Change in modus operandi

In Phase 1, the new and existing pipelines run separately – mostly on either side of the N3 highway. In Phase 2, however, the new pipes run in very close proximity to the existing lines and the sheer scale of the work poses a threat to the existing pipeline's stability.

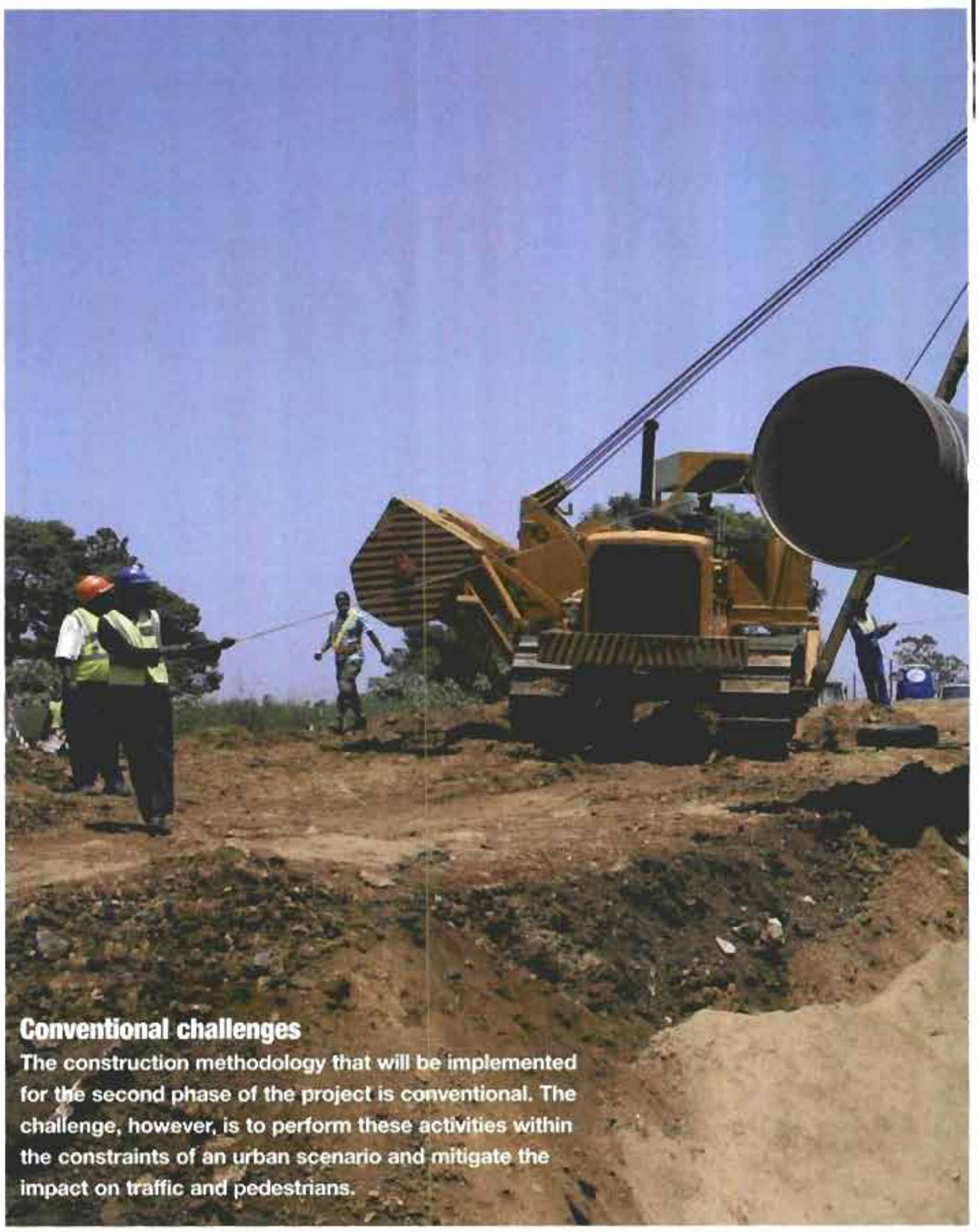
"We have to prove the position of the existing services (cables, sewers and stormwater) on site before we proceed and we will have to fence them off when working nearby. If we find that the existing services meander and start to encroach on the planned route, then the new line will be amended accordingly.

"In certain areas, we will have a restricted mode of construction. The construction methodology is conventional but the difficulty is in how to perform these activities within the constraints of an urban scenario, and mitigate the impact on traffic and pedestrians. For example, there is a restriction on how much of this work can be opened up in an urban area. There is a limitation between the excavation front and the back where you do all the reinstatement. The maximum trench length is about 300 m. So, until the back is closed and the asphalt laid, the front cannot progress."

A minimum of six fronts will be open at any given time with, possibly, up to 12 open in the region in order to keep the machines moving. The main contractor will be required to provide teams on site, outside working hours, to check barricading, lighting and signage at the open fronts, and undertake aspects such as stormwater management.

The intention is that these teams will operate in conjunction with the Ethekwini call centre to deal with public queries and complaints. In terms of noise and dust management, no work may be done outside normal working hours (06:00 to 18:00) and no work will happen near schools during term time.

With a 30-month construction period, if Phase 2 starts on schedule in July 2010, it should be completed towards the end of 2012 or beginning of 2013.



Conventional challenges

The construction methodology that will be implemented for the second phase of the project is conventional. The challenge, however, is to perform these activities within the constraints of an urban scenario and mitigate the impact on traffic and pedestrians.

Pressure to power

Two new reservoirs will be constructed to deal with pressure control in Hillcrest (20 Mℓ) and Wybank (10 Mℓ). The purpose is to dissipate the energy accumulated in the pipeline as it moves from a high altitude down to the coast.

Rodrigues says that the Ethekwini Municipality has already put out an expression of interest for transaction advisors for two power-generation plants on these sites. "Instead of dumping the energy generated by the flow of water downhill, the intention is to use small hydropower generators that would reap that 'green' power and check it into the local grids. The transaction advisor would be required to advise on the possibility of international companies working in conjunction with local companies to finance, construct and operate these small power generators."

The actual power generated would, probably, be less than 1% of what the city uses but could be used to run parts of Hillcrest, Pinetown and New Germany.

Several jack crossings

Phase 1 required several jack crossings under the highway and the Durban-Johannesburg railway line where special precautions have been taken. Ground levels are surveyed before work commences during the process of jacking and for 12 months thereafter.

Rodrigues observes that all crossings have been trouble-free except for one. At Inchanga Station, where the pipeline traverses the provincial road, the road surface and structure is undermined. "The road is a boulder construction and groundwater has generated cavities among the boulders. When the jack sleeve was put in, some settlement occurred and cavities were found. So a section of the culvert crossing has been completely grouted in. The rest of the road will have to be repaired by the provincial authorities."

Another challenge will be in the flood plain of the Umgeni River where there is a traverse of about 300 m. The pipeline will be constructed in two sections here. The river will be moved 150 m to one side to allow construction of the pipeline on one half of the flood plain. It will then be moved to the other side to allow construction of the balance.

"This work will be undertaken after the May rains which can be very destructive and before the September rains," says Rodrigues. "So, during the winter period, we will liaise with Umgeni Water to shut off some of the water coming out of Inanda Dam, construct this section of the pipeline quickly, concrete it in and bring the river back on course so that it flows as normal for the next rainy season."