Structural Liner Created with GeoSpray

PROJECT OVERVIEW

Wellington City Council was looking for a solution to repair the 1350-millimeter South Karori stormwater corrugated culvert. During the past 50 years of its service, the culvert's invert had fully degraded over its entire length (220 meters) from erosion and corrosion, with holes of up to 500 millimeters deep throughout the culvert. The culvert was installed simultaneously with the subdivision surrounding it, so it followed the natural stream bed, with four bends, vertical and horizontal deviations of up to 32 degrees and backfilled with up to 10 meters of cover.

The close proximity of the residential properties meant a trenchless, nondisruptive solution was required with at least a 50-year design life and an application that is less than 100 millimeters thick. The area was also popular for hiking and mountain biking, so public access had to be maintained during construction.

Opus International Consultants was hired to find a suitable product to meet the budget and timeframe specifications of the council. After reviewing submissions, Concrete Treatments NZ Limited (CTNZ) was awarded the project by proposing GeoSpray geopolymer mortar as the structural solution.

SOLUTION

CTNZ provided a solution in the form of a structural liner, which was formed using the GeoSpray system supplied by GeoTree Solutions. The repair area was cleared of any debris and the culvert bedding was reinstated. Then the invert was repaired using pumped concrete so the GeoSpray mortar could be applied. The project required various thicknesses along the length of the culvert, ranging from 42.5 to 50 millimeters

As part of the overall project process, CTNZ obtained approval from the Greater Wellington Regional Council for its Environmental Management Plan and communicated with the neighborhood residents regarding the project. A temporary access track needed to be built to safely access the culvert. All aquatic species were captured and taken 100 meters upstream of the work site. Once the regulatory preparation was done, the liner design was finalized and reviewed prior to installation.

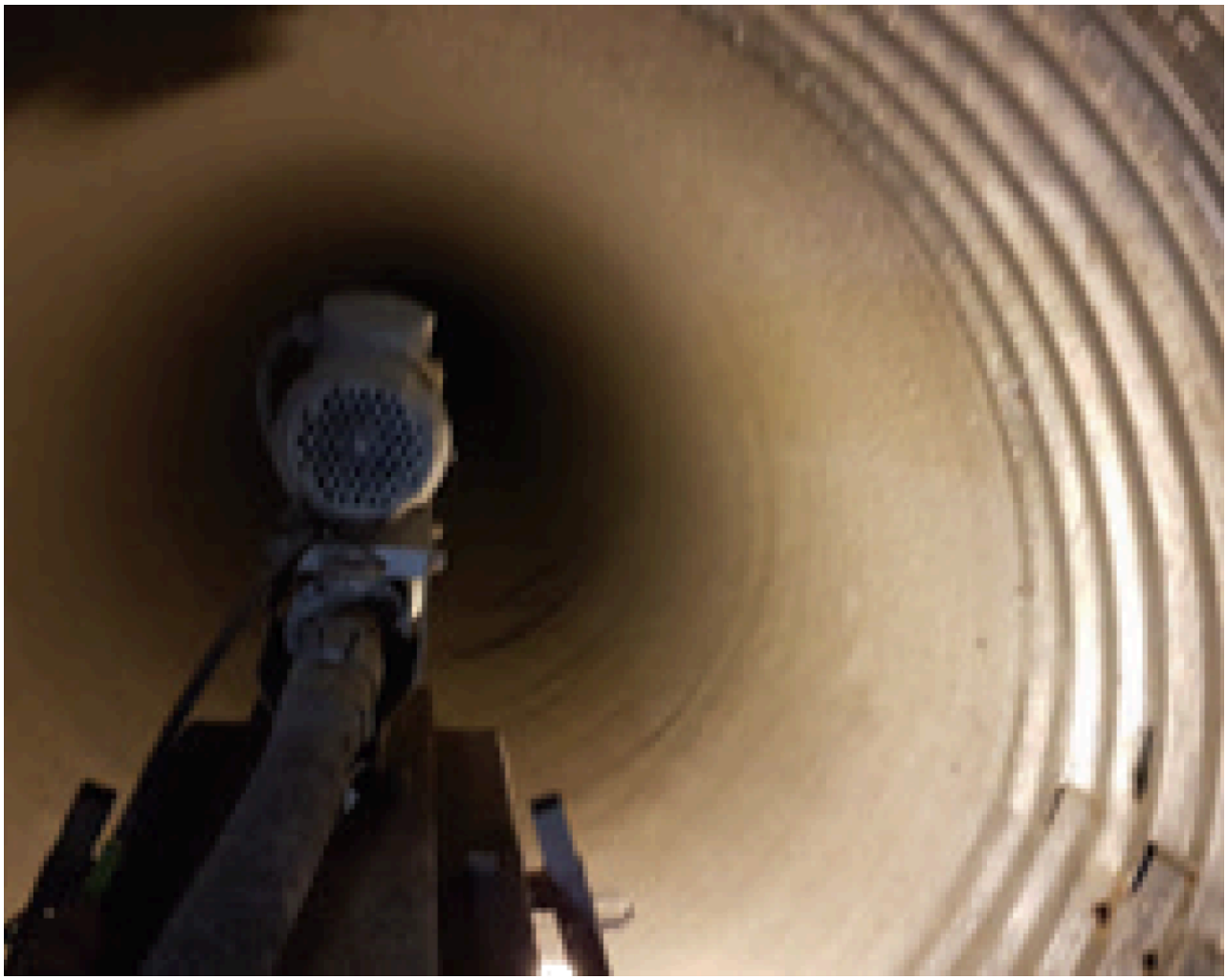
RESULTS

After the GeoSpray mortar was applied, Flexible Iris baffles were installed to accommodate migrating fish, and riprap was placed on either side of the culvert for protection. The temporary access track was reinstated back to the environment through planting of local tree

species, and the mountain bike track was lengthened and enhanced. The project was completed on time and within approved budgets, without any time extensions for inclement weather experienced during the contract.

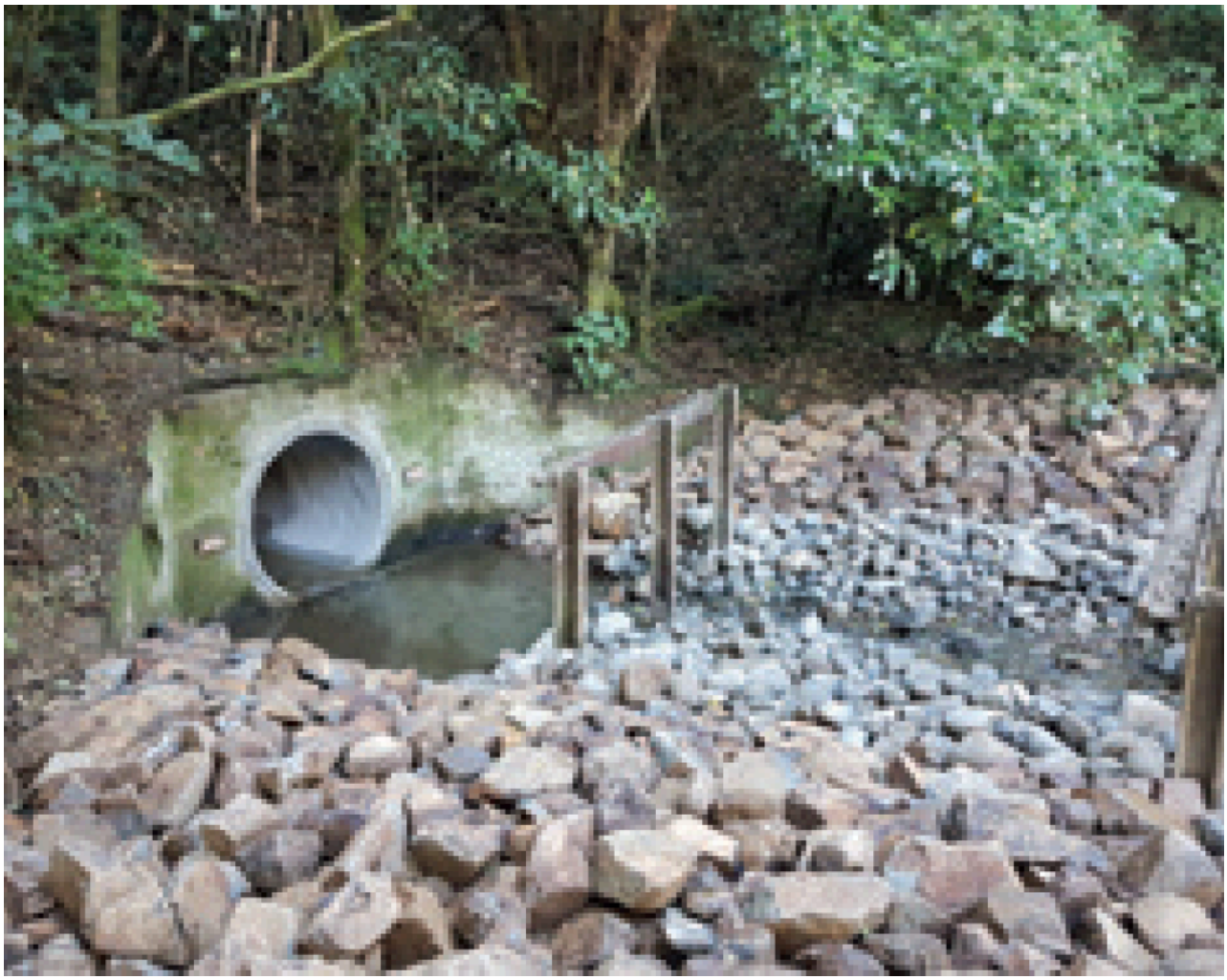
PROJECT DETAILS
Application: Stormwater Corrugated Culvert
Client: Wellington Water
Location: South Karori, Wellington, New Zealand
Installation: March 2018
Contractor: Concrete Treatment NZ Limited (CTNZ)

Completed project with Iris baffles installed as refuge for migrating fish.



Centrifugal casting of GeoSpray mortar.

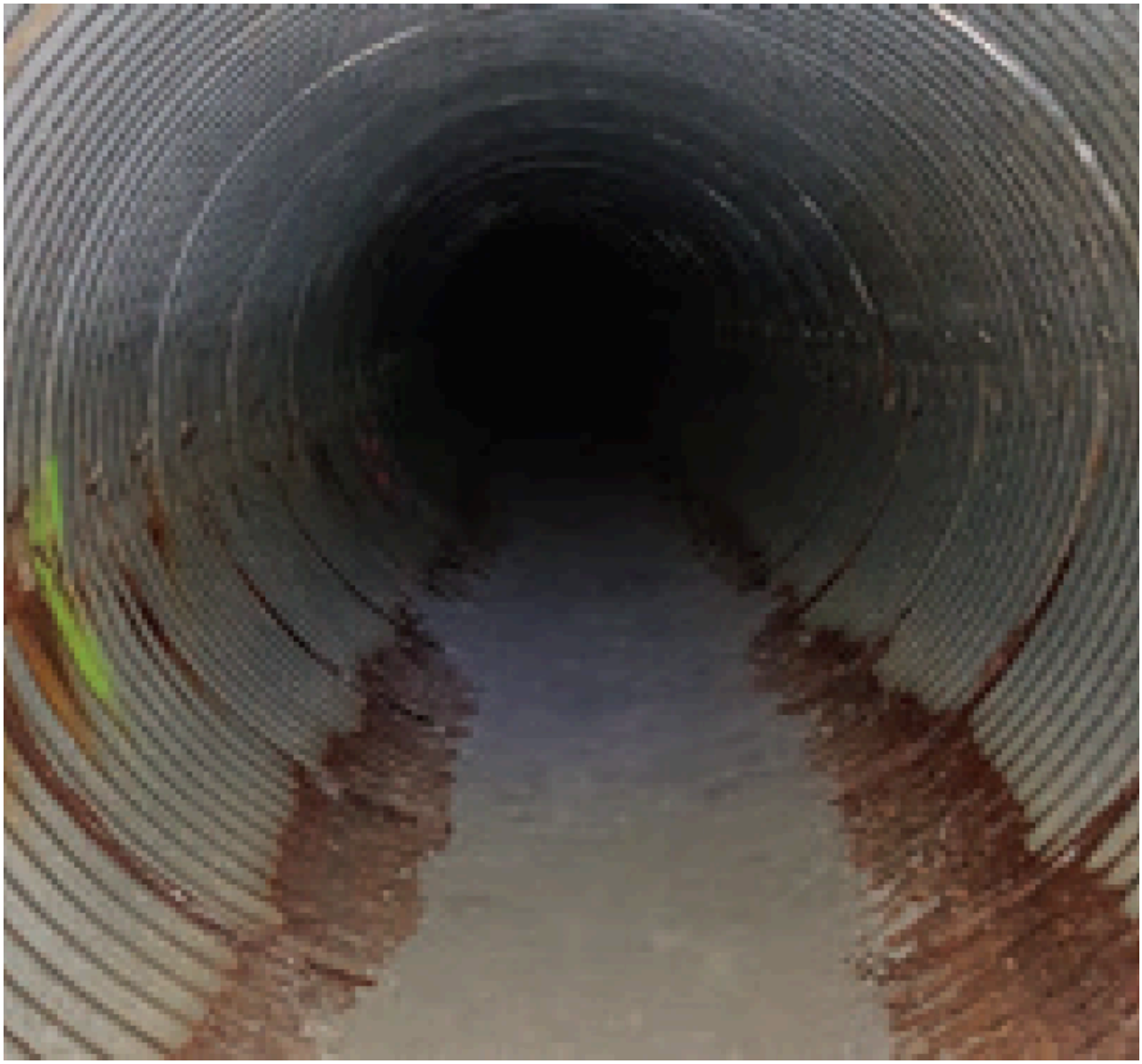
Completed lining with GeoSpray mortar at inlet.



Completed culvert with GeoSpray mortar and riprap surrounding exterior.

Condition of invert prior to GeoSpray coating.

Excavation of debris within the culvert invert



Invert repaired and ready for GeoSpray mortar casting.