

NAPIER COUNCIL

UTILITY COMPANY PREPARES FOR A RAINY DAY AND SAVES ON INSTALLATION COSTS



Situated on the East Coast New Zealand's North Island, Napier is best known for its Art Deco architecture, wine and fruit production. At the heart of this is the region's low rainfall and high sunshine hours. However, rain does also fall at times and a new \$15.4m storm water pumping system has recently been commissioned.

Johan Ehlers Napier City Council Works Asset Development Manager and project lead explains that "Three quarters of Napier's urban area relies on storm water pumps for drainage. Much of this is pumped out into the estuary, an ecologically sensitive area. The CBD and areas east of the city are pumped to the ocean. The Cross Country Drain (CCD) project was commissioned to accommodate infill development, green field development and projected city growth."

A new 50m wide canal cuts a swathe some 4.5km from the sea front westward towards Taradale. This links existing drains into one major scheme and is designed to handle maximum flows of 16,000 litres of water per second. At the ocean end of the CCD is the pump station which delivers the water from the intake via pipes under Marine Parade to the ocean.

The pump station is currently capable of pumping 10,000 litres per second, via its three pumps.

A 40kW low flow pump is supplied from the local power network and this handles normal water pumping duty. The stars of the show are three 450kW pumps each capable of pumping a massive 3,300 litres per second. These pumps are supplied by 3 x 900kVA Cummins Generators and will swing into action at times of heavy and sustained rainfall. Ehlers explains that "the decision to power the main pumps using generators was made to ensure a reliable power supply at all times and to avoid the fixed costs associated with such a large power connection". He goes on to say "if the pumps were powered from the grid then some standby generation capacity would still have been required".

"At this rate, an everyday household swimming pool would be pumped dry in two seconds."

Johan Ehlers, Napier City Council Works Asset Development Manager.

One major aspect was the maximum harmonic distortion limits of the generators. Drive Dynamics considered various harmonic mitigation solutions and proposed 3 x SD70650 IP54 18 Pulse Drives to be supplied by 3 x 18 pulse phase shifting transformers.

Andy Buckley, Power Electronics Engineering Manager explains that "The advantage of the 18 pulse dry type transformers was the zero maintenance aspect of the transformers, the absence of any additional associated control equipment and the ability to select stock standard production Power Electronics SD700 VSDs. We believed this to be the simplest and most elegant solution, given the intermittent operating duty of the VSDs.

Napier based, John Geoghegan, of Electrical Engineering Services oversaw the Electrical and Controls portion of the project.

When asked what were the more challenging aspects of the project John replied "The coordination of the various elements such as the VSD concept, system design, MCC tendering and construction, electrical installation etc, were as per any major project. However, one aspect that we had given considerable thought to was how to commission the pump station. Obviously we needed plenty of storm water to be able to commission the plant and test it to its full capacity. Fortunately nature played its part delivering a spring storm, which resulted in record snow fall in the ranges behind Napier and two or three days of sustained rain fall. This provided us with sufficient water to perform the final commissioning tests and I am pleased to say that this couldn't have gone more smoothly. The performance of the SD700 drives and harmonic mitigation has exceeded expectations".



SD700
Series

VARIABLE SPEED DRIVE