TROPICAL SUSTAINABLE DESIGN CASE STUDIES

The Lake House

Project type: Residential

Location: Yungaburra, Atherton Tablelands, QLD, Australia
Year completed: 2010

- **A home using locally sourced, low embodied energy materials**
- **Passive design keeps the house warm in winter and cool in summer naturally**

OVERVIEW

Designing a house for ourselves seemed like it would be an easy task however our design brief ended up being more demanding than the average client. We had a block with water views from the front. We wanted to be slightly elevated to capture the views and be cool during summer. We wanted an open plan design and we did not want any air-conditioning.

Home needed to accommodate our office and a growing family. The office needed to be at the front of the house as I would be spending quite a bit of time in this area and need a nice view to draw inspiration from.

We are entertainers so we wanted the kitchen to be the focal point and a deck to be positioned at the front of the house to capture the view. We have an active lifestyle, including water sports. Hence 3 car accommodation and shed was required, we didn't want 3 car accommodations dominating the streetscape, so rear access was needed. We wanted to showcase to clients how building a sustainable house could be done affordably therefore we were aiming to get a HIA GreenSmart Accredited Design.

As this was also our office we wanted to use a selection of different building materials that we

could show clients as an example. Blending them all together so they complement each other would be difficult. Budget was max of $350k (Building Costs only)

This 7 star house achieved a HIA GreenSmart accreditation and the same year the designer was also a national finalist in the HIA Awards for "GreenSmart Professional of Year"

PLANNING AND MANAGEMENT

The house was planned to be HIA GreenSmart accredited so site orientation, window position and type and material selection all became top priority. The Atherton Tableland's climate whilst located within a tropical, hot and humid region can in fact mimic warm temperate conditions with cold, drizzly winters where frost is not uncommon. This provided an additional challenge in trying to achieve a house that would keep warm in winter naturally and cool in summer naturally.

SITE

The site is located on the Atherton Tablelands in a residential subdivision in Yungaburra. It is a flat irregularly shaped lot and cleared of vegetation. The right hand boundary tapers off at a large 28° and the rear boundary is 8 metres wide. The water views to Lake Tinaroo are from the north of the site.

DESIGN

It became obvious that the design had to be 'V' shaped to suit the difficult site. The main concern was that 'V' shaped buildings typically create difficulties in roof structure often causing budgets to explode. To remain within the budget the roof was simply constructed by dissecting the buildings into 3 smaller buildings each having its own skillion roof. This provides an aesthetically pleasing, contemporary yet extremely efficient solution.

The deck is at the front of the house for the views although it is protected from the predominant South Easterly cold, drizzly Atherton Tableland winters.

The main sustainable features are the efficient design, layout and orientation. The home also has high ceilings throughout to allow hot air to rise away from lower living spaces. Vents have been placed in the bedroom walls to allow a full cross flow of breeze.

The floors, walls and roof spacing have all been heavily insulated and the roof is a light colour to control heat gain and losses. Windows are positioned to allow natural lighting.

MATERIALS

All materials were purchased locally to minimise the impact transportation has on the environment.

The materials have low embodied energy. Concrete has only been used sparingly and where it would be advantageous.

A variety of claddings are specified. Colourbond, matrix board, shadowclad and stone are all sleek contemporary materials, each providing a diverse and textured architectural presence to create a striking result.

ENERGY

The home is designed to reduce demand on energy using passive design principles. No artificial heating or cooling devices have been installed.

Natural daylighting means that artificial lighting is only required at night and all lights in the house are energy efficient fluorescents or LED's.

All appliances have a higher star rating than required.

WATER AND WASTE

A water tank supplies water to the toilet and laundry. The slimline water tank is positioned beside the shed and house and able to catch water from both roof surfaces. All water fixtures have a higher star rating than required both for water usage.

OWNERS/USERS STATEMENT

"We had moved from a spec block home with low ceilings and the difference good design makes to the overall comfort of the home was instantly obvious. We have lived in the home for over three years and always felt comfortable all year round. We never felt the need for air-conditioning and often don't even have the ceiling fans on. The high ceilings ensure the liveable areas are always cool and cleverly positioned windows capture the breeze and fill the home with fresh air as soon as they are opened."

PROJECT TEAM

Base building architect/ designer: EDR Building Designs
Interior designer: EDR Building Designs
Structural engineer: CMG Consulting Engineers
Project manager: EDR Building Designs
Builder: Superior Steel Homes

Photographs courtesy of The Official Photographer

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

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