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COMPLEX INFRASTRUCTURE

FEATURES

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BURROWS ROAD EA TUNNEL

Abergeldie Complex Infrastructure™ has just completed pipe jacking a purpose designed Transmission cable housing tunnel for Energy Australia. The tunnel will house up to 6 x132kV cable circuits which will form a part of the reconfigured Energy Australia Network from TransGrid's Beaconsfield South substation.

The 87m long and 2800mm diameter tunnel is approximately 5m below Burrows Road in Alexandria, Sydney. At that depth the top of tunnel is located 4m below the watertable and is within 100m of the nearby Alexandra Canal.

"The project required an Earth Pressure Balance Machine (EPBM) due to the difficult water charged ground conditions. Abergeldie had a suitable machine, and that was a major factor in it being awarded the job" says company director Mick Boyle.

Abergeldie has successfully provided Energy Australia with similar pipe jacked, cable housing tunnels over the past 4 years: a tunnel at Artarmon, 111m long and 1650mm diameter excavated in sandstone; another at Pymble, 97m long and 1650mm diameter bored through shale; and most recently at Carlton, a 120m long and 2400mm diameter tunnel through sandstone. All of the projects included the construction of permanent access structures that were used as send and receive pits. The projects also included fit out of the tunnels with the necessary cable support brackets so that the cables could be installed later by others.

In the previous projects Abergeldie teamed up with Tunnel Boring Australia and utilized their tunnel boring and pipe jacking equipment. This time they again teamed with Tunnel Boring Australia but utilized Abergeldie's own Herrenknecht Earth Pressure Balance (EPB2000) pipe jacking machine.

Abergeldie designs, builds and operates a fleet of the largest blind bore drilling rigs in the world. Abergeldie blind boring rigs are capable of vertically drilling and hydrostatically lining shafts up to 600m deep and 7m in diameter. Using a combination of Abergeldie's expertise in this related field and the experience of Tunnel Boring Australia, Abergeldie 'upskinned' their EPB2000 to enable it to drill the required diameter for the tunnel.

The scope of work for this tunnel also included an 8m deep launching shaft and an 8m deep receiving shaft. These will become permanent access structures. The design of the launching and receiving shafts adopted contiguous pile walls with fibreglass reinforcement positioned with exact precision for the tunnelling machine to drill through.

Leakage at the entry shaft was prevented with the use of a seal ring combined with the injection of expanding hydrophilic crystals at the entry point, and the pre-treatment of the ground by injection at the cutting



head. When the machine broke through at the receiving shaft it was completely dry.

"Due to the poor quality water charged ground we had to be careful the tunnel boring machine didn't sink when it first left the send pit. Careful steering was required to keep it on target" said Jonathan Sisovic, Abergeldie's engineer on the project. "When we broke through at the receive pit we were out by only 7mm in both line and level which is a great result. We only had a 20mm tolerance on line and level in our seal ring."

Abergeldie specialises in complex civil infrastructure projects and has been able to use its experience and resources to overcome difficult ground conditions to construct this pipe jacked tunnel within tight timeframes set out by the client.

The tunnel is due for completion late October 2010.