energy therefore leading to significant increased operational efficiency.

The selection of material alternatives would need to achieve the desired high standard and commitment to the permanence of the buildings consistent with the long term vision for the site and its intended use and also provide the desired levels required for bushfire impact.

The buildings will be full of fresh air, natural light, and open to views of the natural landscape. The spaces will have a level of comfort and warmth with the use of natural materials.

A holistic well-integrated approach is embraced that will provide a cost effective sustainable low-energy long term asset for the cemetery.









## Principle 8: Sustainability and Ecology

A detailed sustainability framework will be developed for the project. Initiated at project inception the framework would identify and prioritise the appropriate sustainability targets for the development. Its implementation will be facilitated and assessed against by the project's sustainability consultant through each of the key design and delivery stages.

Key Regulatory and Planning Policies

The design response will also reflect the following standards.

BCA Section J – Energy Efficiency

Campbelltown Local Environmental Plan – District 8 (Central Hills Lands).

Campbelltown Development Control Plan 2012

The design response would also seek to stretch beyond these standards in careful response to the site opportunities and sustainability objectives.

A number of sustainability initiatives for the proposed developed have been identified. These include:

Site + Surroundings strategies;

Energy conservation

Water Conservation and management strategies;

Transport strategies.

### Passive design

The proposed passive design approach responds to the local climate, local sun path and wind profile, reducing the building's demand for active building-services systems to provide thermal comfort and lighting and reducing peak energy demand and annual energy consumption. The following passive design opportunities have been considered:

The thermal performance or the building glazing and envelope along with passive solar design features (such as optimised shading – particularly for western facing glazing) will be utilised to reduce the need for cooling and heating and improve thermal comfort;

The site's microclimate provides suitable conditions to support natural ventilation which can provide occupant comfort for significant periods of the year;

Evaporative cooling effects from adjacent water courses can provide additional cooling benefit.

Careful placement of thermal mass to stabilise air temperatures and reduce the need for heating and cooling, particularly during shoulder seasons;

Using thermal mass in conjunction with natural ventilation, night time purging, passive solar design and night cooling, the total air conditioning energy consumption can be significantly reduced.

A relatively narrow footprint coupled with an expanse of glazing will provide excellent levels of natural light. This can be further enhanced through distributed skylights / operable sun portals for increased daylight penetration and potential venting of warm air. This will however need to be balanced with additional heat loads introduced by direct solar penetrations.

#### Low carbon / renewable energy

Renewable technologies use free natural resources, such as the sun and the earth, as a fuel to generate energy. They typically have high capital costs compared to conventional generation technologies but low operational cost. The cost effectiveness of renewable technologies is, therefore, directly related to the effective utilisation of the equipment as well as any associated 'added value" benefits. Such system not only reduce energy use and greenhouse gas emissions, they can also contribute to reducing capacity and sizing of site infrastructure and can also reduce peak load which leads to further cost savings. Technologies potentially suited to the site / buildings include:

A solar air-conditioning system which uses heat generated from the sun's energy to drive a refrigeration cycle.

Geothermal Heat Pump/Air Conditioning System. A heating/cooling system that pumps heat to and from the ground. Ground source heat pumps use the relatively stable temperature of the ground to provide efficient space heating and cooling. They operate by using the stable temperature of the ground, relative to the air temperature, to exchange heat. Ground source heat pumps can effectively serve an in-slab heating system during winter and augment the space cooling in mixed mode and non-critical spaces during warmer months.

PV panels can be integrated into external landscape features such as the sculpture park;

Standalone external LED lighting system utilising wind (3D wind turbines) and/or solar (solar panels). This technology can also reduce electrical cabling and reticulation costs.

#### Water

A water strategy has been developed using hierarchal sustainable design process to first minimise water consumption through design and selection of fixtures, fittings and through using xeriscaping to reduce need or limit the need for irrigation. To minimise use of potable water, measures to harvest and reuse waste water have also been considered. Opportunities for recycling have considered rainwater capture, grey water and Blackwater treatment.

Potable water demand reduction will be met through the use of water efficient fixtures such as toilets, showers and taps.



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Renewable water supplies from rainwater and stormwater harvesting are suited to the site and can be used for nonpotable uses such as toilet flushing and irrigation.

Grey water produced (from showers, wash hand basins etc) for a site of this nature is typically low volume and therefore a treatment system for reuse is not likely to be viable. Particularly with the availability of large catchment areas for rain and stormwater collection. As such a grey water treatment system is not expected to provide a cost effective mechanism of further reducing potable water consumption or waste water generation.

An onsite Blackwater treatment systems should however be considered as potential option to capture and treat all waste water. Water treatment can be completed to a level to that would allow re use for irrigation or discharge to the stormwater system, thereby reducing or eliminate the need for the site to connect and reticulate to the mains sewer system.

### Transport

A sustainable transport strategy will be developed to encourage and promote alternatives to cars at the site.

The park should provide a welcoming destination of walking tracks, footpaths and cycle routes for active modes of transport in and around the site. This would include not only visitors to the site but staff, using and accessign all parts of teh site on a daily basis.

