



## Josh's House – Star Performers Pilbara Vernacular House

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Living Key: enhancing prosperity and quality of living



# property certificate

project Pilbara Vernacular House  
client Star Performers Project  
address Karratha, Western Australia  
date 27 November 2014



## About this Report:

This report has been provided at the request of and is solely for the client Josh Byrne & Associates as supporting information for the Josh's House Star Performers Project.

It is an independent assessment based entirely on published information, including site and house plans, brochures and fact-sheets as well as information provided by the client. Living Key did not visit the property as part of undertaking this assessment.

The Living Key categories assessed are relevant to property and building performance only. It does not include an assessment of the broader locational categories of Community, Transport and Nature.



### summary result



49.8%

This property resulted from a design competition to demonstrate a Pilbara vernacular for residential housing and the Karratha lifestyle, and as a demonstration of excellence in climate responsive energy efficient housing suitable for the hot semi-arid Karratha climate with warm to very hot temperatures year round, and which is affordable in the Pilbara context.

Given the harsh local climatic conditions, this dwelling is a very good example of, and model for sustainable living in this isolated regional context.

Best practice in climate responsive and environmental sustainable design has been achieved, and as discussed below, a 5 Star ABODE rating for Energy is a good result for housing that requires the use of mechanical air-conditioning to maintain occupant thermal comfort throughout many months of the year.

For Liveability the property achieves an 8 star rating through a combination of excellence in climate responsive design and a healthy indoor environment quality as well as some beneficial accessible design features.

A waterwise garden and irrigation system, efficient fixtures, installed appliances and lighting, and the reuse of overflow water from the air-conditioning units support a 4 star rating for water.

The 5 star rating for Resources is achieved through the inherent flexible and adaptable design features, lightweight materials used in the wall and roof construction, and use of low-carbon materials for landscaping result in a property with a lower than average embodied energy and a potential for a longer design-life.

### detailed results by category



41%

This property achieves a 5 star result – however we believe some points of clarification are necessary to provide useful context for this property.

<sup>1</sup>Karratha, although coastal, is situated in a hot, semi-arid desert-like climate zone, as well as being in a cyclone prone area with the highest 'Category D' cyclone rating. While approx. 6 months of the year are suitable for comfortable outdoor living, the hot summer months have temperatures generally exceeding 35°C and often above 40°C. These high average temperatures necessitate the use of mechanical cooling to maintain reasonable thermal comfort of occupants. It is also very difficult and expensive in this harsh climate to achieve a high thermal performance in the base building.

In this context a 5 star rating is considered a very good result for a dwelling that requires significant amount of mechanical air-conditioning throughout many months of the year.

The base building has achieved a high 8.1 star NatHERS thermal performance rating – an excellent result for the Karratha climate, and has achieved an excellent outcome in climate responsive design. The key features which

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contribute to this rating include:

- 8.1 Star NatHERS thermal performance rating.
- Excellent climate responsive design incorporating specific design features to account for the very hot summer temperatures, including:
  - o orientation of main daytime living areas to the south to optimize outdoor living during the cooler 'winter' months,
  - o wide eaves, parasol roof and significant shading to mitigate heat impacts,
  - o high levels of insulation in the roof, above the ceiling and in all walls
  - o low-mass wall cladding and roofing
  - o excellent zoning and sealing to stabilize internal temperatures
  - o excellent air-movement and ventilation via natural breeze-ways, openings, and innovation walls ventilation
  - o ceiling fans, roof and eave vents for heat purging, room zoning, appropriate use of lightweight materials for wall and roof.
- Ceiling fans installed throughout the home, including all indoor and outdoor living areas and bedrooms.
- Large 5kW renewable energy generation.
- Solar water heating
- Efficient fixtures and fixed appliances, including dishwasher and ceiling fans.
- LED and compact fluorescent lighting throughout, and ultra-sonic motion sensors to outdoor lighting and walk-in-robe.

The choice of efficient reverse cycle individual inverter split system air-conditioning systems, although large energy consumers, is aimed at maximizing efficiency.

While we applaud this result, we would add one technology that if included would support improved energy efficiency, is very cheap to install, and also provides a security benefit:

- Install occupancy 'motion' sensors to outdoor spaces, including carport, front porch and gardens, and internally to store rooms, pantries and robes.

(<sup>1</sup> [http://www.bom.gov.au/climate/averages/tables/cw\\_004083.shtml](http://www.bom.gov.au/climate/averages/tables/cw_004083.shtml))

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38%

The property achieves a 4 star rating for Water, largely due to the waterwise landscaping and irrigation. There are a number of water saving inclusions that contribute to this rating:

- Waterwise landscaping – use of local native and imported waterwise plants
- Low-flow controlled drip irrigation
- Re-use of overflow water from the 5 air-conditioning units to supplement garden irrigation

There are a number of water saving features which if included would reduce potable water consumption and improve the overall water efficiency and therefore the overall rating. Typical inclusion to reduce water consumption include:

- Re-use of greywater from showers and laundry to offset water for garden irrigation, and to irrigate productive gardens if installed (refer Liveability)
- Cold-water diverters in showers and kitchen
- 5 star rated toilets with integrated hand washing.
- Hi-efficiency WELS 6 star rated tapware

With regard to rainwater harvesting and reuse, this is generally not favoured in Karratha due to two main factors: being located in a high cyclone-prone region, guttering is not installed on roofs, thereby negating the opportunity to collect rainwater. Also the Pilbara coast has a low and highly variable annual rainfall due to the intervals between cyclones or cyclone related rainfalls events which cross the area in the summer months between December and April and provide most of the total rainfall. The Pilbara Vernacular Handbook which states: “Water storage tanks are helpful but limited in their usefulness because of the short spells of rainfall in the Pilbara.”

[\(http://www.landcorp.com.au/Residential/Pilbara-Vernacular/\)](http://www.landcorp.com.au/Residential/Pilbara-Vernacular/)



75%

For Liveability this property has achieved a commendable 8 star result in key areas including excellence in climate responsive design and indoor environment quality providing occupants with a thermally comfortable and healthy home throughout much of the year, and some universal access features for people with disability and limited mobility.

The key features which contribute to this rating include:

- Excellence in climate responsive design features: the home will be thermally very comfortable for all cooler month of the year with lots of natural light; ventilation, indoor-outdoor flow-through, and ceiling fans provide air movement.
- Good access via main entry access and good movement and access around the

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dwelling.

- Healthy indoor environment quality: low dust collecting surfaces and low0-allergen finishes.
- Naturally ventilated bathroom(s) and laundry.
- There are a number of Liveability features which if included would improve the overall rating. These include:
- Wider doorways (>820mm openings) to improve mobility for universal accessibility
- Hobless showers and semi-recessed basins to improve accessibility.
- Food productive gardens – install some raised vegetable/herb beds, some fruit trees and dedicated composting or worm-farming to reuse kitchen scraps.

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The 5 star rating is a reasonable result for a near new dwelling constructed as a detached single residential property in a new development area. The dwelling has a number of features which support an increased design-life and reduce the overall embodied energy and carbon intensity of materials and construction:

- The home has excellent in optimizing an adaptable, flexible and open-plan internal-external layout, thereby allow the dwelling to be used by multiple demographic types – families, couples, singles - and addressing varied occupant needs.
- The home has some beneficial accessibility features for occupants with disability and limited mobility.
- The outdoor areas and landscaping have large areas of low embodied energy materials, including gravel and mulched garden beds
- Recycled Plastic / Timber Composite screening elements and timber decking



48%

Living Key Star Ratings and Percentage Scores:

1 Star = 0-10%; 2 Stars = 10.01-20%; 3 Stars = 20.01-30%; 4 Stars = 30.01-40%; 5 Stars = 40.01-50%;

6 Stars = 50.01-60%; 7 Stars = 60.01-70%; 8 Stars = 70.01-80%; 9 Stars = 80.01-90%; 10 Stars = 90.01-100%

### About Living Key

Living Key is a suite of rating tools, services and resources for industry and consumers to assess and certify the liveability and sustainability of properties. Its core objective is to address the market need for an easy to understand 'rating assessment' of the key liveability and sustainability features and attributes of new or existing properties.

### Living Key Categories and Descriptions



**ENERGY**

Design features and fixtures of the property that optimise good design and conserve and produce energy



**WATER**

Design features of the garden, and fixtures and appliances that conserve and re-use water



**MATERIALS**

Well located and long life buildings with low energy content and are from sustainable sources



**LIVEABILITY**

Design features, materials and finishes, and location, which enhance human and environmental health



**NATURE**

Type, amount and diversity of vegetation on the lot, on street verges and in open space, and proximity to bushland



**MOVEMENT**

Proximity of the property to public transport, walking and cycling paths, and bicycle storage



**COMMUNITY**

Proximity of the property to local amenities and services such as shops, schools, day care, community centers and parks



Summary average of ALL assessment categories to indicate the average benefits and potential of the property

### The Disclaimers:

This report is valid for 12 months from the date of issue. Whilst this report has been formulated from sources we deem to be reliable and is tendered in good faith, no warranty, expressed or implied is made by Living Key as to the accuracy or completeness and it does not accept any responsibility for matters arising there from.

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Note: This report was originally issued under the name of ARCAActive, which has since been superseded by Living Key.