

DJEEMBANA

Monash University Solar Decathlon Team



Project Data

Division	Multi-family building
Location	2123-2135 Point Nepean Road, Rye, VIC, Australia
Climate zone	6 (3C ASHRAE equivalent)
Lot size	1922 m ² (20688 sqft)
Building size	886.46 m ² (9541.78 sqft)
Occupancy	30 (2 residents per dwelling)
Build cost	USD\$6.48 million
Target EUI	45 kBtu/ft ² /yr

Technical Specifications

External wall	200mm (R-1.66)
Internal wall	150mm (R-1.25)
Foundation	Pad & pile footing
Windows	U - 0.2 Btu/h-ft ² -F
PV system size	100 kW

Project Description:

Our aim is to design a sustainable independent assisted living facility that feels much less like an institution, both in form and nature, and will encourage a sense of community between residents and the society. Our design will focus on accessibility for those with limited mobility. However, since autonomous living is encouraged, it is unlikely that our accommodation will be suitable for elderly with severe care needs. We strive to create a greater sense of community, by incorporating commercial sections, including a cafe, rooftop restaurant and childcare centre, and communal areas exclusive to residents, such as a function room.

Relevance of project to goals of competition

We strive to combat isolation and depression experienced by residents of aged care facilities by creating an environment focusing on community between residents and outreach to the greater neighbourhood. Our design also highlights sustainability through our selection of building materials, most notably CLT, and reliance on solar power to attain net neutrality.

Partners: Jacobs . Smart Plus Academy . Efficiency Matrix . GHD



Architecture

Djeembana is a six-storey retail and residential building, and provides unique stores and services along Point Nepean Rd. In addition, its residential spaces mirror the homes around the beachside. The design creates a homely environment that leverages the seaside location to promote a sense of belonging.

Energy Performance

Through the use of energy efficient appliances and load shifting of the buildings requirements, renewable generation will be fully optimized. Additionally, the utilisation of a Power Division Control System (PDCS) from Allume energy is able to provide efficient and smart usage of the energy being generated on-site. This is a homegrown innovative solution tailored for multi-tenanted buildings.

Occupant experience

Djeembana creates a welcoming environment by connecting the elderly and the community. Community spaces allow groups to socialise, facilitating a sense of community.

Colour-coded rails will assist with navigation through the building. Two elevators will ensure privacy for residents and to protect against disease transmission during pandemics.

Embodied environmental impact

We minimise embodied environmental impact by using low embodied energy and carbon footprint structural materials such as sustainably sourced engineered timber and fly ash concrete. Our selected structural materials are also easily recyclable.

Moreover, we aim to reduce wastage by recycling building materials such as wood, glass and metals where possible.

Engineering

The team has utilised a decentralised VRF system to control temperature zoning and conditioning in the building. Individual HRV units are also implemented to improve ventilation within the residential apartments. CLT walls and columns will be designed for their high thermal stability and compressive strength.

Market Analysis

Djeembana capitalises on the largest growing demographic of elderly along the Mornington Peninsula. By providing an affordable living environment and a community-focused living to target the elderly to buy into the sense of belonging and independence at Djeembana. Meanwhile, the optimal position across the Nepean highway provides incentives to businesses owners looking to rent out spaces that include a restaurant, a gym and a daycare.

Integrated Performance

PV energy efficiency is optimised through solar panels placed on shaded area covers, including the roof social area and car pick up spot. Windows, vents and automated shutters in residential apartments are placed to facilitate passive ventilation, minimising climate variability.

Durability & resistance

The building is designed to address key risks, including bushfire risk, power outages, and flooding. A slow-burning fire resistant species of engineered timber reduces risk and allow time for evacuation in case of a fire. On-site solar panels and battery storage are implemented to maintain a stable, self-reliant power supply in case of disruptions.

Comfort & environmental quality

Biophilic design principles will be used to compliment the prime beachside location. Strategic orientation of the living spaces and windows ensures optimal sunlight penetration and passive ventilation. Acoustic controls and sound-proofing are integrated into the building layout where commercial floors are separated from residential floors.

