

## BUCUREȘTI Expansion



Stabled Astra and Bombardier trainsets await their duties in the evening rush hour.

# Line 5 heads towards the city centre

The Romanian capital is expanding its four-line metro network, with four new lines and an airport link planned. **Murray Hughes** reports from București.

A short distance south of the Cotroceni National Museum in București lies Razoare, the location of one of the main worksites for Line 5, the Romanian capital's next metro line. The site houses an access shaft for a Herrenknecht tunnel boring machine that in mid-year was being prepared to undertake the 857 m drive from Razoare to Eroilor, where Line 5 will offer interchange to lines 1 and 3 on the western edge of the city centre.

At that time much of the site was occupied by concrete lining segments awaiting installation in the tunnel, construction of which is in the hands of a consortium formed of Astaldi, FCC and local company Delta ACM.

Line 5 is divided into two main sections, with the 9 km western segment from Parc Drumul Taberei to Universitate running ahead of the 8 km Universitate – Pantelimon route in the east, which will include a new depot. The initial section of tunnel between Orizont and Favorit, a distance of 341 m, was completed at the end of 2013, and

# 39 metres

OF TUNNEL BORING WAS ACHIEVED IN ONE DAY ON BUCUREȘTI LINE 5

the tunnels running west from Razoare towards Drumul Taberei are now well on the way to completion. Beyond Drumul Taberei the line will divide into two branches, with one turning south to serve Valea Argeșului and Râul Doamnei, and the other reaching Valea Ialomiței.

Using a TBM, the average rate of progress on Line 5 was 16.2 m a day, but a record figure of 39 m was achieved on one occasion; two TBMs are in use

on the project.

The capital cost of the Râul Doamnei – Eroilor section, including the spur to Valea Ialomiței, is €708.6m, of which €409.5m is being paid for by the European Regional Development Fund under its 'Transport' Operational Programme. Opening of the entire route is expected in time for the Euro 2020 football championship.

Also under construction at the moment is a 2 km northern extension of Line 4 from Parc Bazilescu to Străulești with a single intermediate station at Laminorului. Work is in the hands of Astaldi and three local companies, with completion expected in 2018.

### Airport link

Next on the agenda is Line 6. In May metro operator Metrorex announced that it would allocate 33.5m lei for design and land acquisition for the new line as part of a 1.74bn lei infrastructure investment programme during 2015. The route commences at 1 Mai on Line 4 and runs for 16 km northwest to terminate at Henri Coandă-Otopeni airport. Also due to open in time for Euro 2020, the line will carry through services from the airport to Gara de Nord.

There is already an airport rail link by suburban train to a station close to the airport, with a bus link from there to the airport terminal. However, there are only 10 services a day in each direction and there is no outbound departure from Gara de Nord between 07.37 and 13.40.

The new link is also intended to stimulate development along the corridor between the city centre and the airport. It will serve exhibition and commercial development areas, as well as important residential zones and locations with leisure activities.

### Long-term plans

In the longer term Metrorex has ambitions for two further lines. Line 7

Visitors from the UNIFE 2015 General Assembly in June inspect the workshop at Militari. Metrorex has contracted all rolling stock maintenance to Alstom Transport.





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## TRAMS

### Integration lacking

Parts of the 143 km tram network in București have been modernised to light rail standards. These include construction of an elevated station at Pasaj Basarab (right) where passengers on the circular Line 1 can interchange to main line rail services from Gara de Nord. Elsewhere on the network considerable efforts have been made to segregate tram tracks from road traffic, with modernisation schemes partly funded by the European Investment Bank.

Although tram services remain popular, there is no integration with the metro as trams are operated by Regia Autonoma de Transport



București and the metro by Metrorex; an agreement for common use of tickets was scrapped in 2014 as RATB was in debt to Metrorex.

six-car sets built by CAF which entered service in July 2014.

These are likely to be followed by a further 43 six-car sets from the Spanish builder, which Metrorex chose as preferred bidder for the Line 5 rolling stock contract. However, the contract is on hold pending investigations into the selection process.

The Militari depot is capable of undertaking major overhauls that fall due after trains have completed 1 million km. It takes about five weeks to overhaul a six-car set, during which the bogies are removed and the traction motors replaced from a float. The depot maintains a stock of around 5000 different spares.

On the oldest trains supplied by Astra, Alstom has replaced braking equipment, door mechanisms and other items, helping to drive up reliability. Dume says that availability levels have now reached 99.86%.

Last year Alstom signed an addendum to its contract that provides for refurbishment of the stabling shed at Militari, which is adjacent to the existing maintenance depot. Design work and preparations for tenders are in hand, but the job will require specialist contractors as the roof contains asbestos.

Tunnel lining segments await placement at the Razoare construction site southwest of the city centre.



would run from Bragadiru in the south-west through the city centre to Bucegi and Voluntari in the northeast. Interchange would be made with the circular Line 1 at Obor and Piața Unirii, where passengers could also change to lines 2 and 3. A connection with the future Line 5 is envisaged at Calea Moșilor.

Line 8 is proposed as a ring around the southern sector of the city, diverging from Line 1 at Crângași in the north-west and meeting Line 1 again at Drisor in the east. En route Line 8 would connect with Line 2 at Piața Sudului, with Line 5 at Drumul Taberei 34 and with Line 7 at Piața Rahova.

On a similar scale to a new line is the project to extend Line 4 southwards by 15 km from Gara de Nord to Eroii Revoluției on Line 2, continuing beyond there to Gara Progresul. The extension would have 13 stations.

Metrorex has also drawn up proposals for a northern extension of Line 2 from Pipera to Tunari, a further extension of Line 4 from Străulești to Mogoșoaia, a branch off the western end of Line 3 from Păcii to Linia de Centură Vest, lengthening of Line 5 beyond Valea Ialomiței to Brâncuși and Domnești, and from Pantelimon to Cernica in the east.

### Four lines in service

The existing network consists of four lines totalling nearly 70 km with 51 stations. It carries around 600 000 passengers a day, who contribute around 40% of annual revenue — the other 60% takes the form of various grants or subsidies. Traffic has remained static or fallen slightly over the last few years from a peak of 174.7 million in 2010, the 2013 figure being 169.8 million. However, Metrorex expects this figure

to grow significantly in the future as lines 5 and 6 come to fruition.

### Rolling stock

The metro's entire fleet of 750 V DC rolling stock is maintained by Alstom Transport under a 15-year contract that began in July 2004. The contract included maintenance and upkeep of the depots, other buildings and workshop equipment, and Alstom has transformed the working environment by refurbishing the buildings and installing modern equipment. This has been accompanied by a dramatic rise in productivity, with just 350 staff now employed in maintenance roles.

Depots are located at Militari, Ciurel, Pantelimon and Berceni. Services Managing Director Philippe Dume says that each depot originally handled one particular type of train, but now each depot deals with all types. There are 15 six-car IVA trains built by Astra in 1979, 44 six-car BM2 and BM21 trains supplied by Bombardier since 2002, and 16

Construction work is in progress on the Eroilor – Drumul Taberei section of Line 5 and on the northern extension of Line 4 to Străulești. The next major project is Line 6 to the main international airport, while longer-term plans cover Line 7 running from Bragadiru to Voluntari and Line 8 looping around the south of the city.

