



Rail Culvert Re-supported with Controlled Teretek[®] Resin Injection

The Durraburra-Newlands rail line near Collinsville was experiencing deflection above a set of culverts, where water migration beneath the structure had caused erosion, void formation and a reduction in the load-bearing capacity of the underlying soils.

Aurizon required a controlled ground engineering solution capable of filling subsurface voids, improving support beneath the culvert base slab and limiting further deflection under rail loading, while maintaining strict lift tolerances to protect the rail structure throughout the works.



Asset Type

Rail Culverts



Location

QLD



Sector

Infrastructure



Solution

Ground Improvement & Void-filling



Technology

Teretek[®]

mainmark

Problem

Deflection had been identified in the rail directly above the culvert structure, indicating a loss of support beneath the asset. Water migration beneath the culvert had caused erosion of the supporting ground, resulting in void formation below the base slab and around the culvert support zones. This had reduced the strength and support capacity of the underlying soils, increasing the potential for continued movement under rail loading.

The project required a remediation approach that could address both voiding and weakened ground conditions beneath the culvert without excavation or major disruption to the rail corridor. A key technical requirement was lift control. The treatment needed to reintroduce support and improve ground contact beneath the culvert, while ensuring the rail and culvert structure did not experience excessive vertical movement during injection.

Solution

Mainmark delivered a targeted Teretek® resin injection program beneath the culvert base slab to fill voids, improve the supporting ground and re-establish support beneath the structure. The methodology involved direct drilling through the box culvert base slab, with injection points positioned along the culvert support walls and beneath the nominated culvert legs.

Injection was undertaken at two treatment depths to address both shallow voiding immediately beneath the slab and deeper ground improvement requirements. Initial injections were carried out approximately 500 mm below the culvert base slab to target loss of contact and voiding beneath the structure. Secondary injections were then undertaken at deeper locations, up to a nominal 1000 mm below the base slab, to improve support within suitable compactable soils.



Throughout the works, Mainmark used real-time monitoring to track the elevation response of the rail and culvert structure. Levels were established prior to injection and used during treatment to monitor vertical movement. The injection process was carefully controlled, with small, staged injections used to achieve the required ground response while maintaining lift within the specified tolerance.

Positive vertical displacement was used as confirmation of void filling, support re-engagement and compaction response. This allowed the team to progressively verify that the resin was filling voids and improving support beneath the culvert, while carefully managing movement of the structure above.

Result

The project was successfully completed over two days. Mainmark injected approximately 500 kg of Teretek® resin beneath the culvert structure, treating approximately 60 linear metres along the culvert support walls. The works filled voids, improved support beneath the base slab and restored bearing support beneath the affected culvert zones.

A critical project requirement was to maintain rail lift within 2 mm throughout the treatment process. This was achieved through controlled resin injection, staged treatment depths and continuous monitoring of rail and structure elevation. The total lift recorded across the treated cells remained within the project tolerance, demonstrating that the remediation works were completed with the required level of control.

The works provided a targeted remediation outcome for Aurizon, helping to improve support beneath the culvert and safeguard the long-term performance of the rail infrastructure, while completing the works efficiently, safely and with minimal disruption to the asset.

The project demonstrated Mainmark's ability to deliver highly controlled, low-disruption ground improvement solutions in sensitive rail environments, where asset protection, movement control and operational continuity are critical.

1000 mm
Treatment
Depth

500 kg
Volume
Injected

60 Linear
Metres

2 Days
Duration

