

# HDD drives fuel line for BP

UEA was recently contracted by AJ Lucas on behalf of BP Australia to install 345 m of 16 inch steel pipeline under the open channel and port access road at Elizabeth Street, Carrington near Newcastle in New South Wales.

**B**P Australia owns and operates a fuel terminal located at the corner of Industrial Drive and Elizabeth Street, Carrington. The terminal is used for the storage and handling of bulk quantities of diesel and petrol fuels.

Due to increases in demand and mining growth in the Hunter region a more secure fuel supply has been sought. The Newcastle Infrastructure Project will allow fuels to be pumped directly from tankers at Port Hunter via a 2.5 km steel pipeline to the refurbished BP terminal. In order to construct the pipeline, a

345 m horizontal directional drill (HDD) operation was needed to bore under an open channel and port access road at the site.

### Background to the bore

Historically, the Carrington area has been subject to uncontrolled filling. Uncontrolled fill refers to fill deemed unsuitable to support a slab-on-ground foundation and may contain undesirable materials and/or has not been placed under compaction control.

The majority of the pipeline route is

through areas of known contamination with areas of fill material found to contain slag-based materials. This posed a challenge not only for environmental risk factors but on the unknown effect these contaminants would have on the drill fluids.

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*The DFE 700 gallon per minute cleaning system positioned at the receipt side of the bore cleaning mud to be pumped back to the rig 350 m away.*



*View from the receipt pit along Elizabeth Street.*

UEA's Vermeer D300x500 set up at the launch side of the bore.



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The location for the underbore was within the heavy vehicle access route to Port Hunter and the exit location was in close proximity to residential houses. This posed further constraints on working hours and days as well as limiting the work method.

Geotechnical investigation of the bore location suggested that fill would be encountered down to 2 m, with estuarine sands found below this point. It was also noted that the ground water level was 500 mm below surface at high tide.

## Pilot bore

In order to meet the client's time requirements, UEA mobilised its 45 tonne Vermeer D100x120 HDD rig and DFE 300 gallon per minute cleaning system to undertake the pilot bore.

After initial delays refining the bore design and launch location due to service congestion, pilot boring began and was successfully completed in five days within easement and bend radius.

Completion of the pilot bore confirmed that ground conditions included estuarine sand with low clay content at depth.

Due to commitments on another bore and a Christmas deadline, UEA was

unable to mobilise its 136 tonne Vermeer D300x500 rig until the New Year. A decision was made to pull in a smaller drill string to enable washing over once remobilised.

## Reaming and pipe installation

Come the New Year and completion of prior commitments, UEA mobilised its D300x500 rig and DFE 700 gallon per minute cleaning system to undertake reaming and installation of the 345 m, 16 inch main. Once set up and ready to wash over the drill string maintaining the bore hole, further site constraints delayed works until a closure of the port access road could be agreed in order to string out the pipe for pullback.

Scheduling of the reaming works were based on a day and time that pipe could be laid out across the access road in order to maintain the only heavy vehicle access to Port Hunter.

A 750 mm open reamer was utilised for the pre-reaming pass in conjunction with a comprehensive mud program designed to carry out solids and help maintain hole stability in the sand. The bore was surprisingly stable with returns maintained for 90 per cent of the ream, a testament to the importance of good mud in these ground conditions.



A mud engineer busy keeping up with demands during pipe pull.

With a road closure agreed from mid-day Saturday, a pull late into the evening was assured. The two pipe strings were craned into place before being welded and wrapped ready for installation.

The pipe pull began at 1.30 pm and after a few delays the pipe was steadily pulled in, with pullback pressures increasing less than 10 tonnes through the install. The pipe was successfully installed with pullback pressures lower with the pipe in the borehole than when on the rollers.

## Rising to the challenge

After numerous meetings and 'rig side' discussions it was a pleasing result for UEA to complete the bore on time without serious incident. UEA appreciated the opportunity to work on a project that provided an interesting challenge.