

PROJECT PROFILE

A Sustainable Wastewater Treatment Solution for Commercial Properties

SCENIC RIM TRAIL, AUSTRALIA

Problem Two ecotourism camps were being constructed along the Spicers Scenic Rim Trail in the Gondwana Rainforests of Australia. Both camps would be located in a remote, pristine area of the trail, so all wastewater would have to be treated and dispersed via an onsite treatment system that was environmentally sustainable and would have minimal impact on the local ecosystem, including several endangered species.

Solution ENVIRA Holdings proposed a two-stage, customized AdvanTex® AX-Max™ system, featuring all-season reliability, low power usage, and excellent treatment performance, including advanced nitrogen reduction to meet stringent treatment limits. Treated effluent would be reused for landscape irrigation and would also be available for use in fighting bush fires.

Luxury Ecotourism Sites Are Off-Grid

The Gondwana Rainforests of Australia, including Main Range National Park, are designated as a World Heritage site by UNESCO, the United Nations Educational, Scientific, and Cultural Organization. Traversing the park, Spicers Scenic Rim Trail has been developed as an ecotourism experience, allowing visitors to spend 2-7 days exploring the trail with an expert guide, then staying each night in a luxury eco-camp featuring hot showers and chef-prepared meals.



Photo courtesy of ENVIRA Holdings.

This remote ecotourism camp needed a wastewater system that was environmentally sustainable and would have minimal impact on the local ecosystem. Developers chose a customized AdvanTex® AX-Max™ system (visible at right), featuring all-season reliability, low power usage, and excellent treatment performance.

Commercial — Reuse Market

Project Overview

QUEENSLAND, AUSTRALIA



Design Parameters

- Spicers Amphitheatre: 7 cabins
- Spicers Timber Getters: 7 cabins
- Average flow per site: 402 L/day (106 gpd)
- Peak flow per site: 534 L/day (141 gpd)

Treatment Limits

- 15 mg/L BOD₅
- 15 mg/L TSS
- 5 mg/L NH₃
- 10 cfu/100 mL E. coli

Start-Up Date

- May 2020

Collection System

- Vacuum toilets and grinder pump lift stations

Primary Treatment

- One 8300-L (2200-gallon) tank per site (integrated into the AX-Max37-14 unit listed below), divided in half for primary and pre-anoxic chambers

Stage 1 Secondary Treatment

- One AdvanTex® AX-Max37-14 unit per site with alkalinity feed for enhanced nitrification and pH balancing

Stage 2 Secondary Treatment

- One AdvanTex AX-Max25-14 unit per site, including a 4160-L (1100-gallon) post-anoxic chamber and supplemental carbon feed for enhanced denitrification

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Photo courtesy of ENVIRA Holdings.

Treated effluent from the AdvanTex system is clean enough to be reused as subsurface irrigation. Left to right, the storage tanks at this off-grid camp contain treated AdvanTex effluent, rainwater for fighting bushfires, and rainwater that will be treated and used as potable water (two tanks).

The trail first opened in 2009, with an extension opening in 2020 as part of the Queensland Ecotourism Trails program. Included in the extension were the Spicers Amphitheatre and Spicers Timber Getters overnight camps. Both were designed to be off-grid, with power generated by the sun and water supplied by the rain.

As for how to handle the wastewater and its higher than usual waste concentration due to low-flow water fixtures at each camp, an expert consultant provided a short list of options that included an AdvanTex® Wastewater Treatment System. Thousands of these systems have been manufactured by Orenco Systems® and installed all over the world, including in locations that are environmentally sensitive and require high levels of treatment quality and efficiency.

ENVIRA Holdings, the local Orenco distributor, provided further information on the AdvanTex treatment process and recommended a customized AdvanTex AX-Max™ with enhanced nitrogen reduction capabilities as the most appropriate solution for each camp.

After carefully considering various alternatives – and meeting extensively with government regulators, environmentalists, and ENVIRA staff – the development team chose the AdvanTex option.

ENVIRA had demonstrated an in-depth knowledge of onsite wastewater treatment and best-practice environmental management, both extremely important factors on this ecologically sensitive project. In addition, the AdvanTex system offered many advantages:

- Low power consumption
- Strong nitrogen-reduction capability
- Effective treatment of seasonal flows
- Process reliability
- Operational efficiency
- Simple maintenance requirements
- Portability

AdvanTex® Makes It Possible

The AX-Max is a multi-chambered unit that produces high-quality effluent with particular emphasis on nitrogen reduction. The system is state-of-the-art and includes the AdvanTex textile media, treatment chambers, pH-augmentation input feeds, pumps, disinfection, and control systems – all in a prepackaged unit that's easy to transport and install, minimizing impact to the site.

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All AdvanTex treatment systems use a fixed-film, attached-growth treatment process and are an excellent solution for a variety of applications. In an AdvanTex system, small doses of blended wastewater filtrate are uniformly distributed onto the textile media throughout the day using timer-operated pumps. This maximizes contact time and ensures an unsaturated and highly aerobic environment, resulting in optimal treatment performance.

Low-horsepower, high-head turbine pumps operate intermittently, with sophisticated controls that automatically adjust recirculation ratios and pump run-times based on daily flows. These pumps are lightweight, extremely robust, and field repairable.

Given that both camps were being constructed in remote areas of the mountainous trail, the greatest installation challenge was transporting the AX-Max treatment units to each site. The only vehicle capable of delivering the units up and down steep inclines and through tight turns on narrow tracks was



Photo courtesy of ENVIRA Holdings.

The versatility of the AX-Max design allowed it to be split into two units per site, so that each unit could be transported up the mountain via truck. To blend in more fully with the environment, each unit received a custom paint job.

a 6-m (19.7-ft) ex-military vehicle. Fortunately, the versatility and superior engineering of the AX-Max design could be split into two units per site, each unit measuring just 4.3-m (14-ft) long, making the trip up the mountain possible.



Photo courtesy of ENVIRA Holdings.

These AX-Max units were custom designed to work together at this campsite. Integrated into the unit on the right is an 8300-L (2200-gallon) tank that's divided in half to accommodate both primary and pre-anoxic chambers.

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Photo courtesy of ENVIRA Holdings.

Cabins include low-flow water fixtures that contribute to a higher than usual wastewater concentration. Despite that, the AdvanTex Wastewater Treatment System at each site is equipped to meet strict treatment limits on dispersed effluent.

Known for their ease of maintenance, the installed AX-Max units are monitored remotely by ENVIRA staff via an Orenco TCOM™ telemetry panel. ENVIRA coordinates a response to any control panel alarms and also provides quarterly on-site servicing of the entire system, while a site caretaker performs daily inspections and tasks.

Protected environments like the Gondwana Rainforests demand special attention, including the proper management of wastewater. At these two camps on the Scenic Rim Trail, AdvanTex treatment technology is performing reliably and providing enhanced nutrient reduction, even with high organic loads. The rainwater that's collected and used in sinks, showers, and toilets is being safely reclaimed and reintroduced with minimal impact or risk to the local environment and its rare and endangered wildlife.

Commercial — Reuse Market

Tertiary Treatment

- UV disinfection (pre-installed and included in the AX-MAX25-14 unit)

Dispersal and Reuse

- Landscape irrigation via subsurface drip and effluent storage for potential firefighting

Monitoring and Control

- Orenco® TCOM™ telemetry panel for 24/7 remote monitoring

Equipment Supplier

- ENVIRA Holdings

For information about Prelos™ Sewer, AdvanTex® Wastewater Treatment, or Orenco Controls™, contact Orenco Systems®, Inc.



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Data used by Orenco to derive the representations and conclusions contained within this Project Profile were current as of September 2020.