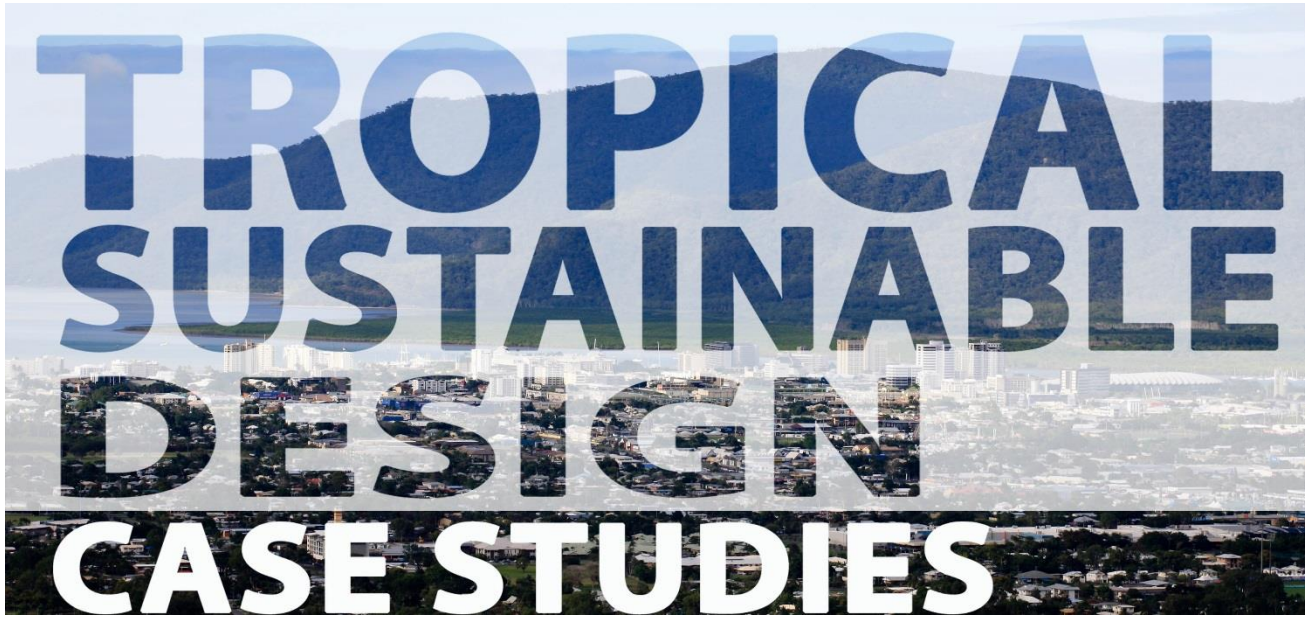


TGBN
TROPICAL GREEN BUILDING NETWORK
An Initiative For Tropical Australia

JAMES COOK UNIVERSITY
AUSTRALIA

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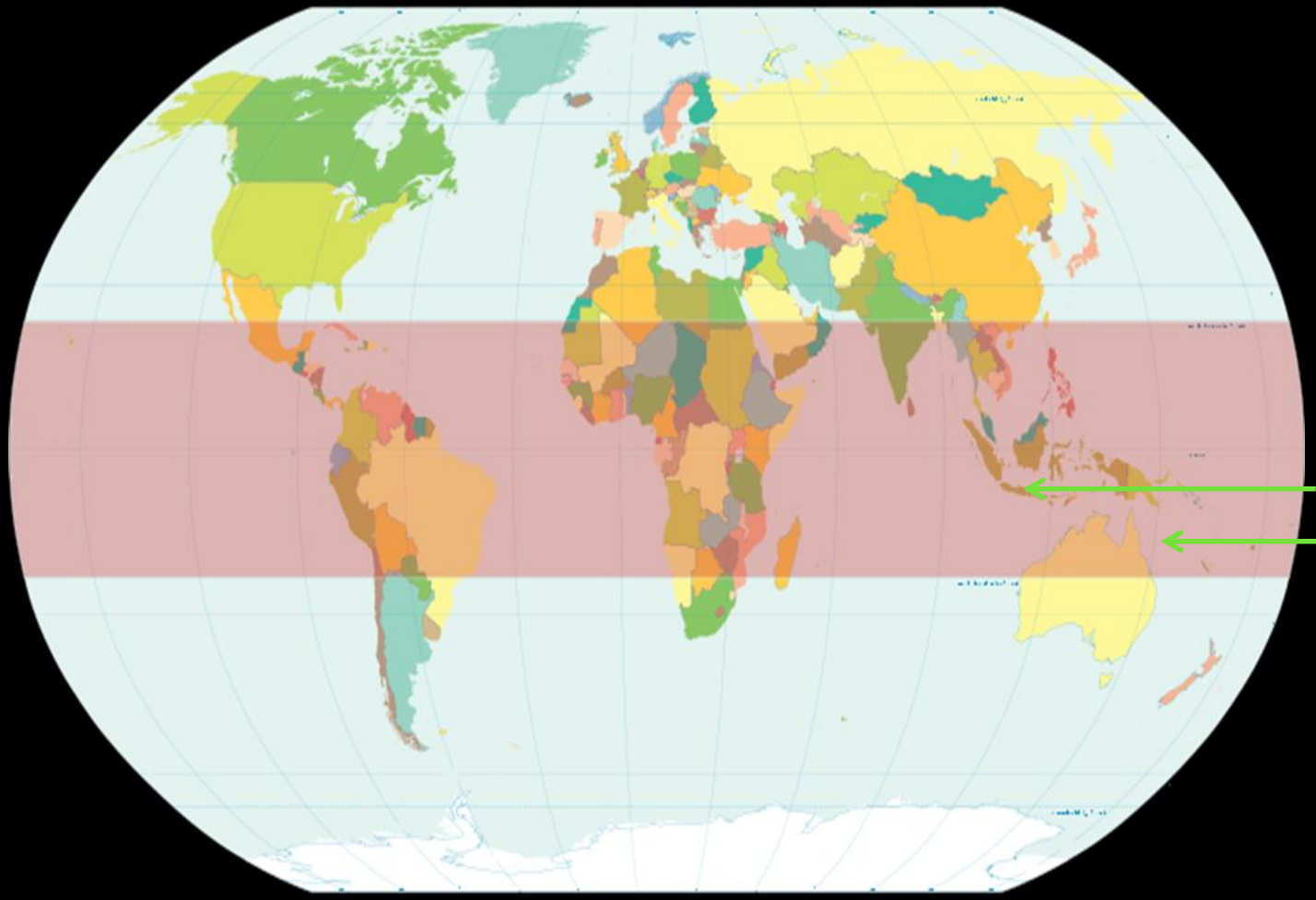
greenbuild.com.au
tropical eco-building & living

*The project has been funded by the JCU Sustainability Fund and supported by the TGBN powered by GreenBuild.com.au.*

# The Tropics



Jakarta, Indonesia

Cairns, Australia


WORLD GREEN BUILDING COUNCIL
Asia Pacific Regional Network
WorldGBC Asia Pacific
Regional Network Meeting
7 to 9 May 2014, Jakarta, Indonesia


TGBN
TROPICAL
GREEN
BUILDING
NETWORK
An Initiative For
Tropical Australia
THIRKELL
CONSULTING
ENGINEERS
TOTO.

The Cairns region has the largest population in tropical Australia. It was founded in 1876, services a hinterland rich in agriculture and mining and has an international sea and airport . It is the gateway to World heritage listed rainforests, the Great Barrier Reef and hosts 2.4 million tourists a year.


**Our Business Directory promotes over 200 businesses and over 400 products and services and is found at:**

greenbuild.com.au
tropical eco-building & living

VISION ARCHITECTS
THE OMEGA GROUP
THIRKELL CONSULTING ENGINEERS
Total Project Group Architects
CA ARCHITECTS
FLANAGAN CONSULTING GROUP
WSP
POD
PEOPLE ORIENTED DESIGN
NRA Environmental Consultants
GHD
PeddleThorp | Far North
SOLARCOOL
Tropical Energy Solutions
CLEAN > RELIABLE > AFFORDABLE
WORKING VISIONS
ARUP
SUSTAINABLE SOLUTIONS
GILBOY HYDRAULIC SOLUTIONS
Kilfoy Cabinets
discover YOUR kitchen
ROCKCOTE
COLOURED RENDERS · PAINTED FINISHES
green INSULATION
Solar-Fish
Sustainable for Life
eco Splash
Living Water
OzPoly
water products
rpmenviro
themissinglink
evolve energy
ENGINEERING + SUSTAINABILITY
Andy's Sheetmetal
Home of
The R.V.
ROOF VENTILATOR
"Cool Your Home"
Naked Energy
go natural
EFFECTIVE ENERGY SOLUTIONS
Innovative Facility Solutions Pty Ltd
ABN: 94 151 72 593
BRYANT
ASTEC PAINTS
JACKSON & JACKSON REFRIGERATION PTY LTD
sustainable cooling solutions
environment & energy systems
Hempcrete Australia
energy saving eco building
chris vandyke designs
KENICK Constructions

**James Cook University Cyclone Testing Station advice has been incorporated in design codes and building standards in Australia and overseas.**
**It has influenced Government policy on storm tide mitigation and contributed to the prevention of catastrophic loss of life and property.**

**Photo: Thirkell Consulting Engineers,**

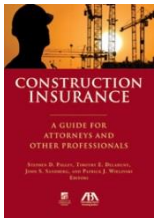
Tropical Australia is not just a beautiful place to live and visit. It is delivering some of the worlds best practice in construction.

qbcc queensland building and construction commission

Member Australian Institute of Architects

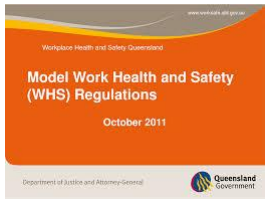
STANDARDS Australia

Certified Product™ Australian Standard

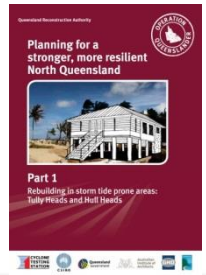

Cyclone Testing Station
*Wind engineering research and testing. Serving the community since 1977.*

FNQROC




ABSA Association of Building Sustainability Assessors

CSIRO




ENGINEERS AUSTRALIA Professional Engineers MEMBER

greenstar

CAIRNS REGION PLANNING SCHEME

Australian Government Department of the Environment


State Planning Policy 3.1 Residential Design Codes

Professional Indemnity Insurance

# DEFINING TROPICAL GREEN BUILDING EXPERTISE:

**Tropical sustainable design expertise plans, designs, specifies and builds to deliver :**

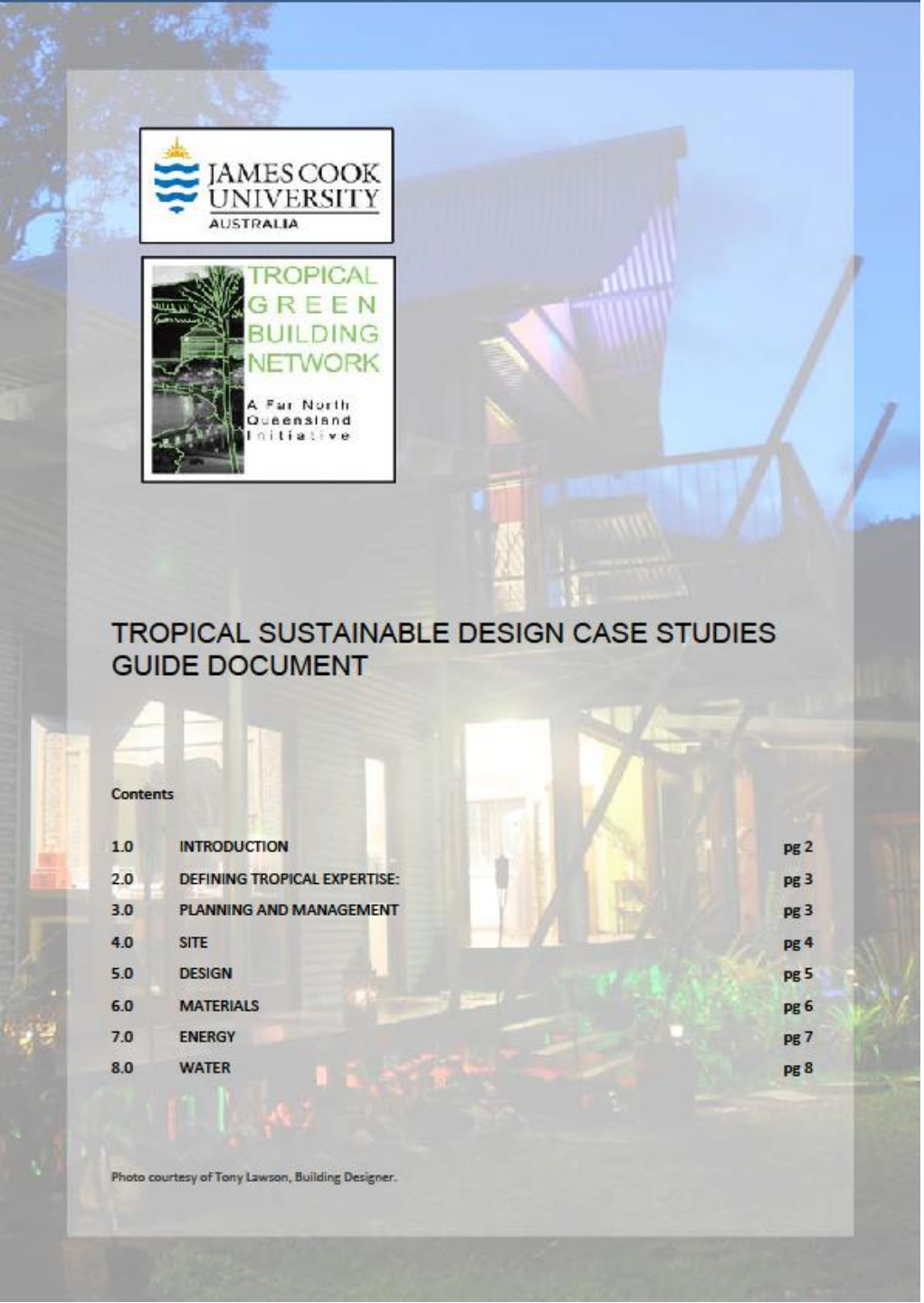
- **The design and construction of sustainable, resilient communities and infrastructure for tropical climates.**
- **The development and application of building materials and technologies for extreme heat, cyclones, humidity and heavy rainfall.**
- **Sustainable environmental practices through the efficient use of renewable natural resources and protection of natural assets.**

MARINA POINT, CAIRNS
CA Architects and
Cox Rayner Architects
Photographs: Christopher Frederick Jones


Source: http://www.studycairns.com.au/

**Designing sustainably for a tropical climate is different**

Our project that is a joint initiative of the Tropical Green Building Network (TGBN) and James Cook University (JCU). It has captured the knowledge around best practice tropical expertise in our built environment through a series of case studies produced by the construction industry for the university.




A Guide document was produced to enable the case study compilation. It outlines six primary focus areas of sustainable tropical design that our working group deemed critical to best practice.

- Planning and management
- Site
- Design
- Materials
- Energy
- Water


## PLANNING AND MANAGEMENT

**In addition to the general considerations tropical climate construction is considering:**

- **Managing construction sequencing.**
- **Procuring materials to manage delays or damage.**
- **Durability of materials, seasoning for humidity & detailing to minimise condensation, moisture traps and mould.**
- **Researching new products.**
- **Sharing successful and poor project outcomes.**
- **Managing the workforce in difficult site conditions.**
- **Tropical health considerations.**
- **Planning for safe and resilient buildings.**
- **Appropriate design response to cultural imperatives.**

**SITE:** In addition to the general considerations, tropical climate construction is considering:

- Minimising site disturbance and controlling volume and quality of wet season stormwater run-off to minimise erosion and sediment/nutrient loss to waterways.
- Micro-climates relating to coastal, rainforest, highland and savannah locations.
- Maximise resilience and to minimise isolation, disruption and loss of property during floods, storm surges and cyclones.

The Cairns Convention Centre was Australia's first environmentally planned public building.

**DESIGN** In addition to the general considerations, tropical climate construction is considering:

- Passive design minimising solar heat gain, maximising natural ventilation
- Light colours to reflect heat.
- Comfortable outdoor spaces for all building types.
- Reducing mould, condensation, pests and insects.
- Doors and windows that maximises cross ventilation, protects from rainfall, good seal when closed, has glass that minimises conduction and radiant heat transfer and is designed and installed for cyclonic wind speeds.
- Land subdivision design to support the correct orientation of buildings to allow for optimal passive design
- Building envelope design supporting resilience, adaptability, safety and security

Photo: Cyclone Yasi approaches the Cairns coastline in 2011

## MATERIALS

**In addition to the general considerations tropical climate construction is considering:**

- **Moisture absorption.**
- **Minimising corrosion, deterioration & maintenance.**
- **Appropriate use of insulation**
- **Cladding and glass that is impact resistant.**
- **Careful use of rubbers, adhesives, sealants, silicones, resins and binders, as these products may deteriorate faster.**
- **Avoiding VOC's, as high humidity and heat may accelerate its release.**
- **Technologies for condensation & mould control, heat & UV light resistance.**

Barron Gorge Hydroelectric Power Station produces 66 MW of clean green energy powering 660,000 light bulbs.  A refurbishment project was completed in 2011.

## ENERGY

In addition to the general considerations tropical climate construction is considering:

- Passive Design to minimise the need for mechanical cooling.
- Careful design of efficient mechanical ventilation, dehumidification and air-conditioning.
- Ceiling fans to increase evaporative cooling.
- Taking advantage of tropical latitudes with PV energy
- Innovative use of technologies such as  hydroelectricity , wind turbines & chiller plants

Photo: TAFE BLOCK J HEALTH and SUSTAINABLITY PRECINCT
Total Project Group Architects

## WATER

**In addition to the general considerations, tropical climate construction is considering:**

- **Water supply and management for up to 1:8 dry/wet season volumes .**
- **Rain water harvesting technology.**
- **Condensation collection and re-use.**
- **Gross pollutant traps.**
- **Vacuum sewerage systems.**
- **Reticulated recycled water systems.**
- **Bio-mimicry and retention ponds.**
- **Management of tropical pests and water borne disease.**
- **Innovative use of water related technologies or applications suited to tropical climates i.e. hydro electricity, chiller plants & geo-thermal uses .**

Total Project Group Architects &
Arkhefield Architects in Association
CAIRNS CRUISE TERMINAL

Photographer : Scott Burrows

**We are attuned to appropriate environmental design and deliver world-class expertise in the development and use of materials that will deliver energy efficiencies and withstand the force of extreme weather events.**

**We support buildings that may ‘stand-alone’ lessening their dependence on non-renewable resources and state developed infrastructure.**

**Our capacity to design and engineer green buildings is supported by experience in applying new technology that suits tropical climates.**


2


Bana Yirriji
Art & Cultural Centre
Wajal Wajal
5 Kilometers


VISA


GAB TITUI
Torres Strait
Cultural Cen
GAB TITUI
Torres Strait
Cultural Centre
NO
ENTRY


MALANDA FALLS
VISITOR CENTRE


CAIRNS CRUISE LINER TERMINAL


PARAMOUNT
HIRE


CAIRNS CONVENTION


CONICS
Tattoos
CORAL & GEMSTONE GALLERY
RED CORAL - GEMSTONES - AMBER - BEADS
OPALS - PEARLS - DIAMONDS - ACCESSORIES
IMPORTERS, EXPORTERS & MANUFACTURERS
OPEN TILL LATE
PH: 40 414499
CONICS
FASTEST INTERNET
CAIRNS FASTEST INTERNET


CAIRNS CAMPUS
TAFE
TAFE Queensland


TOMORROWS FUTURE TODAY
LAB 1
LAB 2


HITACHI
EX300


BEASLEY


GATEWAY CONSTRUCTIONS
placid pools
PLACID POOLS PTY LTD


25 CHARLES

MARINA POINT, CAIRNS
CA Architects and
Cox Rayner Architects
Photographs:
Christopher Frederick Jones

**There are multiple challenges associated with sustainable buildings and infrastructure in tropical environments as compared to other climatic environments.**

**Cairns is one of the few developed tropical regions in the world and is sharing its expertise.**