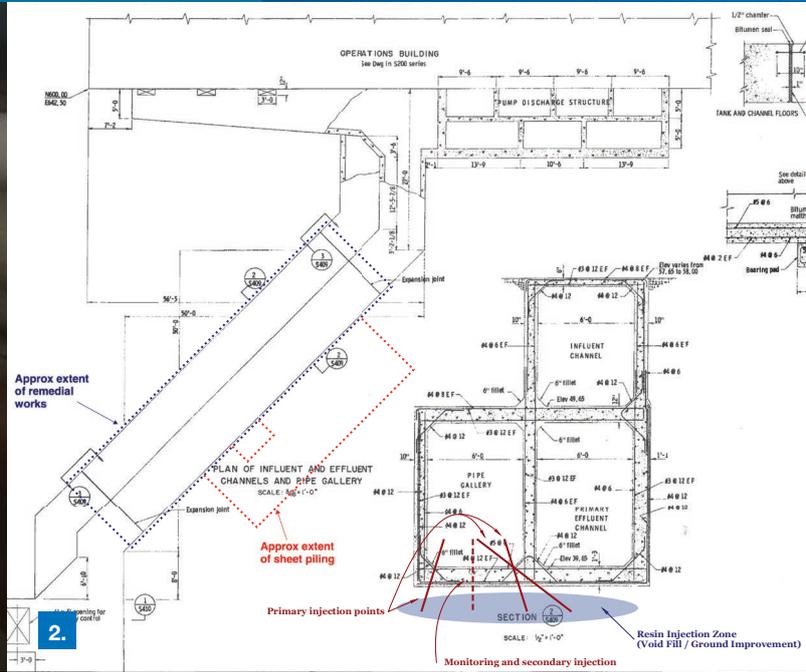


# Voids Under Sewer System Filled Using Teretek®



1.

2.

## INDUSTRY

Infrastructure

## STRUCTURE

Wastewater Treatment Plant

## PROBLEM

Voids Beneath Culvert

## LOCATION

Christchurch, New Zealand

## DURATION / YEAR

5 days / May 2017

## TECHNOLOGY

Teretek®

## BUSINESS UNIT

Mainmark New Zealand

Pictured above:

1. Pipe gallery where angled holes were drilled to treat the area beneath the channels

2. Diagram showing the areas of treatment at the plant

## Summary

The Christchurch City Council is responsible for managing the city's wastewater via the Christchurch Wastewater Treatment Plant. The plant processes sewage from its raw state before safe, clean water is discharged three kilometres off New Brighton beach.

While excavating down one side of a treatment plant culvert to seal a leaking silicone joint, a civil contracting company discovered large voids under the main effluent route. Left untreated, this would potentially result in the culvert sinking under its own weight. Because this was Christchurch's main wastewater culvert, the issue needed to be remediated quickly as a collapse could cause the entire wastewater network to shut down.

The voids were likely caused by smaller surface water drainage running adjacent to the culvert and needed to be filled to keep the culvert supported and the sewage pipeline operational.

Christchurch Wastewater Treatment Plant engaged Mainmark to fill the voids beneath the main effluent lines and pipe gallery, remediate the ground, and improve its bearing capacity to limit further settlement. The structure also required monitoring to ensure it was adequately supported and safe.

The successful void-filling project has provided Christchurch Wastewater Treatment Plant with peace of mind, knowing that further voids are less likely to occur, thereby protecting one of its critical infrastructure points.

## Voids Under Sewer System Filled Using Teretek® continued

### Objectives

The Christchurch Wastewater Treatment Plant had a requirement to fill significant voids beneath its main culvert, which measured approximately 50m<sup>3</sup>.

Mainmark needed to remediate the ground and improve its bearing capacity. As lifting the culvert was not possible, it was essential to stabilise it in situ.

As the asset was critical to the Christchurch Wastewater Treatment Plant's operations, monitoring for the structure was required to confirm it was adequately supported throughout the project.

Mainmark was required to complete the project quickly and with minimal disruption to the treatment plant without shutting down any machinery or equipment.

Mainmark also needed to limit water ingress while working below the water table in the pipe gallery.

### Solution

Mainmark used its proprietary engineered resin injection solution, Teretek®, to fill the voids and re-support the culvert. Teretek®'s unique two-in-one capability made it ideal for the project because it fills the voids and strengthens weak ground, reducing the risk of similar voids forming in future. Teretek® is applied via small, precise injection points, using a fast and clean process that creates minimal disruption.

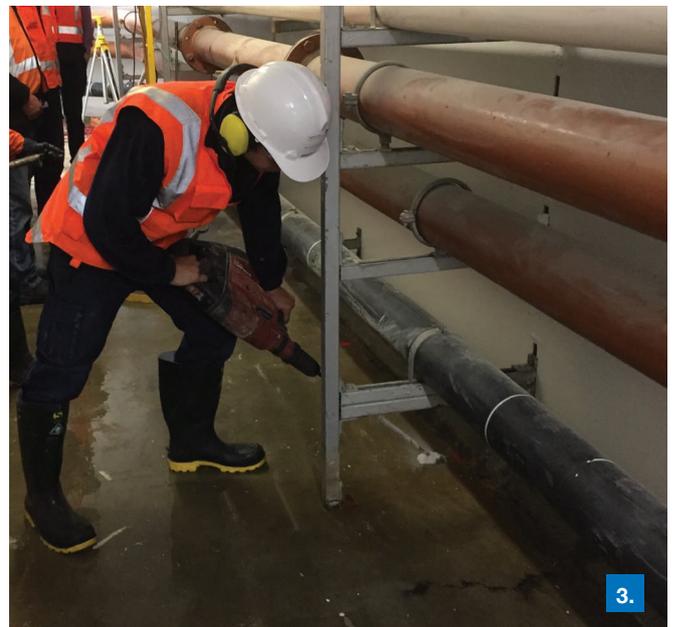
Mainmark's engineered structural resins are a closed-cell membrane, meaning they are completely impervious to water ingress.

To minimise disruption to the plant's operations, all the work was carried out through 16mm penetrations in the floor slab from a pipe gallery that ran parallel to the culvert. The holes were then leak-sealed using resin. Mainmark was mobilised to the site within four days of being notified of the issue, and completed the project in just five days.

Since the culvert was critical to the Christchurch Wastewater Treatment Plant, Mainmark worked with local surveyors, KOA, to provide continuous monitoring throughout the project to ensure the culvert did not experience further movement after the voids were filled.

KOA set up prisms along the top of the culvert and used a 'Total Station' to provide real-time feedback on the culvert's movement. The monitoring stopped at the end of the project, however the resulting data can be used in the future as a benchmark to gauge whether the culvert has experienced further movement.

Civil engineering firm G&T Construction was responsible for overseeing the project on behalf of Christchurch City Council, and was very impressed with the way Mainmark delivered the project. Lex Thomson, managing director, G&T Construction, said, *"This was a great job, well done. It was a pleasure to work with people who are quite good at what they do."*



3. Small angled holes drilled by Mainmark technician