

JUBILEE LINE WORLD CLASS CAPACITY PROJECT

by John Hawkins

When plans first emerged to increase the Jubilee Line to 36tph, consideration was given to current problems with the 30tph service blocking back behind reversing trains, especially at Willesden Green. The Line General Manager wrote to staff on 10 July 2013 suggesting that these trains would have to be extended through to Harrow-on-the-Hill along the local lines, but the cost of extensive track alterations probably brought this proposal to an end before the TfL Plan 2014-15 was published. There was then talk of following the Victoria Line Upgrade 2 proposal to run all peak services throughout the line, although the Stanmore service is well in excess of passenger demand already. Given the greater length of the Jubilee Line, this would have required the construction of many additional trains. So the final plans announced to the 14 October 2014 TfL Finance & Policy Committee meeting provide for a three hour 36tph peak service, both morning and evening, between West Hampstead and North Greenwich by 2019. I wondered how current blocking back problems will be avoided.

The meeting did learn that 34.3tph may be the maximum achievable for a reliable service, and this became the fall-back plan. The off-peak service will become 27tph between Willesden Green and Stratford. Ten additional trains are required, to be ordered with others for the Northern Line in 2016. Modifications are needed for overnight stabling at Stratford and Stanmore, power works at six substations, and four cooling fan upgrades. At Stratford Market Depot cleaning road 35 will become a pit road, and the temporary fit-out shed will be demolished to provide for three stabling roads.

To obtain further information about the basis for these decisions I made a freedom of information request for the feasibility study and business case analysis mentioned at the meeting. These have only recently been received some nine months later, and are significantly edited. Two of the recommendations of the Feasibility Study and three of the main elements of the recommended option in the Business Study have been redacted.

FEASIBILITY REPORT – APRIL 2014

The feasibility study was asked to consider 33 or 36tph, but concluded that 34.3 or 36tph could be achieved. It was originally assumed that the full peak service would operate to Stanmore from North Greenwich, but later only as far as Wembley Park. Remodelling at West Hampstead would provide enhanced reliability of service. Relaying the points at West Hampstead for faster running would allow scheduled reversing there, with possibly 6tph reversing there, at Willesden Green and at Wembley Park and with 18tph through to Stanmore. West Hampstead is considered the most challenging part of the recommended option, and track works would probably be undertaken over three bank holiday weekends in 2016. It is considered that current stations will cope with increased passenger numbers from a service boost once current Bond Street works are commissioned.

It is further stated that a service of 38tph might result, although not explored as part of this study. It is also possible that the signalling system and infrastructure could be modified to potentially 40tph, but this would require operational changes that are considered unlikely to be acceptable.

Harrow-on-the-Hill was found to lack a business case with its high costs. The local roads and intermediate stations would have been served by the Jubilee Line, with the Metropolitan Line confined to the fast lines from Wembley Park. Jubilee Line signalling would have been installed and the Metropolitan Line signalling plans modified.

Significant track works would be required to separate the lines. It was estimated that the Metropolitan Line service would need to be suspended for two weeks at Christmas and one week at Easter to achieve this, whilst the local lines would be without a service for three months during conversion. This was a proposal to provide additional reversing capacity, but would have required more trains and therefore stabling capacity. Platforms would have needed alteration to meet modern accessibility regulations. The whole project was estimated to take over six years.

Additional train crew accommodation will not be required, although it remains desirable from an operational viewpoint, with the North Greenwich facility poorly sited. An ability to reverse north to south at Green Park was also considered, but discounted as detrimental to introducing a 36tph service.

The operations team made the case for an alternative reversing facility south of West Hampstead station, should scheduled reversals be planned, but costs and access for construction could threaten

the whole upgrade and is not supported. I presume this refers to a proposed new reversing platform south of the current station, making use of the space left by the former southbound loop road. That once provided a lay-over road for trains to await their forward path when crossing from one southbound line to the other.¹

Stanmore could have been redeveloped for additional stabling and train maintenance on part of the car park site, but additional stabling and maintenance roads in Neasden depot have been located. It is stated that Farringdon sidings will accommodate seven S7 trains from Neasden to facilitate a balanced start-up of the Circle Line, although its affordability and timing is uncertain. The current timetable does not require any S7 trains from Neasden, so this remains unclear. It does indicate that Farringdon sidings will not normally see S8 trains.

Three or four double-length roads, or four shorter sidings at the south end of Stanmore car park were suggested. Use of Wembley Park sidings was also considered as these are to be abandoned by the SSR after completion of their line upgrade. However, access from the Jubilee Line would be problematic and is not considered desirable. At Stratford Market depot three roads are to be reinstated by demolition of the temporary fit out shed, and four new roads could occupy unused space in the depot fan area if necessary.

The Feasibility Study suggests that 34.3tph be introduced first to give experience with service delays before attempting 36tph, especially since a large number of delays are due to passenger action. However, the business case takes a reverse, more positive, approach. 34.3tph now becomes a fall-back position if 36tph cannot be achieved. Neither paper comments on current blocking back problems caused by short-working trains, which were the original reason for considering sending some trains to Harrow-on-the-Hill or all to Stanmore. So I am no wiser as to how this will be handled.

THE BUSINESS CASE – 2014

Eight service patterns were evaluated, four at 34.3tph and the same at 36tph. They would involve a peak shuttle service between North Greenwich and either West Hampstead or Willesden Green. Each was evaluated with or without 'auto' (presumably auto operation in the sidings). West Hampstead reduces the number of additional trains required, and avoids over-capacity north thereof, and the auto option was preferred with 36tph. The fall-back option is 34.3tph with no auto option, requiring the same number of trains and both requiring 47 additional train operators.

It seems odd that 36tph or 34.3tph require the same number of trains, but this is dependent on the 'auto' decision. And yet no explanation is provided in the documents that I received. I presume this was hidden in the redacted paragraphs. Business case table 3 shows that three trains are saved with auto operation in the siding – 33.4tph could be done with 7 trains and 36tph will need 14 without it (includes an extra spare for over 9 trains). Since the current signalling provides auto operation on the running lines, I must presume that this is referring to train operation in the centre reversing roads. I understand that auto operation is already provided in the sidings at Willesden Green and Wembley Park so that the operator can press the start buttons and the train will berth safely and correctly, but it is not currently at West Hampstead. And yet the options for reversing at Willesden Green are also evaluated with or without 'auto'. Does this indicate that it is currently not used there, drivers perhaps preferring to practice manual driving?

Or are we talking about a new way of reversing in sidings which will mean that trains can take up a southbound working faster. This would indicate auto-reversing, when the train can be ready to depart almost as soon as it has arrived, without waiting for a driver to walk through to the other cab. The difference between the 'auto' and 'without auto' options seem to concern only Willesden Green siding in the recommended options, with around 6tph reversing in each siding on the line but with auto, only that siding has about 10tph. With the options for a peak shuttle to Willesden Green, it is Wembley Park that will have about 10tph. I recall that auto-reversing was planned for the 1973 Tube Stock when new, for the 2012 Tube Stock intended by Tube Lines to replace it, and mentioned for S Stock under Bombardier signalling. This might indicate why details have been redacted, with a defence that it is only pure speculation on my part.

If 36tph is successfully implemented, one can then envisage such reversing at both locations releasing further trains to make 38tph as mentioned in the Feasibility Study in passing, and even 40tph, although

¹ I recall the Finchley Road signalman could hold a train in the loop for the following Metropolitan Line train to overtake and take its rightful path in the timetable, having missed this at Wembley Park.

that would probably require a lower speed limit through the tunnel section to allow trains to safely run closer. Such options would require further study.

The business case compares the recommended services with the current timetable. The current peak service operates for only 90 minutes whilst the planned peaks will run for three hours. The current off-peak service is 24tph with 16tph reversing at Stanmore and 4tph reversing at both Willesden Green and Wembley Park. Following the evening peak this changes to 18tph to Stanmore and 6tph reversing at Wembley Park. The line is very crowded south of Baker Street, and particularly crowded throughout the day between Waterloo and Canary Wharf, and this is expected to continue after Crossrail opens.

The highest new train requirement was 18, quoted in the recent paper about tender options for the train order. This option would have provided 36tph between North Greenwich and Willesden Green without auto operation, 30tph to Stratford and Wembley Park, and 24tph to Stanmore. A new analysis to capture wider economic benefits prefers the Willesden Green reversing options without auto operation, requiring 15 or 18 new trains. However, their advantage over the recommended West Hampstead options is smaller than that of competing projects at this time, and this will not therefore be pursued.

Whilst the new trains will feature innovations for the passenger environment and to reduce whole life costs, these will not be incorporated into the current fleet before its midlife refurbishment. I presume this is different to the train refurbishment completed on the Northern Line and about to start on the Jubilee Line since the specification of the new fleet will not be known until the order is placed in late 2016.

Key assumptions for evaluating this project include that all trains are replaced in 2040/41 with no value remaining in the new trains to be acquired. However, it is noted that the current fleet could provide a further 10-15 years of service with life-extension works, which would allow the new trains to operate for 30-35 years in total. Unmentioned is that this would delay the line receiving anticipated benefits from the New Tube for London, including additional capacity and air cooling.

Access to maintenance facilities at Neasden, including a pit road, will need to be arranged. Three extra trains will stable there, which is within the current agreement. Three extra trains will stable at Stratford where the current Temporary Fit Out Shed stands, and two trains will outstable at both Stratford and Stanmore stations. To stable more than this number on the line would require up to eight additional sidings on the site of the current Stanmore car park, with significantly extra capital costs. The planned implementation date is April 2019.

FUTURE JUBILEE LINE DEMAND

The business case concludes with a review of developments along the Jubilee Line route that will affect future passenger demand. Demand north from Kilburn to Wembley Park is static, and north from there is rising steeply from a low base with the current service adequate. After steady growth between West Hampstead and Finchley Road, slight growth is anticipated. The problems of cross-platform interchange at the latter station are noted, and the possible use of screen doors is mentioned as a solution. This topic has been fully redacted from the papers, although the Jubilee Line has experience with such doors and must have considered if they could benefit other busy stations. Such fitment was specifically included in the London Infrastructure Plan 2050 last year.

Swiss Cottage and St. John's Wood have seen healthy growth. Heathrow bound passengers are likely to change at Bond Street rather than at Green Park after the opening of Crossrail. Unmentioned is that they will find only four trains an hour, and none through to Terminal 5, compared with the current 12tph on the Piccadilly Line, although Crossrail trains will be twice as long.

Dwell time management at Waterloo and London Bridge is noted as critical to achieving timetabled headways. Southbank and London Bridge property developments are underway, and significant amounts are still planned. The highest viewing platform at the Shard will drive off-peak demand at nearby London Bridge station. Demand at Bermondsey and Canada Water will continue to grow as housing density increases. Canary Wharf is the 9th busiest station on LU, and the only one in the top 20 without interchange to other LU services. 50% growth is expected there before Crossrail opens. Scheduled dwell is challenging to achieve there with heavy alighting loads during mornings, and increasingly so into the future.

The O₂ by North Greenwich is the world's most popular concert venue. Coupled with Stratford, Wembley and Canning Town for ExCeL, the line will need to serve four venues, potentially operating

simultaneously. Royal Docks development will increase interchange demand at Canning Town until Crossrail opens. Olympic legacy developments will maintain growth at Stratford.

Post Script – Early benefits of the Jubilee Line Upgrade 2 are now expected before the delivery of additional trains, with improvements to West Hampstead siding allowing scheduled reversals there from May 2017. This will release additional trains that would have gone as far as Stanmore to extend the peak period of service. The full upgrade is not expected until May 2019, although a boost to the inter-peak service to 25tph is planned from May 2016.