

LTA's new way to sound the ground for MRT tunnels

It uses ground vibrations, currents where drilling boreholes can't be done

By ADRIAN LIM

WITH new underground rail lines being built below existing buildings and infrastructure, the Land Transport Authority (LTA) is finding new ways to assess soil conditions before construction starts.

These geophysics methods – which make use of ground vibrations or electric currents – are used when more direct means of surveying, such as drilling boreholes cannot be done.

This was encountered at six locations along the northern section of the Thomson-East Coast Line (TEL), where construction moved into full swing yesterday following a ground-breaking ceremony.

Giving two examples, an LTA spokesman said geophysics methods were used in 2009 to survey the soil conditions at St Joseph's Institution (SJI) International and Innova Junior College.

At SJI International, which is near Caldecott Station, the TEL

tunnel passes under the school's canteen and buildings, while at Innova JC in Woodlands, the rail alignment runs under a running track and other buildings.

Being unable to drill boreholes there, the survey team relied on two techniques – seismic reflection and electrical resistivity – to do the job. The former, used at SJI International, employs probes called geophones placed on the ground. These probes pick up reflections and refractions from energy sent through the ground.

Different types of ground have different densities, which produce different rebound velocities, so that is used to identify the nature of the soil, LTA said.

At Innova, the team put electrodes into the ground to send a weak electric current. Probes are then used to determine the ground resistance.

If the rock below is dense, there is more resistance and the current will travel slower, the LTA explained.

The authority said soil investigation works are conducted for between three and five years before the tender for a rail project is called.

In the final phases, boreholes are drilled at intervals as close as 20m around the construction site, and rock and soil samples taken from as deep as 70m.

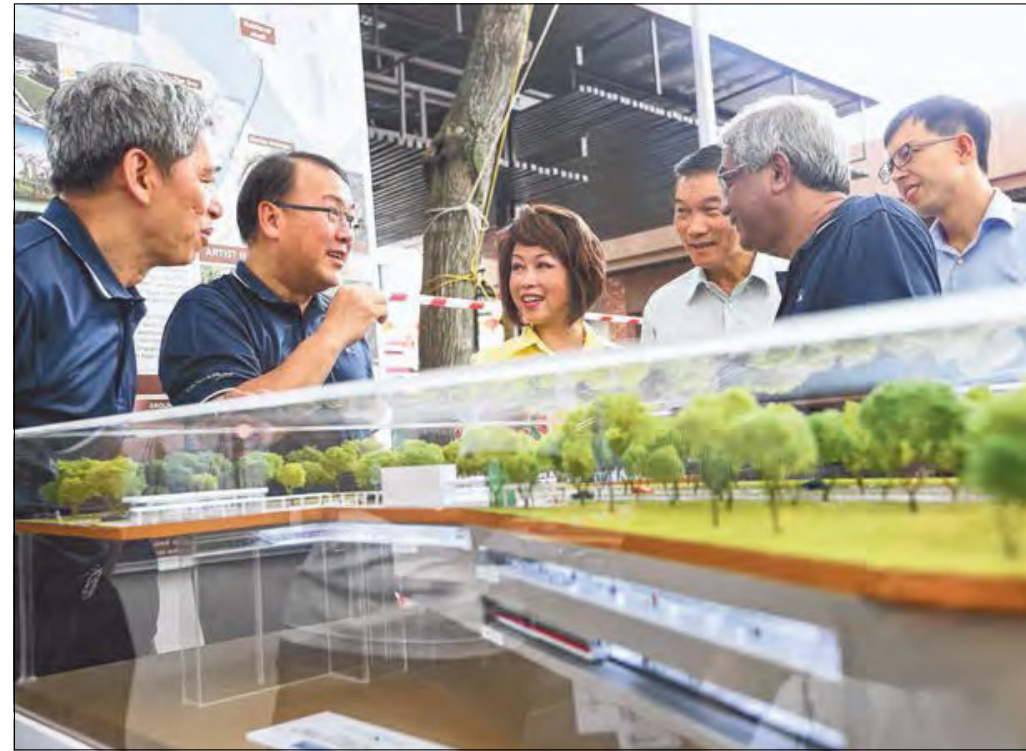
Despite its best efforts, no assessment can provide a complete picture of the ground, LTA said.

In 2012, houses in Watten Estate in Bukit Timah were damaged due to underground soil movements from the Downtown Line construction. Recharge wells had to be used to pump water back into the underlying soil to replace seepage caused by construction.

For the TEL, LTA said it will closely monitor the impact of construction, especially at Housing Board flats near Woodlands South station, shophouses near Springleaf station, and terrace houses near Upper Thomson station.

Geotechnical instruments, including ground-settlement markers and water standpipes – to measure fluctuations in the ground water levels – will be used.

Yesterday, a ground-breaking



Dr Lily Neo with a scale model of one of the upcoming Thomson-East Coast Line (TEL) stations. Dr Neo, adviser to Tanjong Pagar GRC grassroots organisations, was the guest of honour at the groundbreaking ceremony for five TEL stations yesterday. They are: Maxwell, Shenton Way, Marina Bay, Marina South and Gardens by the Bay. ST PHOTO: ONG WEE JIN

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READING THE REBOUND

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– LTA

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ceremony was held at Kreta Ayer Square to mark the start of construction of five TEL stations: Maxwell, Shenton Way, Marina Bay, Marina South and Gardens by the Bay.

With this, the construction of the 22-station northern stretch of the TEL between Woodlands North and Gardens by the Bay will move into full swing.

The TEL, which also has nine stations along the East Coast, will open in stages from 2019.

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