

BITOU MUNICIPALITY

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CORPORATE BROCHURE





Long-term

thinking

Solving the world's water problems is not going to be an easy task, but drought-hit Bitou Municipality in South Africa's Western Cape is making an effort to relieve local water shortages through the construction of a new seawater desalination plant at Plettenberg Bay



Water is one of the world's most valuable commodities, and perhaps one of its most destructive. Over the past 12 months floods have washed away entire communities in Pakistan, while hot on the heels of this natural disaster came the unprecedented floods in Queensland, Australia, which reduced much of this sophisticated state to a seething mass of refugees forced from their homes by none other than Mother Nature.

In other areas of the world, however, the all too familiar problems of drought continue to threaten the lives of people, their livestock, crops and industry.

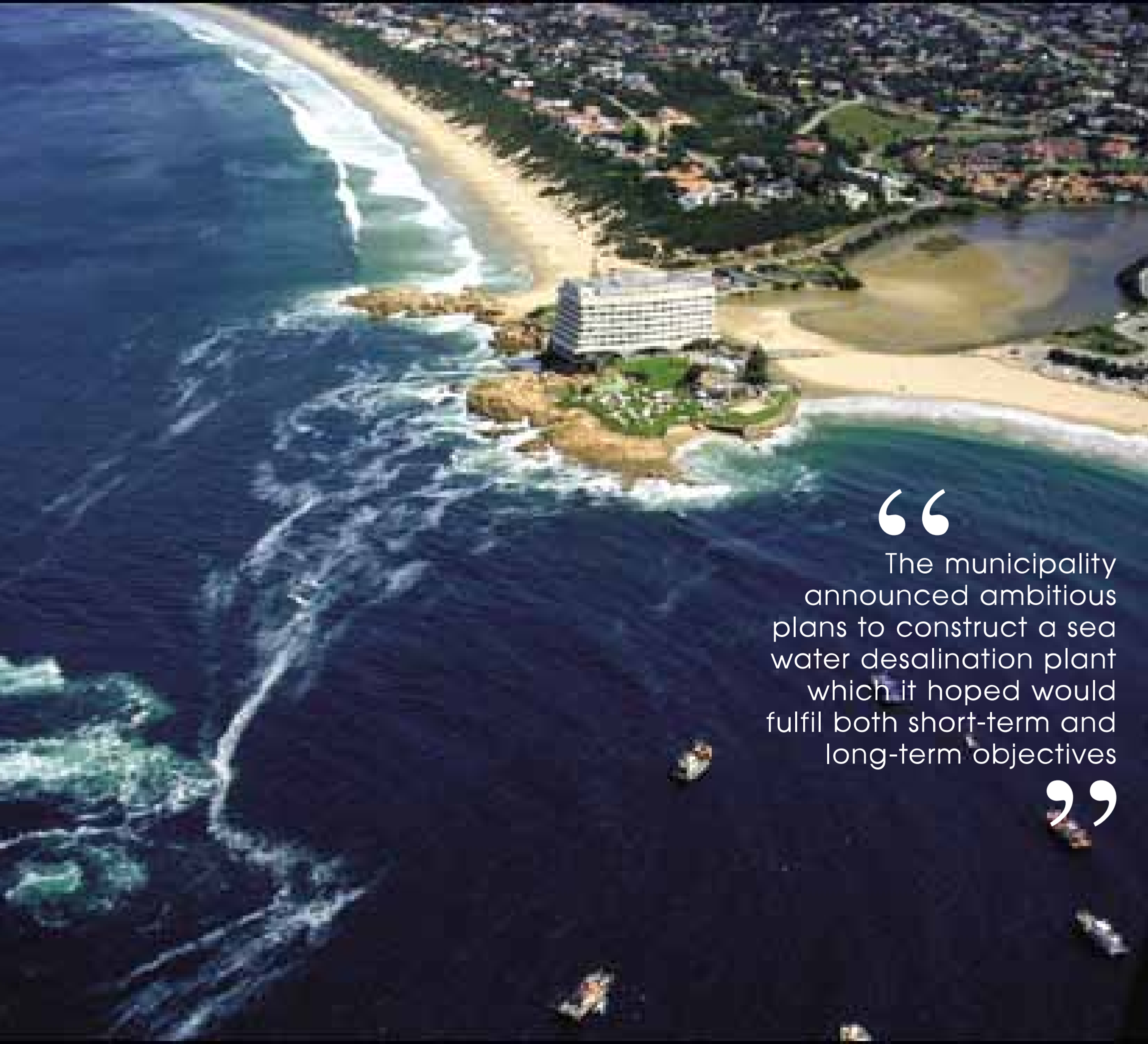
In 2009 the Western Cape of South Africa was held fast in the grip of the worst drought in 138 years. By 2010, the situation had become so serious in the municipality of Bitou that the Roodefontein Dam had been depleted to just 10 per cent of its normal capacity and water flow in the Keurbooms River—the major source of fresh water—had fallen substantially and was approaching the point where water would no longer be pumped from it. The municipality of Bitou faced a crisis, and joined those of George and Knysna to be declared disaster zones by the National Disaster Management Centre.

The authorities were presented with two pressing but contradictory needs. They had to find a way of providing water for the local communities, including the town of Plettenberg Bay, in the short term and to ease the crisis. However, they also had to develop a satisfactory long-term plan to establish a reliable water supply for the future which would be unaffected by reduced rainfall and drought.

Many options were explored and hotly debated, and this was supported by a highly successful campaign to encourage people to reduce their water consumption significantly. In some instances, extreme measures were taken against stubbornly high water users, who were named and shamed in the local newspaper. The initiative bore fruit, and water consumption across the municipality was slashed by 40 per cent, earning the region the coveted Blue Drop status.

After much deliberation, the municipality announced ambitious plans to construct a sea water desalination plant on the coast close to the town of Plettenberg, which it hoped would fulfil both short-term and long-term objectives. The system would take water from the sea and pass it through a reverse osmosis processing plant to produce potable-quality water at a rate of 2 megalitres of water a day—sufficient to supply 50 per cent of the region's water requirement. The remaining 50 per cent would be provided through a combination of surface water, boreholes and agreements with big developments to trade fresh water for recycled effluent.

The search for a suitable location for the desalination plant took many factors into account including the environmental sensitivity of this beautiful and pristine coastline as well as the cost of the project, land availability and infrastructure. Finally, a suitable site was identified on one of the tennis courts of the Beacon Isle Hotel. Located on municipal land,



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the site already had much of the pipe work and electricity supply in place.

The intention was to sink bore holes to a depth of 12m on the adjacent Robberg Beach, and then cover them with sand. The beach sand would then act as a filter, and perform one of the pre-treatment functions naturally.

The final environmentally sensitive question was how to dispose of the waste product of the reverse osmosis process, brine. The solution to find the greatest favour was to pump the brine through an outlet pipe to Blinders, some 250m out to sea, where the tides and wave action on the rocks would ensure the brine mixed with the seawater and would have no significant adverse effect on the environment.

The desalination plant itself was designed to minimise environmental impact and increase its aesthetic appeal. Viewing windows were added with the intention of creating something of a tourist attraction. From the environmental perspective, the structure would have a flat concrete roof which could be

planted with indigenous succulents to reduce noise, and would house mechanical energy recuperation units to increase the plant energy efficiency.

The project was always battling against time, though. With no end in sight to the drought and the water shortage becoming increasingly serious, it was essential that the desalination plant be up and running by the beginning of December 2010 in readiness for the influx of holiday makers expected over the peak season.

Supported by R20 million in disaster relief funding from the Government, the municipality awarded Veolia Water Solutions & Technologies subsidiary VWS Envig the R32 million turnkey contract to design, build and maintain the desalination plant, and Aurecon was tasked with conducting an environmental impact assessment in parallel with the planning and engineering. No one said the process was going to be easy though.

After a thorough engineering investigation, the Robberg beach was found to be unsuitable for seawater abstraction. Not only was the sand shallow and lying directly onto bedrock, but it was fine and relatively impermeable, which meant that

the holes simply would not be capable of producing enough water. This presented the engineers with the challenge of finding a practical alternative. The options included increasing the number of beach wells, moving the abstraction wells to the sand bar at the mouth of the Piesang River estuary, or abstracting directly from the sea.

Finally the decision was taken to site the plant as planned at the Beacon Isle Hotel, but to move the intake wells to the Piesang estuary. In September 2010 construction began on the plant and seven test boreholes were sunk 8.5m down into the sandbar. The results of a two month water quality trial showed that three of the seven bore holes were producing water of reduced salinity and were therefore probably abstracting estuary rather than sea water. These boreholes were relocated closer to the four that were effectively abstracting sea water, and the depth of the

holes was extended to 12m.

The plant went into test mode in early December, and then progressed to a three-four month pilot phase aimed at providing the municipality with adequate water over the peak demand season while generating data on plant performance and effects on the river estuary.

The challenges have continued through this period, particularly when the estuary water level dropped below the environmentally viable threshold, the mouth of the river closed up and abstracted water became increasingly fresh. At the end of the pilot phase, having successfully satisfied short-term demand, the desalination plant was shut down and its resourceful engineers are doing what they do best: working to develop the best solution for long-term water abstraction. www.plett.gov.za ■



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