



Treatment plant

for sensitive environment

Dr Matt Savage, technical director, Apex Environmental, and **Joseph Findley**, project engineer, Southland District Council, review the building of the new Curio Bay sewage treatment plant.

The rugged beauty of the Curio Bay area of the Catlins Coast and the presence of a 170-million-year-old petrified forest, and an astounding diversity of rare and endangered wildlife, has experienced a significant lift in visitor numbers over the past decade.

This has placed growing pressure on the infrastructure of this remote site, which has historically only used onsite septic tanks to handle the sewage that resulted from the 30 or so permanent residences and 100,000 plus visitors per year.

In response to the steady increase in visitor numbers, the South Catlins Charitable Trust has upgraded campground facilities to include a large kitchen, multiple showers and new toilet blocks, and has started construction of a new Natural Heritage Centre to educate visitors on the



Curio Bay story. The Natural Heritage Centre will also include a much-needed cafe, as despite such a high level of visitor numbers, this is not something the small remote community has been able to offer previously.

As part of the upgrade to the area, the Department of Conservation is building a new car park to accommodate the increased visitor numbers, and constructing new public toilets integrated into the Trust's new Heritage Centre.

In 2006, the South Catlins Charitable Trust, the Department of Conservation, and the Southland District Council reached agreement that the wastewater infrastructure of the community needed substantial upgrade to cater for the proposed growth.

A governance group was formed to represent the collaborative interests of all parties involved and in 2012 they issued the council a directive for the new wastewater treatment plant.

It was agreed that the plant needed to: produce high quality discharge to protect the sensitive receiving environment; be of modular nature to cater for increasing tourism numbers and bring the rest of the community on board in future; and be capable of handling high seasonal variance in daily flows.

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links to the Curio Bay area through Te Ao Marama Incorporated (Southern Iwi), which ensured a seamless progression of the project.

Based on the extensive consultation and as a result of the high level of treatment required, a Membrane Bioreactor (MBR) was specified as the preferred type of treatment system. MBR systems have been shown elsewhere in the region and throughout the country to not only provide a very high level of treatment consistent with the needs of the sensitive receiving environment, but to do so far more stably under the varying seasonal loads encountered at sites like this.

Once the decision was made to use an MBR as the treatment process, Apex Environmental was approached to design and cost a suitable system. The company had already built a similar system at a DOC camping ground, further up the Catlins Coast.

Preparation included assessment of environmental effects for the resource consent for the proposed process, as well as consent hearings.

Detailed options analysis was carried out by Apex using BioWin biological modelling software which identified an optimum MBR plant configuration for the near complete removal of BOD₅, suspended solids and coliforms with a two-stage anoxic system with supplemental carbon dosing to also minimise the discharge of nitrogen.

The system was designed in a modular nature so that half of the plant could be isolated during the off season to minimise operating cost and allow off-season maintenance. The full plant volume can then be quickly brought back online to handle peak visitor numbers over the summer holiday period.

The membrane component of the treatment plant was also made modular with the hydraulic capacity of the overall plant able to be doubled simply by adding a second

submerged membrane module to the current membrane tank. This capacity can then be doubled again by duplicating the membrane tank with all other equipment already sized to accommodate the subsequent four-fold increase in peak hydraulic capacity.

While the resource consent for the site is for ultimate discharge of the treated water into the surface waters of Cook Creek, the clean water is first discharged into a rock bed and then flows down about a kilometre of heavily vegetated drainage ditch for further absorption of any residual nutrients before actually reaching the stream.

The flow into the drainage ditch up stream of the point where the treated water enters was also diverted as part of the project to minimise stormwater flows in the ditch and therefore maximise the amount of treated water that is absorbed into soil before actually reaching Cook Creek.

With the plant commissioned over the summer of 2016-17, it is now fully operational and typically achieving undetectable levels of BOD₅, suspended solids and faecal coliforms in the discharge.

Apex will be involved in the continued operation and maintenance of the plant, made possible by the very high level of automation and remote telemetry built into the process. [WNZ](#)