PlACES OF REFUGE — BUILDING RESILIENCE THROUGH COASTAL ENGINEERING

Places of Refuge – Building Resilience through Coastal Engineering

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Mornington Island is an extremely unique part of Queensland with a strong cultural heritage and proud people who are intimately connected with their place and their heritage. It is a remote island situated in the Gulf of Carpentaria. Many challenges confront the community such as isolation, access to goods and services and exposure to natural disasters.

All aspects of life on the island are impacted by these factors and many more, that would be hard for many on the mainland to fully appreciate. The only way to and from the island is by air, which adds an extreme layer to the fundraising efforts of the local premiership rugby league team and financially impacts all who live and work on Mornington Island in terms of accessing specialist healthcare and seeking shelter from seasonal weather events. Every item on the island must be barged across once a week, there is no hardware store or chemist.

Mornington Shire Council (Council) takes a lead role in supply of essential services to the community with much determination and ingenuity. Bakery, hairdressing, civil services, airport, service station, mechanical workshop, concrete batching plant, accommodation are but a few of the services Council provides to the community and visitors. This is provided at a minimal margin to ensure these services are affordable for a community already fiscally constrained due to a high cost of living and limited employment opportunities. The Mayor, Elected Members, CEO and Council Executives advocate on behalf of the community for continuous improvement to liveability and opportunities on the island.

Peak Services (Peak) have been assisting Council in writing grant applications to achieve their goals. The community is in desperate need of a cyclone shelter as the island is threatened several times a year and with no shelter, many people must be flown off the island at great expense to Council and the community. Council have been advocating for some time across all tiers of government for assistance to build an integrated hub to house many essential services, a training facility and
event centre that can double as a maintainable cyclone shelter, so far to no avail.

In desperation and with inherited degraded assets, council looked at other ways they might help protect their community and successfully applied for a small NDRP grant. This grant was to investigate the suitability of Council owned assets to withstand cyclones and determine which buildings could be readily engineered to meet the required resilience to cyclonic wind speeds for the region. Peak on Council’s behalf engaged engineering consultants Bligh Tanner to undertake the works of inspecting over 100 buildings, over a five-day period to then produce a 280-page recommendation report. This report provided the basis for utilising Works for Queensland (W4Q) funding for a project aptly named ‘Places of Refuge’.

Bligh Tanner worked closely with Peak’s Project Manager Lana Maki and the Council to identify building structural deficiencies and recommend critical repairs to existing buildings on the island. The region is regularly exposed to cyclones which necessitates the evacuation of members of the community, who do not have access to cyclone resistant buildings. The lack of a cyclone shelter on the island places all on the island in a vulnerable position each cyclone season.

The project initially involved the assessment of the buildings to resist the cyclonic winds that the region is regularly exposed to. The subsequent phases of the project involved the development of engineering solutions to repair and improve the buildings’ ability to resist cyclonic winds.

Simon Kochanek, one of Bligh Tanners Principal Engineers who has extensive experience in the remediation of existing structures completed structural inspections and audits of more than 100 buildings on Mornington Island at the end of 2018. The investigation works included the inspection of all accessible components of the buildings, including subfloors and roof spaces. The inspection works identified numerous existing buildings with significant deficiencies making them unsafe if exposed to even moderate wind speeds. Some of the building deficiencies identified included:

- Limited or inadequate roof tie down.
- Inadequate bracing, or structure for lateral stability
• Inadequate tiedown to prevent overturning or uplift.
• Structures with inadequate member sizes to resist impose wind actions
• Corrosion, decay or termite damage which reduced the capacity of members to resist required actions.
• Previous modifications resulting in the removal of structural members required to resist the imposed wind actions.

The engineering audits allowed the buildings to be rated and categorised to determine their likely ability to resist cyclonic winds with recommendations for repairs and strengthening to improve capacity. Bligh Tanner senior staff used their experience in working in remote areas and communities to develop practical engineering solutions to repair the structural deficiencies identified. Solutions were tailored to suit the local community, accessible materials, and skills available on the island.

‘Places of Refuge’ seeks to restrain buildings that are not securely tied down to prevent them becoming airborne projectiles, but more importantly provides some surety for Council that several buildings could be used for shelter in the event of a moderate cyclone. Whilst not providing the level of protection a cyclone shelter would, this project will have a dramatic impact on the island and the community. The project will reduce Council’s financial risk during the cyclone season, allowing funds to be spent on essential services and will enable Council to retain staff due to the high level of risk posed from cyclones without access to suitably engineered buildings. The most important benefit will be the safety and retention of people on the island to help recover and make safe for the community in the aftermath of a natural disaster. It has been several weeks after recent events before it has been possible to return clean up crews to the island.

Peak have been providing ongoing project management services to Council to assist with several grant funded projects, including this W4Q ‘Places of Refuge’ project and further engaged Bligh Tanner’s expertise to solve complex and multi-layered engineering challenges. One such challenge has been the re-engineering of a large old tavern that has been in disuse for 10 years and is being refurbished and reopened. The engineering solution will not only equip the building with cyclonic tie down suitable for the region, it will have the added benefit of making the building more secure outside of business hours and support a modern open airy interior that connects with the outdoor dining areas when operating as a tavern restaurant.

The key upgrade that makes this all possible is the introduction of cyclone shutters to all external openings. The shutters when open provide a clear unobstructed view to the outdoors which is currently completely obscured by permanent steel framing and boarding. The current steel and boarding are not proving secure as the building has been broken into several times. The cyclone shutters will be tamper-proof and resistant to break-ins. Most importantly the shutters will exclude wind during moderate cyclones which has enabled the building to be cost effectively tied-down due to the reduction in internal pressures.

Bligh Tanner responded quickly to address remediation requirements to allow repair works to be completed prior to the 2019/2020 cyclone season. The engineering repairs and solutions that were developed were detailed to allow for flexibility with installation and cost effective to install, to ensure the local community could undertake as much remediation works as possible with the limited funds available.

Peak Services and Bligh Tanner have been delighted to be part of the project and to work closely with this remote community to deliver safer buildings for Mornington Island.