

Crossrail 2

The proposals for Crossrail 2 are still at the preliminary stage, but the important decision has been taken, that it should be a proper Crossrail, that is, a line to full loading gauge, linking suburban services either side of London in a proper urban metro, and not a self-contained tube line, as was the original Chelsea – Hackney proposal.

The core of the current proposals is a tunnel section from just south of Tottenham Hale to just north of Wimbledon, thus serving both these surface level stations, via Hackney Downs / Hackney Central (Hackney Central Downs?), Angel, Euston / St. Pancras (i.e. London Hbf – see the article ‘Cross-London Interconnections’), Tottenham Court Rd., Victoria, King’s Rd. Chelsea, Clapham Junction and Tooting Broadway. Additionally, a second northern arm, entirely in tunnel, runs from Wood Green / Alexandra Palace to Angel, via Turnpike Lane, Seven Sisters and Dalston Junction. Outwards from Tottenham Hale, the route is along the Lea Valley Line, but plans are not, as yet, specific. From Wimbledon, it takes over the branches from Raynes Park to Epsom and Chessington South, from New Malden to Twickenham and Shepperton, and to Surbiton and Hampton Court. These are excellent plans, as far as they go. It is now time to build on them and describe what the eventual network should be, and the services to run on it.

The five South West branches are each currently served by an off-peak service of 2tph. Clearly we are not going to build a Crossrail for a mere 10tph, so all these services need to be doubled. One more service is required, to bring the loading of the central core to 24tph (as with the initial service on Crossrail 1). I suggest extending along the main line from Surbiton to Weybridge, then taking over the branch to Virginia Water and on to London Heathrow, Terminal 5, via Egham and Staines West, thus implementing (part of, but an important part,) the late, lamented Airtrack. Appendix A explains how to replace the level crossing at Station Rd., Egham, which was instrumental in getting the original Airtrack cancelled.

At the eastern end, 4tph would serve Bishop’s Stortford and 4tph Hertford East. A further 8tph would serve the Alexandra Palace arm. Clearly we need more. I suggest a branch in tunnel from Hackney Central Downs to Leyton, where it joins and takes over the Central Line route to Epping. The section between Leyton and Leytonstone would be 4 track, with the Central Line trains diverging at Leytonstone and all running to Hainault. The line from Leyton to Epping was of course originally built by the Great Eastern, and is to full-size loading gauge. I regard it as an awful waste of infrastructure to run tiny tube trains on full-loading-gauge lines. The Epping line currently has a service of 9tph, which I would reduce slightly to 8tph.

The final refinement is for an 8tph shuttle service over the central core between Wimbledon and Tottenham Hale, exactly as for Crossrail 1 between Old Oak Common and Stratford South (see the article ‘Crossrail Service Plans’). All South West express and outer suburban services would call at Wimbledon, and all Cambridge line services, including Stanstead, at Tottenham Hale. This provides passengers for central London with very easy and convenient interchange points, rather than continuing through to Waterloo or Liverpool St. and changing there. The shuttle guarantees them an initially-empty train every 7 / 8 minutes, thus with an average wait of under 4 minutes.

The Service Plan

Before presenting the service plan, some explanation of the design aims is appropriate.

Every station has at least 4tph, evenly spread, every 15 mins. Some stations have 8tph, evenly spread, every 7½ minutes or as near to this as possible; there is one exception to this, Tottenham Hale, which has 8tph but to a less even pattern, due to the next requirement. The services from Bishop's Stortford and Hertford East are each alternately non-stop or all stations between Broxbourne and Tottenham Hale, moreover they have cross-platform interchange at Broxbourne, Bishop's Stortford fast/stopping with Hertford East stopping/fast. With the above in mind, the services are:

- 2tph Bishop's Stortford – Sawbridgeworth – Harlow Mill – Harlow Town – Roydon – Broxbourne – Tottenham Hale – Hackney Central Downs – Angel – Euston / St. Pancras – Tottenham Court Rd. – Victoria – King's Rd. – Clapham Junction – Tooting Broadway – Wimbledon – Raynes Park – New Malden – Berrylands – Surbiton – Esher – Hersham – Walton on Thames – Weybridge – Addlestone – Chertsey – Virginia Water – Egham – Staines West – LHR T5
- 2tph Bishop's Stortford – Sawbridgeworth – Harlow Mill – Harlow Town – Roydon – Broxbourne – Cheshunt – Waltham Cross – Enfield Lock – Brimsdown – Ponders End – Angel Rd. – Tottenham Hale – Hackney Central Downs – Angel – Euston / St. Pancras – Tottenham Court Rd. – Victoria – King's Rd. – Clapham Junction – Tooting Broadway – Wimbledon – Raynes Park – New Malden – Norbiton – Kingston – Hampton Wick – Teddington – Fulwell – Hampton – Kempton Park – Sunbury – Upper Halliford – Shepperton
- 2tph Hertford East – Ware – St. Margaret's – Rye House – Broxbourne – Tottenham Hale – Hackney Central Downs – Angel – Euston / St. Pancras – Tottenham Court Rd. – Victoria – King's Rd. – Clapham Junction – Tooting Broadway – Wimbledon – Raynes Park – New Malden – Berrylands – Surbiton – Esher – Hersham – Walton on Thames – Weybridge – Addlestone – Chertsey – Virginia Water – Egham – Staines West – LHR T5
- 2tph Hertford East – Ware – St. Margaret's – Rye House – Broxbourne – Cheshunt – Waltham Cross – Enfield Lock – Brimsdown – Ponders End – Angel Rd. – Tottenham Hale – Hackney Central Downs – Angel – Euston / St. Pancras – Tottenham Court Rd. – Victoria – King's Rd. – Clapham Junction – Tooting Broadway – Wimbledon – Raynes Park – New Malden – Norbiton – Kingston – Hampton Wick – Teddington – Fulwell – Hampton – Kempton Park – Sunbury – Upper Halliford – Shepperton
- 4tph Epping – Theydon Bois – Debden – Loughton – Buckhurst Hill – Woodford – South Woodford – Snaresbrook – Leytonstone – Leyton – Hackney Central Downs – Angel – Euston / St. Pancras – Tottenham Court Rd. – Victoria – King's Rd. – Clapham Junction – Tooting Broadway – Wimbledon – Raynes Park – New Malden – Berrylands – Surbiton – Thames Ditton – Hampton Court
- 4tph Epping – Theydon Bois – Debden – Loughton – Buckhurst Hill – Woodford – South Woodford – Snaresbrook – Leytonstone – Leyton – Hackney Central Downs – Angel – Euston / St. Pancras – Tottenham Court Rd. – Victoria – King's Rd. – Clapham Junction – Tooting Broadway – Wimbledon – Raynes Park – Motspur Park – Worcester Park Stoneleigh – Ewell West – Epsom
- 4tph Wood Green / Alexandra Palace – Turnpike Lane – Seven Sisters – Dalston Junction – Angel – Euston / St. Pancras – Tottenham Court Rd. – Victoria – King's Rd. – Clapham Junction

- Tooting Broadway – Wimbledon – Raynes Park – New Malden – Norbiton – Kingston – Hampton Wick – Teddington – Strawberry Hill – Twickenham
- 4tph Wood Green / Alexandra Palace – Turnpike Lane – Seven Sisters – Dalston Junction – Angel – Euston / St. Pancras – Tottenham Court Rd. – Victoria – King’s Rd. – Clapham Junction – Tooting Broadway – Wimbledon – Raynes Park – Motspur Park – Malden Manor – Tolworth – Chessington North – Chessington South

together with the Regional Metro services:

- 2tph Reading – Wokingham – Bracknell – Martin’s Heron – Ascot – Sunningdale – Virginia Water – Egham – Staines West – LHR T5
- 2tph Guildford – Worplesdon – Woking – West Byfleet – Byfleet & New Haw – Addlestone – Chertsey – Virginia Water – Egham – Staines West – LHR T5

(The 2tph Reading – Waterloo service connects into the immediately-following Guildford – LHR T5 service at Egham.)

The crossrail services form 3 groups:

- 4tph Bishop’s Stortford / Hertford East (2tph each, alternately) → Broxbourne – (non-stop) Tottenham Hale → New Malden → LHR T5
- 4tph Bishop’s Stortford / Hertford East (2tph each, alternately) → Broxbourne – (all stations) Tottenham Hale → New Malden → Shepperton
- 4tph Epping → Raynes Park → Hampton Court
- 4tph Epping → Raynes Park → Epsom
- 4tph Alexandra Palace → Raynes Park → Twickenham
- 4tph Alexandra Palace → Raynes Park → Chessington South

Representative Hourly Cross-Platform Interchange Pattern at Broxbourne:

- 00 Bishop’s Stortford – LHR T5 (thus non-stop Broxbourne – Tottenham Hale)
Hertford East – Shepperton (thus all stations Broxbourne – Tottenham Hale)
- 15 Hertford East – LHR T5 (thus non-stop Broxbourne – Tottenham Hale)
Bishop’s Startford – Shepperton (thus all stations Broxbourne – Tottenham Hale)

– repeating at 30 and 45 minutes past.

Considering times on the section between Broxbourne and Tottenham Hale (taken from current timetables):

Broxbourne	00:00	00:00	00:00
Cheshunt		00:04	00:04
Waltham Cross			00:07
Enfield Lock			00:09
Brimsdown			00:12
Ponders End			00:14
Angel Rd.			00:17
Northumberland Park			00:19
Tottenham Hale	00:11	00:13	00:23

Checking the running of fast and slow over this section:

Broxbourne	00:00	00:00	00:15
Cheshunt		00:04	
Waltham Cross		00:07	
Enfield Lock		00:09	
Brimsdown		00:12	
Ponders End		00:14	
Angel Rd.		00:17	
Northumberland Park		00:19	
Tottenham Hale	00:11	00:23	00:26

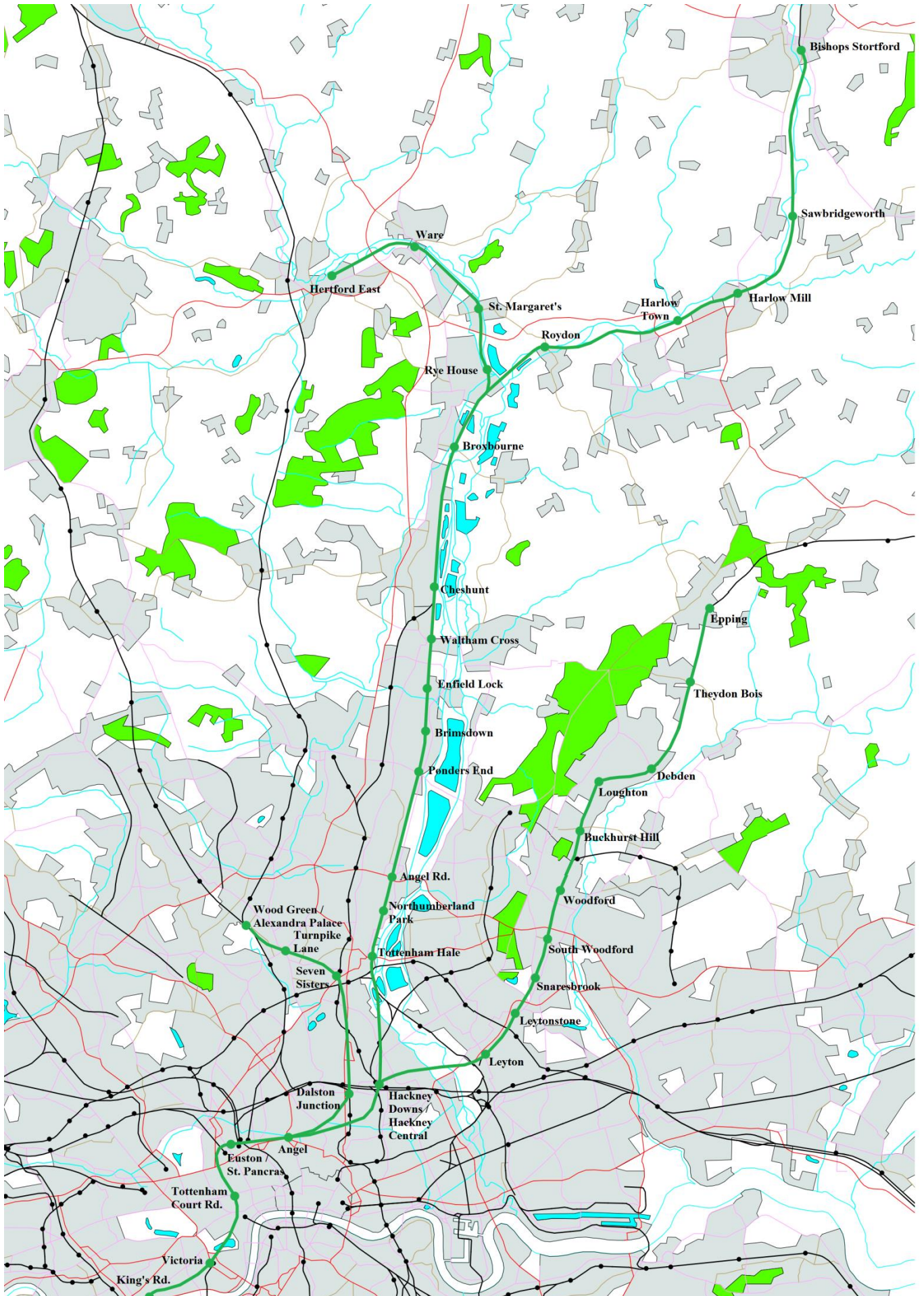
So, given that the stopping service departs Broxbourne as soon as possible after the fast service, then it arrives and departs Tottenham Hale 3 minutes before the **next** fast service.

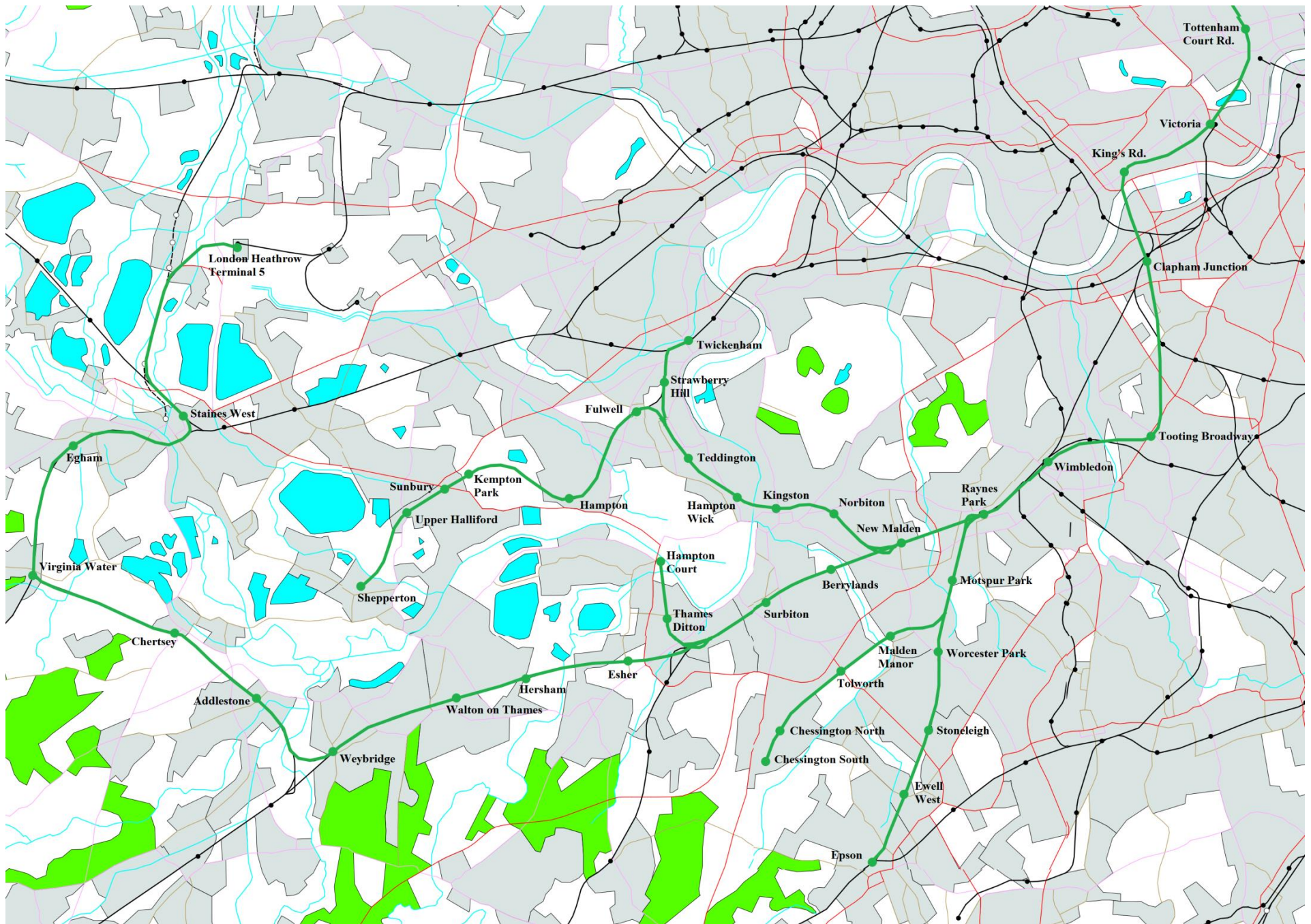
The sequence of westbound departures from any station on the central core (specifically between Angel, where the services all come together on the same tracks, and Wimbledon,) is:

00	Tottenham Hale	– Wimbledon shuttle
02	Epping	– Hampton Court
04	Alexandra Palace	– Chessington South
06	Bishop's Stortford	– Shepperton
07½	Tottenham Hale	– Wimbledon shuttle
09	Hertford East	– LHR T5
11	Epping	– Epsom
13	Alexandra Palace	– Twickenham
15	Tottenham Hale	– Wimbledon shuttle
17	Epping	– Hampton Court
19	Alexandra Palace	– Chessington South
21	Hertford East	– Shepperton
22½	Tottenham Hale	– Wimbledon shuttle
24	Bishop's Stortford	– LHR T5
26	Epping	– Epsom
28	Alexandra Palace	– Twickenham

– repeating at 30 minutes past.

Ignoring the shuttle services (8tph at a regular 7½ minute interval), all the destinations in the RH column have 4tph, at an even 15 minute interval. The sections at the destination end with 8tph are Raynes Park to Motspur Park, shared by the Epsom and Chessington South services, between New Malden and Teddington, shared by the Twickenham and Shepperton services, and between New Malden and Surbiton, shared by the Heathrow and Hampton Court services. It is readily seen that these service pairs have a regular interval pattern of 7 and 8 minutes, alternating, which is as near a regular 7½ minutes as makes no difference. The sources Epping and Alexandra Palace in the LH column both have 8tph, at intervals of 6 and 9 minutes alternately (which is the nearest approach to a regular 7½ minutes possible). The Bishop's Stortford and Hertford East services appear to be an exception to this, but that is due to the alternate non-stop / stopping pattern between Broxbourne and Tottenham Hale. For the sections before Broxbourne, they both have a regular 15 minute interval.





Appendix A – Replacement of Egham Station Rd. Level Crossing

Of the many level crossings which caused abandonment of the original Airtrack proposal, that at Egham was one of the worst, in that it is on a very busy road (albeit just local traffic), and is already closed about half the time. The road is business / residential, and there is no real scope for building an overbridge or underpass at the location of the crossing itself.

But it really isn't a very difficult problem. All that's needed is a diversion of the road along the south side of the station, through a small car park and **not** taking up any of Manorcrofts Playing Field, climbing to the necessary height to curve round in a half circle across the tracks, descending back to ground level over the eastern end of the main car park and joining School Lane.

The following is only a rough sketch, but illustrates the idea quite adequately.



It is hard to understand why this caused such a problem to the original Airtrack.