

Lightweight Terefil® Fills Redundant Culverts and Pipes in Newcastle

PROJECT PROFILE

N17J007

mainmark



INDUSTRY

Infrastructure

STRUCTURE

Stormwater culvert

PROBLEM

Ageing / decommissioned infrastructure

LOCATION

Mayfield, Newcastle,
New South Wales

DURATION / YEAR

9 days / March 2019

TECHNOLOGY

Terefil®

BUSINESS UNIT

Mainmark Australia

Above: (Left) Terefil is pumped through an application hose directly into the area to be treated. (Right) Terefil is produced onsite, eliminating the need to pump in, transport or treat large quantities of water.

Summary

A system of redundant stormwater culverts and pipes located in a residential area of Mayfield, a suburb in Newcastle, New South Wales, needed to be decommissioned after a new stormwater drainage system was installed.

The pipes and culverts were situated beneath the roadway and spanned across three connecting residential streets. There were 3 culverts measuring 1.55m wide by 131m long, and 3 pipes measuring between 27m and 101m in length.

Prior to installing the new stormwater system, the contractor Diona Civil Engineering, sought an appropriate solution to decommission the ageing infrastructure. Digging up the damaged culverts and pipes was deemed to be unfeasible as the excavation work would have been too disruptive for residents in the populated area.

An alternative approach was to leave the redundant culverts and pipes in place and completely filling them with an appropriate grouting solution. There were concerns however, that using a standard high flow concrete fill material would be too heavy and would compromise the integrity of the old culverts and road above.

Diona Civil Engineering consulted Mainmark, who recommended using Terefil®, a lightweight cementitious void fill product, as a viable permanent remediation solution that could effectively fill the culverts and pipes without compromising the surrounding ground or damaging the defunct structures.

The substantial size of the total treatment area made this among the largest Terefil projects Mainmark had ever undertaken. As the site was located in a populated residential area with access restrictions, the project needed to be undertaken during business hours.

Lightweight Terefil® Fills Redundant Culverts and Pipes in Newcastle continued

Objectives

Mainmark was required to decommission the culverts and pipes without compromising the surrounding area or damaging the redundant structures. It was also important that the remediation process did not disrupt local residents or impact the road infrastructure.

Solution

Mainmark's proprietary product, Terefil, is a technologically advanced, engineered lightweight cementitious-based filler that is well suited to projects where alternative granular fills or aggregate material are considered too heavy.

Terefil is significantly lighter than standard grout fill, minimising pressure to surrounding structures and substrate soils, while at the same time, able to withstand significant pressure and maintain structural integrity under heavy loads, such as road traffic.

Being highly-flowable, Terefil can be pumped over long distances while using lower pumping pressure, reducing the risk of damage to nearby pipes or other in-ground structures as the solution is pumped.

Mainmark adapted a delivery solution to suit the unique requirements and substantial size of the project, carefully selecting just 1 injection point for each pipe and culvert, pumping the Terefil at a slower than usual rate to fill the 990m³ of culvert and pipe treatment areas. Each segment of culvert and pipe was capped at one end and then filled with Terefil using "breathers" to reduce the risk of additional pressure on the damaged culverts. Integrity of the culverts and pipes was continually monitored at regular intervals throughout the fill process to ensure no leakage occurred during the application of Terefil.

Approximately 990m³ of Terefil was pumped into the affected culverts and pipes across the entire project area which was completed over a period of just 9 days, delivering an extremely cost-effective solution with minimal disruption to the local residential area, and without compromising project timelines or outcomes.

Senior project engineer for Diona, Gavin Bowen, had this to say: "Mainmark did a great job on the Terefil filling of the redundant stormwater culvert and pipes system in Mayfield. The crew were very efficient and very helpful to work with."



Area map showing the interconnected culverts and pipes decommissioned over a period of just 9 days.