



Launching the Herreknecht AVN 1600 microtunnel boring machine.

PIPEJACKING UNDER A VITAL RAIL LINE AND ROAD LINK

D.J. Mac Cormick Contractors recently completed the installation of a DN1400 water main underneath the Southwest Highway and Brookfield freight line in Serpentine, south of Perth.

The Brookfield freight line is the only rail freight network in the southern half of Western Australia and serves as a vital link for moving a range of commodities, including grain, iron ore, coal, alumina, bauxite and interstate freight. D.J. Mac Cormick was tasked with the challenge of installing a 1,940 mm concrete jacking pipe under the line, without disturbing trains or traffic on

the nearby Southwest Highway. Significant pre-planning was instrumental to the success of the project, which required a high-level of communication between the stakeholders, which included Brookfield and Water Corporation. During the pre-planning stage, pipejacking was selected as the appropriate method to install the new pipeline. The client also stipulated that the 1,422 mm carrier pipe

should be welded and installed inside the jacking pipe using spacers.

D.J. Mac Cormick Contractors started project works by excavating the launch and retrieval shafts for the tunnel boring machine (TBM), setting the stage for tunnelling and pipe jacking works. Each shaft was 4-5 m deep and was supported with shoring supplied by GSS Hire with the »

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required kilopascal (kPa) ratings, as per the ground calculations.

Before launching the TBM, D.J. Mac Cormick Contractors had to consider one of the key project challenges – installing the pipeline without disrupting the train timetable. It was imperative that when the TBM was within 5 m of the rail line, and when it was passing directly under the line, tunnelling operations had to cease 10 minutes prior to trains and carriages passing the tunnel route.

Once the TBM had passed under the tracks, and was 5 m past the other side, operations could continue as normal. During the construction phase, trains with as many as 42 carriages were passing over the pipeline route.

Tunnelling operations were completed

using a Herreknecht AVN 1600 closed-face slurry TBM with a mixed cutting wheel. The machine easily handled the clay and hard ground geology which was encountered during the construction.

The AVN 1600 is capable of drive lengths in excess of 600 m, is laser guided, steerable, and has man entry access, which allowed the crew to change cutter where required. The machine is also suitable for the direct installation of sewer and drain pipe infrastructure, and is guaranteed to be accurate within 20 mm, plus or minus, over the length of a drive.

Analysis predicted settlements of 12 mm; however, D.J. Mac Cormick's specialised tunnelling crew and the TBM resulted in settlement being recorded. Monitoring of the settlement was undertaken on daily basis

through the construction stages and regularly checked following construction to ensure there was no change to the settlement.

Following the completion of the installation, D.J. Mac Cormick Contractors began welding and grouting the outside of the jacking pipes through grout ports. The project was completed to a high standard with minimal disruption to the nearby highway and rail line.

D.J. Mac Cormick Contractors also recently completed another tunnelling project, which included boring under the Perth to Armadale rail crossing in Victoria Park and the Great Eastern Highway. For this project, it utilised a 1,200 mm diameter closed face TBM for construction. Project stakeholders included Main Roads, the Public Transport Authority and the Water Corporation. **T**

D.J. Mac Cormick Contractors is a leading tunnelling and infrastructure construction company, with branches located in Western Australia, South Australia, Victoria, New South Wales and Queensland. Its specialist team of personnel have over 40 years of experience and a reputation for excellence as substantiated by its numerous Australian and international projects and awards.

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