

# **LPTB NEW WORKS PROGRAMME 80TH ANNIVERSARY**

## **A TRIBUTE TO A MAJOR EXPANSION OF THE UNDERGROUND NETWORK**

**by John P McCrickard**

Eighty years ago, on the 5 June 1935, Chancellor of the Exchequer Neville Chamberlain in the National (Coalition) Government announced to Parliament that “the London Passenger Transport Board, London and North Eastern Railway and the Great Western Railway will enter at once upon a programme of great improvements and extensions of London transport”. This bold and ambitious plan comprised several LPTB tube railway extensions out of the London central area to connect with various suburban lines of the LNER and GWR, which would be electrified for the purpose allowing direct Underground services to the City and West End. Also included were a number of station reconstructions in the central area to deal with burgeoning traffic, together with ancillary works such as power supply enhancements. Overall, the prime aim was to deal with serious problems of congestion afflicting the existing transport services, especially from the North-East London area into Liverpool Street, where severe peak-hour overcrowding reigned. A supplementary Commons statement by Chamberlain on 18 June 1935 clarified further details of the plan.

Funding of the expected total cost of £40m would be by loans raised by a Finance Company on which the Government would guarantee both the principal and interest. This so-called “cheap money” would enable these important public transport schemes to be executed – such improvements by the railway companies had previously proved well-nigh impossible due to high costs of borrowing the required capital on the open market. The collective plan of improvements was officially known as the “New Works Programme 1935/40” (referred to as NWP hereafter below) and was expected to take five years to complete – it is sometimes referred to by the alternative titles of “£40m Plan”, “£40m Programme” or “Five-Year Plan”.

Forerunner of the NWP had been the series of schemes recently completed under the Development (Loan Guarantees and Grants) Act, 1929 which had the primary objective of relieving chronic national unemployment by country-wide new public works. The £11m London railways programme successfully brought several important Underground improvements. These included extension of the Piccadilly Line from Finsbury Park to Cockfosters and – by means of quadrupling – over the District Line from Hammersmith to Northfields together with rebuilding of Green Park, Holborn, Hyde Park Corner, Knightsbridge and Leicester Square stations to handle the increased traffic from these extensions; Metropolitan Railway Wembley Park – Stanmore; Wembley Park – Harrow-on-the-Hill quadrupling; plus a number of other central area station reconstructions and enhancements. Funding had similarly been made available through Government support of the finance required. “More of the same” would thus be beneficial to London’s railway services!

The major factor fundamental to the NWP was creation of the London Passenger Transport Board (LPTB) by the Act of 13 April 1933. The LPTB came into being on 1 July 1933. More familiarly known thereafter as London Transport from this date it took over the various railway companies operating in the capital – the Metropolitan Railway and Metropolitan District Railway, together with the tube undertakings: Central London Railway, City & South London Railway, London Electric Railway and the Underground company – plus London’s tramways and main bus concerns. A Standing Joint Committee (SJC) was established from the outset between the LPTB and four main line railway companies (GWR, LMSR, LNER and SR) charged with setting fare levels and, importantly, planning of future services. The SJC provided for pooling of revenues from the LPTB and four main line companies for the “common good” of London’s railway services rather than the “insular” interests of the individual companies. This unified and cooperative approach replaced the previous fragmented and often wasteful competitive rivalries and was crucial to enabling for the first time a properly co-ordinated London-wide programme of improvements to be planned. A comprehensive review was accordingly undertaken to identify deficiencies of provision and recommend remedial solutions. Linking of the previously separate tube and suburban railway systems was to be the linchpin in the success of any improvement schemes.

Leading lights in the new LPTB were Chairman Lord Ashfield (Albert Stanley) and Vice-Chairman Frank Pick who both arrived from the Underground company – where they had been Chairman and Managing Director, respectively – and would carry on with their highly successful progressive and creative partnership which had led to a great expansion in the Underground system. Pick understood the importance of a strong corporate identity together with high design and architectural standards, all of which he established during his time with the Underground – including the “Underground” branding and world-famous “bullseye” logo for station name signs and publicity. He would continue this work in the LPTB. In 1924 he had commissioned leading architect Charles Holden to design the station buildings on the Morden extension of the CSLR in a new forward-looking modernistic style. Pick retired in May 1940 when aged 61 after seven years as Vice-Chairman of the LPTB. He sadly died only a year into retirement during 1941. Ashfield served through nearly to the end of the LPTB when it became the London Transport Executive on 1 January 1948, part of the British Transport Commission formed the same day under Government nationalisation of the railways and other transport undertakings. He had resigned on 31 October 1947, but like Pick had a prematurely short retirement, passing away just over a year later.

A key part in formulation of the NWP was also played by John Pattinson Thomas, General Manager Railways. He had held senior management roles with the Underground company before joining the LPTB on its formation and brought his long engineering and operating experience to bear in the planning of the schemes, especially North-East London. He retired in June 1938, but was called back in November 1940 to urgently organise the tube sheltering scheme at the height of the Second World War blitz bombing of London. J.P. Thomas will be remembered for his seminal work, *Handing London's Underground Traffic*, published in 1928 and essential reading for those interested in the operation and development of the system.

## **RAPID IMPLEMENTATION**

In contrast to today's prevarication on implementing railway improvements in the capital – witness construction of Crossrail, Thameslink and Croyley Rail Link, to name but three – taking decades to commence after first being proposed – the NWP was instigated with almost alarming rapidity. To be fair, planning of potential schemes had been underway for several years with the Bakerloo and Metropolitan enhancements revealed in November 1934 and details of the others gradually emerging before the formal NWP announcement in June 1935. The area having the greatest call for improvements was North-East London (east of the River Lea and north of the River Thames), which would be provided for by extension of the Central Line beyond its existing Liverpool Street terminus. The LNER had previously proposed in 1930 the main line “Ilford tube” from Liverpool Street to relieve acute overcrowding of the existing steam services but was unable to finance this on its own.

The positive effect that all the improvements could have on both unemployment and housing in the Capital area was a major factor in gaining the support of the National Government. Though a total of only some 16 miles of new railway were planned the linking-up of existing lines was to be the major factor giving through tube journeys from the suburbs into the centre not previously possible. A total of 85 route miles would thereby be added to the Underground network. Coupled with enhanced interchanges with intersecting routes “greatly improved connectivity” (as we would say today) would be offered to passengers – thus facilitating commerce and leisure in the capital.

The next steps followed quickly. On 20 June, just a fortnight after the Chancellor's initial announcement the necessary agreement was made between HM Treasury, the LPTB, GWR and LNER for funding the NWP. By the London Passenger Transport (Agreement) Act, 1935, of 10 July, the required finance company was incorporated on the same day. Entitled “The London Electric Transport Finance Corporation Ltd.” the new company was empowered to raise and lend money to the LPTB, GWR and LNER in accordance with the Treasury agreement.

The required railway Acts of Parliament followed promptly too. The first London Passenger Transport Act, covering many of the Bakerloo and Metropolitan items was already in process of approval and received Royal Assent in July 1935. This enabled tenders to be quickly expedited for these improvements thus that physical works were underway by the turn of the year, a matter of months after Chamberlain's Commons statement. Further acts passed the following year conferred authority upon the LPTB, GWR and LNER for most of the remaining schemes. However, the scope of the NWP became enlarged somewhat compared to that in the original 1935 statement – the Treasury Agreement permitted the three companies to vary or add to the works, subject to approval by the Ministry of

Transport. This was to meet continuing demand for better services and included proposals still being planned at the time but now settled, the following being added:

- (a) Central Line: Loughton – Ongar; West Ruislip – Denham; White City new station in replacement of nearby Wood Lane station; Wood Lane depot alterations to accommodate longer trains.
- (b) Metropolitan Line: Amersham station widening and additional platform.
- (c) Northern Line: Edgware – Bushey Heath.
- (d) Reconstruction of LPTB central area stations: Tottenham Court Road – additional low level subway to facilitate improve interchange between Central and Northern lines; Highbury and Marylebone – escalators to be provided.

These were covered by the 1936 Act, plus three further Acts passed in each of the years 1937, 1938 and 1939. The result of these additional items, together with a general increase in prices pushed up the NWP total cost to over £45m in revised estimates prepared on 1 October 1937.

## **NEW WORKS PROGRAMME SCHEMES**

The NWP railway works under the Treasury Agreement consisted of eight schemes (with associated company responsibilities):

- North-East London: Central Line eastern extensions and existing central section improvements (LPTB/LNER)<sup>1</sup>.
- West London: Central Line western extension (LPTB/GWR).
- North London: Northern Line extensions and Northern City Line improvements (LPTB/LNER).
- North-West London: Bakerloo and Metropolitan Line improvements including existing Bakerloo central section (LPTB/LNER).
- East London: District and Metropolitan Line improvements (LPTB).
- Reconstruction of LPTB central area stations: Earl’s Court, King’s Cross, Liverpool Street, Notting Hill Gate, St. Paul’s, Sloane Square and Tottenham Court Road stations including new escalators; together with:
  - Monument – additional escalators and subways.
  - Oxford Circus – high speed lifts (LPTB).
- Other railway improvements (LPTB).
- Power supply improvements (LPTB).

These schemes are considered in detail below. (A ninth scheme covered conversion of tram routes to trolleybus operation and does not concern us here.)

Major new builds of rolling stock featured in the above schemes, notably the 1938 Tube Stock together with the O, P and Q surface trains. Evolution and delivery of these fleets was complicated by the intervention of the Second World War with consequent deferment and cancellation of some of the Underground extensions. As the full and sometimes complex histories of these trains has been well covered previously further details are not repeated here – readers are referred to the following books which furnish full information on the subject: *Underground Train File – Surface Stock 1933-1959* by Brian Hardy (Capital Transport, 2002) and *Underground Train File – Tube Stock 1933-1959* by Brian Hardy (Capital Transport, 2001).

## **NEW ARCHITECTURE – NEW STATIONS**

The NWP was envisaged to be a continuing showcase for the futuristic architecture of Charles Holden and his associates following their recent successful new stations on the Piccadilly Line extensions. The LPTB Architects office would also be responsible for a number of the stations, together with the GWR and LNER. Unfortunately, the programme was to be curtailed due to the effects of the Second World War and was eventually completed to much simpler and more economical designs in the all-pervading post-war “austerity” conditions. For example, early proposals for the rebuilding of Harrow-on-the-Hill included a rather grandiose main entrance on the north side facing the town. Together with other elements, this was pared down substantially in the much simplified final scheme as built.

Also largely lost was the scheme announced in 1938 to utilise symbols with local historical connections

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<sup>1</sup> The North-East London Scheme also included the LNER Liverpool Street/Fenchurch Street – Shenfield 1500v DC main line electrification. This provided improved, more frequent services offering greatly increased capacity complementing that provided by the Central Line eastern extensions. Originally to be completed in 1941 this was delayed to 1949 due suspension of works during the Second World War.

to designate particular new or reconstructed stations – many were proposed but only a few were actually executed:

- East Finchley: Statue of archer with bow and arrow pointing towards London by Eric Aumonier signifying the swift and direct tube service to the centre of London (1939); nearby new electric substation featured the sculpture of a transformer by Joseph Armitage (1939) – the substation closed in 2000 (replaced anew) but the building is believed to survive out of use.
- St. Paul's: Floor paving inlay depicting a dome, ball and cross symbolic representation of the nearby cathedral (1940).
- Uxbridge: Sculpture pair each depicting railway wheel and leaf springs by Joseph Armitage; three stained glass windows containing the coats of arms of Uxbridge Urban District Council, and the counties of Buckinghamshire and Middlesex by Ervin Bossányi (1938).

Others known but not proceeded with as the intended line extensions or station rebuilding schemes were either cancelled or considerably rationalised due to World War 2:

- Denham: Angler symbol for locally famed trout stream.
- Elstree: Sculpture of roman soldier recognising location of the village as a post on Roman Watling Street.
- Fairlop: Aeroplane symbol at proposed resited station serving new City of London airport (both never built due to World War 2 – also see below).
- High Barnet: Mural remembering a Wars of the Roses battle which took place nearby.
- Highgate: Symbol or weathervane-mounted silhouette of Dick Whittington and cat on roof of Archway Road new entrance building recalling the English folklore tale.
- Mill Hill East: Crest of Middlesex Regiment, based at the nearby Inglis Barracks.
- Mill Hill (The Hale): Windmill symbol remembering its name origins.
- Perivale: Pear symbol recognising valley of pears name origin.
- Redbridge: Glass screen panel of Britannia by Gertrude Hermes ex-Paris Exhibition 1937.
- South Ruislip: Bulrushes symbol (possibly also at Ruislip Gardens and/or West Ruislip) recalling each as places where rushes lined the River Pinn (“Rush Leap”).
- Wanstead: Carved and gilded mahogany St. George and the Dragon above-entrance signs by Joseph Armitage saluting both George Green and George Hotel nearby.
- Woodford: Heraldic river and tree symbol recognising the town as an ancient crossing place over the River Roding.

Holden's company were no longer consulting architects after February 1942 – save for completion of outstanding commissions – with all subsequent rebuilding schemes the responsibility of the LPTB Architect's office. The stations on the Central Line western extension were handled by the GWR's Chief Architect Brian Lewis as the company were building the line. Designs had been completed by the outbreak of war but with the consequent deferral of the extension they were executed in rationalised form by his successors from 1946, Dr. Frederick Curtis initially. Limited finances meant the final station rebuildings (Northolt, South Ruislip, Ruislip Gardens and West Ruislip) were not undertaken until 1961-62 – temporary constructions had to suffice in the interim including use of recycled Anderson shelter sheeting! Only West Acton (Ealing Broadway branch) had been rebuilt in 1940 to Lewis' original design.

Looking eastwards, of particular note was Gants Hill, designed by Holden. Construction commenced in 1937 but was halted during World War 2 and finally completed in 1948. The sub-surface station featured a wide platform-level concourse with high barrel-vaulted roof, inspired by station design on the new Moscow Metro system, to which LT had provided much advice in design, construction and operation. The originally-proposed lofty brick clock tower surmounting the roof of the booking hall in the centre of the road roundabout was sadly not built in the finalised post-war design. However, Gants Hill is now Listed.

The following new and rebuilt stations with surface level buildings – as opposed to just simple street level entrances – were included in the NWP. Dates of completion are given together with Architect responsible (all LPTB (to 1947); LT (from 1947) Architects Office unless otherwise stated); L = Listed building.

**BAKERLOO LINE:** St John's Wood (1939), Finchley Road (1939), West Hampstead new booking hall and island platform building (1939), Kilburn (1939), Dollis Hill new island platform building (1939).

**CENTRAL LINE (eastern extensions):** Mile End (1946), Stratford (1946; joint with LNER), Leyton (1948), Leytonstone (1947), Loughton (L; 1940; LNER Easton), Wanstead (1948; Holden; much simplified design compared to original 1939 proposal), Redbridge (1948; Holden), Newbury Park barrel roof to bus stand only (L; 1949; Hill; rest of rebuilding cancelled), Hainault (1948), Grange Hill (1949), Roding Valley (1949).

**Not proceeded with:** Fairlop (resiting 500 yards south to serve planned new City of London airport at adjacent airfield which was cancelled due to World War 2).

**CENTRAL LINE (western extension):** White City (1950), Hanger Lane (1949; BRWR Maclver), Perivale (1948; GWR Lewis), Greenford (1948; GWR Lewis), Northolt (1962; BRWR), South Ruislip (1962; BRWR), Ruislip Gardens (1962; BRWR), West Ruislip (1962; BRWR).

**Not proceeded with (extension cancelled):** Denham (GWR Lewis), Harefield Road (GWR Lewis).

**DISTRICT LINE:** Earl's Court (1937).

**METROPOLITAN LINE:** Finchley Road (1939), Harrow-on-the-Hill (1943), Northwood (1962), Moor Park (1961), Rayners Lane (L; 1938; Holden/Uren), Eastcote (L; 1939; Holden), Ruislip Manor (1938; Holden), Uxbridge (L; 1938; Holden/Bucknell).

**Not proceeded with (existing station buildings retained):** Chorleywood, Pinner, Rickmansworth.

**NORTHERN LINE:** Highgate (1940; Holden; partially reconstructed only, including new island platform building; full scheme including new Archway Road entrance building abandoned although a single Up escalator in brick shaft was provided instead and opened in 1957), East Finchley (L; 1939; Holden/Bucknell).

**Not proceeded with (existing station buildings retained):** Finchley Central (Holden/Uren), Mill Hill East, Edgware, High Barnet.

**Not proceeded with (extensions cancelled):** Finsbury Park (joint with LNER), Mill Hill The Hale (new joint ticket hall and interchange with LMSR Mill Hill station), Brockley Hill, Elstree (Holden), Bushey Heath (Holden).

## THE NAME GAME

The following stations initially had the listed alternative names considered at the planning stage.

### BAKERLOO LINE

**St. John's Wood:** Acacia Road.

### CENTRAL LINE (eastern extensions)

**Bethnal Green:** Bethnal.

**Debden:** Chigwell Lane. This original name was changed on 25 September 1949 to that of the new housing estate nearby which partly justified the Loughton – Epping extension opened this date – the new name also avoided any confusion with nearby Chigwell station on the Hainault loop.

**Gants Hill:** North Ilford, Ilford North, Cranbrook.

**Redbridge:** Red House, West Ilford, Ilford West, Red Bridge.

**Wanstead:** George, George Green.

### CENTRAL LINE (western extension)

**Hanger Lane:** Brentham.

**Harefield Road:** South Harefield, Harefield South.

**Northolt:** Northolt Park, Northolt Course, Northolt Races, Northolt Racecourse.

**South Ruislip:** Ruislip South.

**West Ruislip:** Ickenham Green, Ickenham North, Ruislip West, Ruislip.

### METROPOLITAN LINE

**Moor Park:** Sandy Lodge part of original named to be retained only.

### NORTHERN LINE

**Brockley Hill:** North Edgware, Edgwarebury, Edgebury, All Souls, Canons.

**Bushey Heath:** West Elstree, Caldecote Hill, South Aldenham, Aldenham.

**Elstree:** Elstree Hill, Elstree South.

**Highgate (existing):** Highgate South – actually renamed Archway.

**Highgate (new):** Highgate North, Highgate Wood.

**Mill Hill East:** Bittacy Hill.

**Mill Hill (The Hale):** Mill Hill.

## **CIVIL ENGINEERING**

The NWP employed modern, state-of-the-art civil engineering techniques to enable the rapid and most economical progression of the tube extensions, including overcoming many tricky construction challenges along the way. Some may be mentioned. Finchley Road tunnel mouths where the new Bakerloo tube had to be brought to the surface between the existing Metropolitan lines – requiring partial diversion of the latter southbound tunnel – in order to secure the required cross-platform interchange between the two at the rebuilt station here.

The Central Line eastern extension from Liverpool Street was driven through the waterlogged land beneath the East London marshes and under the River Lea and its tributary. Tunnelling often had to be undertaken in compressed air to keep the water out. Special chemical soil-solidifying (Joosten process) was also used to stabilise the ground and make it firm enough for tunnelling on this section and also at Leyton and Mile End.

Station reconstructions at Aldgate East and Mile End required intricate work in confined locations, including underpinning of overlying buildings and roadways.

Shortages of iron in the late-1930s due to the rearmament programme led to the decision to construct some 2¾ miles of the tunnels on the Central Line eastern extension between Redbridge and Newbury Park with reinforced concrete segments, a suitable design having been evolved after extensive tests. Use of concrete in this way was expected ultimately to reduce construction costs and proved very successful, being used extensively subsequently, for example on the Victoria and Jubilee lines. Above ground, some of the more impressive works were the Greenford flyovers, necessary to carry the Central Line tracks over the GWR West Ealing branch triangular junction, and the massive Rickmansworth Road steel girder bridge near Northwood on the Metropolitan Line – the largest bridge on the Underground.

## **SIGNALLING**

The NWP featured an extensive resignalling programme over nearly 120 route miles comprising some 40 miles of new and 80 miles of existing lines. This would be controlled from 45 new signal boxes and 25 ground frames. Due to the interruption of World War 2 and the subsequent deferment, cancellation and modifications to the programmes these totals were slightly reduced. A full list of known signal boxes is given below.

LPTB standard two-aspect colour light signalling was used throughout with two-aspect colour light repeaters in rear where necessary; fog repeaters were also provided for all stop signals on open sections; three-lamp junction indicators signified diverging routes and floodlit mechanical ground discs were used for shunting moves. Automatic Train Control was secured by means of trainstops at all stop signals. Trainstops, disc signals and points were generally electro-pneumatically operated, except goods yard points which were usually mechanical. Automatic signalling was provided on some plain line sections between stations and junctions. Speed controlled signalling was installed on two sections of the Bakerloo – to enable a train to draw-up to a station already occupied – and on the southbound Northern Line between Highgate and Archway which is on a falling gradient approaching a sharp curve.

As LNER goods workings would continue to operate over the Central Line eastern, Metropolitan and Northern Line extensions, additional mechanical disc distant signals had to be provided at the requisite braking distance from the respective stop signals for these trains.

Signal cabins were to LPTB standard architectural design (brick built with concrete roof and metal windows), containing miniature lever power frames (Westinghouse Style N) with a few (as noted in the list) also having mechanical frames for operating local points, facing point locks and subsidiary signals for the yards and sidings at these places. Standard illuminated diagrams in metal cases were provided. Signal cabins constructed from 1938 were built to ARP (Air Raid Precaution) specifications with reinforced concrete roofs mounted immediately above the windows and having greater overhang (compare Willesden Green and Stanmore with later Edgware, Finchley Central and Woodford signal cabins – photos elsewhere in this issue).

Route setting by means of push-pull levers with relay interlockings was employed in some signal boxes – Elephant & Castle, Finchley Road, Harrow-on-the-Hill and Rayners Lane. Back-up local frames were provided for individual lever operation of points and signals in cases of fault conditions in the main route setting frame, e.g. Harrow-on-the-Hill and White City (North Acton as local frame).

## NWP SIGNAL BOXES

**BAKERLOO LINE:** Elephant & Castle, Lambeth North, Piccadilly Circus, Baker Street, Paddington, Stanmore.

**BAKERLOO AND METROPOLITAN LINES (shared section):** Finchley Road, Willesden Green, Neasden South, Neasden North (controls depot connections only).

**Existing signal cabin retained and modified:** Wembley Park.

**Temporary signal cabin (during track remodelling stageworks):** Dollis Hill.

**CENTRAL LINE (eastern extensions):** Liverpool Street, Bethnal Green, Leytonstone, South Woodford\*, Woodford, Loughton, Debden, Epping, Newbury Park, Hainault, Grange Hill†.

**Existing signal cabins retained and modified:** Leyton\*, North Weald, Ongar.

**CENTRAL LINE (western extension):** White City, North Acton, Greenford, Ruislip Gardens†, West Ruislip.

**Signal cabin proposed but not built:** Northolt (following post-war cancellation of additional sidings for racecourse traffic – see below).

**DISTRICT AND METROPOLITAN LINES:** Aldgate.

**METROPOLITAN LINE:** King's Cross, Harrow South†, Harrow-on-the-Hill, Harrow North†, Rickmansworth‡, Amersham‡, Rayners Lane, Uxbridge.

**Existing SB retained and modified:** Chesham‡.

**Temporary SB (during track remodelling stageworks):** Preston Road.

**NORTHERN LINE:** Drayton Park, Park Junction, East Finchley, Finchley Central, High Barnet, Edgware (not opened – used as IMR from 1965).

**Existing signal cabin proposed to be retained and modified (extension cancelled):** Finsbury Park No 7.

**Signal cabins proposed but not built (extension cancelled):** Elstree South, Bushey Heath.

\* Also contained mechanical frame operating local points, facing point locks and subsidiary signals;

† Unmanned subsidiary signal cabin remotely operated from adjoining staffed signal cabin.

‡ Provided under modified post-war plans.

## WARTIME ABEYANCE

By 1939 work on the NWP schemes was in full swing with good progress being made on all fronts. There is probably little doubt that, had it not been for the onset of war, the NWP would have been completed in its entirety by 1941 (see table on page 311 for planned opening dates). Unfortunately, this was not to be the case as the unwelcome possibility of conflict loomed. Attention of industry had been turning to rearmament and munitions activities at a quickening pace meaning manpower and materials for civil works increasingly became restricted. The first rumblings of adverse effects came in early-1939 when LPTB warned of possible postponement of the Harrow – Rickmansworth widening even though placement of contracts had started and earthworks were underway. This was formalised in December 1939 when the MoT agreed to curtailment of the NWP for the period of the war, with works on which little or no activity had taken place suspended for the duration. Only those elements nearing completion would be brought into use, namely: Bakerloo and Metropolitan between Baker Street – Wembley Park and Stanmore plus Northern Line extension from Archway to High Barnet, all achieved in 1939-40, together with the reconstruction of King's Cross (1941) and Sloane Square (1940) stations.

Sadly, the optimism of bringing the Central Line eastern and western extensions into at least partial use – to Loughton (including the Grange Hill loop) and Greenford, respectively – was thwarted despite the best efforts of all concerned. By the outbreak of war the new tunnels from Liverpool Street to Stratford and Leytonstone to Newbury Park were nearly complete together with the main civils works at the new intermediate tube stations. Tracklaying had begun, but much signalling work remained outstanding. The new stations out to Greenford were partially completed, including the flyovers at the latter place.

However, with the national situation deteriorating and ending of the “phoney” period with onset of “total war”, the “Battle of Britain” and threat of potential German invasion imminent it proved impossible to carry on with even the curtailed programme. NWP construction activities stopped altogether in June

1940 – save for a handful of works nearing completion – leaving the majority of schemes suspended until return of peace.

One short section of the NWP was in the event to be opened as part of the war effort when the Northern Line was extended the short 0.89 miles as a single line from Finchley Central to Mill Hill East on 18 May 1941 to serve the needs of the nearby Inglis barracks. Additionally at Drayton Park, the completed southbound connecting ramp was linked to the LNER at Highbury Vale in 1941 for stock transfer movements only.

Partially completed works were protected so they could be left safely unattended for the duration of hostilities. A number were commandeered by the authorities for munitions or civil defence purposes in which they rendered valuable war service:

**CENTRAL LINE (eastern extensions): Liverpool Street – Leyton and Leytonstone – Gants Hill:**

Air raid shelters at various locations in sections of the uncompleted tube tunnels, between September 1940 and May 1945: Liverpool Street, Bethnal Green station, Leyton, Leytonstone, Redbridge and Gants Hill. Bethnal Green was the scene of a dreadful catastrophe on the evening of 3 March 1943 when shelterers descending the poorly-lit stairway *en masse* during an air-raid alert were crushed following a tripping incident; 173 people including 62 children sadly perished in the tragedy with a further 62 injured.

**CENTRAL LINE (eastern extensions): Leytonstone – Gants Hill:** Some 2½ miles of the twin tube tunnels were utilised as an aircraft component factory by the Ministry of Aircraft Production – conversion work started in November 1940 and was completed in March 1942. The factory was operated by the Plessey Co. who already had an existing plant nearby in Ilford. Factory personnel entered via the uncompleted stations at Wanstead, Redbridge and Gants Hill, together with additional shafts at Cambridge Park and Danehurst Gardens. A narrow-gauge railway with battery locomotives ran the length of each tunnel to convey raw materials to and finished parts from the workstations.

**CENTRAL LINE (eastern extensions): Hainault new railway depot:** This virtually completed facility was used by the US Army Transportation Corps (756 Railway Shop Battalion) from 1 June 1943 for the assembly of rolling stock from kit parts shipped over from America for the Allied invasion of Europe after “D-day”, 6 June 1944. It was an ideal location with excellent rail access from the existing LNER GE main line via Woodford and Ilford. The USATC vacated the depot in January 1945.

**CENTRAL LINE (western extension): Ruislip new railway depot:** Occupied by the British Small Arms company on behalf of the Admiralty for manufacture of anti-aircraft guns – served by sidings accessed from temporary connection to GWR line at South Ruislip.

**NORTHERN LINE: Highgate:** New tube platforms used for air raid shelter purposes from September 1940 – trains specially stopped for the purpose – prior to opening of the station on 19 January 1941 (air raid shelter use continued thereafter).

**NORTHERN LINE: Brockley Hill:** Land used for agriculture and supply of produce to LPTB canteens.

**NORTHERN LINE: Brockley Hill tunnels:** Used by the Home Guard.

**NORTHERN LINE: Aldenham new railway depot:** Adapted for use as a Government “shadow factory” by the London Aircraft Production Group consortium of LPTB and London motor companies to manufacture 710 Handley Page Halifax bombers between 1941 and 1945. De Havilland also used part of the depot site for Mosquito fighter-bomber construction. Both aircraft types were finally assembled and flown from nearby Leavesden airfield.

Two escalators – one each from the upper flights at Holborn and St. Pauls – were sent in 1941 to Corsham, Wiltshire, for use in an Ministry of Aircraft Production underground factory installed in disused mine workings there.

Rails already laid on the Central Line western extension (North Acton – Greenford) and Northern Line (Finchley Central – Edgware second line) were lifted for reuse on essential war works elsewhere.

On the Metropolitan Line, most of the steelwork for the bridges for the Harrow – Rickmansworth quadrupling had been delivered. It was stored for the duration of hostilities at convenient lineside locations and subject to periodic inspection, painting and restacking; components for the massive Rickmansworth Road girder bridge were held next to the line at Moor Park. *(Do any readers have or know of any photos of the latter bridge during storage here – or indeed of the other bridges?).*

## PEACETIME RESUMPTION – AND CURTAILMENT

After the war, the Government reviewed the outstanding NWP schemes. The Minister of Transport decreed that the Central Line eastern (to Loughton) and western (to West Ruislip) extensions be given top priority and accordingly in late-1945 authorised construction works to be resumed. Progress would be hampered by the lack of suitable manpower and restrictions in material supplies that would continue for many years after the war had ended.

The restart of the programme was celebrated in a special edition of the *Railway Gazette* entitled *Improving London's Transport*, published in June 1946 which in over 100pp gave a thoroughly detailed overview of all aspects of the NWP. In an optimistic-looking Foreword, Lord Ashfield confidently expected all outstanding schemes to be carried through to completion as "vital" to the "new and better London ..... being planned".

However, in the post-war period new factors came into play. The Green Belt (London and Home Counties) Act, 1938, and forthcoming Town and Country Planning Act, 1947, were both passed with the objective of stemming unchecked urban growth or "sprawl". The designation of London's "Green Belt" was included in the Greater London Plan, 1944, which recommended open spaces in and around the capital be protected and developed for leisure pursuits. The new planning regulations thus prevented envisaged residential development taking place in the areas to be served by both the Central Line West Ruislip – Denham and Northern Line Edgware – Bushey Heath extensions, which would both penetrate the new green belt. Additionally, a rise in prices during the war led to a steep escalation in the NWP total cost to £55m by December 1945 – an increase of nearly 38% on the 1935 estimate of £40m.

See the accompanying table below, prepared by Desmond Croome, detailing the works completed and outstanding.

Figures shown in £000.

Description of Works	Works by	Spent to 31.12.45			Expenditure still O/S			Revised estimate total cost
		Works In Service	Works Not in Service	Total	On works In service	On works not in service	Total	
1 Electrification of LNER, GE section:								
(a) Liverpool Street and Fenchurch Street to Shenfield	LNER	–	1,635	1,635	–	5,366	5,366	7,001
(b) Loughton and Ongar lines and Grange Hill loop	LT/ LNER	–	1,327	1,327	–	1,975	1,975	3,302
2 Central Line 'tube' extensions	LT	–	4,579	4,579	–	1,410	1,410	5,989
3 Central Line central area improvements	LT	1,249	–	1,249	50	55	105	1,354
4 (a) Northern Line (north)	LT	1,091	163	1,254	120	395	515	1,769
(b) Improvements to Northern Line (existing)	LT	58	–	58	–	–	–	58
5 (a) Electrification of LNER – High Barnet, Alexandra Palace and doubling of Edgware branch	LT/ LNER	1,153	85	1,238	65	1,150	1,215	2,453
(b) Edgware – Aldenham including depot	LT	–	451	451	–	1,280	1,280	1,731
6 (a) Northern City extension to connect with LNER	LNER	–	200	200	–	125	125	325
(b) Northern City improvements	LT	34	–	34	10	6	16	50

Description of Works	Works by	Spent to 31.12.45			Expenditure still O/S			Revised estimate total cost
		Works In Service	Works Not in Service	Total	On works In service	On works not in service	Total	
7 (a) Two extension tracks North Acton – West Ruislip	LT/ GWR	–	1,288	1,288	–	1,256	1,256	2,544
(b) Two extension tracks West Ruislip – Denham	LT/ GWR GWR	–	–	–	–	–	–	–
		85	–	85	–	–	–	85

(c) Two extension tracks Wood Lane – North Acton									
(d) White City station and sidings	LT	–	74	74	–	545	545	619	
8 (a) Aldgate/Aldgate East	LT	807	–	807	21	–	21	828	
(b) Rolling stock for this scheme	LT	198	–	198	–	–	–	198	
(c) Tower Hill substation	LT	68	–	68	–	–	–	68	
9 Finchley Road tube and Baker Street station	LT	1,510	–	1,510	100	–	100	1,610	
10 Metropolitan track realignment and station improvements:									
(a) Finchley Road – Harrow	LT	1,511	60	1,571	75	825	900	2,471	
(b) Two extra tracks Harrow – Rickmansworth	LT	–	302	302	–	1,675	1,675	1,977	
(c) Rickmansworth – Amersham electrification	LT	–	7	7	–	705	705	712	
(d) Chesham electrification	LT	–	–	–	–	235	235	235	
11 Uxbridge branch stations and signalling	LT	628	–	628	15	140	155	783	
12 Bakerloo improvements	LT	759	–	759	52	–	52	811	
13 Central area station improvements:									
(a) King's Cross	LT	580	–	580	130	–	130	710	
(b) St. Paul's (Post Office)	LT	307	–	307	–	–	–	307	
(c) Earl's Court	LT	147	–	147	–	–	–	147	
(d) Tottenham Court Road	LT	38	–	38	–	–	–	38	
(e) Sloane Square	LT	69	–	69	–	–	–	69	
(f) Notting Hill Gate	LT	–	44	44	–	300	300	344	
(g) Liverpool Street	LT	111	–	111	–	220	220	331	
(h) Marylebone	LT	101	–	101	30	–	30	131	
(i) Monument	LT	–	–	–	–	200	200	200	
(j) Oxford Circus	LT	–	25	25	–	–	–	25	
14 Trolleybuses for trams:									
(a) 148 tram route miles	LT	3,635	–	3,635	20	–	20	3,655	
(b) 52½ tram route miles	LT	1,622	–	1,622	116	–	116	1,738	
15 Power supply Greenwich power station and substations in the east	LT	1,567	130	1,697	–	1,280	1,280	2,977	
16 Rolling Stock	LT	6,648	80	6,728		283	283	7,011	
17 General Works:									
(a) Acton Works extension	LT	308	–	308	5	–	5	313	
(b) Lillie Bridge depot extension	LT	30	–	30	–	–	–	30	
(c) LT Railway automatic telephones	LT	66	–	66	–	–	–	66	
Grand totals:		24,380	10,450	34,830	809	19,426	20,235	55,065	

**NOTES:**

- Information from Public Records Office, Kew, file MT 6/2803.
- Denham – West Ruislip (£612,000) excluded.
- Loughton – Ongar included – being considered.
- Works in service – confined to complete schemes or clearly defined major schemes.
- The above table included a memorandum and is dated 5 September 1946.
- It is estimated that all outstanding works will be in service 1947-1949.

These factors meant, despite the optimism of Ashfield, that perhaps inevitably there would now be adjustments to the outstanding NWP schemes. In the financially-stringent post-war “austerity” years, each was now subject to individual MoT financial scrutiny and authorisation or, in some cases, cancellation:

**CENTRAL LINE (eastern extensions).**

- Liverpool Street – Loughton and Leytonstone – Woodford via Newbury Park authorised late-1945;

steam working remains 'north' of Loughton.

- Loughton – Epping, new passing loop and platform at North Weald plus Epping – Ongar signalling improvements authorised by early-1948, justified by new housing developments already underway at Debden and elsewhere. Steam working remains between Epping – Ongar operated by BRER for LT but to an enhanced timetable;
- Epping – Ongar authorised early-November 1956. Justified to eliminate uneconomic pocket of steam working and enabled by reduced cost electrification in which current was fed to the line from the Epping end only, the intended NWP substation at Blake Hall not built. However, this required the line be worked by shuttles of reduced formation trains.

It is noteworthy that the Central Line eastern extensions would have originally been commissioned in just two stages during 1940-41 but actually took seven stages to bring to fruition post-war, stretching from 1946 to 1957!

### **CENTRAL LINE (western extension)**

- North Acton – West Ruislip authorised late-1945.
- West Ruislip – Denham cancellation announced 19 November 1948 (upon ceremonial opening of Greenford – West Ruislip section). The reason given was "Green Belt" development restrictions. (The cost of the cancelled extension had doubled from the £306,000 pre-war estimate to £612,000).

### **METROPOLITAN LINE**

- Finchley Road – Amersham and Chesham outstanding works including electrification announced in July 1956, although the scheme was rationalised compared to the original plans following full re-evaluation in the light of changed post-war conditions and foreseen traffic requirements (as detailed below).

### **NORTHERN LINE**

- Brockley Hill – Bushey Heath cancellation announced 7 October 1950. Reason was (again) "Green Belt" development restrictions. Aldenham unused depot to be converted to main overhaul works for LT bus fleet.
- Finsbury Park – Alexandra Palace withdrawal of existing BRER passenger services announced early-December 1953 including cancellation of the superseding Northern Line extension Drayton Park – Alexandra Palace. Reasons were that the branch was operating at a loss with only 700 or so passengers Mondays to Fridays and about half that number on Saturdays and as "post-war conditions have altered the flow of traffic a through electric service to the City cannot be justified". (Finsbury Park – Alexandra Palace passenger services were duly withdrawn on 5 July 1954.).
- Mill Hill East – Edgware – Brockley Hill cancellation announced 9 February 1954. The reason given was no further major housing developments expected in these areas to justify these extensions, coupled with rising construction and operation costs.

The cancellation of the outstanding Northern Line work was particularly controversial, especially in the areas to be served, and has continued to be up to the present day. Works were at an advanced state, particularly on the Finsbury Park – Alexandra Palace and Mill Hill East – Edgware sections with much of the electrification, signalling equipment and cabling installed and ready for use. Critics pointed out that extension of tube trains to High Barnet had been accompanied by a large upsurge in traffic which was likely to be repeated on these uncompleted sections which generally served areas of similar existing residential development crying out for transport improvements. This was all seemingly ignored. However, it is very likely that abandonment of Aldenham depot would have made it very difficult to work all the Northern Line extensions to full efficiency. Their full story is comprehensively covered in *The Northern Line Extensions* Supplement to *Underground News* No.599 (November 2011) as well as the Society's similarly-titled earlier publication issued as *Underground* No. 9 (1981).

## **NORTH-EAST LONDON SCHEME: CENTRAL LINE EASTERN EXTENSIONS AND EXISTING CENTRAL SECTION IMPROVEMENTS**

### **OBJECTIVES**

- Relief of severe overcrowding on existing LNER services between Liverpool Street and North-East London; capacity relief between Liverpool Street and Stratford enabling additional services as part of the LNER main line electrification to Shenfield.
- New, improved and faster tube services from North-East London – Ongar line and Fairlop loop –

direct to the West End eliminating the previous need to change trains at Liverpool Street; and onwards to the City south area by simple cross-platform interchange with the District and Metropolitan at Mile End.

(The only disadvantage was the loss of direct services between the Fairlop loop and LNER main line via Seven Kings which was catered for by reorganised bus services in the area which accompanied and connected with the tube extensions).

## DETAILS OF SCHEME

- **Liverpool Street – Stratford:** New tube line serving new station at Bethnal Green plus existing stations at Mile End (cross-platform interchange with Metropolitan/District Lines) and Stratford (surface level cross-platform interchange with LNER).
- **Leytonstone – Newbury Park:** New tube line serving new stations at Gants Hill, Redbridge and Wanstead.
- **Leyton – Ongar and Woodford – Newbury Park:** Projection of tube trains over LNER (GER) lines, electrified and resignalled, and serving existing stations at Leyton, Leytonstone, Snaresbrook, South Woodford (George Lane), Woodford, Buckhurst Hill, Chigwell Lane (renamed Debden), Theydon Bois, Epping, North Weald, Blake Hall, Ongar, Roding Valley, Chigwell, Grange Hill, Hainault, Fairlop, Barkingside, Newbury Park. Hainault station would act as a termini from services via Newbury Park and Woodford, i.e. there would generally be no through running Leytonstone – Woodford via Newbury Park.
- **Leytonstone:** New westbound platform loop.
- **Loughton:** Station resited just east of existing (28 April 1940).
- **North Weald:** New westbound platform loop.
- **Hainault:** New railway depot (virtually complete by mid-1939).
- **Loughton, Newbury Park and Woodford:** New stabling sidings.
- **Level crossing elimination:** As they were incompatible with the operation of a frequent tube train service, the six busy GER road level crossings on the Leytonstone – Theydon Bois section were abolished and replaced as follows:
  - **Leytonstone:** Road underpass (Church Lane) just to the south (opened 1950) and pedestrian subway at station. Church Lane underpass closed in 1997 due to construction of the new A12 (M11 link) on the west side of the line here.
  - **Snaresbrook:** Underbridge reconstructed and footbridge provided.
  - **Eagle Lane:** Pedestrian subway.
  - **South Woodford (George Lane):** Road overbridge just to north (opened c.1948) and pedestrian subway at station.
  - **Woodford (Snakes Lane):** Road overbridge (Broadmead Road) just to the south (opened c.1947) and pedestrian subway at station.
  - **Buckhurst Hill (Queens Road):** Pedestrian subway at station.
  - **Theydon Bois:** Road overbridge (Coppice Row) just to the south (opened 1940).

A number of other footpath crossings were either replaced by footbridges, e.g. South Woodford (Marlborough Road), Buckhurst Hill (Luxborough Road) and Loughton (Gingells Lane) or closed.

**Central Line** (existing): Platform lengthening for eight-car trains; alterations to tunnel alignment to accommodate standard tube stock; track renewed to latest specifications; LPTB fourth-rail electrification in replacement of original Central London Railway third-rail system; power supply strengthened including new substation at Notting Hill Gate.

## WORKS NOT UNDERTAKEN

- Hainault: Outer (westbound) platform converted to island with additional line.
- Stratford: Connections between the eastbound tube and LNER Down Local, and westbound tube and LNER Up Local lines, both immediately east of the station, were to be installed “at some later date, if required” although their traffic purpose is not known.

## WEST LONDON SCHEME: CENTRAL LINE WESTERN EXTENSION

### OBJECTIVES

- To serve areas of considerable and rapid industrial and housing expansion alongside and north of the A40 Western Avenue. These demanded improved services in the form of tube trains direct to

the West End and City in replacement of GWR and LNER steam services to Paddington and Marylebone respectively, also eliminating the inconvenient changes required at both termini for onward journeys.

- To balance the Central Line eastern extensions.

#### DETAILS OF SCHEME

- **Wood Lane:** Replaced by new White City station just to the west (23 November 1947).
- **Wood Lane – North Acton:** Existing double line quadrupled – GWR new double-track (known as the “steam lines”) for its own use, adjacent to east side of existing line, brought into use 19 June 1938 enabling latter to be used exclusively by Central Line trains. The GWR Wood Lane – North Acton 1938 section lasted but 26 years and closed on 9 March 1964 leaving just the original Central Line tracks (in use today).
- **North Acton – West Ruislip:** New line on south side of existing GWR/GWR&GCR Joint line serving new stations at Hanger Lane\*, Perivale†, Greenford‡, Northolt†, South Ruislip, Ruislip Gardens and West Ruislip (for Ickenham).
- **Ruislip:** New railway depot (completed Autumn 1940).
- **Wood Lane depot:** Additional sidings.

\* Situated between and replaced GWR halts at Park Royal West and Brentham together with nearby Park Royal GWR station, all closed.

† Replaced existing GWR stations, closed together with North Acton GWR halt.

‡ Incorporated east end bay for GWR trains from/to West Ealing and Paddington, subway connection to adjacent GWR Greenford station and Central Line reversing siding west of station.

#### WORKS NOT UNDERTAKEN

- **Greenford:** Connections with GWR West Ealing branch. These may have been associated with an earlier proposal to electrify the latter line in conjunction with extension of District Line services from Ealing Broadway (a possible scheme of which details were sought in *Underground News* March 2015, page 163).
- **Northolt:** To handle traffic for the nearby racecourse the station was originally to have an additional footbridge and ticket office at its west end serving an exit on the north side, plus four sidings for terminating tube extras on race days. However, during the Second World War the racecourse was commandeered for use as an army depot and prisoner of war camp. It was never reopened thereafter and used instead for much-needed new housing in the early-1950s. This negated the need for the additional facilities to cater for racecourse traffic which were thus never proceeded with.
- **West Ruislip – Denham:** New line on south side of existing GWR/GWR&GCR Joint line serving new stations at Harefield Road and Denham. The terminus would have had four platform faces serving three tracks. However, intervention of the Second World War meant that no construction contracts were ever placed, although much detailed scheming work was undertaken. Heavy engineering works would have been likely in bridging both the Grand Union Canal and River Colne, adjacent to the existing GWR&GCR Joint line viaducts, plus the nearby west curve to the Uxbridge High Street branch (the east curve had closed in 1917) which added to the expense – and thus viability – of this relatively short extension.

#### NORTH LONDON SCHEME:

#### NORTHERN LINE EXTENSIONS AND NORTHERN CITY LINE IMPROVEMENTS

##### OBJECTIVES

- The LNER (GNR) “Northern Heights” branches to Alexandra Palace, High Barnet and Edgware served busy areas of existing and developing residential and commerce which required greatly improved transport links to the City and West End; these could be provided by tube trains via new links to the existing Northern and Northern City lines and would eliminate the previous need to change trains at King’s Cross.
- Consequent removal of local services from the LNER King’s Cross – Finsbury Park congested section, freeing-up capacity for improved main line services to outer suburban stations.

##### DETAILS OF SCHEME

- **Moorgate – Finsbury Park:** Northern City Line resignalled and modified to accept LPTB tube trains, becoming part of the Northern Line. Existing Finsbury Park low level terminus retained for peak

hour workings only to/from Moorgate.

- **Drayton Park – Finsbury Park:** New tube link serving new LPTB island platform on east side of Finsbury Park LNER (GNR) high level station.
- **Finsbury Park – Alexandra Palace, High Barnet and Edgware:** Projection of tube trains from over LNER (GNR) lines, electrified and resignalled, serving existing stations at Stroud Green, Crouch End, Highgate, Cranley Gardens, Muswell Hill, Alexandra Palace, East Finchley, Finchley Church End (renamed Finchley Central), West Finchley, Woodside Park, Totteridge & Whetstone, High Barnet, Mill Hill East, Mill Hill (The Hale) and Edgware LPTB. Edgware LNER (GNR) retained for goods and parcels use only.
- **Archway – East Finchley:** New tube line serving new station at Highgate\* (surface level interchange with Alexandra Palace branch).
- **East Finchley and Finchley Central:** Remodelled as four-platform stations, including goods yards at each to allow shunting clear of running lines, tube reversing sidings provided at both stations.
- **Wellington (Park Junction) and High Barnet:** New stabling sidings.
- **Northern Line (existing):** Camden Town substation improvements.

\* Not opened until 19 January 1941 (but trains specially stopped there for air raid shelterers from September 1940).

### WORKS NOT UNDERTAKEN

- **Finchley Central:** Southbound platform converted to island with additional outer line.
- **Finchley Central – Edgware:** Single line doubled with new northbound track on south side and new northbound platforms at Mill Hill East and Mill Hill (The Hale) stations – existing single line and platforms redesignated southbound.
- **Mill Hill (The Hale):** Rebuilt as interchange station with adjacent LMSR station.
- **Edgware LNER (GNR) – LPTB:** New interconnecting double track spur.
- **Edgware LPTB:** Station remodelled with additional platforms and sidings, together with associated realignment of Golders Green line (works partly completed only).
- **Edgware LPTB – Bushey Heath:** New line serving new stations at Brockley Hill, Elstree and Bushey Heath.
- **Aldenham: New depot.** After wartime use (see above), the depot was to find new life as LT's Aldenham Bus Overhaul Works, formally opened as such by the Minister of Transport and Civil Aviation on Tuesday 30 October 1956. It lasted but 30 years in this role, closing on 15 November 1986 when bus overhauls reverted to Chiswick Works. Aldenham Works was subsequently demolished and the site redeveloped.

Additionally, four new stations were proposed at the time (but not part) of the NWP, although with the intervention of war none were built:

- Deans Lane (between Mill Hill (The Hale) and Edgware).
- Finchley Manor (on North Circular Road, East Finchley – Finchley Central).
- Watford Way later Bunns Bridge then Cophall (Mill Hill East – Mill Hill (The Hale)).
- Willenhall Park later Barnet Vale (Totteridge – High Barnet).

Another little-known Northern Line extension was that proposed from High Barnet north a short distance through new tube tunnels into Barnet town centre (Chipping Barnet) where a new Underground station would be built.

Mooted in 1936, again it was not part of the NWP and was never proceeded with, no doubt due to the high cost of tunnelling such a short extension.

## NORTH-WEST LONDON SCHEME: BAKERLOO AND METROPOLITAN LINE IMPROVEMENTS INCLUDING EXISTING BAKERLOO CENTRAL SECTION

### OBJECTIVES

- Augmented and accelerated services from the “Metro-land” suburbs with direct link to the West End eliminating the previous change of train required at Baker Street.
- Improved local services from Stanmore and Wembley Park, including to the West End.
- Relief to Metropolitan Line Baker Street – Finchley Road double-track “bottleneck” operating at maximum capacity.

- Metropolitan Line electrification extensions to eliminate steam working of suburban services to Amersham and Chesham.
- Metropolitan Line improved services by segregation of express and local trains.

### DETAILS OF SCHEME

- **Bakerloo Line (existing):** Platform lengthening for seven-car trains; resignalling to allow intensified services; improved terminal layout at Lambeth North.
- **Bakerloo Line:** Baker Street – station reconstructed with new central ticket hall serving both the Bakerloo and Metropolitan lines with improved interchange by means of new escalators and subways; new southbound platform from the Stanmore branch complementing existing southbound platform served by the Queen's Park line.
- **Bakerloo Line:** Baker Street – Finchley Road. New tube line \* serving new stations at St. John's Wood and Swiss Cottage †, Finchley Road station rebuilt with northbound and southbound island platforms providing easy cross-platform level interchange between Bakerloo and Metropolitan Lines in each direction.
- **Bakerloo Line:** Finchley Road – Stanmore. Projection of tube trains and takeover of Metropolitan Line local services and serving existing stations at Finchley Road, West Hampstead, Kilburn, Willesden Green, Dollis Hill, Neasden, Wembley Park, Kingsbury, Queensbury, Canons Park and Stanmore;
- **Bakerloo Line:** Wembley Park. Stanmore branch flat junction replaced by flyunder.
- **Bakerloo/Metropolitan Line:** Finchley Road – Harrow-on-the-Hill. Remodelling of existing four tracks from pairing by use to pairing by direction, reducing conflicting moves and increasing capacity‡, Local lines now centre pair used by Bakerloo Line Finchley Road – Wembley Park and by Metropolitan Line local services Wembley Park – Harrow-on-the-Hill (and beyond); Main lines now outer pair and used by Metropolitan Line services throughout; new island platforms at West Hampstead, Kilburn and Dollis Hill all now served by Bakerloo Line only.
- **Metropolitan Line:** Harrow-on-the-Hill – Uxbridge. Reconstruction of Rayners Lane, Eastcote, Ruislip Manor stations and Uxbridge stations; latter terminus also relocated to more convenient site in town centre accessed via ½ mile new connecting line; Uxbridge existing terminus retained as stabling sidings.
- **Metropolitan Line:** Harrow-on-the-Hill – Rickmansworth. Quadrupled.
- **Metropolitan Line:** Rickmansworth – Amersham and Chalfont & Latimer – Chesham. Electrified.
- **Metropolitan Line:** Neasden depot. Reconstructed and enlarged to also accommodate Bakerloo Line trains; Wembley Park new single track flyunder line providing non-conflicting route accessing depot west end.

### WORKS NOT UNDERTAKEN

- **Bakerloo Line:** Elephant & Castle third platform.
- **Metropolitan Line:** Harrow-on-the-Hill – Watford South Junction. North Harrow, Pinner, Northwood Hills and Northwood planned platforms on new main lines; stations to be served by existing platforms on the local lines §.
- **Metropolitan Line:** Northwood. Local lines turnback siding (to/from Harrow-on-the-Hill direction) §.
- **Metropolitan Line:** Watford South Junction – Rickmansworth. Quadrupling including associated reconstruction of Rickmansworth station with four platforms §.
- **Metropolitan Line:** Chorleywood. Remodelling with platform loops and associated station reconstruction §.

### WORKS ADDED UNDER REVISED SCHEME (JULY 1956)

- **Metropolitan Line:** Moor Park. Platforms also on new Main lines, the station now to be an interchange between LT Amersham/BR Aylesbury fast and LT Watford and local stopping services.
- **Metropolitan Line:** Chesham. Short bay platform adjacent to south end of existing platform to enable two trains to be accommodated on the branch simultaneously.

\* The link had its genesis in a Metropolitan Railway proposal of 1925 for a main line-size tube between Edgware Road and Kilburn which had the same objective of relieving the chronic congestion which had increasingly afflicted its Baker Street – Finchley Road “bottleneck”.

- † The Bakerloo new intermediate stations at St. John's Wood and Swiss Cottage supplanted St. John's Wood, Marlborough Road and Swiss Cottage on the parallel Metropolitan, all three closing in 1939-40, enabling its services to run non-stop between Baker Street and Finchley Road with consequent acceleration and resulting increased capacity too. (Had it not been for the intervention of war, St John's Wood – renamed Lord's on 11 June 1939 – on the Metropolitan would have been retained to serve the famous cricket ground nearby).
- ‡ When works were suspended in December 1939 remodelling had reached Preston Road where a temporary signal box and junction was provided between the old and new layouts. What was intended to last just a few months in fact persisted for nine years until the remodelling was completed through to Harrow-on-the Hill (see signalling diagrams and photograph in *Underground News* March 2015 pages 154 and 155).
- § Deleted under the revised plans authorised July 1956.

## **BAKERLOO TO CAMBERWELL**

A long sought extension of the Bakerloo southward to Camberwell was proposed in 1931 but was not to be included in the NWP. It has been revived on a number of occasions since, including in recent years, but has yet to come to fruition.

## **EAST LONDON SCHEME: DISTRICT AND METROPOLITAN LINE IMPROVEMENTS**

### **OBJECTIVES**

- District and Metropolitan Line improved services to Barking and Upminster to cater for continuing traffic growth especially due to new housing developments, for example the large London County Council estate at Becontree.
- Remodelling of the cramped triangular Aldgate/Aldgate East/Minories Junction to enable working of 8-car trains in supersession of the existing 6-car trains to give enhanced capacity; Aldgate East station relocated east in consequence.

### **DETAILS OF SCHEME**

- **Aldgate/Aldgate East/Minories Junction:** Remodelled and improved layout to permit working of 8-car trains; involved providing a new and longer south curve, Minories Junction - Aldgate East Junction; Aldgate station gained a lengthened southbound platform as part of these works;
- **Aldgate East:** Station relocated a short distance east (31 October 1938); the new and enlarged station also replaced nearby St Mary's station (closed 30 April 1938).

## **LPTB CENTRAL AREA STATION RECONSTRUCTIONS AND IMPROVEMENTS**

### **OBJECTIVES**

To relieve congestion and provide additional capacity and improved facilities to handle forecast future passenger growth.

### **DETAILS**

#### **Stations reconstructed including installation of escalators in replacement of lifts:**

**Earl's Court:** Station linked with new Earl's Court Exhibition buildings (opened 1 September 1937), including escalators to a subway under the District Line to give access to its and the Piccadilly Line platforms; new covered way from the Warwick Road entrance communicating directly with the District Line platforms. Completed by mid-1937.

**Liverpool Street:** New ticket hall, escalators and subways to improve interchange between the Central and Metropolitan lines. Delayed by World War 2; completed February 1951.

**King's Cross:** Original Metropolitan station replaced by new station a short distance to the west opened 14 March 1941; new joint ticket hall for Northern and Piccadilly lines with improved interchange including to King's Cross and St Pancras main line stations.

**Marylebone:** New escalators and ticket office completed 1 February 1943.

**Notting Hill Gate:** New joint sub-surface station replacing previously separate Central and Metropolitan stations. Delayed by World War 2; completed 1 March 1959.

**St Paul's:** Completed 1 January 1939.

**Sloane Square:** Completed 27 March 1940; first District Line station with escalators from platform to street level; severe bomb damage 12 November 1940 required a second rebuild (mainly to 1940 scheme) completed 3 May 1951.

**Tottenham Court Road:** Interchange and relief passages and additional staircases opened for traffic 8 May 1937.

**Stations with major improvements:**

**Monument:** Additional escalators and subways.

**Oxford Circus:** High speed lifts.

## OTHER RAILWAY IMPROVEMENTS

**Acton Works:** Reconstructed and enlarged to handle additional rolling stock required for the new tube extensions, as well as overhaul work formerly carried out Drayton Park and Neasden depots; substantial new facilities and buildings provided, together with new sidings and traversers; completed 1939.

**Lillie Bridge permanent way depot:** Improvements.

## POWER SUPPLY IMPROVEMENTS (LPTB)

**Greenwich power station:** Re-equipment including improved maximum capacity.

**Lots Road power station:** Additional plant.

**Electrical substations and cable systems:** Modernisation and extensions.

## NWP HERITAGE

The NWP lines and stations remain substantially in use today – a tribute to their sound original planning, design and construction. The only line closure has been Epping – Ongar which saw its last Central Line trains on 30 September 1994. Dwindling traffic to this rural backwater was not helped by the need under the low-cost electrification of 1957 to operate the line as a shuttle, also involving inconvenient interchange at Epping over the station footbridge. Happily, this short line is now preserved and thriving under the auspices of the Epping Ongar Railway company.



**Left:** The former signal cabin at Debden, redundant since the new signalling was commissioned on 29 July 1996, when the number of reversing sidings were reduced from two to one. The signal cabin is now empty. This looks east from the east-bound platform on 20 May 2010.

**Photo:**  
**Brian Hardy**

There have of course been a myriad of other changes including new generations of trains and various resignallings over the years. The majority of the original NWP signal cabins have closed as a result, although Harrow-on-the-Hill, together with its unmanned subsidiary cabins at Harrow North and Harrow South, and Rayners Lane, live on borrowed time with continuing delays in implementing the Sub-Surface Railway resignalling. Many others happily remain as Interlocking Machine Rooms, Signalling Equipment Rooms or staff offices. There are too many other changes to mention, except perhaps to record that the new Jubilee Line took over the Bakerloo Line between Baker Street and Stanmore from its opening on 1 May 1979. Also, BR freight workings had ceased during the 1960s with closure of all the goods yards on the Central Line eastern extensions, Metropolitan and Northern lines. This allowed rationalisation with the yards, associated ground frames, connections and signalling, plus the

mechanical disc distant under the colour light running signals all to be abolished mostly by the mid-1970s.

Finally, the NWP architectural heritage is firmly intact for the future with many of the reconstructed stations protected by listed building status as noted in the summary above. Many fine examples of the original GER and GNR stations, including buildings and attractive platform canopies – even some of the old signal boxes of the latter company – also survive and are well maintained today on the Central and Northern Line extensions, respectively. Go travel by Underground and enjoy!

### NWP LINE OPENINGS PLANNED AND ACTUAL

LINE	PLANNED OPENING *	ACTUAL OPENING	Note
<b>BAKERLOO LINE</b>			
Baker Street – Stanmore	October 1939	20 November 1939	
<b>CENTRAL LINE</b>			
Liverpool Street – Loughton and Hainault (via Woodford)	April 1940	21 November 1948	1
North Acton – Greenford	March 1940	30 June 1947	
Greenford – West Ruislip	July 1940	21 November 1948	
Loughton – Ongar and Leytonstone – Hainault via Newbury Park	January 1941	18 November 1957	2
West Ruislip – Denham	March 1941	CANCELLED	
<b>METROPOLITAN LINE</b>			
Finchley Road - Harrow-on-the-Hill track rearrangement and Harrow-on-the-Hill station rebuilding and remodelling	July 1940	2 May 1948	
Rickmansworth – Amersham and Chesham electrification	January 1941	12 September 1960	
Harrow – Rickmansworth widening	January 1941	18 June 1962	3
<b>NORTHERN LINE</b>			
Archway – East Finchley	June 1939	3 July 1939	
East Finchley – High Barnet	March 1940	14 April 1940	
Drayton Park – Alexandra Palace	September 1940	CANCELLED	4
Finchley Central – Mill Hill East	January 1941	18 May 1941	5
Mill Hill East – Bushey Heath	January 1941	CANCELLED	

\* Dates as published at September 1939.

1. Liverpool Street – Stratford opened 4 December 1946, Stratford – Leytonstone 5 May 1947, Leytonstone – Woodford 14 December 1947, Woodford – Loughton and Hainault 21 November 1948.
2. Leytonstone – Newbury Park 14 December 1947, Newbury Park – Hainault 31 May 1948, Loughton – Epping 25 September 1949, Epping – Ongar 18 November 1957.
3. Widening to four tracks curtailed at Watford South Junction.
4. Drayton Park – Finsbury Park link opened on 8 August 1976 as part of the BRER GN Suburban electrification and utilised most of the NWP ramps at the former station, opened out to accommodate standard loading gauge stock.
5. Had been postponed along with rest of extension to Bushey Heath but opening brought forward as a wartime measure to serve the Inglis military barracks at Mill Hill East.

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