



**Project Name:** *Innovation House 3*  
*Environmental as Anything*

**Project Address:** "The Cockatoo House"  
Lot 103, 17 Village Way, Kaira Hamlet, The Ecovillage at  
Currumbin, Currumbin Valley Q 4223

**Estate Developer:** Landmatters Currumbin Valley Pty Ltd

**Builder:** Jaymac Constructions

## SUMMARY

### **The Ecovillage at Currumbin Estate**

The Ecovillage, located at the entrance to the Currumbin Valley on Queensland's southern Gold Coast, is established as a residential community comprising 144 eco-homes and community facilities, including a Village Centre. Development of this magnificent 110ha site, located only 7kms to beaches and urban facilities, targets self-sufficiency in water, energy and food production and its innovative design is intended to foster and promote community.

In a true testament to the sustainable initiatives employed at The Ecovillage, the project was recognised as Australia's Best Environmental Development in 2007 by the Urban Development Institute of Australia and Qld's best Small Residential Subdivision and Best Ecologically Sustainable Development in 2006.

### **The Cockatoo House**

The bringing together of this award winning development in my local area and my goal to incorporate environmental building techniques into my company, presented the opportunity to create a display home with a focus on true sustainability.

Working with King Design for a number of years, the timing was right for this collaboration to set a goal for a new benchmark in subtropical design and construction with an environmental theme and inclusion of environmental technology.

The home has recently been named as Gold Coast City Council's Innovation House 3, a prestigious classification focussing on sustainability and smart technology in the domestic sector. The home will be open for public display, fully funded by GCCC for a period of 6 months from July 2007.

## AIM

The **aim** of the project was to build a display home for interested builders, designers and potential home owners to view the latest resource saving practices available. The Cockatoo House achieves education of not only the concepts but also the practices of sustainability.

## PHILOSOPHY

The philosophy for The Cockatoo House is to:

- Create a *genuine* 5 star energy rated home
- Keep the home small with efficient use of space and affordable
- Use as many Australian made and locally produced products as possible
- Nil use of pvc
- Nil use of chemical paints, finishes and toxic glues
- Use recycled materials wherever possible
- Provide disabled compatibility and accessibility
- Nil use of imported timbers

## THE SITE

The particular site, Lot 103 at The Ecovillage at Currumbin, was chosen because of its maximum exposure to public view on the major thoroughfare in the village.



The size of the lot is 759sqm and it is close to all future village and community amenities including Village Centre (café / bakery, convenience store, Recycling Centre) and recreation facilities (pools, childrens playgrounds, meeting rooms, gym etc).

The site, under the Ecovillage town planning approval and ethos, has a designation of 2 bedroom + office.

## THE DESIGN

The home faces north and is elevated to a maximum of 500mm clearance below floor level to allow for good air flow and to keep the building footprint minimal.

Elevation also permits access to under floor areas for inspection purposes.



Removable building skirts have been fitted to assist with even internal air temperatures year round – grounding the building to the earth.

Two separate bedroom wings were created with individual bathrooms. A central unit common space joins these wings and provides the living, kitchen and dining area.

A good sized office with separate entry gives the opportunity for work at home or a third bedroom / guest room.

Ceiling height in the bedroom wings and office areas are at 2.7m to create good air flow. A raised roof in the central unit extends its ceiling to 4.75m with north, south, louvred windows in Sun Energy glass. This retains hot air during winter and allows hot air to escape via the louvres and provides good natural lighting to the living space below.

The laundry is also the utility room, housing the necessary equipment to run the state of the art technology throughout the house (see Smart Technology section herein).

Bathrooms and laundry enjoy good natural lighting due to the installation of skylights. The main bedroom ensuite provides for universal access allowing wheelchair compatibility to toilets, shower and vanity basin.

The garage area is 52sqm incorporating large storage areas to one side and utilises recycled timber battens and louvre doors to allow good air flow not only for the garage but the house generally.

The design incorporates 2 good sized decks that allow external functionality. The northern deck has elevated sandwich polystyrene strategically angled roofs to allow sun penetration to the internal polished concrete slab through for heating in winter and protection in summer. There is also piped gas for bbq or heating purposes.

The southern deck is accessed via a ramp providing disabled entry to the home and access to the home office. It adjoins the kitchen area and sliding windows provide indoor / outdoor access for entertaining.

The Cockatoo House has been deliberately kept small in an encouragement of efficiency of space. In these times of sprawling homes, where, more than likely most space goes wasted and unused, education for the integration of indoor / outdoor usable areas has never been more necessary.

Easier to heat and cool, these efficient spaces allow true living areas, useful and functional and able to facilitate good cross ventilation as well as natural lighting.

From an affordability point of view, this cost-effective approach to building offers economical sense, making a well planned home within the reach of average budgets.

Another feature is that both bed room wings are the same widths, able to be moved back or forward or even added to providing a design that could be suited to any building situation.

## **CONSTRUCTION – FROM THE GROUND UP**

### **Sub Floor**

Galvanised steel posts support the plantation pine laminated bearers and “I” joists. Wet areas are stepped down creating a smooth final surface for wheelchair ease.

To the underside of the floor joists a thermal blanket has been fixed to insulate the floor system. Concrete is typical to the garage floor area, however there is also a 30sqm raised concrete slab to the living area to create thermal mass heating / cooling (as shown in the Winter Sun Diagram).

Inside the insulated slab is hydronic pipework heated by solar / gas.

### **Frame**

The plantation pine frame, roof trusses, roof and ceiling battens are all ‘T2’ safety treated against termites.

### **Roof**

Colourbond Dune as a light coloured roofing has been selected with Woodland Grey guttering and fascia. Use of a light colour assists with deflection of hot Queensland Summer sun causing internal heat issues.

Two solar powered fans above the separate bedroom wings have been installed to extract hot air from the roof cavity while drawing cool air in via the strategically placed eave vents. On top of the high roof area, a solar powered heating and cooling device has been mounted to the north-western face which allows for ducted warm air to be dispersed at floor level throughout the winter months. In the hotter months, the fan is reversed to extract hot air from the high internal ceiling area.

### **Insulation**

Maximum insulation has been achieved with the following:-

- Under floor  
E-Therm R Value: Winter: 2.8  
Summer: 1.2

•	<u>External Walls</u>		
	Enviroseal Breather-type wall wrap	R Value	0.45
	Bradford recycled glass wool batts	R Value	1.5
•	<u>Internal Walls</u>		
	Bradford recycled glass wool batts	R Value	1.7
•	<u>Roof</u>		
	Anti-con 75mm blanket	R Value	1.5
•	<u>Ceiling</u>		
	Bradford recycled glass wool batts	R Value	2.5

### External Cladding

The external wall finishes blend together in a complementary way and utilise the following:

- Boral Hancock ‘Evolution’ renewably resourced plywood
- Hardies ‘Linea’ weatherboard
- Colourbond corrugated iron.

### Internal Finishes

- ‘Gyprock’ to walls and ceilings
- plantation finger jointed pine skirting and architraves
- recycled Black Butt hardwood door frames and Hoop Pine entry doors
- plantation pine Hume doors
- recycled Brush Box timber to common areas
- sustainable Bamboo flooring to bedrooms and home office
- All paint finishes are Rockcote, EcoStyle range of zero VOC (Volatile Organic Compounds) environmentally friendly paints

### Kitchen, Bathrooms and Laundry

The kitchen has recycled granite benchtops and nil emission ‘Craftwood’ doors with water based painted finish. Vanities have recycled Hoop Pine tops and nil emission ‘Craftwood’ doors.

The laundry incorporates recycled granite tops and nil emission ‘Craftwood’ doors.

Kitchen appliances include an upright 800mm gas cook top and gas oven, with an externally ducted range hood. A water efficient dish washer and refrigerator in a large "breathing space".

## Plumbing

Sewer pipe was used throughout the home directly linking to the Ecovillage's central Waste Water Treatment Plant.

Reclaimed water is returned and used for toilet flushing (Caroma 4.5star 'Invisi') This Class A+ standard water is also reticulated to the laundry and external faucets for garden use.

Three 17,000lt Colourbond rainwater tanks supply potable water to the home with a dual filtered outlet to the kitchen sink.

The Eco-Smart 250lt gas-boosted solar hot water system has a connection to the Water Guardian (hot water saver) the Water Guardian unit has the potential to save up to 16000lt of water per annum.

All tapware is the latest triple AAA rated water saving taps mixers and shower heads.

## Electrical

A 1.2kW photovoltaic system has been installed to the house with main grid connection for back up supply.

All light fittings and appliances are genuinely energy efficient creating greater awareness for consumption of energy and strategically placed to create a "night sky" policy so as not to impact on the surrounding neighbours and the rural amenity of the estate.

Each room is provided with ceiling fans, a ducted vacuum system alleviates dust particles throughout the home.

## Smart Technology

The house is fitted with 'Ecovision' resource system which monitors consumption and supply of gas, energy and water.

Ecovision provides the following attributes:-

- resource monitoring
- resource management
- visual display incorporating data
- data reports / graphs
- automated home security system
- voice activated control
- fibre optic infrastructure community online network
- entertainment system with surround sound

The unique wiring system throughout the home accommodates Ecovision, the photovoltaic grid connected energy system and the many other smart features of the home.

### **THE COCKATOO GARDEN**

The site was previously a dairy farm and throughout the course of the civil works, the ethos was to 'tread lightly' on the existing grasses.

Consequently, landscaping has occurred on an untouched site and elements of the landscaping include:-

- planting of bird attracting natives
- planting of fruit bearing productive natives and exotics
- Macadamia nut trees framing the entrance
- Drought resistant hardy wind protected shrubs
- Herbal ground cover framing bushrock and sandstone random paving
- Recycled clay pavers act as a base for the rainwater tanks
- Sustainable Tee-Tree brushwood fencing to north-western side
- Recycled post and wire fencing to cater for passionfruit vines to the southern boundary

### **SITE CONSTRUCTION & WASTE MANAGEMENT**

The construction site was maintained at a high level of presentation at all times in conjunction with the estate developer's sales requirements.

A strict Waste Management Construction Plan was created. No large builders waste bins were used on site. Instead, all plastics, glass and other recyclables were sorted and disposed of in the appropriate manner. All metals were placed in an onsite bin especially for recycling purposes.

The large pullout draw in the kitchen allows for sorting of waste at point of use. This waste can then be distributed into the composting area adjacent to the vegetable garden with the remainder in the recycling bins in the garage storage area.

Silt fencing was erected strategically to control sediment.

## **COSTING**

With the majority of the home's floor plan mostly under roof with good sized external areas and including the Smart technology and sustainable utilities cost of construction equates to around \$ 1500 / sqm - or \$ 390K.

The long term goal of cost efficiency to live in this home is where true benefits will be experienced. Solar generation of power could enable a long term goal of self sufficiency – no more power bills. Complete water self sufficiency (already achieved for the home) offers no water utility infrastructure costs as could be encountered by municipal supply in the very near future.

## **CONCLUSION**

Construction of The Cockatoo House has given the Jaymac team a lot of pleasure both from an education in sustainability and knowledge that we are assisting the environment in this age of climate change. We are sure that this goodwill will be passed on to its eventual owners.

The sourcing of new technology and recycled materials made construction a longer period than that normally encountered for a home of this size, however the pioneering nature of the home meant this was an easy consideration to overcome.