Reclaimed Water Management Scheme - 1B Works

COUNCIL NAME
Shoalhaven City Council

WEB ADDRESS
shoalhaven.nsw.gov.au

SIZE
4,567 square kilometres

POPULATION
104,371

Overview

Shoalhaven City Councils' Reclaimed Water Management Scheme (REMS) is one of the largest, more complex water recycling schemes undertaken by a local water utility. The first stage (stage 1A), included connecting four Wastewater Treatment Plants (WwTP's) to a central distribution and storage system, making available approximately 6ML/d of reclaimed water (treated effluent) for beneficial reuse to fourteen dairy farms, a golf course and several sporting grounds, totaling 500 hectares of land being irrigated.

Following the initial success, the next stage of REMS (Stage 1B Works) was initiated. The Stage 1B works entailed major upgrades to Bomaderry and Nowra WwTP's, construction of a dedicated reclaimed water transfer main beneath the Shoalhaven River, extensions to the existing REMS distribution network between Nowra and the existing reclaimed water dam at Callala WwTP, as well as UV disinfection upgrades to the original Stage 1A works. The upgrades have resulted in more treated effluent being reclaimed for beneficial reuse, and significantly less effluent being directed to the Shoalhaven River and associated waterways.

Background

Shoalhaven Water's REMS was driven by a strong community preference to minimise the impacts of drought, reduce potable water consumption and protect the unique environments of the Shoalhaven Region, in light of a rapidly expanding population. Particular emphasis was placed on protecting the iconic Shoalhaven River and Jervis Bay waterways.

Prior to the Stage 1B works both the Nowra and Bomaderry WwTP's discharged effluent directly to local waterways that drain to the Shoalhaven River. Neither plant was connected to the existing REMS system as the effluent transfer infrastructure was simply not available to do so, and the effluent quality produced did not meet the strict regulatory requirements mandated for the collection and reuse of reclaimed water.

Implementation

The successful delivery of the REMS Stage 1B works was undertaken by Council's water utility, Shoalhaven Water, in consultation with the community, government authorities, the local dairy industry and wider project stakeholders.

The Scheme achieves significant environmental, social and economic outcomes for the community with Stage 1B costing $150M over 8 years of definition, design and delivery.

Nowra WwTP during upgrade

Outcomes

REMS itself is an exemplary innovative example of a local water utility operating in a local government setting, lifting above and beyond to improve the uptake and beneficial reuse of reclaimed water whilst delivering sustainable industry, drought proofing measures and a reduction in environmental impacts from a highly expansive population.

In February 2021, the Stage 1B works were officially completed, resulting in maximised use of reclaimed water and the diversion of treated effluent away from the natural environment. The project has seen the reuse of up to 80% of reclaimed water from six wastewater treatment plants, which equates to approximately 13 megalitres per day, helping the region reduce potable water consumption. It has also seen greater quantities of high quality irrigation water being supplied to the region's dairy farmers to improve their sustainability, lessen their reliance

on potable water and help the community's drought proofing efforts. The long term benefits include improvements in the water quality of Jervis Bay and the Shoalhaven River, as well as the promotion of the area as a clean and green community.

The next steps for the project have already been initiated, with REMS Stage 2 works currently in investigation and detailed design stage. This stage will involve the construction of an additional 900ML bulk reclaimed water storage adjacent to the existing 600ML bulk storage at Coonemia.

Key Learnings

Being the single largest capital works project ever delivered by Shoalhaven City Council, the project came with its lists of issues, challenges and in turn opportunities. Two key items are detailed below:

1. Subsoil Geology
   The Bomaderry WwTP was situated over two geological environments, an elevated terrain in the west, and a flood plain in the east; with the Nowra WwTP site entirely located within the Shoalhaven River floodplain. Collectively the team was able to overcome the challenging geological conditions through innovative design and coordinated construction practices entailing preloading, geotechnical monitoring, hydraulic cut-off walls and staged structure/services construction.

2 . Shoalhaven River Horizontal Directional Drilling (HDD)
   A critical component of the project was the major HDD crossing of the Shoalhaven River, which connects the Bomaderry WwTP to REMS. Being 1,410m long and the largest bore of its kind in Australia, the bore was expected to encounter a mixed bag of ground conditions. Deemed a high project risk due to these factors, the team was able to manage the unstable and problematic overlying ground conditions through the inclusion of steel conductor casing seated fully into rock which prevented the intrusion of overlying soils and escape of drilling fluids during the works.

Post completion the project continues to promote a sustainable future, with Shoalhaven Water delivering regular community tours of the new works to help inform community-based organisations on the importance of sustainable water management and reuse practices.

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This project was the 2021 winner of the Water Management Award at the LGNSW Excellence in the Environment Awards.

Nowra WwTP after completion

Bomaderry WwTP after completion