

TROPICAL SUSTAINABLE DESIGN CASE STUDIES

Bana Yirriji Art and Cultural Centre

Project type: Civic

Location: Wujal Wujal nr Cooktown, QLD, Australia

Year completed: 2012

- Art gallery, workshop and café with a trade training kitchen
- Spatial design evolved in conjunction with the community
- Good shading in the eastern and western areas for comfortable outdoor space that is well-used and integrated

OVERVIEW



Bana Yirriji is situated on the remote Bloomfield River at Wujal Wujal in Far North Queensland. The place has great natural beauty. The client, Wujal Wujal Aboriginal Shire Council (WWASC) commissioned the design of an art gallery, workshop and café with a trade training kitchen desiring productive, creative and inspiring spaces. The aim was to attract tourists, sell art and hospitality services as well as host functions for the community. The spatial design of the building was evolved in conjunction with the WWASC representatives.

The design had to support the economic, training, employment, art and cultural needs of the community, as well as address funding allowance constraints, the remote location, life cycle cost, maintenance and tropical conditions. Vital to the brief was consideration of the health and wellbeing of the builders, building users and the surrounding environment. The 'green' design features also had to deliver a sustainable building for this tropical and remote environment.

Awards: 2014 Building Designers Association for Queensland (BDAQ) Regional winner in the Public Buildings Category.

PLANNING AND MANAGEMENT

The budget was set by Queensland government Q150 funding.

Scheme 1 commenced under a 'design & construct' contract on difficult, elevated land chosen by WWASC. The civil engineering requirements included expensive measures for stormwater management, earth retaining structures and car parking compliance. The site was identified as a landslide hazard and the provision of services to the building site was difficult. Environmental soil erosion controls and management of the site became financially unfeasible. The site was abandoned and the 'design & construct' contract came to a close.

Scheme 2 on a new site in a Deed of Grant in Trust (DOGIT) area had positive cost implications. It was practical and could include existing amenities. It had a beautiful outlook over the Bloomfield River adjacent to the main river crossing, ideal for a local tourist development.

WWASC commissioned the new traditional 'design & tender' procurement contract and essentially the 'Scheme 1' design was modified for the new site in a tight time frame to secure the funding and project.

Drawing documentation was completed and a building contract opportunity was tendered. Cost saving measures were agreed and 'ready to go' if the tenders were not favourable.

The tenderer came in below guidance costs and this enabled additional work to be agreed with regards to water saving measures such as water tanks to service the laundry and cleaners sink, as well as high quality hardware fittings to public areas, additional landscaping and car parking areas.



SITE

The building site was existing cleared land minimizing earthworks and further vegetation clearing.

DESIGN

Orientation choices were limited and passive design principles were followed. There was a river view for the tourists to enjoy from the verandah and additional requirements to integrate and upgrade the existing amenities. The proposed car parking locations are to the north and south of the building. Adopting as much as possible of the Scheme 1 design, the building envelope was massaged to fit within all of these parameters.



A priority was to ensure the appropriate design of the roof for shading in a tropical climate. The eastern and western areas were particularly important as it was essential that the outdoor space was comfortable and provided a well-used and integrated space. A traditional verandah roof was adopted to the eastern verandah being the entrance to the gallery and eating area off the kitchen. A high level roof was pitched from the east and down

towards the west to ensure adequate shading over the outdoor area of the arts and craft workshop. The entire roof is well insulated. There are fans throughout including the outdoor areas. There are 900mm to 1200mm eaves all round.

The building is raised from the ground to allow for under-floor ventilation, keeping occupants away from ground dwelling pests and flood events.

The gallery, offices and kitchen is air-conditioned and appropriate use of insulation and glazing optimises the efficiency of air-conditioning during the hot period of the wet season. The building cools quickly at night and is able to function well without air-conditioning for most of the year.

MATERIALS

Material selection was primarily based on lifecycle cost and maintenance in a remote location.

The main structure is steel frame. The steel is recyclable, light weight, transportable and suitable for this remote location. Colorbond metal sheeting is used for the upper roof walls. It is durable and requires little maintenance. The Dulux range of acrylic paints is easy to wash and included mould inhibitor additives. There are quality protective coatings for the steel posts and frames as Dulux Aquagalv is considered as exceptionally hard wearing and resistant to damage during transport.



Floor surfaces throughout have been selected for their durability and easy maintenance. Bamboo floor boards in the Gallery have a very high Janka rating of 8 representing good resistance to dints and scratches. The floors through the workshop and amenities areas are 'Granito' commercial vitrified tiles and highly resistant to chips although should this occur, the tile has the same colour throughout, camouflaging any damage that may occur. The Granito range comes with a coving allowing for easy cleaning. The 'Tarkett' commercial grade vinyl has a recycled content. It is used in the kitchen as it is hard wearing and easily cleaned.

Material selection also considered health and wellbeing by reducing the use of chemicals and toxins. The paint specified is the Dulux range of low VOC paints that include low VOC tints. The interior paints are EnvirO2 low sheen white base with low VOC tints. The enamels for skirting and frames are the water based 'Aqua enamel' high gloss low odour. Decking timbers are coated with an 'Intergrain' water based low VOC coating. It was also specified that the Dulux EnviroSolutions systems were used by the painting contractor.



Protective coatings on the steel posts and frames is Dulux Aqaugalv, a water born inorganic zinc silicate that is exceptionally hard wearing, resistant to damage during transport and suitable for coastal environments.

Bamboo floor boards are made from renewable fast growing plantations. They are coated and cured at the factory where VOC's

(toxic solvent fumes) are controlled. Once cured and at site VOC's have mostly been released. The bamboo floors are very hard wearing requiring little energy to maintain. Floor tiles are 'Granito' and are long lasting and do not emit toxic gases. The 'Tarkett' commercial vinyl has a recycled content of up to 36% and is recyclable at the end of its life. In all instances, it is specified that adhesives are low toxic, low VOC solutions.

Cabinetry and joinery including toilet partitions are from the Laminex Group 'Green First' range. The medium density fibre board has very low VOC's and is partly made of recycled timber.

ENERGY

The building achieved above minimum requirements for compliance with the Building Codes Section J Energy Efficiency provisions at that time.

The appropriate use of glazing for natural light and ventilation is fit for purpose and shaded. Therefore, the building has limited solar gain through the glazing. The use of high level aluminium louvres allows the building to vent warm air up and towards the high level raking ceilings.

Large door openings maximize cross ventilation, also inviting visitors to enter the workshop and gallery.

Air conditioning is supplied to the kitchen, offices, training rooms, staff dining and retail area. This represents about 50% of the usable floor area. Much of the usable floor area is open verandah essential for tropical living.

The roof sheeting is Colorbond steel in a light Dune colour. The light colour reflects the tropical sun.

Thermal reflective insulation E-Therm is used in the roof and walls. This product also acts as a thermal break for the steel frame.

The hot water supply is a Rheem Commercial Heat Pump with electric booster enabling 80°C water for the commercial kitchen supply.



The commercial kitchen has a number of energy saving areas, mostly concentrating on efficient hot water use through self-turn off hot water tap-ware and an automatic as-needed wall mounted water boiler as well as a water efficient dishwasher.

The refrigeration for the cold room efficiently employs a unit that only operates 18 hours of the day instead of 24 hours and saves energy by replacing cold air quickly. A refrigerated preparation cabinet has hinged lids rather than a door to retain cold air.

Food heating is provided by infra-red heating elements rather than heat lamps and servery displays are double glazed for temperature control and reducing condensation.

WATER AND WASTE

Rain water is harvested and stored in a 6,000 litre water tank plumbed into the laundry. All water fittings including taps and toilets to have a minimum WELS (Water Efficiency Labelling Scheme) 4 star rating. Uridden waterless urinals are specified for the men's toilets. A water efficient dishwasher is specified for the kitchen that has the capacity to wash large pots and bowls.

OWNERS/USERS STATEMENT

"The centre was formally opened in 2012 and has established itself as cultural centre for the town and key attraction for the region. Local artists are commissioned to sell their art and craft. The commercial café and trade training kitchen has provided skills training and earnings opportunities. The centre is a major asset for our community." Gary Ashworth, Project officer.

PROJECT TEAM

Base building architect/ designer: Beachcomber Building Designs

Interior designer: Beachcomber Building Designs

Civil engineer (Site and traffic): Thirkell Consulting Engineers

Structural engineer: Thirkell Consulting Engineers

Project manager: Wujal Wujal Aboriginal Shire Council (WWASC)

Energy efficiency rating consultant: Green at Heart

Other consultants: Churchie's Commercial Kitchen Innovations

Builder: Dawson's Constructions

For more information visit: www.jcu.edu.au/tsd
www.greenbuild.com.au

