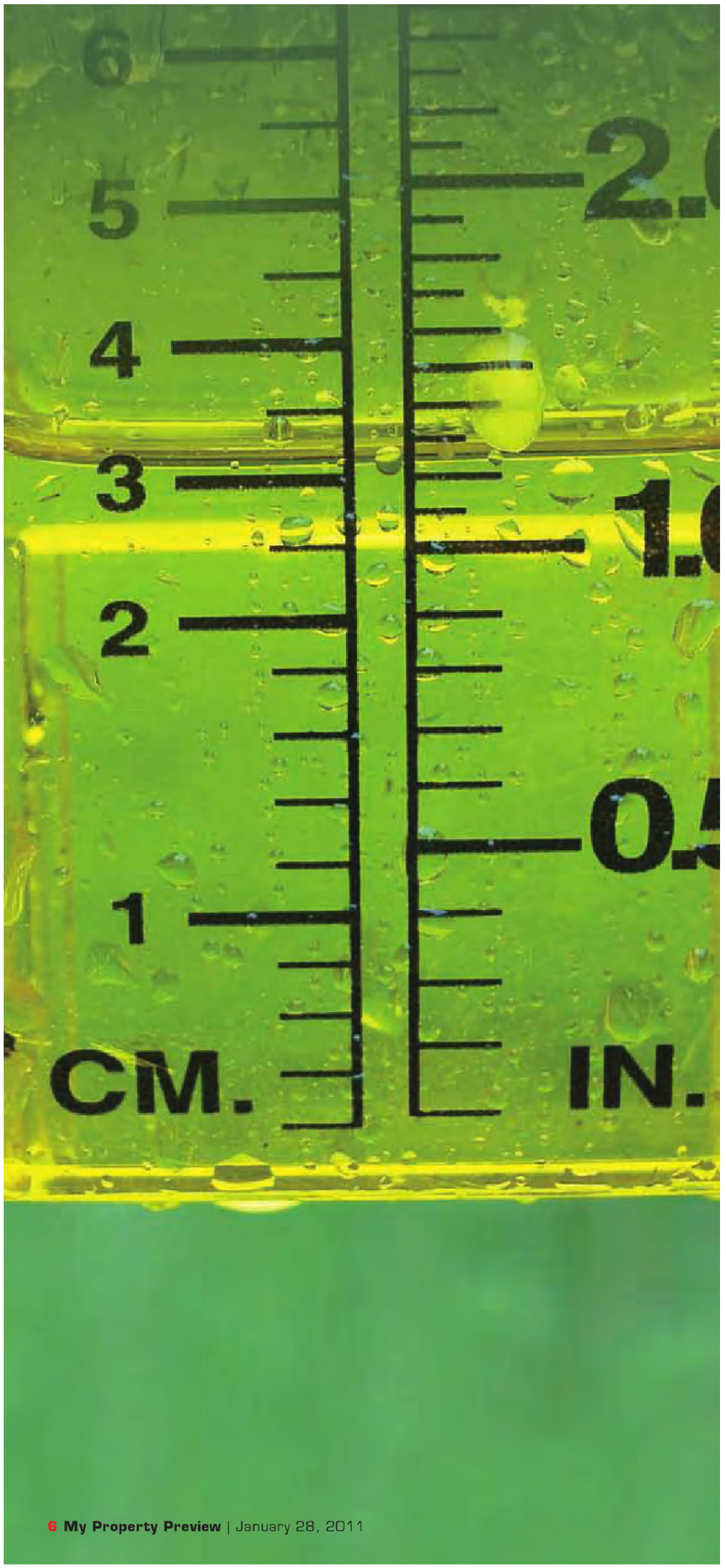

Testing the waters

by Dorothy Drane

With more wet weather ahead, how safe is the Sunshine Coast in the event of a major flood? MPP investigates.

As Queensland mops up after the devastating floods, the Sunshine Coast can heave a collective sigh of relief that it was spared, but it does raise the old question, could such large-scale water damage happen here?

The answer, quite simply, is almost certainly not.

After weeks of rain, the region is well and truly at saturation point and although there are still more king tides and a cyclone season to come, history points to most Sunshine Coasters being able to rest easy.

While there has been huge residential development and various flood plains turned into canal developments during the past three decades, the region has successfully – excuse the pun – weathered the storm.

> "History has shown that it is some of the longest-established residential areas that bear the brunt of flooding while more recent estates stay high and dry. Even if water cuts roads and swirls around them, houses stay above damage level"

It's not a coincidence. While engineers take one-in-100-year flood levels into account and build to standards above and beyond government requirements, we also have reference to history. And history has shown that it is some of the longest-established residential areas that bear the brunt of flooding while more recent estates stay high and dry. Even if water cuts roads and swirls around them, houses stay above damage level.

Towns such as Mooloolah, Palmwoods, Woombye and Nambour that sprung up along the North Coast railway line after it opened in 1891 regularly produce the most

Graham suggests the waters on the Sunshine Coast are probably the **best engineered** around

The engineers responsible for **early** developments did the job well

dramatic flood images. On the coast, Bradman Avenue, which was among the first collections of holiday shanties beside the Maroochy River, will go under long before the Maroochy Waters canal estate behind it will even start to feel any pain.

Engineer Phil Tyrer, the project manager at Pelican Waters, gives an excellent example. "Gympie was developed in the gold rush of the 1870s when they didn't have the advantage of more than 100 years of rainfall records and computer modelling. They came to mine the gold but every time it rains the Mary River comes up and the town floods," he says. "Knowing what we know now, nobody would be building Gympie in that spot today."

It also helps that the Maroochy River

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doesn't have as big a catchment as, for example, the Mary River and it is also very wide, so that even when 30 metres of water rushes through Nambour, by the time it gets to Maroochydore it has little effect on river levels. Much of the water usually spills from its tributaries – Petrie Creek, Paynter Creek, Eudlo Creek – and the low-lying areas around them which, for the most part, remain undeveloped.

Nambour has learnt from bitter past experience and its most notorious flood spot around Petrie Creek at the northern end of Currie Street has been turned over to car parking.

Only a handful of cyclones have had a significant impact on the Sunshine Coast since records began in 1864. On February 20, 1954 a cyclone that crossed the coast at Coolangatta caused structural damage on the Sunshine Coast and then, on January 1, 1963, Cyclone Annie damaged houses and crops when it crossed at the Sunshine Coast.

Cyclone Daisy hit Fraser Island on February 11, 1972 and whipped up the seas and caused severe flooding here. It also washed away part of Pacific Boulevard at Kawana, prompting the State Government to increase the minimum frontal dune height from 12.5 to 15 feet.

Over the next 20 years, houses sprouted like mushrooms, many of the new estates emerging from swamp and flood plain. Sand was dug from swamp to build a canal and pumped on to land to create building blocks.

> "At the end of the day it's only the notorious old places that go under such as Marcoola and Mudjimba, areas that were developed long before flood modelling was understood"

Despite the rapid growth, though, it all passed the test when on March 17, 1993 Cyclone Roger passed close to Fraser Island and after moving back to sea, passed close to the coast causing some damage along the way.

Cyclone Yali, on March 26, 1998, passed seawards and while it was responsible for some beach erosion, the houses stayed safe. A hybrid cyclone on March 5, 2004 caused severe flooding, but still nothing to compare with the damage experienced along the Queensland coast during the past month.

Surveyor Bill Freeman knows the area better than most. He grew up in Palmwoods and later become a key player in some of the major residential developments on the Coast. He says history has proven the engineers responsible for early developments did the job well. "Cardno & Davies were consulting engineers to the then Maroochy Shire Council and came up with the Cornmeal flood plain study aimed at draining the side of Buderim," Bill says. "They then did the River Breeze canal system, a flood study for the whole of Kawana. They established the parameters and none of these areas have ever had a flood problem.

"We have a contained catchment in the Mooloolah, Maroochy and Noosa rivers and their tributaries. There can be some flooding from Eudlo Creek when you go on the Sunshine Motorway on ramp near Trader Dukes but it was left a bit lower so that in the event Eudlo Creek does break its banks, water flows across and escapes into the canals."

Graham Tamblyn, a director of Cardno engineering and resident for more than 30 years, recalls the construction of Maroochy Waters, which was one of the region's first canal estates when it was built in the late 1970s.

"It was all done with conservative levels when knowledge of flood heights was more limited, yet no houses were inundated when the Maroochy River flooded in 1998," he says. "Water comes up over the land but the canals are designed so it can rise and the houses will be safe."

Graham says anyone who fears flooding in canal estates needs only to understand how a flood plain works. "Kawana has a major bypass channel that functioned very well in this last lot of floods. It is all modelled and the hydrology works. You just have to make sure the floodwaters get away. It's not rocket science but just plain good engineering," he says.

"Canals don't create flooding. It's like filling up a bath tub. If you fill two, it doesn't make the water higher but simply spreads it out more. Any suggestion that it generates a flood problem is wrong. A flood plain can be managed just like a CBD," he adds.

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Graham suggests the waters on the Sunshine Coast are probably the best engineered around. "At the end of the day it's only the notorious old places that go under such as Marcoola and Mudjimba, areas that were developed long before flood modelling was understood," he says.

The Twin Waters estate, built on the north shore of the Maroochy River in the late 1980s, has never known the flood and drainage issues experienced by its neighbours at Mudjimba and Pacific Paradise where homes were built on low-lying land in the 1960s, long before there was even a proper drainage scheme.

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Graham says the nearer you get to the ocean, the more certainty you have about water levels, but flood risk areas have long since been identified. "Areas of Nambour, for example, had development encroach on fast-flowing streams so that it is now expected to flood and it does," he says. "Horton Park is a flood area and will have to be developed properly and have channels modified. It will be engineered to be flood immune."

Then there are local drainage problems that can crop up anywhere. Sixth Avenue, Maroochydore, for example, will go under water in any decent storm.

"It's far from any drainage point, so it simply takes longer for water to flow away," Graham explains. "There are a lot of places like that which were built to a different standard. It is about pipe capacity, mainly in older areas, and seldom threatens homes.

"These are annoyance flood situations but they are not wetting the carpets."

Graham says there have been some "good intensity" storms in recent years but the Sunshine Coast canal systems have performed as they were analysed and designed to do. "We are unlikely to ever see the damage that flooding has caused in Brisbane," he says.

Phil Tyrer says the advantage of modern canal subdivisions is that they have been designed with the benefit of more than 100 years of rainfall records. "With that knowledge, engineers can compute a model of a number of different scenarios, calculate fill heights and drainage outflows and protect property," he says. "We build to one-in-100-year flood levels but we build a free board, a factor of safety above that."

Free board is the amount of surface between a given level of river water and the lowest possible entry point during flooding.

In May 2009, catchments around Little Mountain into Pelican Waters had a 100-year event and there was no property damage at all. "In those circumstances, the underground pipe system can't cope with the volume of rainfall but the road system is designed to carry overland flow to protect property, so even though the water comes up, it doesn't get into houses," Phil says.

"Engineers can calculate flood heights and storm surge levels, even a cyclonic storm surge level, which is different from water running through a creek system, and that is used as a basis for the fill level.

"At Pelican Waters, for example, we are working to a level of 2.6 Australian Height Data. The free board is 300 millimetres above that so with the house slabs it is closer to three metres, well above the Q100 level for property protection. We are now also providing for climate change as well."

Kevin Covey of Covey Associates engineers sums up that it's all about good engineering design. "You can develop anywhere if you throw the right sort of design at it," he says. "Our new estates are sound. The council won't allow a development that can't cope with twice the number of houses actually being planned."

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