

REPORT OF MONTHLY MEETING THE NORTHERN LINE EXTENSION

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A report of the LURS meeting at All Souls Club House on Tuesday 8 May 2018

The meeting welcomed Alex to give us an update on the progress of the construction of the Northern Line extension from Kennington to Battersea Power Station.

The contract for the construction of the extension was let to a consortium of Ferrovial and Laing O'Rourke (FLO) in 2014. Alex started by showing the meeting a video which explained the need for the extension and featured various 'vox pops' of members of staff engaged on the project giving their comments on the progress and achievements to January 2018, when the junctions connecting the extension to the Kennington loop had been installed and commissioned for through running on the loop.

The commissioning work at Christmas 2017 was a milestone which marked the project's development and transition from a purely Civil Engineering, construction based project, to the building of a railway, with Mechanical, Electrical & Plumbing fit-out, plus the installation of railway specific assets such as track and signalling. Alex showed the meeting a map and 3D overview of the extension, from the two shafts at Kennington Park and Kennington Green, the two step-plate junctions, the twin running tunnels and the stations at Nine Elms and Battersea Power Station. When combined with the Battersea Power Station redevelopment, the extension is the largest construction project in London, and contributes to the regeneration of the area known as 'VNEB' – Vauxhall, Nine Elms, and Battersea, which has been the vision of successive mayors. The regeneration will create 25,000 new jobs, 20,000 new homes, and will improve access to the West End and City by cutting journey times to around 15 minutes.

We were then taken on a virtual tour of the extension, firstly to Battersea Power Station, where there will be little to see on the surface as the Western entrance will be integrated with the development, and a stand-alone Eastern entrance. There will be a below-ground concourse, with a design similar to that employed on the Jubilee Line extension stations. Battersea will have an island platform, with a scissors crossover on the approach to the platforms, unlike the method of working at Heathrow Terminal 5 where trains reverse in sidings beyond the platforms.

At the present time, the conveyor used to transport excavated spoil to waiting barges is in the process of being removed, and platforms are being constructed, as is the concrete slab for the ticket hall. Construction had also recently started on the concrete slab for the roof. This presents a logistical challenge as the surface land is not owned by London Underground, but by the Battersea Power Station developer. As progress continues, the amount of land available for the project to access will decrease.

At Nine Elms, London Underground owns the complete site, so access and logistics is slightly easier. At both ends, there will be a station entrance integrated with the 'over-site' development, with the development plaza above the station platforms. We were then shown some of the Building Information Management (BIM) models which are used to conceptualise the station design prior to construction. This enables the team to check for clashes between different engineering disciplines, and ensure that there is adequate working space, as well as to model the finishes and layouts. At Nine Elms, the South Western main line from Waterloo is adjacent on a brick viaduct and the arches of this are also being redeveloped at the same time, by a different project.

The programme for construction resulted in the running tunnels being driven in advance of the station construction. Consequently, the station box was excavated around the finished running tunnels which were then dismantled through the platform areas to enable the construction of the platforms. We were shown images of the station construction, with construction at Basement 2 level and permanent beams in place, which will remain as part of the finished station, and then we were shown an artist's impression of how the station will look once construction is complete. At the time, excavation to Basement 5 (below track) level was underway, and the slab below ticket hall level (B1)

is being constructed. This is due to be completed in autumn 2018. Nine Elms has had some issues with water ingress, and this is being rectified.

We were then given an update on the progress of tunnelling, firstly with a view of the Tunnel Boring Machines, and the 'back end' view where the materials for construction are housed, together with a narrow gauge railway (the 'Temporary Way' from which the Permanent Way is so named) used to transport personnel and materials. We were then shown a view of the completed tunnels, awaiting the installation of track, and a view of one of the barges used to transport the spoil to a site in East London, and one of the step plate junctions being constructed with the original running tunnel being supported by beams. Most of the old tunnel rings were removed prior to Christmas, but the final ones around the trackbed had to remain.

Alex explained that his role to date has been primarily within the Signalling, Power, and Communications elements of the step-plate junction works. Whilst the railway was closed for a ten-day period over Christmas and New year 2017/18, what seems like a long time can go very quickly and it sometimes feels like all the work is being done in the final twelve hours. (Your reporter, having been the Tester in Charge for a number of Christmas closures, knows this feeling well!). He then showed a time-lapse video of the closure, with the old track being removed and the last of the old tunnel being taken out, the concrete breakout, installation, and lining up of the Soneville low-vibration track form, where the track sits on a rubber boot which is encased in concrete. Once the alignment of the track is checked and confirmed, the concrete pour can commence, followed by a time where the concrete cures to reach the required strength, before the installation of the point machines, conductor rail and cabling, TBTC loops etc. can commence. Once that is complete there is a period of signalling testing, and then the first test train ran around the loop prior to handback. Alex reminded us that whilst we saw one video, exactly the same was happening for the other step plate junction at the same time!

The meeting was then shown a clip from the first train across the new junctions, showing the new points, before Alex explained how the same process of installation and fine lining of the track will take place along the rest of the extension, working from Kennington towards Battersea. It's important to get it right first time as breaking out concrete is a very time consuming activity.

We were then shown the two shafts at Kennington Park and Kennington Green, with the headhouses above ground which are currently being designed. These shafts will be used for emergency access and egress, as well as for tunnel ventilation. At the moment there is a temporary staircase, which we were told is not fun to have to climb and descend multiple times in a day.

Moving on to Railway Systems, Alex first explained that this was the first time the Soneville trackform and TBTC loop have been used together on the Northern Line, and it was essential to ensure that the two worked together correctly and that the loop crossovers were in the right places. On the extension itself, the contract for the signalling works has been awarded to Thales who will bring their experience of the rest of the Northern Line to the extension. The extension will require a new Vehicle Control Centre (VCC9) located at Highgate Control Centre to control the train movements on the extension. The extension will use Third Generation TBTC equipment, as opposed to the Second Generation used on the rest of the line, and one of the challenges will be to integrate the different technologies. The extension, and the Kennington loop, will be bi-directional to increase operational flexibility. Trains will be outstabled ready for early morning departures from Battersea.

The BIM technology is also used for analysing areas of potential interference both physical and in terms of Electro-Magnetic Compatibility. Alex outlined the challenge of installing the TBTC loop cable along 3.2 kilometres of railway as opposed to the previous experience just around the two new junctions.

At the present time the team are surveying the work needed to upgrade VCC2 which covers the Kennington area, which needs to take on the control of the junction points and allow trains to be moved onto the extension for testing purposes. Next, VCC9 and its wayside infrastructure needs to be installed, as well as fitting out the new Signalling Equipment Rooms (SERs). Once the installation is complete there will be a period of testing culminating in the operation of first one, and then multiple test trains, as well as across the boundaries between VCC2 and VCC9 – probably the greatest challenge to integrate the two different vintages of technology. Alex outlined the key challenges –

design integration, defining the processes and procedures for the operation of an 'Engineer's Railway' during the testing phase, and the final operational testing phase.

In terms of power, the extension requires work at a number of other locations, including Lots Road, Stockwell, and Lambeth, and in the Power Control Room. There are also a number of other systems, such as track to train communications, station wi-fi, Public Address, Lighting and Telephones, all of which need to be seamlessly integrated as a whole. In addition, there are other works which need to be undertaken on the existing Northern Line, such as the construction of new cross passages at Kennington which includes around 600 services which need to be diverted, and the construction of a new High Voltage cable route. At Nine Elms the platform installation was due to commence in June with Electrical and Mechanical fit out in August. Track installation was programmed to start in June. Construction and fit-out of the shafts at Kennington is due to commence at the end of 2018. In the railway systems area, the team are installing a 22kV cable through Oval towards Stockwell and dealing with the construction of the Cable Management System routes, the installation of Connect Radio, with detailed design due for completion at the end of 2018. At this point, the Railway Systems team move into their key phase of getting the railway fit to run trains and open for passenger service.

The meeting was then opened to questions, after which the audience thanked Alex in the usual manner.

Thomas Crame