

# ARGENTINA'S PRESIDENT KICKS-OFF LANDMARK AGUA SUR TUNNEL



*CMC di Ravenna recently marked the commencement of the Río Subterráneo a Lomas tunnel, in Argentina, with a cutterhead lowering ceremony that was attended by the country's President Alberto Fernández..*

**T**ERRATEC is pleased to announce that the first of two 4.66m diameter Earth Pressure Balance Tunnel Boring Machines (EPBMs) that will be used to excavate the Río Subterráneo a Lomas tunnel is currently being assembled, in Buenos Aires, Argentina.

To mark the commencement of the project, a cutterhead lowering ceremony was

held in the presence of Argentina's President, Alberto Fernández, as well as numerous government officials and representatives from Argentina's national water and sanitation company AySA and Italian tunnel contractor CMC di Ravenna.

The tunnel is a key component of the multi-billion-dollar Agua Sur system that is currently

being built by AySA. The new system is the country's largest water infrastructure project in 40 years and will provide access to fresh water for 2.5 million inhabitants in the southern metropolitan area of Buenos Aires.

Along with its sister machine, the 4.66m diameter TERRATEC EPBM named 'Eva' will be deployed by CMC di Ravenna

on the 13.5km-long tunnel, which will eventually carry drinking water from the newly expanded General Belgrano Water Treatment Plant, in the city of Bernal (Quilmes district), to the city of Lomas de Zamora.

The TERRATEC EPBMs have been designed to tackle the variable soft ground geology along the project alignment, which ranges from silts to sandy silts with some cobbles expected. The TBMs' high-torque soft ground cutterheads feature with a spoke style design with a 49% opening ratio and cutting tools

consisting of fixed and back-loading knife bits that will ensure rapid advancement and minimum interventions.

The tunnel will be excavated at an average depth of 25m, beginning with an approximately 400m radius curve and continuing along an essentially straight alignment, reaching a maximum slope of +/- 2.0%. As the machines progress, they will install a precast concrete lining ring consisting of six segments (four parallelograms and two keys) 250mm thick, 1400mm wide, segments.

The new Agua Sur System comprises a series of major infrastructure works that include a raw water intake, the expansion of the General Belgrano Water Treatment Plant – which will increase its water production capacity from a current maximum of 1,950,000m<sup>3</sup> per day to 2,950,000m<sup>3</sup> per day – 23km of water conveyance tunnel (built-in two stages), two pump stations and 46km of pipe connections. The overall project is expected to take approximately 10 years to complete.



**T**ERRATEC is pleased to announce that the first of four new 6.56m diameter Earth Pressure Balance Tunnel Boring Machines (EPBMs) currently working on the Ümraniye-Ataşehir-Göztepe (UAG) Metro line – which is being constructed by the Gulermak, Nurol & Makyol JV – successfully completed its first intermediate breakthrough on 20 May, into Ataşehir Station.

The (S66) EPBM was launched on the 1km long drive southwards from Finance Centre Station (Finans Merkezi) in mid-March – along with its sister machine (S65),

which launched a month later – and has been achieving consistently good advance rates of up to 28 rings (42m) per day, despite the challenges on-site during the Covid-19 outbreak.

“We completed the first station breakthrough on May 20, after a 1,000m long drive with S66,” said Mesut Emre Aymir and İhsan Yağcıoğlu, Tunnel Managers for the Gulermak, Nurol & Makyol JV. “We have made rapid progress on the project, with an average of 20 rings per day for the last 10 days on both the S66 and S65 machines despite the

difficulties posed by Covid-19 and the relative lockdown of the city, which have seriously affected all activities and organization of the site. The outbreak has especially affected the commissioning of the second two machines (S67 and S68) where we have had some delays. Generally, however, we are very satisfied with the performance of the Terratec machines, which have exceeded our expectations.”

The 13km-long Ümraniye-Ataşehir-Göztepe (UAG) line, along with its 11 new stations and NATM-built connections, will form a second north to

south rail corridor under the densely-populated Anatolian side of Istanbul and will be located entirely underground at an average depth of about 30m.

The robust TERRATEC TBMs have versatile mixed-face dome-style cutterheads with an opening ratio of about 35% that have proven to work extremely effectively in Istanbul's mixed geology – which includes low-strength sandstones, siltstones, limestones and shales – as well as other state-of-the-art features such as VFD electric

cutterhead drives, tungsten carbide soft ground cutting tools that are interchangeable with 17" roller disc cutters, high torque screw conveyors and active articulation systems.

All four of the UAG TBM drives will be staged from Finans Merkezi Station, which is the mid-point of the line. As the machines progress north and south on a 24hr basis, they will install 1,500mm wide by 300mm thick pre-cast concrete lining rings, which consist of five segments plus a key. Mucking is via continuous conveyor with TBM and

materials supply provided with the use of Multi-Service Vehicles (MSVs).

The UAG project is one of a number of new metro lines currently being built in the city that will increase Istanbul's current 145km Metro network to more than 480km. TERRATEC currently has a total of nine machines working concurrently in the city. Members of the UAG JV were so impressed with the performance of the TERRATEC machine used on the Mecidiyeköy-Mahmutbey Metro, which is being built by the Gulermak, Kolin &

*A number of TERRATEC Earth Pressure Balance TBMs are achieving great progress rates on new lines for Istanbul's ongoing metro expansion despite the Covid-19 outbreak.*



Kalyon Joint Venture – and the progress of two other 6.56m diameter EPBMs that were delivered in 2017 to the Şenbay Madencilik-Kolin-Kalyon Joint Venture for the Dudullu-Bostancı Metro Line – that they were keen to employ a further four TERRATEC machines on this latest project.

Elsewhere in the city, two 6.56m diameter EPBMs are also making excellent progress on the Halkali-Yeni Havalimani Metro JV (consisting of Cengiz İnşaat, Kalyon and Kolin) on the Halkali-Istanbul New Airport metro line, which was awarded to a consortium comprising Özgün Yapı and Kolin by the Turkish Ministry of

Transport and Infrastructure (AYGM). The 31km-long line, along with 6 new stations and connections, will form the western-leg of the new M11 Line that runs from the recently opened third International Airport on the European side of the city southwards to Halkali (which will also be the final terminus of the new Marmaray railway). These machines (S50 and S51) both launched in mid-December, 2019, and have currently mined 2,980m and 2,680m of tunnel respectively. In April and May, the TBMs achieved their best progress rates to date, with S50 achieving 30 rings (45m) in a single day during April and S51

achieving 29 rings (43.5m) in a single day earlier this month. On the other leg of the new M11 line (the 37km-long Gayrettepe-New Airport metro line that is being constructed by the Kolin-Şenbay consortium), the refurbished TERRATEC S42 machine put in a solid performance on its section of the project last year, achieving a best day of 33 rings (46m). It is currently being prepped for its third project in the city.

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