

Queensland and Northern Territory Steel Excellence Awards: Buildings (Small Projects) Category



Bellbird Retreat

Designed as a weekend get-away, the 67m² Bellbird Retreat property is set in the saddle of a ridge in the middle of a 315 acre bushland reserve.

According to the judges, the project displayed, “An elegant solution using pressed plate to form a cladding and structural roof in one, giving rise to cantilevers for adequate light control!”

Overall Design Merit

The stunning natural environment prompted a focus on creating a dialogue between human-made and natural elements. To ensure this, the building reserves the majority of the mountain saddle for recreational use.

The design used broad eaves to protect the home from the hard summer sun, while also protecting the property from bushfires. The area is extremely susceptible to fire, and the broad eaves and solid steel roof repel any fire embers.

The roof is custom designed and fabricated from weathering steel (HW350 3mm). The corrugation on the roof allowed for the use of a single span with unsupported cantilevered eaves. This provided further fire protection by eliminating the need for traditional combustible timber rafters, without sacrificing on aesthetic sensibilities.

From the south-west, the façade gives the appearance of a fortress, thanks to the three pivoting brick blades which are topped by the roof. The roof features oxidised colouring, so it blends and harmonises with the orange and red bark of the surrounding gum trees. The entry and bedroom are protected by the austere blade walls, while the visual mass of the wall grounds the dwelling to the site, while also providing protection from the elements.

The twisting plane of the roof mirrors the topographical features of the site, with a rise to the east and the mountaintop, a dip on the west to provide shelter to the bedroom as well as glass facades that are designed to look like the ‘brim of a hat.’

The cantilevered eaves facing the north had to be precisely designed to offer protection while also optimising solar gain.

Construction and Design Innovation

The entire roof was fabricated onsite and delivered in V-shaped segments. The segments were then positioned on stainless steel pins, and nestled onto a capping component strapped to the core filled block wall and along the northern PFC.

All overlapping segments were finished with plug welds, which allowed for joints and ensured the roof looked and acted as a solid structural element. Custom gutter profiles transfer the load of the cantilevered end situations, while also tying the ends of the valleys together.

A real achievement is the precise role of the steel in the composition, where it acts as both a fire protection mechanism and an economical and aesthetically-pleasing design element.

The interior is marked by simplicity, with a PFC supported by steel SHS posts running around the northern façade to create a datum. The PFC supports solid rod pins above, that in turn support the valleys of the roof.

Upon entering the dwelling, the building opens up, thanks to the steel-framed full height glass wall towards the north, with hills and valleys rising and falling in a layered view. Cantilevered steel corner windows can be peeled back to allow for the full scope of the stunning natural view.

Sustainability

The cantilevering roof eaves draw the winter sun into the interior, which heats the concrete slab and keeps the interior space warm and enjoyable all through the winter. During summer, the cool of the slab is transferred through the dwelling via the breeze created by the open spaces the design affords. Both of these features utilise natural climatic conditions to minimise the need for human-made forms of climate control.

Photovoltaic energy systems also generate both power supply and reserves, while gas provides cooking and hot water. A self-composting toilet and domestic supply rainwater tanks contribute to the overall sustainability of the property.

PROJECT TEAM

- **Architect:** Steendyk
- **Structural Engineer:** Westera Partners
- **Head Building Contractor:** EA & PJ Bell
- **Steel Fabricator:** Rockpress
- **Steel Detailer:** Steendyk
- **Metal Building Contractor:** Nigel Shepherd