

NINE CARS ON THE NORTHERN

Notes about nine-car trains on the Northern Line have been published before, but with new information now available, it is worth publishing again in expanded form.

The overcrowding of the Northern Line in the 1930s caused the LPTB to consider ways of alleviating the problem. Perhaps turning 'full-circle' and looking at today's overcrowding on the Underground, it is soon realised that quick measures are really impossible, because the only long-term solutions to such problems mean long-term and costly major construction work.

In September 1936, however, preliminary investigations into the feasibility of nine-car operation had commenced, looking at the Morden – Edgware via Charing Cross section of the line¹. The ideas then being formulated would have utilised the usual seven-car formation, but adding an additional trailer and driving motor car to each train. The two extra cars would have accommodation for an extra 240 passengers, increasing capacity by 29% per train. Work would include adjusting signals and their overlaps, and lengthening selected platforms. Problems with restricted length depot roads and shunting necks could be overcome, providing the number of nine-car trains on the line did not exceed 12-15.

It was proposed to lengthen platforms at Morden (middle platform), Tooting Broadway, Strand, Leicester Square, Tottenham Court Road and Brent to Edgware (inclusive). The guard would be located in his normal position and the two additional cars would only have their doors opened at the lengthened stations. A further problem that had to be considered was the ventilation (or lack of it) in the two extra cars, where the doors would not be opened for over half an hour between Tooting and Strand. The stations nominated for lengthening would each be extended by 102 feet, making them suitable for the new 1938 Tube Stock, whose nine-car formation would have the passenger-carrying capacity of ten cars of the old Pre-1938 Tube Stock.

The station tunnels not extended would be painted specially and would have miniature station name bullseyes, so passengers in the two cars stopped in the tunnel would be aware of their location. To lengthen the 'tube' stations, parliamentary powers would be necessary. The ideal proposal was seen to be to lengthen stations at the furthest end from the two special cars so that they were made as accessible as possible. However, site constraints meant that this would not always be possible. At Tooting Broadway the siding beyond the south end of the station meant that only the north end could be lengthened, at Leicester Square the interchange subways at the south end precluded extension at that end, and at Tottenham Court Road, similar reasons (but at the north end) would have meant lengthening at the south end. At Strand (the present Charing Cross) it was not practical to extend at either end because of the crossover at the north end and the fact that the line fell away on a down gradient to nearby Charing Cross (today's Embankment) at the other.

In the end, the only stations to be lengthened were the open-air stations at Golders Green (both ends), Brent (north), Hendon Central and Colindale (south), Burnt Oak (north) and Edgware (platform 1, south end). It is interesting to note that previous proposals envisaged platform lengthening at the opposite ends of Hendon Central and Golders Green.

An experimental night-time run was made during the night of 9/10 August 1937 between Colindale and Kennington via Charing Cross with an eight-car train formed as follows:

CT + M + M – T – T – M + M + CT

This was to examine clearances of station platforms and signals. The end pair of double doors of the control trailers at each end of the formation were locked closed, while all other doors were berthed at platforms. However, the driver's margin of error in stopping was only 4 feet, which was recognised as being too fine. Another objective of this test trip was to consider whether eight cars of the new type (the imminent 1938 Tube Stock, which would be equivalent to nine cars of Pre-1938 stock) would be more operationally practical.

At a meeting chaired by Lord Ashfield on 12 August 1937, it was recorded that the trial eight-car train took place during the night of 9/10 August for the reasons outlined above. The then Operating Manager, J.P. Thomas, reported that it was preferable to operate nine-car trains rather than eight, and

¹ At this time it was the 'Morden – Edgware Line'. Dates of name change as follows:

- 'Hampstead & City' to 'Edgware, Highgate & Morden Line' 21.11.33.
- 'Morden – Edgware Line' June 1934.
- 'Northern Line' from 28.03.37.

arrangements were made for a nine-car test run during the night of 16/17 August 1937. Following this, the proposal to operate nine-car trains was approved by the Board, and thus nine-car operation was born, but only as far south as Kennington (via Charing Cross). After many deliberations with train formations, the formation adopted was as follows:

1 2 3 4 5 6 7 8 9
M – T – M + T – T – T + M – T – M

The guard was located at the guard's position on the motor cars at either position 3 or 7, and special 'tumbler' switches were fitted above the controls on those cars to enable cars 1/2 or 8/9 (or both pairs) to be isolated from either position at stations which were not of nine-car length, and according to where the train was required to stop. It was also possible, through stock availability, for control trailers to be substituted for trailers at positions 4 and 6. If a control trailer was formed in the train at position 4 or 6, it would be possible, in an emergency, for the train to be uncoupled and disposed of in two portions.

Extensive alterations were made to the signalling and track circuits, and to some current rail gaps, and nine-car trains were forbidden (except in an emergency) to operate south of Kennington, north of Camden Town to and from Highgate or both directions via the City, for which special instructions were issued in the event of such an emergency.

The only sidings allowed to take nine-car trains were at Colindale, Golders Green (northbound loop), Kennington and Angel, the last two in emergency only. Also, nine-car trains were banned from operating north of Colindale until platform lengthening and signaling work at Burnt Oak and Edgware had been completed.

The first nine-car train was put into passenger service from 8 November 1937, working two morning rush hour trips and one evening (Saturday midday) trip, as follows:

Monday to Friday – Train 87

07.26 Golders Green – Kennington
07.54 Kennington – Colindale
08.34 Colindale – Kennington
09.11 Kennington – Hampstead
17.37 Hampstead – Kennington
18.03 Kennington – Colindale

Saturdays – Train 71

07.11 Colindale – Kennington
07.48 Kennington – Colindale
08.30 Colindale – Kennington
09.06 Kennington – Hampstead
12.33 Hampstead – Kennington
12.59 Kennington – Colindale

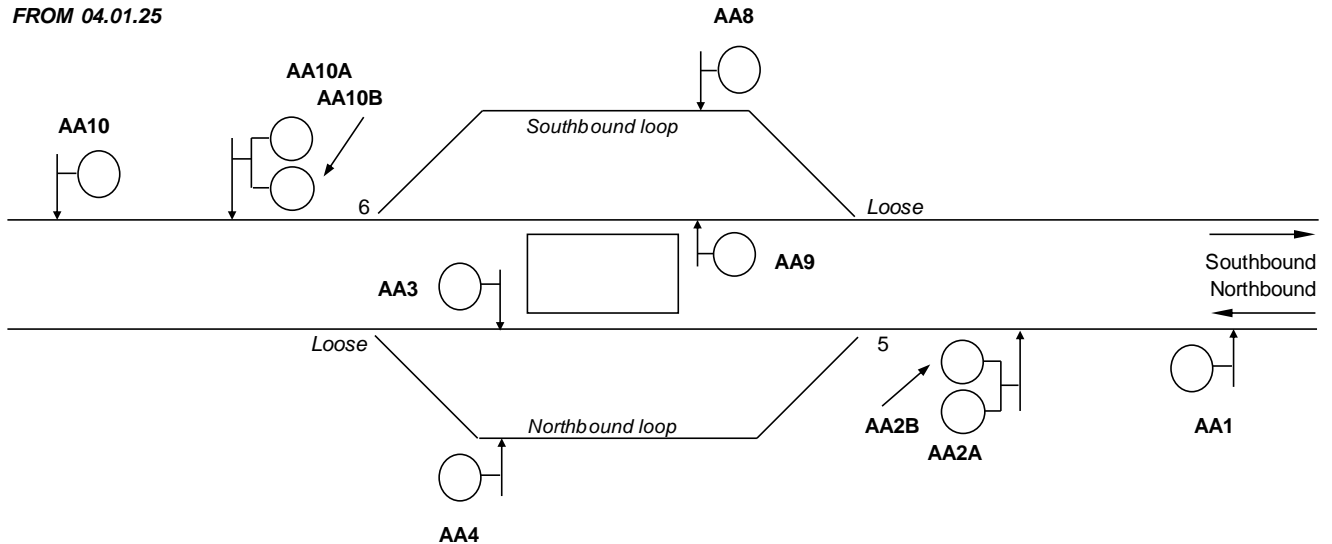
An official inspection by the MoT took place in service on 15 November 1937, although the platform extension and signalling work north of Colindale was not ready in time for the November introduction. In a memo from J.P. Thomas to Frank Pick dated 1 December 1937, the nine-car 'experiment' was recommended to continue, following on from the MoT inspection of 15 November. In the memo, reference is made to the temperature inside the two cars which have doors closed for a considerable part of the journey: "Unexpectedly, the two closed cars do not get hot. They seem rather cooler than the rest. This may be due to the doors not opening at certain stations and not letting in the warmer station air during the rush hour as do the other cars. On three occasions whilst the two rear cars stood at Kennington in the tunnel during the 20 second station stop, the passage of an outgoing City line train caused a whirlwind of dust which entered these two cars through the ventilators. The cars are empty at the point until the time comes to send them to Morden. On one of these occasions, the guard was covered with dust and had to be relieved to be brushed down before putting him back. This unpleasant experience is under investigation". No other reference can be found to the brushing down of guards on nine-car trains!

The MoT was concerned about incorrect door operation in tunnel stations by guards and asked the LPTB to consider installing photo rays for detection purposes². Not surprisingly, perhaps because of its complexities and doubt of reliability in tunnel and restricted clearance conditions, it did not pass the 'consideration' stage. The first error by a driver is recorded as being made in the evening of 29 December 1937, when a southbound train (with the rear two cars empty) stopped at Tottenham Court Road on the nine-car mark with the two leading cars in the tunnel. It is recorded that there were no passengers in these two cars who wanted to get off at Tottenham Court Road. At tube tunnel stations where the two cars stopped in the tunnel, barrier rails were installed (which was piping painted red).

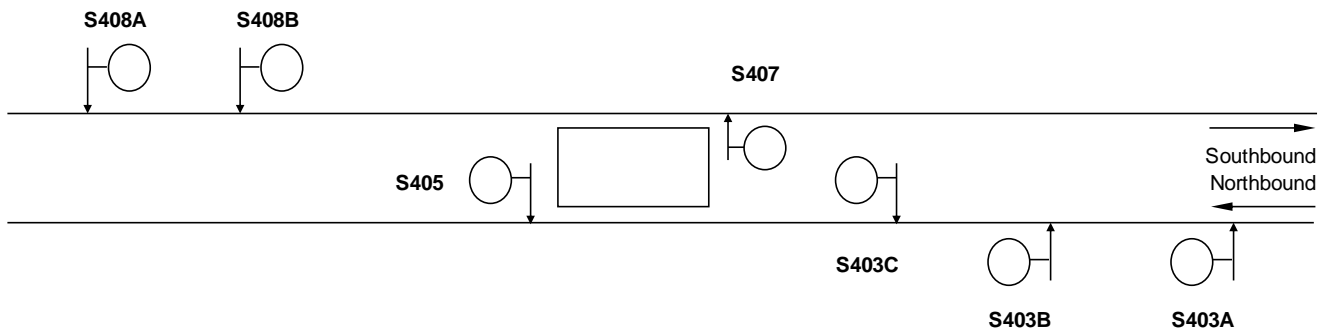
² So, Correct Side Door Enable was born in 1937 (but not implemented until many years later!).

BRENT

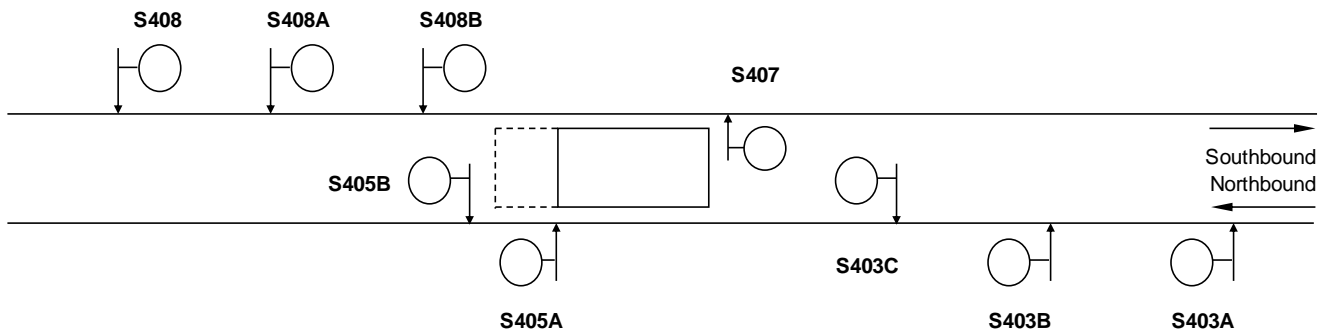
FROM 04.01.25



FROM 17.01.37



FROM 17.10.37



OTHER NINE-CAR SIGNALLING ALTERATIONS

- 10.10.37 Golders Green -
- No.17 crossover moved 150ft south.
 - South end of No.14 crossover moved 30ft north.
 - Signal G34 moved 25ft north.
 - Signals G1A and G1B each moved 70ft south.
 - Signals G3A and G3B, calling-on facility removed (no coupling southbound).
 - Southbound starting signal No.3 road G4A/B/C moved 50ft south.
 - Southbound starting signal No.2 road G5A/B/C/D moved 55 ft south.
 - Shunt limit north end of No.3 road moved 60ft north.
- 19.10.37 Colindale -
- New 9-car starting signal AC12B 140ft south of starter AC12 which is renumbered AC12A.
- 24.10.37 Hendon Central -
- New 9-car starting signal A413A 130ft south of starter A413, which is not renumbered.
- 16.01.38 Burnt Oak -
- Northbound starting signal S440 moved 140ft north.
- 30.01.38 Edgware platform 1
- New advance starting signal AE33C 120ft south of starting signal platform No.1.
 - Derailer moved 8ft south of signal AE33C.

The necessity of these was highlighted on 4 January 1938 when a driver's error resulted in a northbound train over-running the nine-car stopping mark, and the leading doors on the third car were thus opened in the tunnel!

At Edgware, because of site constraints, only platform 1 could be used for nine-car trains and even that meant that the southern-most car and a half were off the platform – the doors on the south end two cars were kept closed here so presumably passengers were allowed to alight via the communicating doors if they had boarded these two cars. When the work was completed (from 30 January 1938), train 87 on Monday to Friday evenings from 7 February 1938 was extended from Colindale to Edgware on its 18.03 trip from Kennington. From the same date a second nine-car train was put into service.

Monday to Friday – Train 19

06.34 Golders Green – Edgware
 06.54 Edgware – Kennington
 07.36 Kennington – Edgware
 08.21 Edgware – Kennington
 09.01 Kennington – Hampstead
 17.07 Hampstead – Kennington
 17.36 Kennington – Edgware
 18.19 Edgware – Kennington
 19.03 Kennington – Edgware

Saturdays – Train 90

06.34 Golders Green – Edgware
 06.55 Edgware – Kennington
 07.36 Kennington – Edgware
 08.20 Edgware – Kennington
 09.01 Kennington – Hampstead
 12.25 Hampstead – Kennington
 12.53 Kennington – Edgware
 13.37 Edgware – Kennington
 14.18 Kennington – Edgware

For nine-car trains to enter service from Golders Green to Edgware, they had to leave depot and reverse on the southbound line, as the train was too long for the shunting neck. (This had been lengthened to take seven cars in 1923, hence the third tunnel mouth south of Golders Green!).

A third nine-car train followed from 14.2.38 (train 58 MF, train 49 SO), and a fourth from 21.2.38 (train 56 MF, train 79 SO). The **Monday to Friday** workings were as follows:

Train 58

06.11 Golders Green – Edgware
 06.27 Edgware – Kennington
 07.06 Kennington – Edgware
 07.53 Edgware – Kennington
 08.33 Kennington – Golders Green
 09.04 Golders Green – Kennington
 09.33 Kennington – Hampstead
 17.01 Hampstead – Kennington
 17.26 Kennington – Edgware
 18.09 Edgware – Kennington
 18.50 Kennington – Edgware

Train 56

06.21 Golders Green – Edgware
 06.38 Edgware – Kennington
 07.18 Kennington – Edgware
 08.02 Edgware – Kennington
 08.44 Kennington – Edgware
 09.27 Edgware – Kennington
 10.08 Kennington – Hampstead
 17.50 Hampstead – Kennington
 18.15 Kennington – Edgware

SOUTHBOUND TRAIN WORKING

Peak Direction (MF/SO Mornings)

At Edgware, only the seven north end cars would have doors open for boarding. Between Burnt Oak and Golders Green, all nine cars would operate normally with all doors opened. The two rear cars were reserved for passengers travelling to Tottenham Court Road and thus stopped in the tunnel from Hampstead to Goodge Street (inclusive), the leading seven cars stopping at the normal seven-car mark. At Tottenham Court Road, the leading two cars stopped in the tunnel at the nine-car mark, allowing passengers to detrain from the rear two cars. From Leicester Square to Kennington (inclusive) trains would stop at the normal seven-car mark, leaving the two rear cars (by then empty) in the tunnel.

Against Peak Flow (MF Evenings, SO Midday)

As these trains started up from Golders Green depot running direct to Hampstead, the rear two cars were kept isolated, and trains stopped at the normal seven-car stopping mark (with the rear two cars in the tunnel) throughout to Kennington.

NORTHBOUND TRAIN WORKING

In both peaks, from Kennington to Leicester Square the two front cars remained empty and trains stopped in the tunnel at the nine-car marks. At stations Tottenham Court Road to Hampstead, the train would stop at the normal seven-car mark, leaving the two rear cars in the tunnel. The leading two cars,

up until Tottenham Court Road being empty, would thus be available for passengers from there northwards. Passengers thus entering the rear two cars between Kennington and Leicester Square were destined to travel to at least Golders Green or beyond. It should be noted that nine-car trains (as with almost all Edgware via Charing Cross trains) non-stopped Mornington Crescent.


9 CAR TRAINS
SOUTHBOUND

FRONT TWO CARS
NOT FOR
TOTTENHAM
COURT ROAD



9 CAR TRAINS
NORTHBOUND

REAR TWO CARS
FOR
WATERLOO
CHARING CROSS
STRAND
LEICESTER SQUARE
GOLDERS GREEN
BRENT
HENDON CENTRAL
COLINDALE
ONLY



There appears to be no surviving records as to which cars of Pre-1938 Tube Stock were adapted for nine-car operation. Such cars required alterations to the door control circuits and on these trains the guard's 'open' button on cars 3 and 7 would only open the doors on the centre five cars (3 to 7 inclusive). However, above each door control panel were a pair of tumbler switches, each with 'on' and 'off' positions. Also provided was a two-section sign in the ceiling of the guard's gangway. The operation of one (or both) of the tumbler switches would enable the front two cars' doors (and rear two cars' doors if both tumbler switches operated) to be opened with the appropriate section of the overhead sign being illuminated. The operation of the 'close' button by the guard would then close all doors throughout the train, be it on seven or nine cars, and the guard was required to return the tumbler switch(es) back to 'off'. Should the tumbler switches not be returned to the off position, the pilot light and bell circuits would not be operative.

1938 TUBE STOCK

The success of the nine-car scheme led to London Transport to order ten trains specifically for nine-car working on the Northern Line, four for the Edgware branch, four for the Barnet branch, plus a spare train for each.

The 90 cars for nine-car trains were numbered as shown opposite:

'A'-end DMs	90324 – 90333	10
'D'-end DMs	91324 – 91333	10
NDMs	92029 – 92058	30
SNDMs	92447 – 92466	20
Trailers	092389 – 092408	20
Total:		90

Trains were formed: DM – NDM x SNDM – T – NDM – T – SNDM x NDM – DM

- Denotes semi-permanent ‘bar’ coupling.
- × Denotes emergency Ward coupler, as found on Pre-1938 Tube Stock.

As seen above, the Special Non-Driving Motor car (SNDM) was located at positions 3 and 7, and as with the Pre-1938 Tube Stock contained door controls for the guard, along with a handbrake. The adjacent NDM car (at positions 2 and 8) also had a Ward coupler for emergency uncoupling, and for ease of maintenance in 7-car-length depot roads. These ten trains were ‘block’ formed and did not lend themselves for off-peak short train working – their use would thus be confined to rush hour working only.

We are told that the nine-car order as tacked on to the end of the original order for 1938 Tube Stock, but after production of the main order had begun, the builders (Metro-Cammell and Birmingham) were asked to give priority to the nine-car stock. To that end, deliveries of it began on 20 February 1939 with the last of the 90 cars on 31 May 1939.

However, only two nine-car trains of 1938 Tube Stock ran as such, both from 19 June 1939. Prior to that, nine-car stock had first entered service as seven-car ‘block’ trains from 15 May 1939 with two others on 22 May and 30 May 1939. One other also entered service on the same date as the two-nine-car trains, with two others on 1 July and 10 July 1939, making 60 cars out of the 90.

The timetable dated 3 July 1939 was the last to incorporate nine-car train working and even this reduced the number of nine-car trains on Saturdays to two. The four Monday to Friday workings in passenger service are summarised thus:

Train			58	56	19	87	58	56	19	87	58	56
Non-Stop Note			M	M	M	M	M	M	M	M	M	M
Edgware	–	–	06.27	06.39	06.54	–	07.53	08.02	08.21	–	–	09.27
Colindale	–	–	06.31	06.43	06.59	–	07.57	08.07	08.25	08.34	–	09.31
Golders Green	–	–	06.39	06.51	07.06	07.26	08.05	08.15	08.33	08.42	09.04	09.39
Hampstead	–	–	06.42	06.54	07.09	07.29	08.08	08.18	08.36	08.45	09.07	09.42
Camden Town	–	–	06.48	07.00	07.15	07.35	08.14	08.24	08.42	08.51	09.13	09.48
Kennington	–	–	07.03	07.15	07.30	07.50	08.29	08.39	08.57	09.06	09.28	10.03
Non-Stop Note			M	M	M	M	M	M	M	M	M	M
Kennington	–	–	07.06	07.18	07.35	07.54	08.33	08.44	09.01	09.11	09.33	10.08
Camden Town	–	–	07.21	07.33	07.52	08.10	08.49	08.59	09.17	09.26	09.48	10.24
Hampstead	–	–	07.28	07.41	07.59	08.18	08.56	09.07	09.24	09.34	09.55	10.31
Golders Green	06.11	06.21	07.31	07.44	08.02	08.21	08.59	09.10	–	–	–	–
Colindale	06.18	06.28	07.39	07.51	08.11	08.28	–	09.17	–	–	–	–
Edgware	06.22	06.32	07.43	07.55	08.16	–	–	09.22	–	–	–	–

Train	58	19	87	56	58	19
Non-Stop Note	M	M	M	M	M	M
Edgware	–	–	–	–	18.09	18.19
Colindale	–	–	–	–	18.13	18.23
Golders Green	–	–	–	–	18.21	18.31
Hampstead	17.01	17.10	17.37	17.50	18.24	18.34
Camden Town	17.07	17.16	17.44	17.57	18.30	18.40
Kennington	17.22	17.31	17.59	18.12	18.45	18.55
Non-Stop Note	N	N	N	N	N	M
Kennington	17.26	17.36	18.03	18.15	18.50	19.02
Camden Town	17 41	17 51	18 18	18 30	19 05	19.17
Hampstead	17.49	17.58	18.26	18.38	19.12	19.24
Golders Green	17.52	18.01	18.29	18.41	19.15	19.27
Colindale	17.59	18.09	18.36	18.48	19.23	19.34
Edgware	18.04	18.13	18.41	18.53	19.28	19.39

- All trains work via Charing Cross.
- All trains start and finish at Golders Green Depot. (There were also some empty trips between Golders Green and Edgware).
- M – Non-stopping Mornington Crescent.
- N – Non-stopping Mornington Crescent and Camden Town.

The Northern Line service was suspended between Moorgate and London Bridge and between Strand and Kennington from 6 September 1939 for floodgate construction. The service was thus split into separate ‘north’ and ‘south’ sections with a split service. Trains on the southern section remained as seven cars but on the northern section, all trains had to be six cars only. Nine-car operation thus came to an end, never to be reinstated. The remaining 30 cars of nine-car stock entered service in drips and drabs, with one six-car ‘block’ from 30 September 1939. A total of 11 trailers entered service in 1944 and the final six trailers in 1949, having been stored for ten years.

SUMMARY OF CARS ENTERED SERVICE

DATES	TRAINS	DM	NDM	SNDM	T	TOTAL	GRAND TOTAL
15.05.39	1x7	2	3	2	–	7	7
22.05.39	1x7	2	3	2	–	7	14
30.05.39	1x7	2	3	2	–	7	21
19.06.39	1x7	2	3	2	–	7	28
19.06.39	2x9	3	6	4	4	18	46
01.07.39	1x7	2	3	2	–	7	53
10.07.39	1x7	2	3	2	–	7	60
30.09.39	1x6	2	2	2	–	6	66
17.02.40		–	1	–	–	1	67
23.04.40	1x7	2	3	2	–	7	74
23.02.44		–	–	–	1	1	75
15.03.44		–	–	–	2	2	77
21.03.44		–	–	–	2	2	79
05.04.44		–	–	–	1	1	80
10.05.44		–	–	–	2	2	82
14.06.44		–	–	–	2	2	84
30.03.49		–	–	–	2	2	86
04.05.49		–	–	–	2	2	88
25.05.49		–	–	–	2	2	90
Total:		20	30	20	20	90	

STIFLED DEVELOPMENT?

Careful monitoring of nine-car train operation showed that it caused no significant delays to the service and a nine-car train was able to accelerate at the same rate as a seven-car train. Furthermore, the two additional cars per train took about 12% of passengers that would have otherwise been on the other seven cars. There were also no adverse comments about interior car temperatures, even the doors on two cars that were not opened between Golders Green and Tottenham Court Road. J.P. Thomas then put forward a paper with proposals to extend nine-car-train operation on the Northern Line, as follows:

1. The present experimental working of four nine-car trains to and from the Edgware branch of the Northern Line has proved a success upon that line since its inception on 8 November 1937. Observations taken in the rear two cars on leaving Golders Green southbound show all seats taken and a few passengers standing, so that 100 passengers – or about 12% of a normal train load – are taken from the remainder of the train, giving this much relief to passengers in the other cars. The punctuality of the nine-car trains has been good. Over 1,000 trips to Kennington and back to Edgware have been made, representing 200,000 car miles, and no delay has been reported due to the operation of the two additional cars. Temperatures have been taken in the two special cars, and although it was suggested at the outset that the ventilation might suffer from the doors not being opened between Golders Green and Tottenham Court Road, thermometer readings have shown that the temperatures are rather less than in the rest of the train.
2. There is no reason why the nine-car principle should not be extended to other sections of the Board's railway system should traffic conditions warrant. The following paragraphs will show how this might be done, and is recommended that certain minor engineering works at stations or in sections where reconstruction work is at present in progress should be undertaken forthwith in preparation for nine-car working.

3. With the extension to Finchley and High Barnet, opportunity will be taken to operate nine-car trains on this branch, track layout having been arranged to accommodate longer trains by a simple platform extension wherever alterations were involved, and the following proposals are submitted:
- (a) All platforms, Highgate to High Barnet inclusive, to be equipped with nine-car length platforms: Highgate, East Finchley and Finchley Central already provided for, also Archway siding for use in an emergency. Approximate additional cost: £5,000.
 - (b) All station platforms, Edgware to Bushey Heath and sidings in depot and at Edgware to take nine-car trains. Approximate additional cost: £3,000.
 - (c) Provision of runaway sidings in Camden Town Junction loops to allow trains to run up to junction home signals without checking. (Approximate additional cost: £20,000.
 - (d) Signalling alterations Camden Town to Archway. Approximate additional cost: £2,000.

The rear two cars in the workmen's southbound morning peak will be reserved for Tottenham Court Road only – south of this the special cars will be locked and run empty to Kennington whence the trains will reverse to return northbound empty to depot. A feature of the southbound peak from the Finchley line will be to meet the steam trains of the LNER which, during transition, will use the same platforms at East Finchley as the tube trains – nine-car trains will be useful to accommodate the traffic which will be expected to exchange from the heaviest of the steam trains to the tube.

In the evening peak a similar arrangement will operate as today, special cars serving the group of stations, Kennington to Leicester Square, and then proceeding direct without further call to the long platforms at stations north of Hampstead and Tufnell Park or at East Finchley and stations north.

Four trains work as nine-cars on the Edgware service today. Four more nine-car trains will be required to give comparable service on top of the workmen's and business peaks to and from the Finchley line. Owing to the length of the line, workmen's trains can only, in a limited number-of instances, be used at a second trip to work the business peak. A number of trains will, therefore, only be used for a single trip, morning and evening. It is proposed to operate two trips in the workmen's and three in the business peaks from Finchley, two trips in the workmen's and five in the business peaks from Edgware. A schedule based on these lines would require eight nine-car trains.

(Paragraphs 4 to 7 go on to examine the possibility of nine-car operation on the other tube lines).

8. As regards the remainder of the Northern Line, it is not suggested that nine-car operation should be contemplated on the Alexandra Palace branch, Northern City Line or between Euston and Kennington via Bank. It may be desirable one day to give relief to Morden by this method. The procedure visualised would be to lengthen all platforms to a width of 6ft 3ins for the longer trains from Morden to Tooting Broadway inclusive and resignal the line south of Kennington.

Eight or a dozen train berths of 500ft long would also be required in Morden depot. The increased demand on traction current supply would necessitate a new substation at Tooting Broadway and additional equipment in certain existing substations. Owing to the high cost involved, extension of nine-car trains to Morden is not recommended for present consideration.