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Narrabeen Lagoon

At two square kilometres in area, Narrabeen lagoon – fed by five creeks that wind their way through 55 square kilometres of mostly bushland catchment – is the largest coastal lagoon in Sydney. It is a precious regional asset, providing a habitat for 46 fish species, 16 types of marsupial and nine species of bats, and a valuable recreational resource for canoeists, windsurfers, stand-up paddle boarders, swimmers, fishers and other day trippers and residents.

The lagoon is surrounded by natural bushland, Cromer Golf Course, The Sydney Academy for Sport and Recreation, expensive homes and a major road.

After decades of campaigning by local activists, the newly completed Narrabeen Lagoon Trail adds walkers, cyclists and wheelchair users to the list of people who will benefit from access to its shores.

Stage one of the Narrabeen Lagoon Trail was completed in 2011 by Fleetwood Urban and, almost immediately, won the 2011 Minister for Planning & Infrastructure – Sydney Greenspace Award. The 850m of trail between Deep Creek and Middle Creek, included marine piling, elevated boardwalks, viewing pods and landscaping, and cost \$2.2 million. Construction was complicated by site access issues which Fleetwood Urban solved by carrying out the piling first – starting at Deep Creek and working backwards to the limited access points. Some of the steel sub-frames for the elevated walkways were craned in off Wakehurst Parkway and the remaining materials were carried along the trail using crawler tracked dumpers. Small crawler cranes were used to install the sub-frames and decking was mostly installed just ahead of the work as it progressed. The decking was towed to site on small trailers towed by quad bikes, or in boats, and the heavy square “perch seats” were lifted into place using portable A-frame cranes.

Stage Two B of the Narrabeen Lagoon Trail – the missing link that finally allowed complete circumnavigation of the lagoon – was the most expensive (\$3.7 million) and complicated stage of the development. It was opened in February 2015 and required the construction of two bridges across bushland creeks, resumption of land used by the Sydney Academy of Sport and Recreation and Cromer Golf Club and all with minimal disruption of the fragile riparian zone – the interface between the land and water.

“The environment is a significant part of the project” said Fleetwood Urban’s project manager, “I’ve never seen so many kookaburras in one spot. A good number of snakes and

lizards have been sighted and we've staged construction to ensure that the endangered Australasian Bittern (*Botaurus poiciloptilus*) is able to nest in peace."

"Working in such a sensitive ecological area has meant we've taken extra care with the construction of the bridges. We've been able to use the site at the golf course and at the Sports Academy to undertake the construction so that we disturb the area around the lagoon and the two creeks as little as possible."

Drawing inspiration from the way that mechanical engineers are now using "design for manufacture" to ensure that product designers incorporate elements that improve quality or ease of manufacturing, Fleetwood Urban has developed its DesignExecute™ methodology where design elements are driven as much by construction considerations as the original creative vision. This was particularly evident in the design and installation of the two bridges – a 34m span over South Creek and a 52m span over Middle Creek.

Fleetwood, Warringah Council and the bridge designer, Thompson Berrill Landscape Design, collaborated in a multi-skilled team to ensure the most aesthetic and cost effective design while maintaining environmental protections. The technical, operations and construction teams considered the project, brainstormed the challenges and developed strategies for dealing with those challenges all during the design phase.

The impact of collaboration was particularly evident in the installation of the Middle Creek and South Creek bridges. With input from the riggers the group concluded that using pontoons to move the bridges into place risked damage to the riparian zone through potential oil spills and impact damage. In addition to these risks, a certain amount of groundwork was required for the cranes to lift the pontoons into the water. Investigation showed that the groundwork required to set up cranes to lift the bridges into place was largely the same as for the pontoons. The team eliminated the pontoons and used the cranes to carefully lift the bridges directly into place – an elegant, though more difficult solution given that one of the bridges was 52m long.

The benefits were several: the riparian zone was protected from oil spills; the creek remained open during the operation and, because no works took place within the creek line, no sediment controls were required in the creek. This reduced the risk of flooding and protected wildlife from harm. (Another side-benefit is an impressive video of the lifting operation which the council has helpfully posted to YouTube.)

In addition to the ability to circumnavigate Narrabeen Lagoon and enjoy its diverse ecology, the Narrabeen Lagoon Trail development has delivered safer access from Wakehurst Parkway, a new watercraft launch bay, dedicated car and trailer parking spaces, barbecues, signage, shelters, picnic facilities and improved disabled access.

"The Narrabeen Lagoon Trail is, without a doubt, one of the best walks or rides in Sydney," said a spokesman for Warringah Council, "When you're here you can't believe you're just 30 minutes from the CBD."

The trail is partly funded by a \$4 million grant from the Australian Government's Regional and Local Community Infrastructure Program – Strategic Projects.

The NSW State Government has also contributed via the Department of Planning and Infrastructure Metropolitan Greenspace Program (\$370,000); the Office of Environment and Heritage Estuary Management Program (\$158,750); and the NSW Roads and Maritime Services for Deep Creek Bridge (\$478,000) and boating facilities for the Stage 2A Middle Creek Reserve upgrades (\$127,333).