HS3 Route and Service Plans

HS3 Route Mk1A

Following the referendum on EU membership and the decision to disengage from the EU, several changes have been made to the plans for HS rail, most importantly, abandoning GC-gauge, and building all new infrastructure to standard UK loading gauge. This has very little impact on the routes proposed, but significant impact on the service plans. In certain cases it is now proposed to include sections of classic route in the HS route, rather than building exclusively new throughout. (Note that this is different from the previous proposals to run classic compatible services on classic lines, **beyond** the HS route; this actually incorporates classic sections, upgraded as appropriate, in the HS route itself.) Appendix H lists all specific changes of route, for HS3 and associated routes, which are also, of course, incorporated in the various route sections, following. Specific to HS3 is a change proposed by HS2 Ltd., for a variation in the plans for their proposed HS2 route in South Yorkshire, involving a connection from a new junction near Pinxton to the classic Erewash Valley line, allowing some services to be routed via Sheffield Midland, also serving Chesterfield. A further connection, at the new South Yorkshire station between Mexborough and Conisborough, allows services to re-join the HS line north of Sheffield.

As a consequence of experience with the original route design, in particular the new outlook on services made possible by the availability of service time estimates, and of the desirability of adding further services, beyond the capacity of that design, the route has been significantly amended and enhanced. The main driver is the requirement to (be able to) have 4 tracks between London and Loughborough (Stanford Junction), to provide the necessary capacity. This would simply not have been possible with the original route. Other changes include 4 tracks between Nuthall South and Wales Junctions, but this is possible with the existing route, so no other changes are necessary. The section between Nottingham station and Strelley Junction is replaced by the direct tunnel route, previously described as an alternative possibility in appendix C, but now adopted as the preferred option. In effect, this means that there are 4 tracks all the way between London and Garforth, c.17 miles south of York, though in several cases the two pairs of tracks take different routes.

In brief, the new route follows the alignment of the M1 between Edgware / Scratchwood and Leicester. The original route followed this alignment from Leagrave onwards. The original plan for a station at Luton Airport Parkway has been replaced by Luton and Dunstable Parkway, where the M1 passes between Luton and Dunstable, with access thence to Luton, Dunstable and Luton Airport via the restored and enhanced (relevant portion of the) former GN Welwyn – Dunstable branch. Northampton station is now on a branch (like Leicester and Nottingham), with the main line continuing along the M1.

A further enhancement, north of Leagrave, involves a new station at Milton Keynes Parkway, where HS3 (and the M1) crosses the East-West route near the former Ridgmont station on that route, which is relocated a short distance westwards, to become the lower level of the new, two-level station. Since Luton & Dunstable and Milton Keynes Parkways are adjacent stations, i.e. trains do not have sufficient distance on departing Luton & Dunstable to accelerate up to line speed before having to decelerate for Milton Keynes, the station loop for Luton and Dunstable is extended to Milton Keynes, and stopping trains rejoin the main line north of Milton Keynes. (So this section is quadruple ab initio.)

Because of the significant changes introduced at Mk1A, the latest versions of all the Mk1 plans (v7.1 in the case of HS3) have been preserved, available in an archive section on the website. For the avoidance of

confusion, note that the above change of route between Edgware / Scratchwood and Leagrave was actually planned and written before Mk1A, and was designated as ‘Mk2’ in v7.1!

HS3 Route Mk2

The real Mk2, as now planned, consists merely (!) of the new section in tunnel, direct between Canley St. and Scratchwood Junctions, and the completion of 4-tracking thence to Loughborough (Stanford Junction), also between Nuthall South and Wales Junctions, thus giving 4 tracks all the way between London and Garforth, c.17 miles south of York, though in several cases the two pairs of tracks take different routes., as previously noted. In addition, new HS platforms are added at West Hampstead.

As few changes have been made to the existing article as are essential, to cover the new situation. The Route sections between London and Leicester, and around Nottingham, have of course been completely rewritten and remapped, but elsewhere the changes are minor.

Extra service plans are provided to illustrate the introduction of and the benefits enabled by the 4 track sections.

The Purpose, Background and Method

This article refers to and should be read in conjunction with my article ‘Towards a High Speed **Network**’. That article makes the case for developing a network plan for all the HS routes which will eventually be needed, and, as a contribution to getting the discussion started, gives my own thoughts of what such a network should look like. Naturally, this involves describing a number of routes, in varying but superficial detail. This lays me open to the charge, something on the lines of ‘That’s all very easy to say, but how would you actually go about doing it?’ Accordingly, a decent respect to the opinions of the interested public requires that I should go into more detail on the individual routes. The present article deals with HS3, the route from London to Yorkshire, the North East and Scotland.

The general route is decided on strategic and business grounds, thus which locations are to be served. This gives the general alignment, at a very high, superficial level. I plan the detailed route using Ordnance Survey maps, taking careful account of the shape of the landscape, from the contours. I note the location of all significant infrastructure, thus tunnels (generally, over about a quarter mile in length), viaducts and major river crossings. I simultaneously make a virtual tour of the route from my computer, via satellite maps, to make sure, as far as possible, that there is actually room for my lines where I wish to put them, and that, for example, a housing estate has not materialised in an inconvenient location since the (paper) map was published. (I understand that the images used by satellite maps are up to a maximum of three years old, so not exactly real-time, but still pretty good.) I make a great effort to avoid any housing. I’m blasé about demolishing warehouses – after all, all that’s required there is to build a (better) new one nearby, and the owners will be very happy. But I regard demolishing housing (or even getting very close to it) as a thoroughly bad idea; people just don’t like it, and I understand their feelings. If ever I must (knowingly) propose to demolish housing, I will point out the fact. These considerations apply in extreme form when, as in the present case, the route starts from London. Here there are simply no free routes available. The design has to follow an existing route, widened where there is space for it, (this involves searching, via satellite maps at a high magnification, where there is space to fit extra tracks within the

existing alignment or where there is adjoining space to widen the alignment,) with recourse to tunnelling where there isn't.

In general I try to follow an existing alignment, railway or motorway, (or, very occasionally, of a non-motorway road,) if there is a suitable one available, simply because it's there already, in the right place, with good layout, (somebody else has done all the hard work!) and, except in very few places, there's plenty of room available adjacent to it. (In this context, motorways are particularly helpful. Nobody wants to live close to one, so house builders don't develop new estates at the side of motorways, leaving plenty of space available for new railways.) Also, most importantly, it minimises disruption, and so I (optimistically, perhaps) expect it to maximise public support and minimise opposition.

When I am following an existing alignment, (this obviously includes taking over the route and trackbed of a former railway, now closed,) I don't generally worry about gradients, confident that they will be well within the capacity of HS trains. Very occasionally, when following a motorway or (more likely) non-motorway road, the contour pattern suggests that there might be a problem, and then I do check the gradients, (and state what these are, in the route plan). When I am obliged to design a completely new alignment, then the gradient profile forms part of the design, and will be stated, (unless, from the contours, it's obviously essentially level, or undulating but with no significant underlying change of level). The present article contains gradients only for those sections of the route between Derwent Hill Junction, north of Consett, and Stocksfield Junction, before Hexham, and between Ravenswood Junction, near St. Boswells, and Millerhill, Edinburgh, since all the rest follows existing or former alignments.

I believe that this approach gives a route which in general terms is practicable and satisfies the requirements, though obviously a lot of work, especially detailed surveying on the ground, would be needed to turn it into an implementable design. Specifically, I can say nothing about cuttings and embankments, though I may note that a particular piece of landscape is strongly undulating, so cuttings and embankments will be required. Also, when I take the route alongside an existing railway or motorway alignment, I don't attempt to design it in any detail around (particularly motorway) junctions, although I do note on which side it runs, and wherever it is necessary to cross over to the other side.

The Maps

Naturally, the chosen route must be illustrated with maps. I briefly describe the route, giving the map reference of all significant points (invariably of tunnel end points and significant river bridges), but the accompanying maps are the real definition. Mapping software can be very expensive, but fortunately the Ordnance Survey makes available, free of charge, the OS OpenData product suite, of which I use two components, the 1:250000 Scale Colour Raster data set and the Strategi Dataset. The former comes as a set of TIFF files, each containing one of the standard National Grid 100km Reference squares. These are easily converted into Microsoft Paint files and edited. These are, in other words, pure graphics, and are the basis of the detailed maps in the 'Route' section. The maps reproduced in the text all represent an area 20km in width (unless noted otherwise) and 10 km high (if the detail I wish to show will fit within that, but otherwise as high as necessary). They do actually contain contours, but not many; the scale is too small for contours to be really informative. For the present purposes, this scale is adequate; if you need more detail, use them as an index to the corresponding 1:50000 Landranger or 1:25000 Explorer maps.

The Strategi Dataset contains GIS (Geographical Information Systems) data, which has to be processed by special software; I have used the Open Source QGIS product. This has been used to produce an overall

map of HS3, including sections of other routes over which HS3's services run. These overall maps come at the end of the 'Route' description, and also show HS3's HS-Classic services on classic lines (these are shown as dotted lines). Also included there are maps of the overall HS Network.

In all the maps I use the following colour scheme for the various routes:

As the various route plans have been developed, the maps have been updated, so now they show all routes, as relevant. The maps in the present article are thus not limited to HS3.

The Service Plans

The Route section of this document describes the complete lines in their final, full configuration (as far ahead as the plans consider). The service plans explain how that final state is reached: the order in which sections are opened, and the services which run on these partial configurations. The aim is always to get useful services running as soon as possible, to maximise return on the investment.

The service plans deliberately envisage maximum frequencies, to give an impression of just how much the system **could** accommodate. Initial services would certainly not be so intensive, probably no more than half of the frequencies quoted.

HS3 services fall into three categories:

1. Long Distance, limited stop, Ultra-High-Speed services to the North West, North East and Scotland, first stop York, South Yorkshire or Sheffield. (When the Mk2 route enhancements are fully implemented, a UHS service to Nottingham and Derby is also proposed.)
2. High Speed Metro on that part of the route south of Leeds / York, stopping at all stations.

3. Services involving significant distances on classic routes, termed HS-Classic (what were formerly called classic-compatible, but with the abandonment of GC-gauge, **all** services are now in effect classic compatible).

A standard HS station has two island platforms, thus two platformed tracks in each direction. If some of the services passing through the station are non-stop, then the main line must pass through the layout without adjacent platforms, either through the centre of the alignment, in tunnel below or on viaduct above, or the station must be on a branch loop off the main line, which thus bypasses it completely. All stations south of Leeds / York have main lines avoiding the station platforms, through the middle of the alignment (Luton & Dunstable Parkway, Milton Keynes Parkway, South Yorkshire), or the station is on a loop away from the main line (Northampton, Leicester, Nottingham). This allows category 1 services to overtake. Leeds, York and the later Sheffield HS station, and all HS3 stations (except Lauder) to the north of them, are served by all services, so don't need overtaking/avoiding lines. At the end(s) of a route, the traffic density may not be sufficient to warrant this level of provision, so a single island platform (or two single platforms within some other arrangement) would suffice; this is the case with HS3 at Lauder.

The point of insisting on two platforms in each direction is **either** to enable cross-platform interchange between different services, (both HS or HS and RM,) **or** to maximise capacity, (especially when all serevices stop at the station,) by allowing a second train to arrive at the station before the preceding train has departed. (It also promotes resilience, if a failing train can make it at least as far as the next station, to be taken out of service.)

Several service plans are developed, reflecting the piecemeal development of the network. As new sections open, further services come into operation. In all cases, consideration is given to maximum loadings – which section(s) are fully loaded and thus determine the maximum service frequencies. I used to take 16tph as the maximum throughput, but, following new capacity calculations (expounded in appendix B of the article 'Same Speed Railways', which do include the effect of junctions,) I am now considerably more relaxed on this, and will countenance loadings of up to 24tph. (The quoted appendix contains my justification for this choice.) As stated above, the service plans deliberately quote maximum frequencies; initial services will almost certainly be to lower frequencies.

In the present article, the northern half of HS7, the NE-SW route, must also be considered, as HS3 and HS7 are intimately linked, sharing the same route from Nuthall North Junction (Nottingham) to Newcastle. HS5, the route from London to Brighton and other Sussex / Hampshire / Kent locations, must also be considered, in the later service plans, as many of HS3's services are all inter-regional with HS5.

Two types of services are contained in the plans, those featuring High Speed trains, which travel on HS3 for at least part of their journey, and those featuring Regional Metro (semi-fast) services on the corresponding classic route(s). Connections between the services (both HS and RM) are shown for the relevant interchange stations (the connections are usually cross-platform), together with the clock-face hourly departure plan. (Note that these plans are **representative**; the **actual** times are determined by the coordination of interchanges at multiple locations).

It is important always to bear in mind that the HS network is **not** a separate, stand-alone system, but an integral part of the complete railway network, hence the importance I attach to showing precisely how HS services interact with classic (RM) ones. (In this context it is worth pointing out that if, when HS lines come into service, the current ridiculous and illogical franchising system is still in operation, it will be necessary to include the corresponding classic route(s) in the same franchise as a HS route, with a strict

contractual obligation on the franchisee to ensure close integration of HS and classic services. It certainly won't happen otherwise.)

Estimated Journey Times

Following the service plans, estimated journey times are produced for all HS services, and for several HS-Classic services also. The assumptions and approximations made are explained.

The Mk1A route brings some slight accelerations, compared with the original plans, and the completion of 4 tracking brings more.

HS3 Route – Introduction and Assumptions

Except for that part of the route north of the former, now restored Relly Mill Junction, near Durham, HS3 closely follows existing alignments, railway and motorway. (Even within that part, it **loosely** follows many former alignments – with frequent variation to ease curves, since none of those former lines was designed for high speed!)

HS3's long-term HS-Classic services begin at St. Pancras West (the MML platforms), and the HS services all begin at Pancras Cross. This is an underground station with 6 platforms, (passive provision for 8). It is located between St. Pancras and King's Cross stations, the precise location, horizontal position and depth, to be determined by the configuration of all the other tunnels in that area. Initially it is a terminal station, but with the tunnels joining at the south end of the platforms, and extending some distance further, so that tunnelling work may be resumed at a later date, for HS5, without affecting the operation of the station. The assumption in making the initial service plans is that this terminal station will be able to handle 16tph (which allows 22½ minutes to reverse a train, or 30 minutes if the full 8 platform faces are provided ab initio). Once HS5 opens, and Pancras Cross becomes a through station, then nothing starts or terminates there; HS3's services via Pancras Cross continue into Sussex, West Kent and Hampshire, as route HS5. Later, HS6's HS services also serve Pancras Cross, balanced by further services on HS5. Appendix A gives full details of Pancras Cross and its surroundings. Full details of the services on HS6/HS10 are contained in the article 'HS Eastern Routes and Service Plans (HS6 and HS10)', and of those on HS5 in article 'HS5 Route and Service Plans'. Summary details of the inter-regional services are in the service plans of the present article. There is a connection from classic to HS lines immediately west of West Hampstead Thameslink, to allow HS-Classic services from St. Pancras to join the HS route.

The maximum speed for HS3 is 360kph, 225mph, south of Darlington (except for those sections of incorporated classic route, where it is, naturally, lower). North of Darlington the non-stop runs are not long enough to take advantage of this speed, so a lower limit of 300kph, 187.5mph, applies there, with no detriment to the service provided, and with significant savings in construction costs. However the final section, between Riccarton North Junction and Edinburgh, reverts to 360kph. This section is intended to be shared with the (extra-highly-speculative) Scottish extension of HS2. Those sections of classic route incorporated within HS3 have maximum speeds of 225kph, 140mph, between York and Northallerton, and 200kph, 125mph, or even 160kph, 100mph, elsewhere.

HS3 is based closely on the classic MML alignment, on the immediate approach to London, and between Leicester and Toton. North of Edgware, it follows the alignment of the M1 as far as Leicester, for the final part, above Rugby, taking over the alignment of the Great Central Railway into Leicester, and re-joining the MML there (Leicester London Rd. is the HS station). From Loughborough, a branch diverges on a new alignment to approach Nottingham from the east; Nottingham Midland is the HS station. The main line of HS3 follows the alignment proposed by HS2 Ltd. for the Leeds arm from Toton (no station there!) to Ulleskelf. The Nottingham branch re-joins the main line at Nuthall South Junction, a little to the north of which HS7 joins, at Nuthall North Junction, sharing the alignment from there all the way to Newcastle. HS3's approach to Leeds is quite different from HS2 Ltd.'s proposal, for reasons explained in the route description. An extension beyond Leeds, (actually a very early section of HS9, the Northern Transpennine HS route,) re-joins the HS3 main line at Garforth. Between York and Relly Mill Junction, just before Durham, HS3 closely follows the alignment of the ECML (the section from York to Northallerton actually incorporating the ECML fast tracks). Beyond there the alignments are new, but making use of several former alignments.

HS3 Route – Junctions

There are various junctions on the route of HS3, enabling connections with other HS and classic routes. These are identified in the description of the route, but it is convenient to list them all here, together with their map references and identifying remarks, since, when discussing the capacity/loading of different sections of route, the end points are usually junctions (occasionally stations). The junction names are my own suggestions, except in those few locations where there was formerly a junction, where I adopt the previously existing name).

One feature of the following list needs clarification: certain of the junctions are given as north / south (could equally well be east / west, as a few are). These are all the junctions of station loops, and are where the services stopping at that station diverge from / rejoin the main line. Their location is precisely defined by the acceleration / deceleration rates of the trains. (They decelerate more rapidly than they accelerate, which is probably just as well.) The junction where a service re-joins the main line, having accelerated up to the turnout limit speed from a stop is thus further from the station than the junction where trains diverge, at the turnout limit speed, and decelerate to standing at the platform. (The actual vales, for a line speed of 225mph, 360kph, are 10.35mile, 16.67km acceleration and 6.21mile, 10km, deceleration. See appendix B of the article 'Same Speed Railways' for **very** full details.) Note that this **only** applies to station loops; for a genuine route junction, where one route diverges from another, and no station is involved, junctions in both directions can be and usually are at the same location.

I make the distinction between a station loop and a station branch. A loop is where the main line passes through the centre of the station, but not adjacent to any platforms – the platforms are served by loops off the main line, the position of the junction with the main line at each end of the loop being precisely specified, as described above, (South Yorkshire is an example of this). A station branch is where the station is off the route of the main line, served by a branch which diverges from the main line, serves the station then re-joins the main line, (Nottingham is an example of this). The distinction is, however, not hard and fast. Thus Leicester is undoubtedly on a station branch, since the main line does not pass through the station, but the branch is actually shorter than a station loop would be, so the positions of the end junctions are prescribed. Northampton, likewise on a branch, is close enough to the main line at the southern end to have its junctions positions prescribed, as for a loop, but the rest of the branch is long

enough that it re-joins the main line in a normal route junction. Note the special case of Luton and Dunstable Parkway and Milton Keynes Parkway stations. The distance between them is insufficient for re-joining the main line intermediately, so they are both on the same station loop. A northbound train serving them both thus diverges from the main line at Slip End North Junction, serves both stations, then re-joins the main line at Newport Pagnell North Junction.

The junctions are:

• Canley St.	TQ300831	HS6 diverges from HS3 immediately north of Pancras Cross (in tunnel). When the 4-track extensions of HS3 Mk2 are implemented, the direct, tunnel route to Scratchwood Junction also diverges here.
• West Hampstead	TQ250848	Allows HS-Classic services from St. Pancras to join HS3
• Scratchwood (Mk2 only)	TQ204935	The direct, tunnel route from Pancras Cross emerges from tunnel, and the lines following the existing alignment join it on either side. All four tracks then diverge from the MML alignment, and join the south side of the alignment of the M1. This is a route, but not a track, junction.
• Slip End(*)	TQ090163	(South) Southbound services from the Luton & Dunstable Parkway / Milton Keynes Parkway (LDP/MKP) stations loop, having stopped at the stations, re-join the main line.
	TQ082192	(North) Northbound services for the LDP/MKP stations loop, stopping at the stations, diverge from the main line.
• Newport Pagnell(*)	SP885427	(South) Southbound services for the LDP/MKP stations loop, stopping at the stations, diverge from the main line.
	SP830464	(North) Northbound services from the LDP/MKP stations loop, having stopped at the stations, re-join the main line.
• Collingtree(*)	SP758547	(East) Southbound services from the Northampton station loop, having stopped at Northampton Castle, re-join the main Line.
	SP739565	(West) Northbound services for the Northampton station loop, stopping at Northampton Castle, diverge from the main line.
• Langborough	SP604671	Northampton branch re-joins main line.
• Watford Gap	SP589697	HS2-CV's southern interconnection diverges from HS3.
• Cotesbach	SP546820	HS2-CV's northern interconnection joins HS3.
• Aylestone(*)	SP559984	(South) Southbound services from the Leicester station loop, having stopped at Leicester, rejoin the main line.
	SK569010	(North) Northbound services for the Leicester station loop, stopping at Leicester, diverge from the main line.
• Watkin Rd.	SK577030	HS3 Leicester station branch diverges from main line. This is a route, but not a track, junction.
• Regent St.	SK593038	Classic line joins Leicester station branch (just south of Leicester station)
• Swain St.	SK596044	Classic line diverges from Leicester station branch (just north of Leicester station)
• Humberstone Rd.	SK599049	HS3 Leicester station branch rejoins main line. This is a route, but not a track, junction.

• Thurmaston(*)	SK613078	(South) Southbound services for the Leicester station loop, stopping at Leicester, diverge from the main line.
	SK622104	(North) Northbound services from the Leicester station loop, having stopped at Leicester, re-join the main line.
• Stanford	SK543215	HS3 Nottingham station loop diverges from main line
• Edwalton	SK601347	Classic route from Melton Mowbray joins HS3 Nottingham station loop. (Later merged with HS8.)
• Manvers St.	SK588393	HS3 Nottingham station loop joins alignment of classic route east of station. Allows connections both ways between classic and HS.
• Strelley	SK512423	Connects HS3 Nottingham station loop to HS7
• Nuthall South	SK509425	HS3 Nottingham station loop re-joins main line
• Awsworth	SK484444	Spur to HS3 Nottingham station loop (passing over HS3 main line) diverges from HS7
• Nuthall North	SK514469	HS7 joins HS3
• Huthwaite	SK457588	Erewash Valley chord diverges from HS3
• Stonebroom	SK420602	Erewash Valley chord joins Erewash Valley line
• Wales	SK474835	Connection to HS8 (incorporating Retford – Sheffield classic route)
• Waleswood	SK469839	Above connection joins classic route to Sheffield
• Ravenfield(*)	SK500928	(South) Southbound services from the South Yorkshire station loop, having stopped at South Yorkshire, re-join the main line.
	SK498957	(North) Northbound services for the South Yorkshire station loop, stopping at South Yorkshire, diverge from the main line.
• Denaby Main	SK490993	Connection from classic Shefield – Doncaster route joins HS3
• Old Denaby	SK480995	Above connection diverges from classic route from Sheffield
• Hickleton(*)	SE490042	(South) Southbound services for the South Yorkshire station loop, stopping at South Yorkshire, diverge from the main line.
	SE477064	(North) Northbound services from the South Yorkshire station loop, having stopped at South Yorkshire, re-join the main line.
• Ryhill	SE400160	HS3 Leeds branch diverges from main line to York.
• Crofton	SE390168	HS3 Leeds branch joins merges with classic route to Leeds
• Gelderd Road South	SE279320	HS3 diverges from classic Leeds route to reach New Lane station, via the viaduct line.
• Gelderd Road North	SE282232	HS3 joins HS9 west of Leeds New Lane station.
• Swillington Common	SE378331	Spur to approach Leeds from the east diverges from HS3 main line.
• Manston	SE372344	Spur to approach Leeds from the east joins classic route (not HS9).
• Garforth West	SE387342	Spur to HS3 diverges from HS9.
• Garforth East	SE395341	Spur from HS9 joins HS3 main line to York.
• Micklefield HS	SE439327	HS9 joins classic route to York at relocated and expanded Micklefield station.
• Ulleskelf	SE518399	HS3 merges with classic Leeds – York route
• Poppleton	SE563558	HS3 merges with fast lines of ECML immediately north of Skelton Bridge Junction (where 4-track alternate layout commences).
• Romanby	SE368920	HS3 diverges from the fast lines of ECML

• Derwent Hill	NZ103537	HS3 route to Hexham and Edinburgh diverges from route to Newcastle
• Paradise	NZ220634	HS3 route from Consett joins Hexham – Newcastle (north bank) route
• Blaydon East	NZ186634	HS3 merges with classic route immediately east of Blaydon station.
• Stocksfield	NZ050610	HS3 route from Consett merges with classic Newcastle – Hexham route
• Tynegreen	NY923651	HS3 route to Edinburgh diverges from classic route to Carlisle
• Riccarton North	NY531988	HS3 route to Edinburgh joins the former Waverley North route north of the original Riccarton Junction
• Ravenswood	NT575339	HS3 diverges from the classicWaverley route
• Birkenside	NT562412	(South) Southbound services having stopped at Lauder re-join HS3
•	NT555438	(North) Northbound services stopping at Lauder diverge from HS3.
• Wiselawmill	NT513510	(South) Southbound services stopping at Lauder diverge from HS3.
	NT503536	(North) Northbound services having stopped at Lauder re-join HS3.

Micklefield is an existing junction, where the Selby and Hull line diverges from the Leeds – York line. Blaydon East is a former junction.

There are various other links between HS3 and classic lines, for operational purposes and not intended for regular services, so not relevant in the present context.

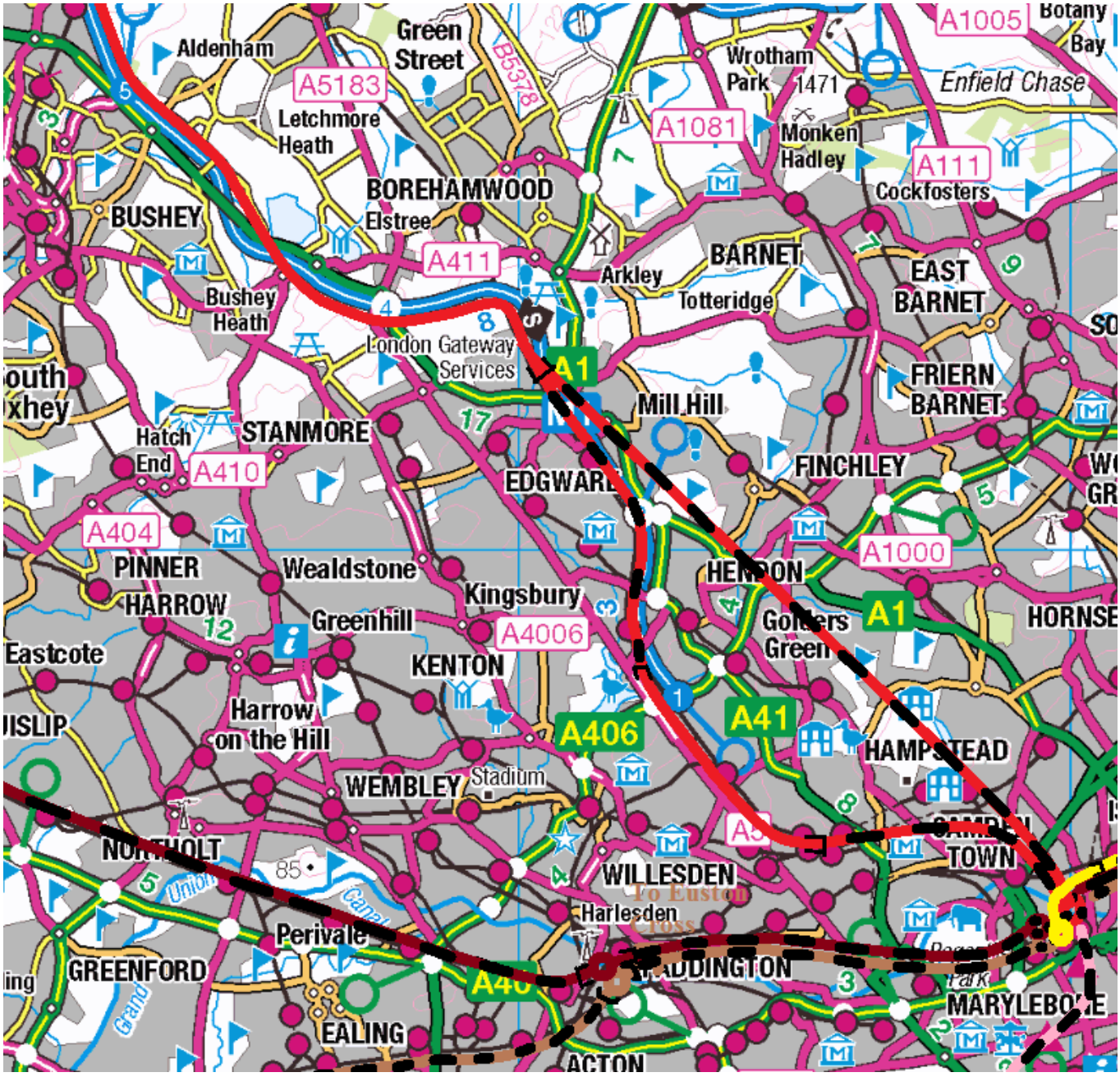
(*) Slip End, Collingtree and Aylestone junctions are at the southern end of the LDP/MKP, Northampton and Leicester station loops/branches, respectively. When the HS3 Mk2 quadrupling is implemented, the outer two tracks will diverge and become the station loops/branch. There will still be the connections from the main line – the inner two tracks – but these will probably no longer be used in normal service. (They're there already, so they might as well stay; we do need the occasional connections to and from the main lines, in the 4-track sections) Newport Pagnell and Thurmaston junctions are likewise at the north end of the LDP/MKP and Leicester station loops/branches, and the same remarks apply. Langborough Junction, at the north end of the Northampton station branch, is a normal route junction.

There now follows the definition of the actual route, in several logical sections.

1. *Pancras Cross / St. Pancras West – Luton & Dunstable Parkway*

HS3 follows the route of the MML, underground all the way until immediately before West Hampstead station, at TQ255848, a distance of slightly under 2 miles. From West Hampstead it takes over the two freight tracks on the south side of the alignment. Immediately to the west of West Hampstead is the connection from the classic line to the HS line, to allow HS classic-compatible services from St. Pancras West to join.

At Mk2, HS platforms are added at West Hampstead. There are now only 6tph HS Metro trains on the fast tracks at this point, the rest being on the MML tracks, (unchanged from Mk1A,) so a single platform in each direction will suffice. This is a worthwhile connectional enhancement for the HS Metro services, giving access to and from Thameslink, Overground and Underground services.

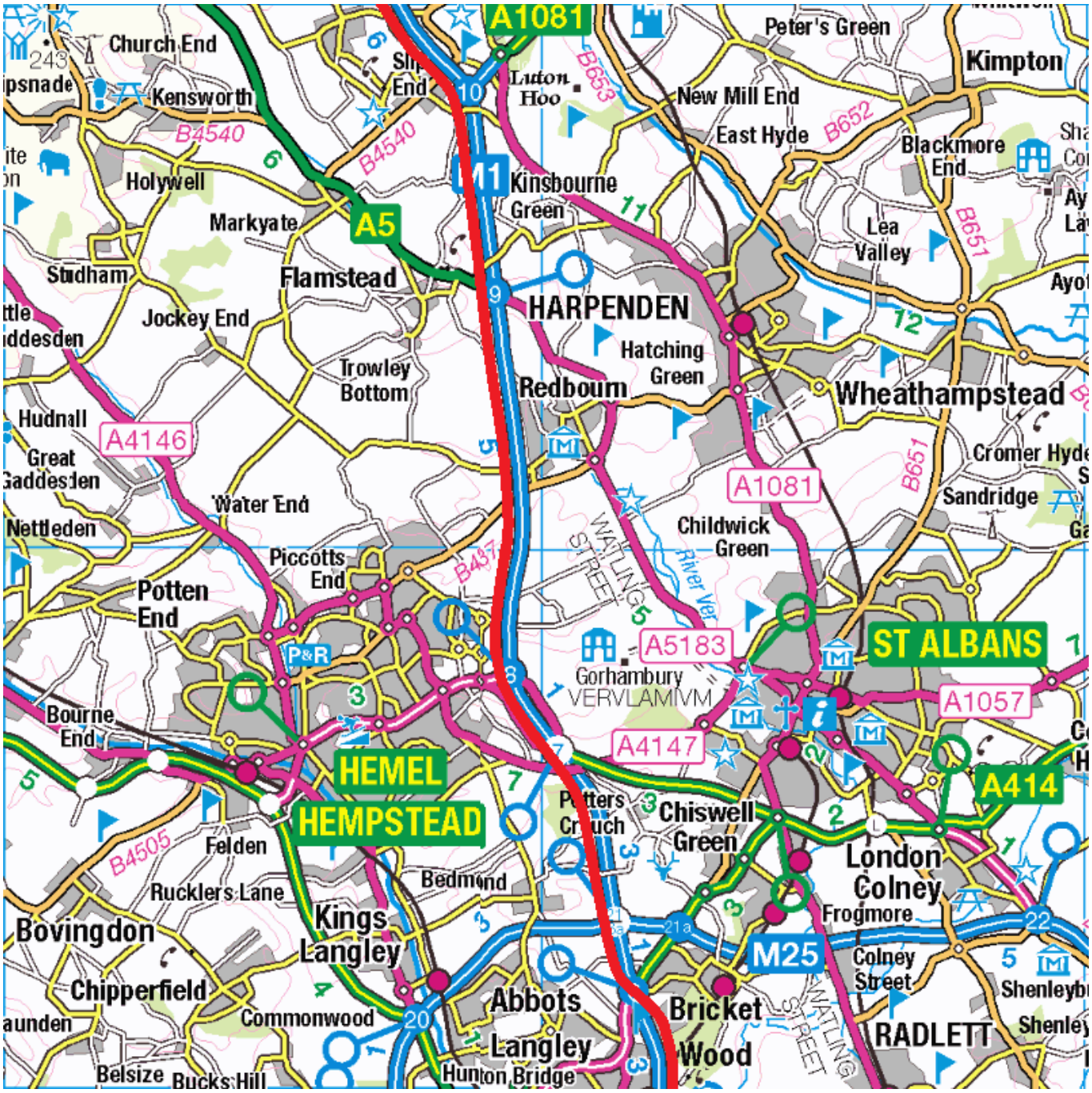


1.1 Somers Town– Aldenham

HS3 occupies the former freight lines all the way to TQ230870, where the freight lines from Dudding Hill would have merged. These freight lines are now extended along a widened alignment, which will involve

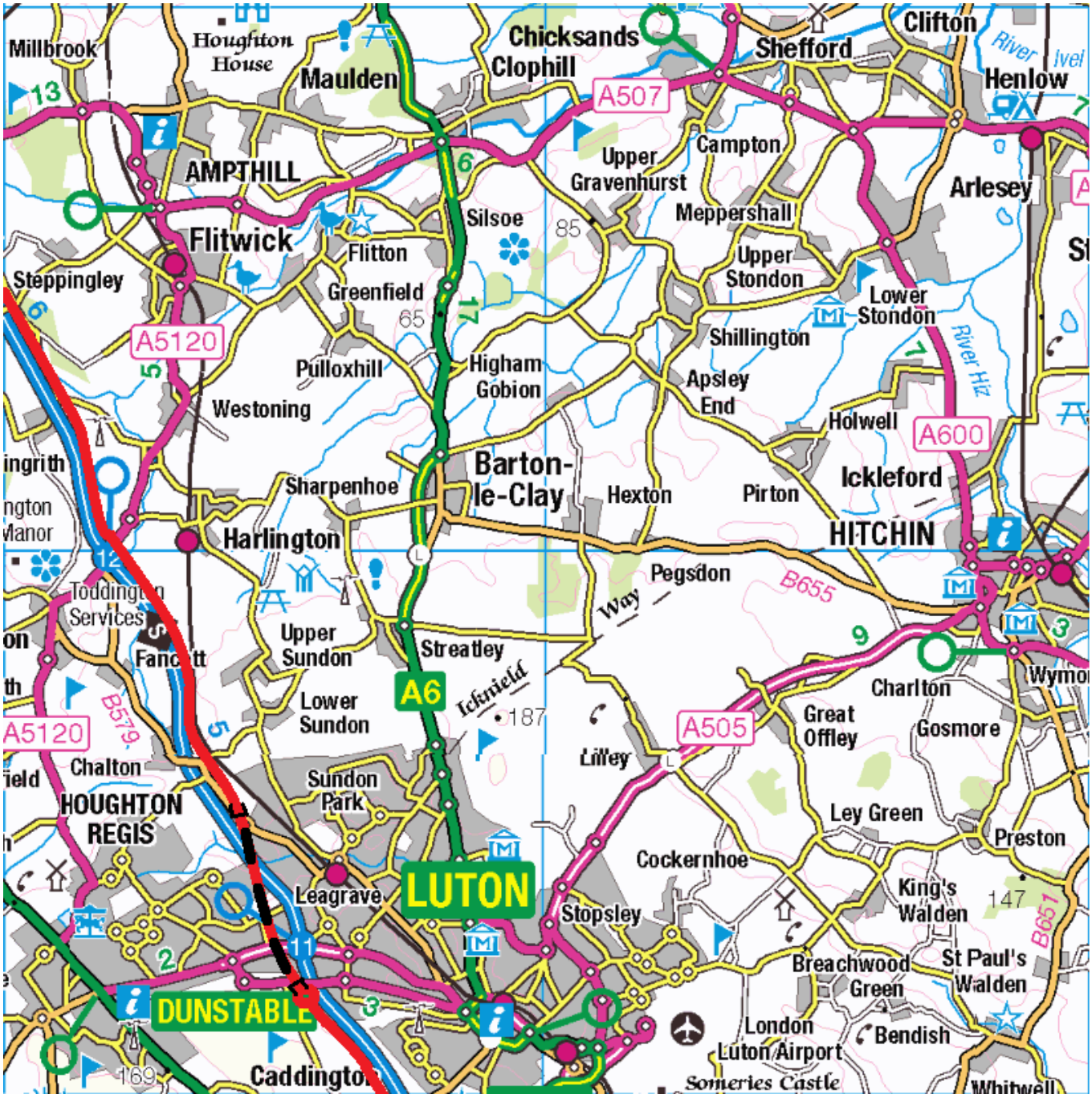
the relocation of several warehouses. HS3 crosses to the NE side of the alignment entering a tunnel at TQ221882 (immediately before Hendon station), and from that location, the freight lines resume their original location, on to the Silkstream flyover.

HS3 emerges from tunnel 3.5 miles later, at TQ204935, Scratchwood Junction, where the M1 diverges from the Midland alignment. When the 4-tracking of HS3 Mk2 is implemented, the additional 2 tracks of the direct, tunnel route from Pancras Cross also emerge from tunnel here, and become the central 2 tracks of a 4-track, parallel arrangement.



1.2 Bricket Wood – Slip End

From Scratchwood Junction, HS3 follows the south side of the M1 until TQ155959, where it crosses to the north side, also easing a curve in the motorway. It follows the north side for just over 5 miles, crossing back to the now west side at TL121045. These two crossings are purely to avoid extensive housing at Meriden and Bricket Wood respectively. HS3 remains on the west side of the M1 until Luton.



1.3/2.1 Luton – Steppingley

Luton & Dunstable Parkway station is located at TQ055221. There may be a slight problem with the approach. The height at TQ071208 is 170m and at the station 150m, these being 1.5km apart. That gives a gradient of 1 in 60, which is no problem. However, there is a quite step hill in between, which the M1 climbs over, followed by a steep descent. It might be advisable for HS3 to tunnel under this, but that is a decision for the detailed design phase; I merely flag it up for consideration.

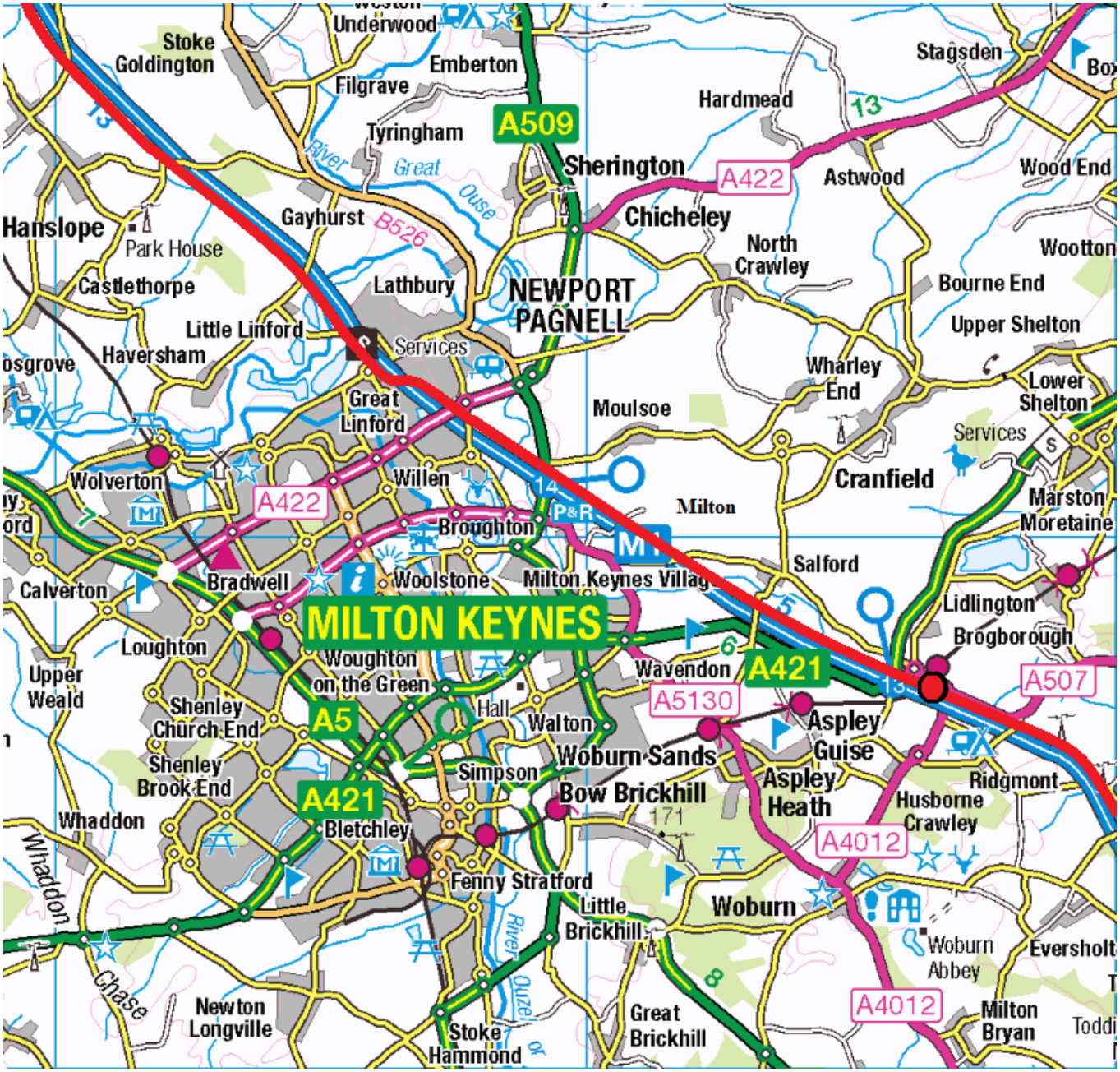
The station loop junctions south of the station are Slip End, South and North junctions, at TQ090163 and TQ082192, and are respectively for trains stopping there re-joining / diverging from the main line. (See the remarks on p.7 preceding the list of junctions for an elucidation of this.)

The main lines of HS3 pass through the centre of the alignment at the station, or alternatively in tunnel, between Slip End North Junction and (eventually) Newport Pagnell South Junction. See (the new) appendix C, for the connections from Luton & Dunstable Parkway to Luton, Dunstable and the airport.

2. *Luton & Dunstable Parkway – Northampton*

HS3 enters a 2 mile tunnel on the west side of the M1, immediately north of the station, at TL085216, emerging at TL045247, on the **east** side. The station loops continue to the next station, Milton Keynes Parkway, at SP965373. This incorporates the former Ridgmont station on the East-West route, providing for extensive interchange opportunities. (See the article 'East-West Rail Service Plans' for full details.) The eventual station loop junctions on the north side are Newport Pagnell South and North junctions, at SP885427 and SP830464, and are respectively for trains stopping there diverging from / re-joining the main line.

HS3 follows the M1 all the way to Northampton. It follows the E/NE side of the M1 as far as Newport Pagnell, then switches at SP863430 to the SW side, (Newport Pagnell South Junction precedes this,) following this as far as SP794506 where it crosses back to the NE side; these two crossings are purely to avoid housing.

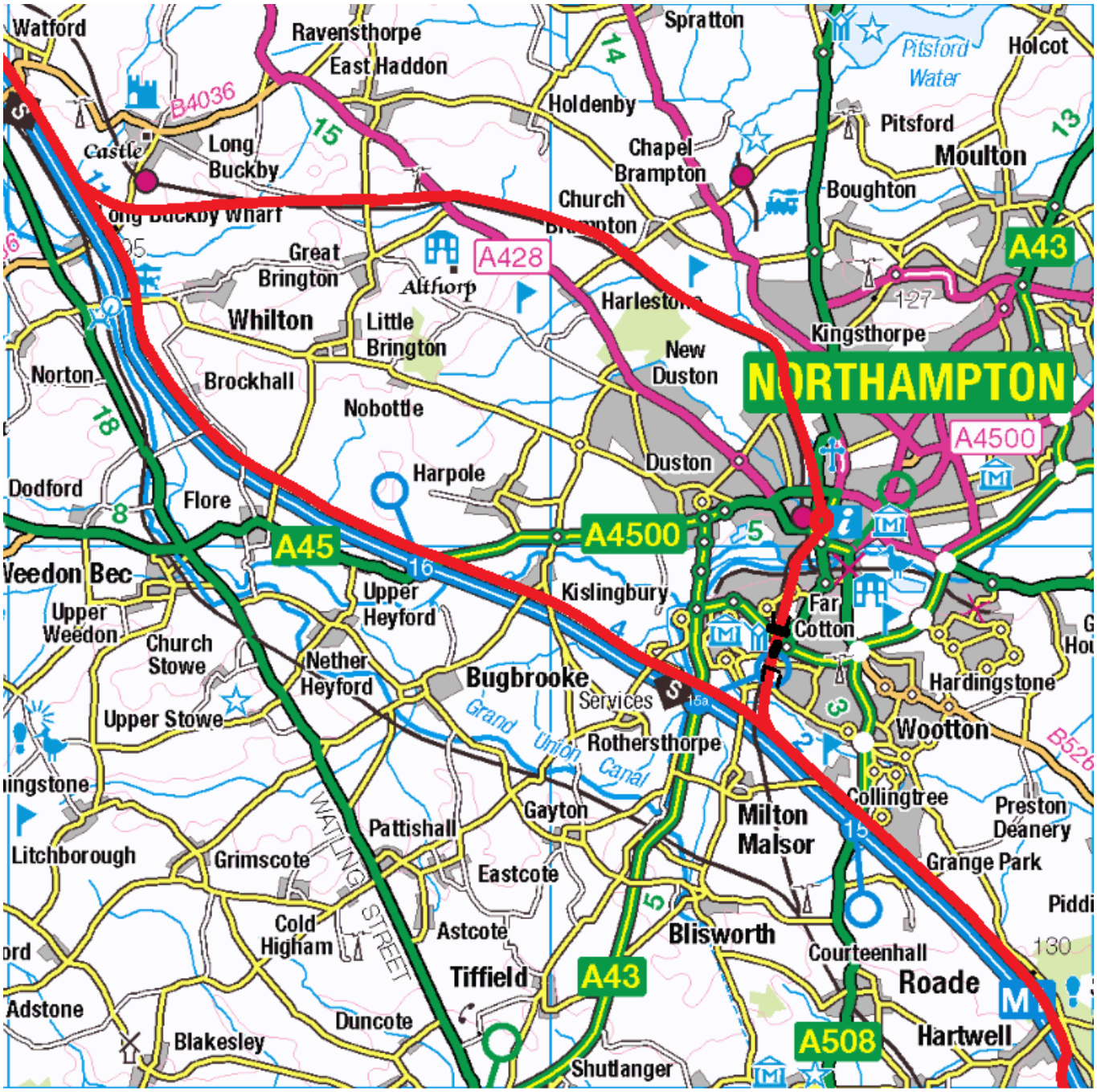


2.2 Eversholt – Hanslope

Approaching Northampton, the station loop/branch junctions are at Collingtree East and West junctions, at SP758547 and SP739565, and are respectively for trains stopping there re-joining / diverging from the main line.

Immediately after Collingtree West Junction, at SP738564, the Northampton station branch diverges from the main line, and follows the east side of the WCML into Northampton, where there is plenty of room on the east side of Northampton Castle station for the double HS3 island platforms.

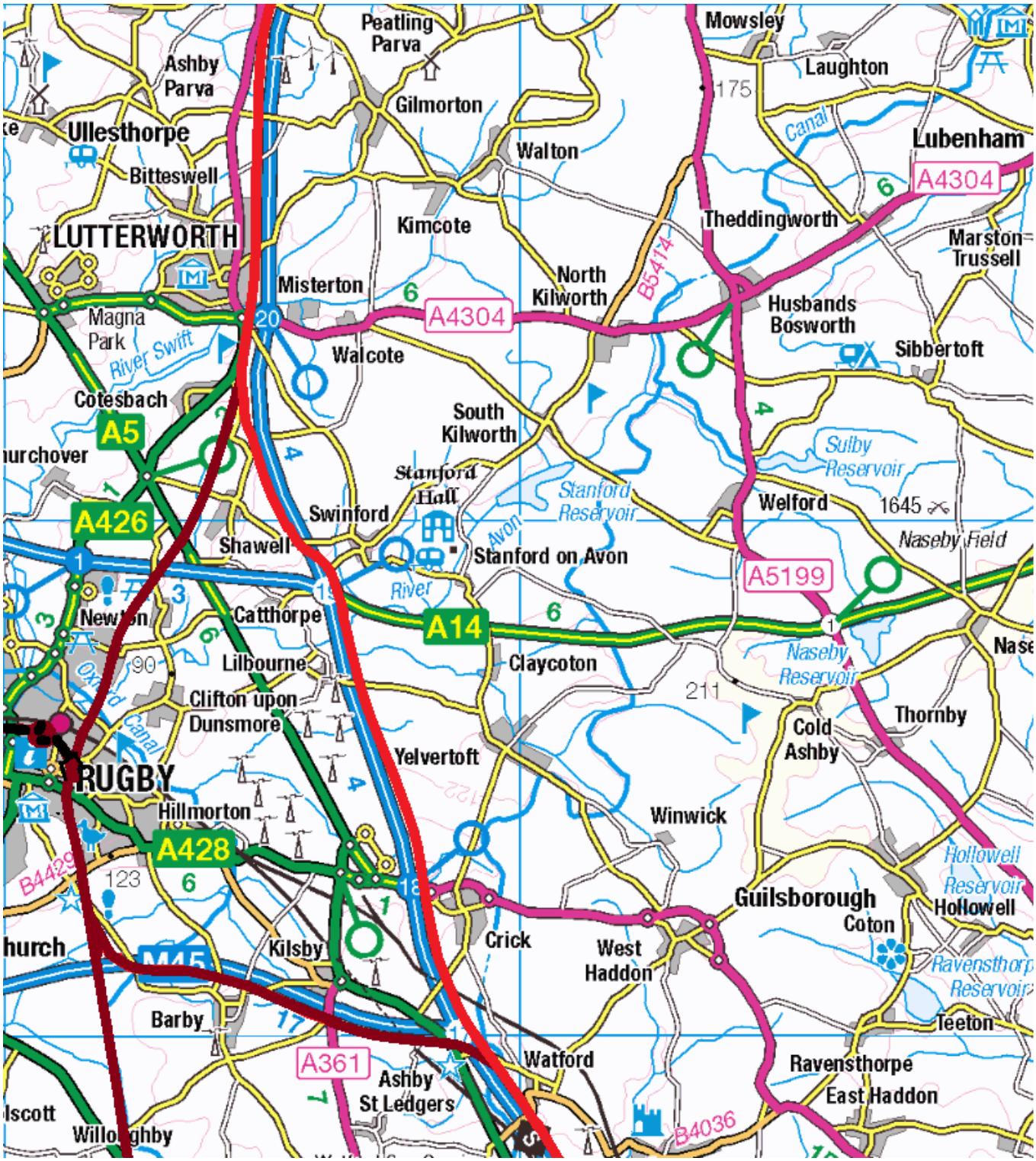
There is a connection from HS3 to the classic route at Northampton Castle station. This is a temporary arrangement (though probably lasing a long time) to allow HS3's HS-Classic services to Birmingham and on to Liverpool/Chester and Worcester to gain the WCML and on to Birmingham via Rugby and Coventry. Eventually, when HS2-CV opens, this will make a connection with HS3 at Watford Gap Junction (SP589697), and the HS-Classic services will then travel on HS tracks as far as Warwick Rd. Junction, Coventry.



3. *Northampton – Leicester*

The main line of HS3 follows the north / east side of the M1 alignment until junction 19, where the M6 diverges. Immediately after the junction, it crosses to the west side of the M1 and follows that for the next 2 miles, where, at SP550815 it diverges and takes over the route and trackbed of the former GC line, at SP546820. This will eventually be Cotesbach Junction, where the northern interconnection between HS2-CV and HS3 joins.

HS3 follows the GC alignment all the way to Leicester. (We may say that it's still following the west side of the M1, since that follows the GC alignment closely, as far as Cosby.)

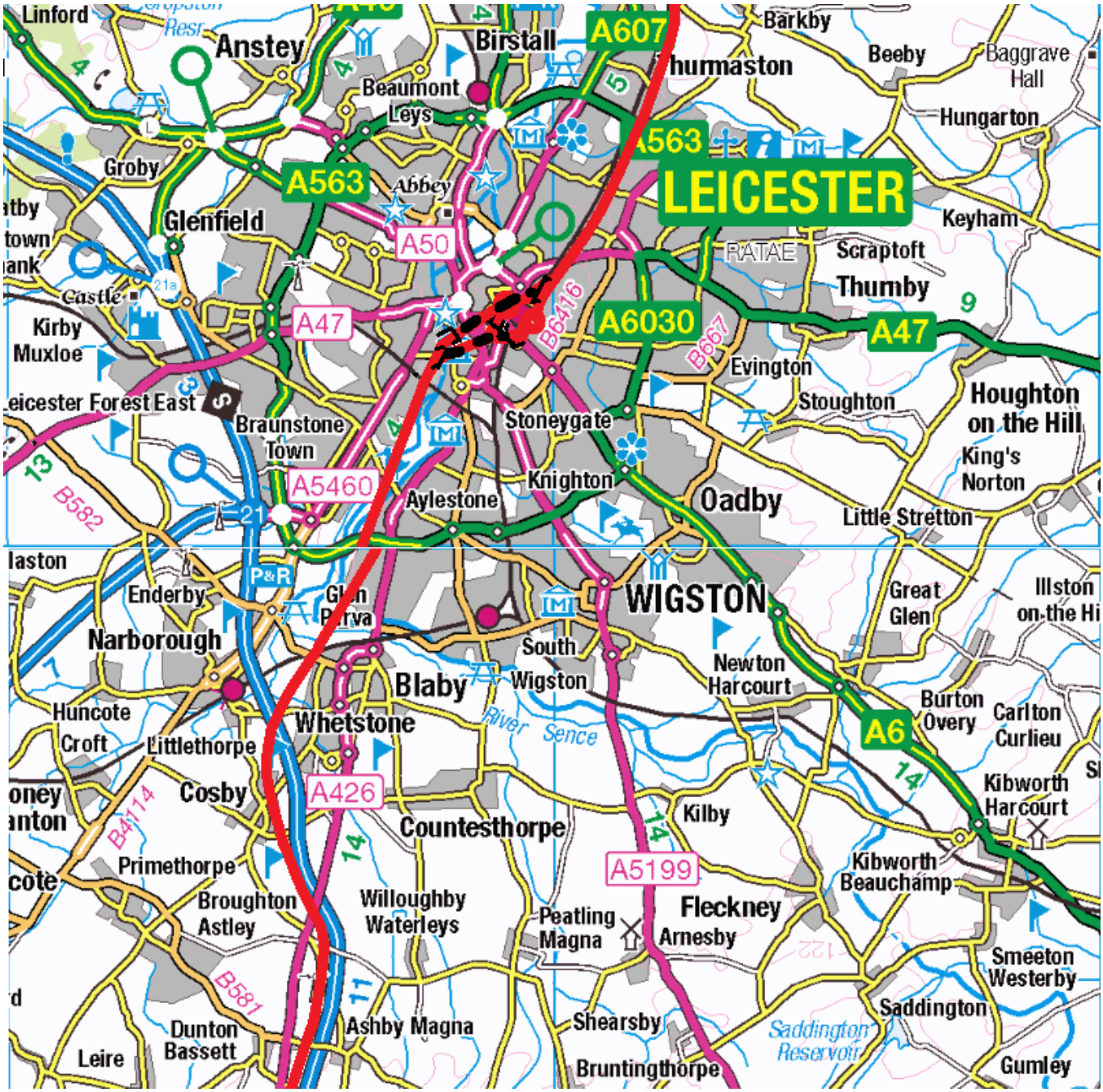


3.2 Ashby St. Ledger's – Ashby Parva

The Northampton station branch of HS3 follows closely the east / north side of the alignment of the WCML Northampton branch until SP660661, where it crosses to the south side and diverges, re-joining the main line of HS3 at SP604671, Langborough Junction.

HS3 continues along the GC trackbed almost to the centre of Leicester. The alignment is, as far as I can judge, completely unobstructed except in the Whetstone area, where, for a short distance around SP555974 the alignment has been built over, but there is free space a short distance to the west, so it could be slewed slightly to the west and continue. Likewise, houses have been built on the alignment at SP557980, between the B582 underbridge and the (Leicester – Hinckley) railway line underbridge – a distance of about 200yds! This will either be tunnelled under or, for such a small distance and such a few houses, I would even consider demolishing them!

As far as I can judge, the alignment is available as far as Upperton Road (SK578034). The Leicester station branch of HS3 diverges from the main line at Watkin Rd. Junction, SK577030, and shortly



3.3/4.1 Ashby Magna – Thurmaston

afterwards, at SK578032, enters a 1 mile tunnel leading directly to Leicester London Road station, where a junction is made with the classic route. The station branch is actually shorter than a station loop would be. The junctions for the station branch are Aylestone South and North junctions, at SP559984 and SK569010, and are respectively for trains stopping there re-joining / diverging from the main line.

The main line continues from Watkin Rd. Junction, itself entering a 2¼ mile tunnel at Sk579033, emerging on the eastern side of the MML alignment at SK5990149 (Humberstone Rd. Junction) where it is re-joined by the station branch.

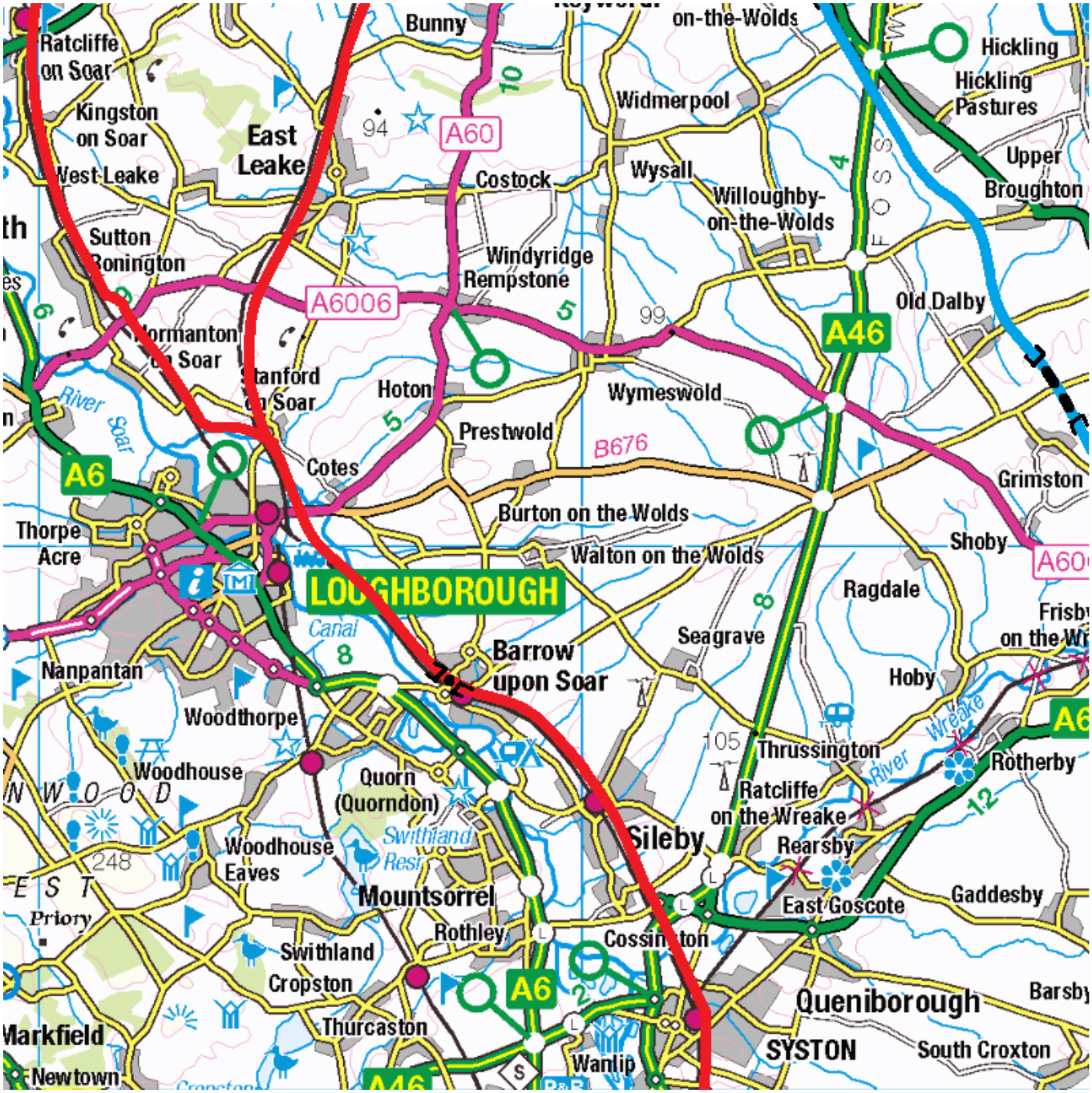
The arrangements at Leicester London Road are very tricky, due to the cramped nature of the site. Appendix B explains how this might be effected, using the available infrastructure to best advantage, and minimising the extra land take.

See also appendix G, on the impact on HS3 of the Coventry Variant of HS2.

4. *Leicester – Nuthall North Junction*

HS3 follows the eastern side of Midland alignment from Leicester as far as Toton. The Leicester Station branch is re-joined by the main line at Humberstone Road junction (refer to Appendix B for the detailed arrangements). Humberstone Rd. Junction is a route junction, not a track junction, The actual track junctions for the station branch are Thurmaston South and North junctions, at Sk613078 and SK622104, and are respectively for trains stopping there re-joining / diverging from the main line.

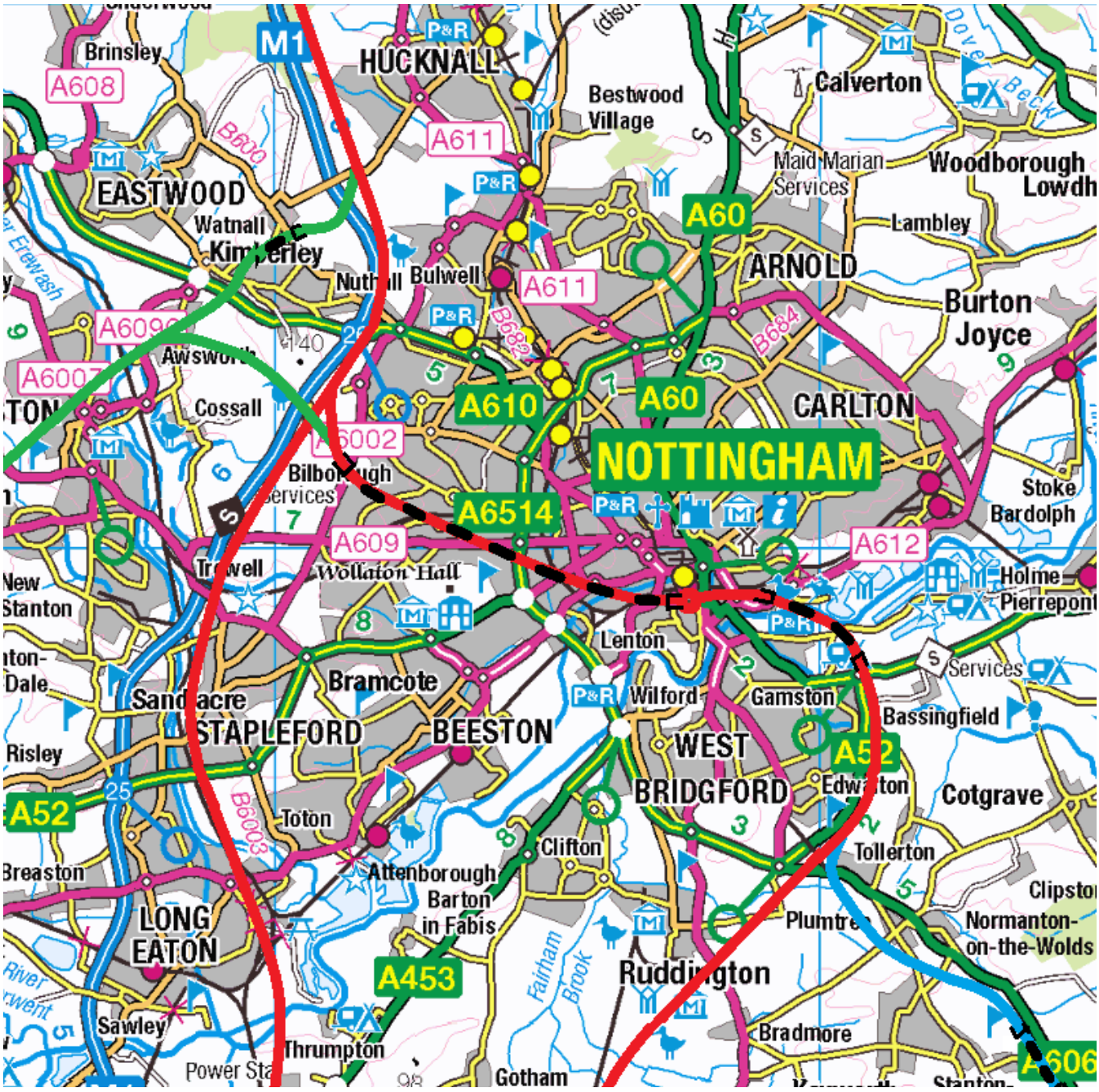
HS3 crosses over the junctions at Syston on a viaduct. A very short tunnel (c. quarter mile) is required under the centre of Barrow on Soar. (When the 4-tracking of HS3 Mk2 is implemented, the additional 2 tracks would probably best tunnel under Sileby and Barrow on Soar. While I judge that there is room for another 2 tracks on this section, there almost certainly isn't for yet another 2.) The few buildings which encroach seem to be of warehouse / industrial type, but there are remarkably few obstructions. The most



4.2 Systen – Ratcliffe on Soar

serious is the Brush works at Loughborough, but even here, there is plenty of open space behind, enabling HS3 simply to go round it. Just south of Loughborough station, at SK548201, HS3 diverges from the MML alignment and follows closely to the east of the GC alignment for 1 mile to Stanford on Soar (SK543215). Here the Nottingham Loop of HS3 (see below) diverges from the main line, which veers west through Loughborough Meadows, re-joining the MML alignment at SK530220, and completing the circumvention of the Brush works. A similar (much smaller) works obstructs the route a little over a mile further on, at SK514241, just beyond the site of the former Hathern station. This is easily avoided by a short diversion behind it (if, indeed, it is still there at construction time). HS3 runs alongside the East Midlands Parkway station. No HS station is provided here; the HS3 station is in the centre of Nottingham, on the branch. (But East Midlands Parkway will be well served by HS-compatible services.)

The HS3 main line joins the alignment proposed by HS2 Ltd., for the eastern arm of HS2 phase 2, at SK496305, and follows that for the rest of the way to York. This is fully detailed in the HS2



4.3/5.1 Thrumpton – Hucknall

documentation, and will not be repeated here, except insofar as these proposals differ from it (particularly in Leeds and near Sheffield). Maps are, however, provided here, to the same standards as the others, documenting the route.

The Nottingham station branch diverges from the main line at Stanford on Soar, (Stanford Junction,) as noted above. It follows closely, slightly to the east of, the GC alignment, as far as SK554285. It then curves to the right, passing north west of Bradmore and south east of Edwalton, then following the east side of the A52(T) ring road (Gamston Lings Bar Road) from SK593342 to SK605377 (not forgetting to provide an adequate bridge over the currently disused Grantham Canal). It then tunnels under the Trent for ~1 mile to join the south side of the alignment of the classic line from Lincoln, Newark and Grantham at SK588393 (Manvers Street Junction), allowing for each-way connections between classic and HS tracks, on the approach to Nottingham station. (Speeds are very low here, so nothing fancy is required in the way of point work. Flat junctions will be perfectly adequate.) This approach to Nottingham has an entirely unexpected and serendipitous benefit, in that it can be shared with the classic Midland route to Nottingham, from Melton Mowbray, allowing it to be reopened readily. (Trying to restore this on its original alignment through West Bridgford / Trent Bridge would now be very problematic.) Of course, Network Rail will have to find itself a new test track! The classic route joins HS3 Nottingham branch at Edwalton Junction (SK601347).

That was the original idea, but in fact it's even better – the section from Edwalton Junction (SK601347) to Asfordby Junction, near Melton Mowbray, also forms part of HS8's route to Peterborough and Ely (and Norwich).

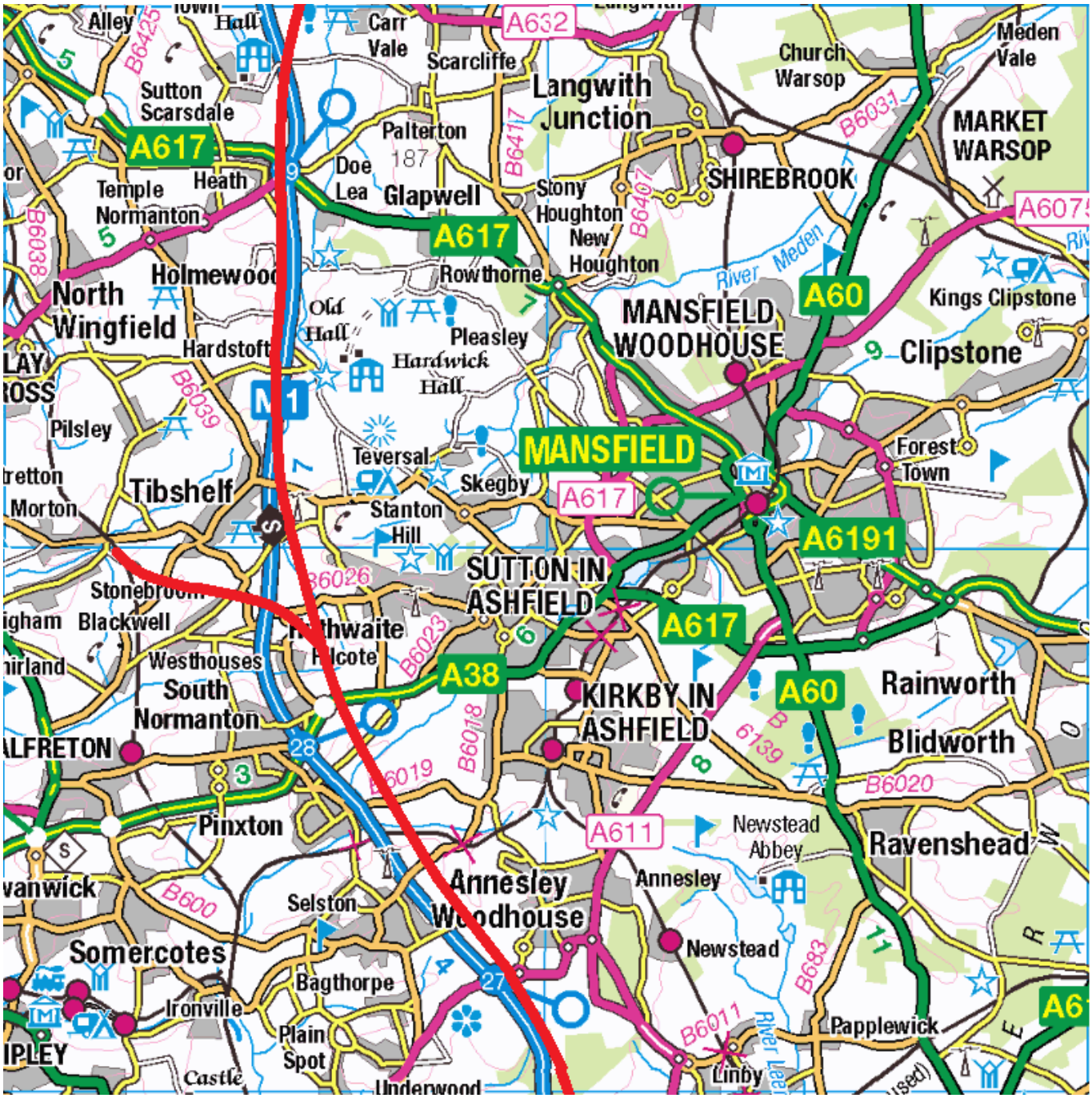
Nottingham Midland **is** the HS station. Two extra island platforms, thus 4 platform faces, are provided on the south side of the station (there's plenty of room – it's currently a car park).

Leaving Nottingham Midland, the station branch immediately enters a 4 mile tunnel, emerging immediately before Strelley Junction (SK512423) where the Nottingham connection of HS7 diverges. It finally re-joins the HS3 main line at Nuthall South Junction (SK509425).

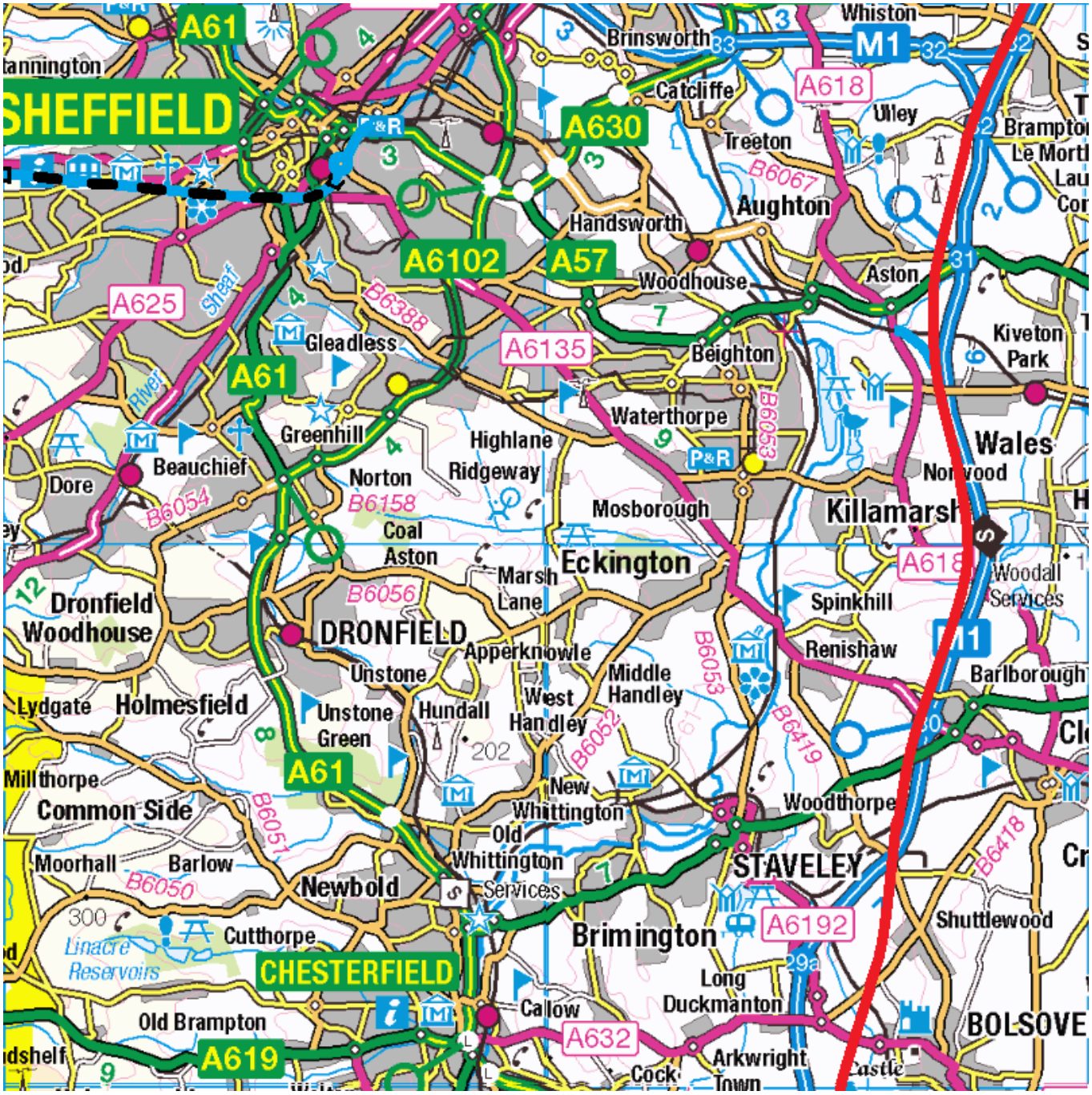
Shortly beyond this, the route of HS7 from Derby joins HS3 at Nuthall North Junction (SK514469). A short spur links HS7 at Awsworth Junction (SK484444) to HS3 (Nottingham branch) at Strelley Junction, as noted above, passing over the HS3 main line, and providing a HS route between Nottingham and Derby.

5. *Nuthall North Junction – Wales / Sheffield*

HS3's alignment in this section is exactly that proposed by HS2 Ltd., (incorporating the latest plans for South Yorkshire,) with the sole exception of the addition of a junction at Wales (SK474835) giving access to Sheffield HS station via the Southern Transpennine route, HS8.



5.2 Annesley Woodhouse – Sutton Scarsdale

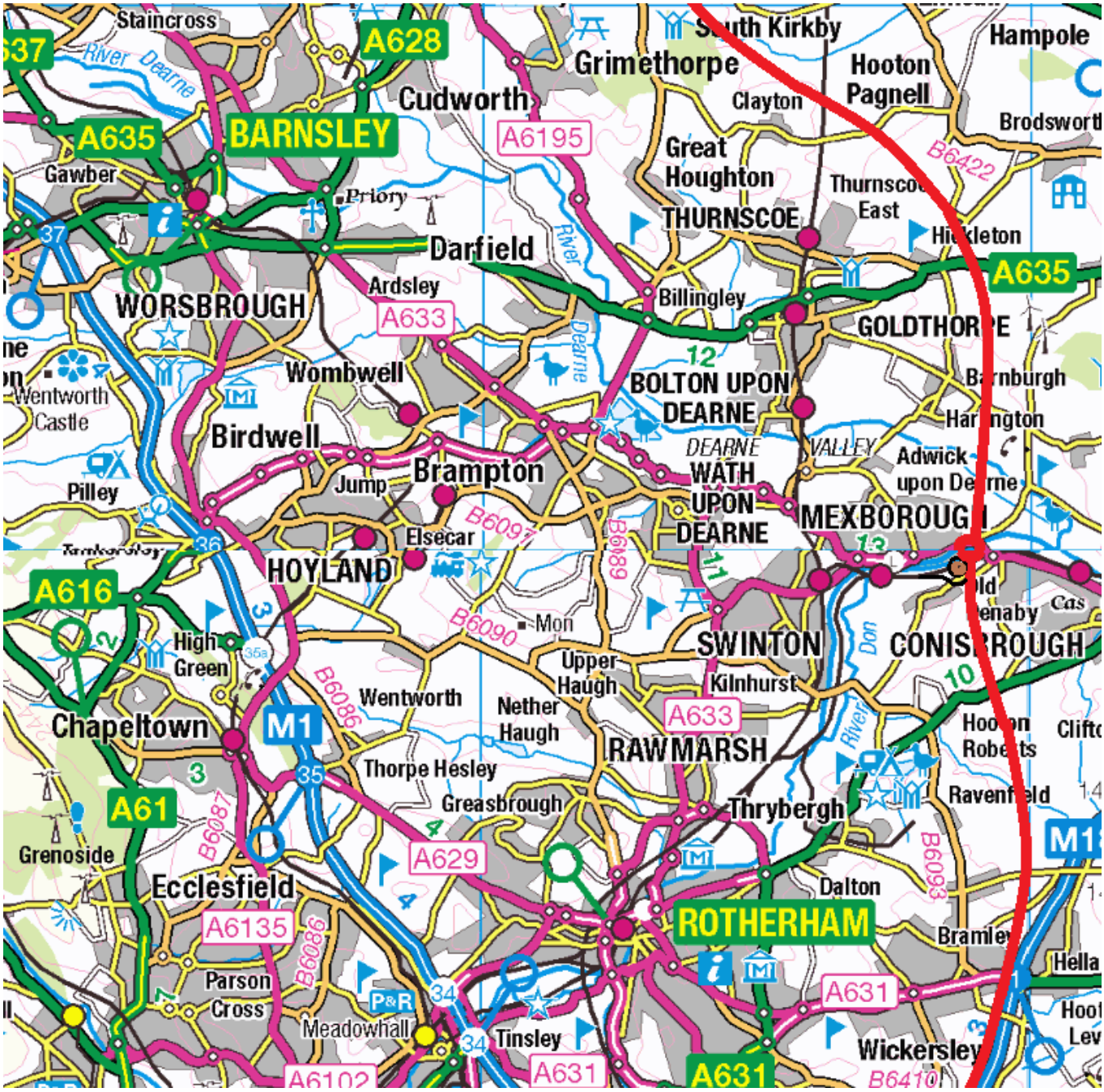


5.3 Bolsover – Brinsworth

6. *Wales – Leeds and York*

HS3's alignment in this section is exactly that proposed by HS2 Ltd., (incorporating the latest plans for South Yorkshire,) except for the approach to Leeds and the alignment of Leeds New Lane station.

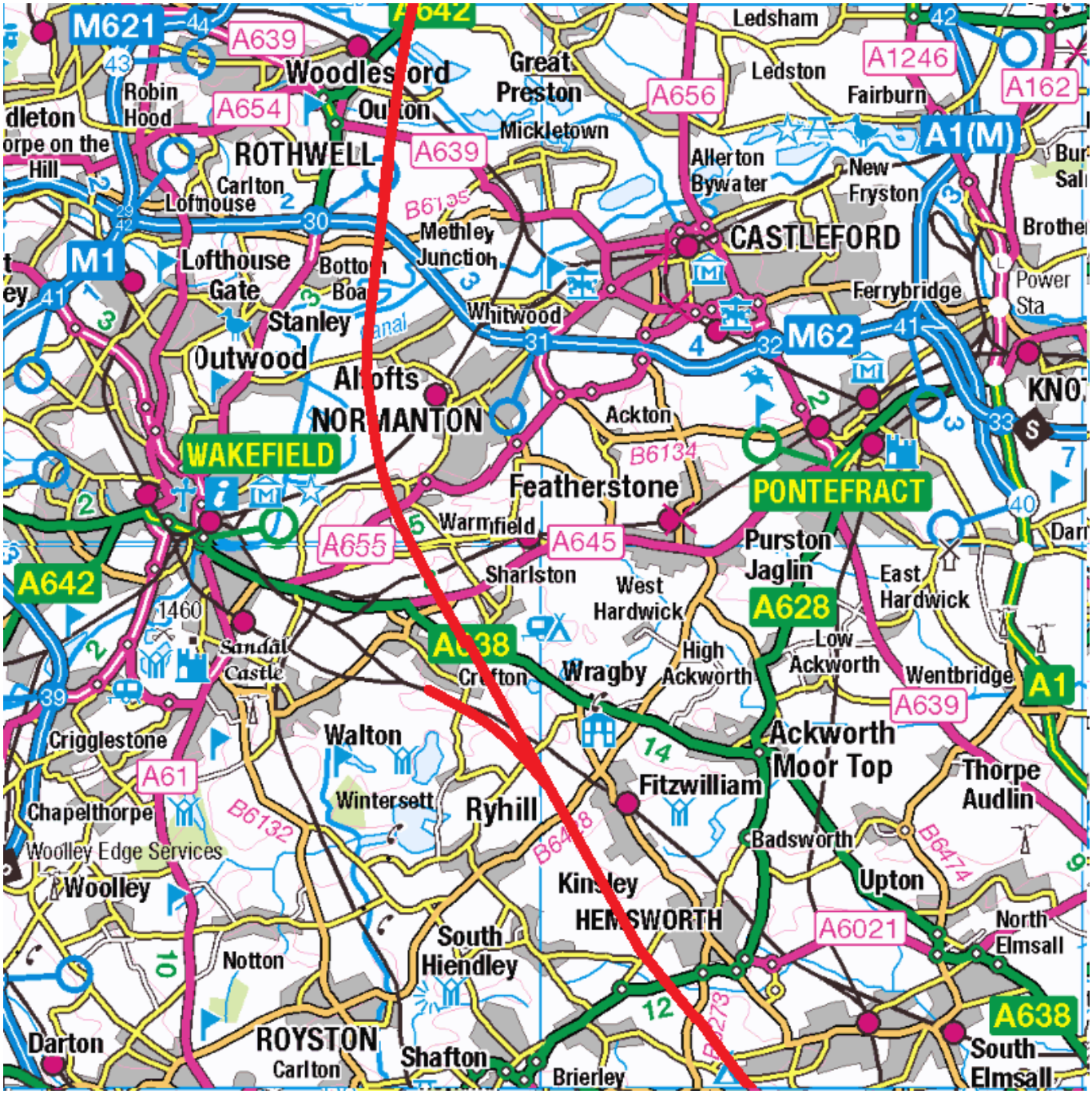
The new South Yorkshire station is at SK490997, and has high level platforms on HS3 (on passing loops, allowing non-stop services to pass through the centre, unimpeded) and low level platforms on the classic Sheffield – Doncaster line, including a terminal platform on the north side, allowing the UHS service from Tunbridge West to South Yorkshire via the Erewash Valley link (the portion extended via Rotherham) to terminate and reverse. There is also a link from the classic route, from Old Denaby Junction (SK480995) joining HS3 at Denaby Main Junction (SK490993), to allow for a HS-Classic Birmingham – Leeds service via Sheffield Midland. (It may be advantageous to run HS3 in tunnel on this section, to avoid new housing.)



6.1 Wickersley – South Kirby

The station loop junctions south of the station are Ravenfield, South and North junctions, at SK500928 and SK498957, and are respectively for trains stopping there re-joining / diverging from the main line.

The station loop junctions on the north side are Hickleton South and North junctions, at SE490042 and SE477064, and are respectively for trains stopping there diverging from / re-joining the main line.



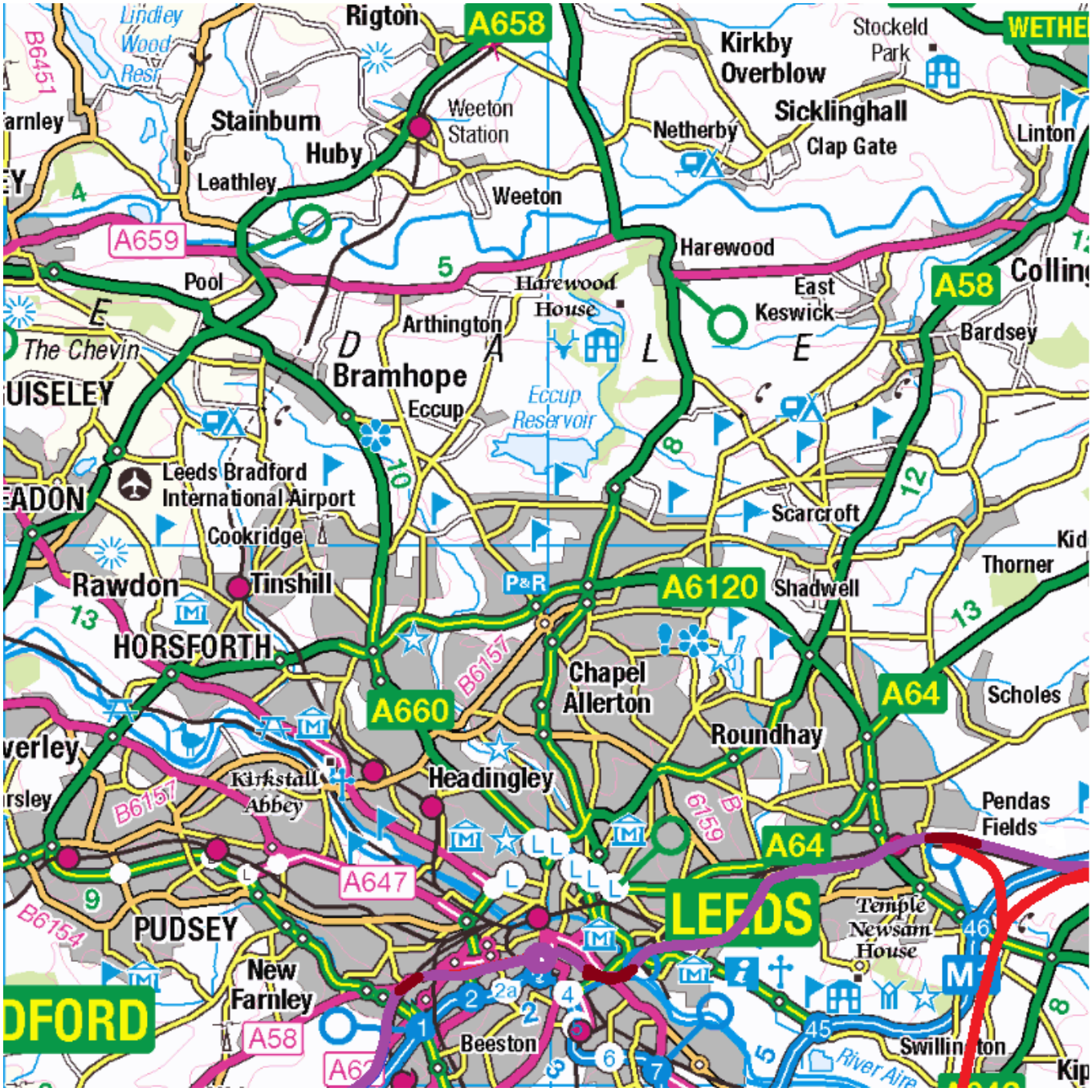
6.2 Hemsworth – Woodlesford

Leeds HS station must be on a through route, joining the HS line to York. The New Lane station as planned is completely unsuitable for this, as it is on an axis pointing in a N/NW direction straight at the existing station, and as it is an elevated structure, there is no scope in the available space for dropping the line into a tunnel. Leeds New Lane is a perfectly decent location for the HS station. It's just that it needs to be rotated through 90 degrees. Then it will be pointing in the right direction for extending the line through to York. The planned approach from Hunslet is quite unsuitable for this, so a new approach to Leeds must be chosen. Accordingly the Leeds branch now diverges from the York route at Ryhill

Junction (SE400160), merging with the Doncaster – Leeds classic route at Crofton Junction (SE394168), Following this to the former Wortley (Gelderd Road) Junction (SE279320), where it joins the viaduct line (using the same route as the later, Northern Transpennine – HS9) to reach the new, improved, rotated Leeds New Lane.

An alternative approach to Leeds, from the east, diverges from the main line at Swillington Common Junction (SE378331) and joins the classic tracks into Leeds City, at Manston Junction (SE372344), rather than the HS9 tracks into New Lane, since these services are extended along the Aire Valley line west of Leeds.

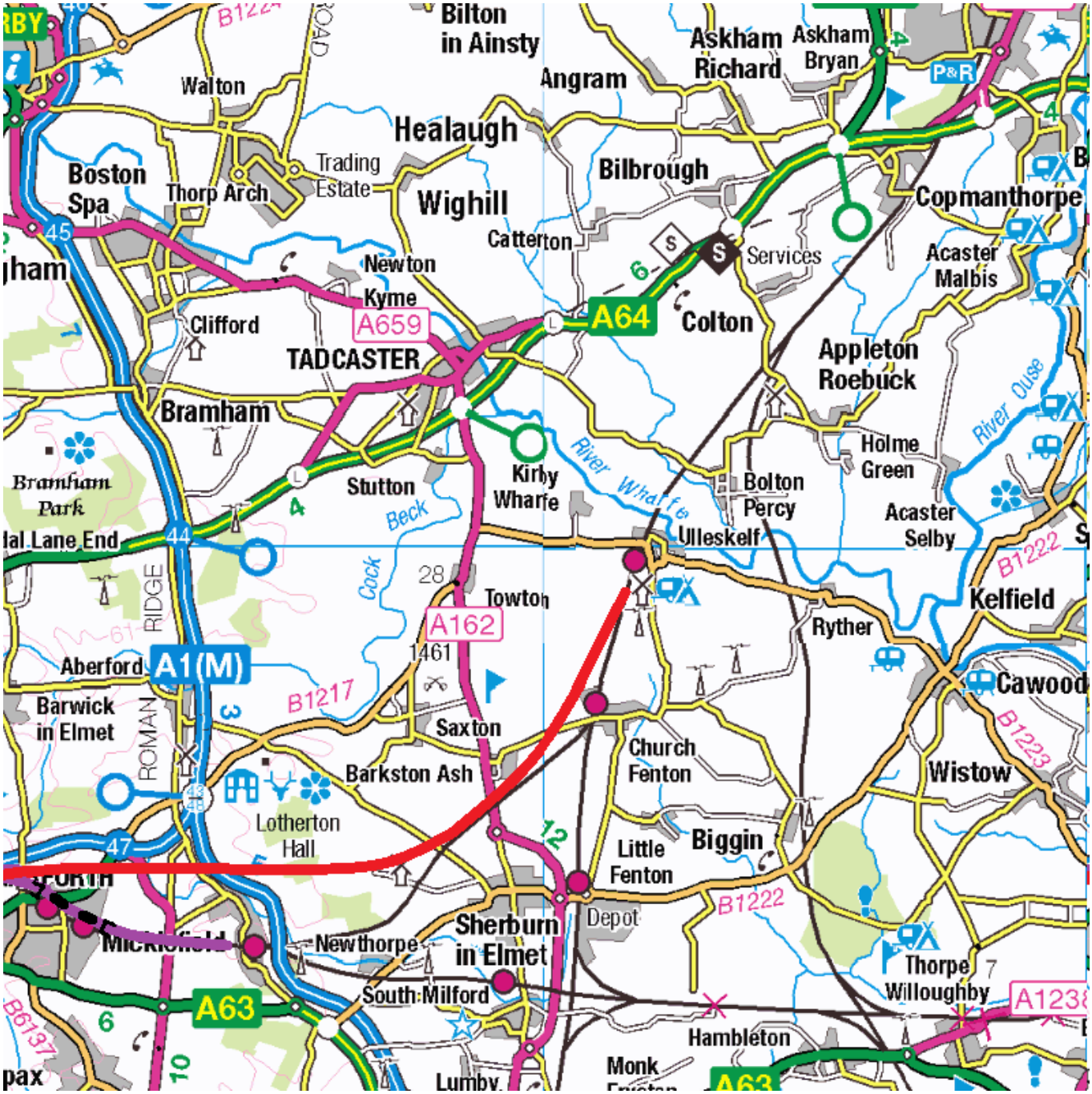
The York line has reverted to the original proposed by HS2 Ltd, merging with the classic Leeds – York line at Ulleskelf Junction (SE518399.). It follows this to York, diverging at the existing Holgate Junction, and taking over the former York station avoiding lines, on which the HS platforms are located.



6.3/7.1 Beeston – Pendas Fields

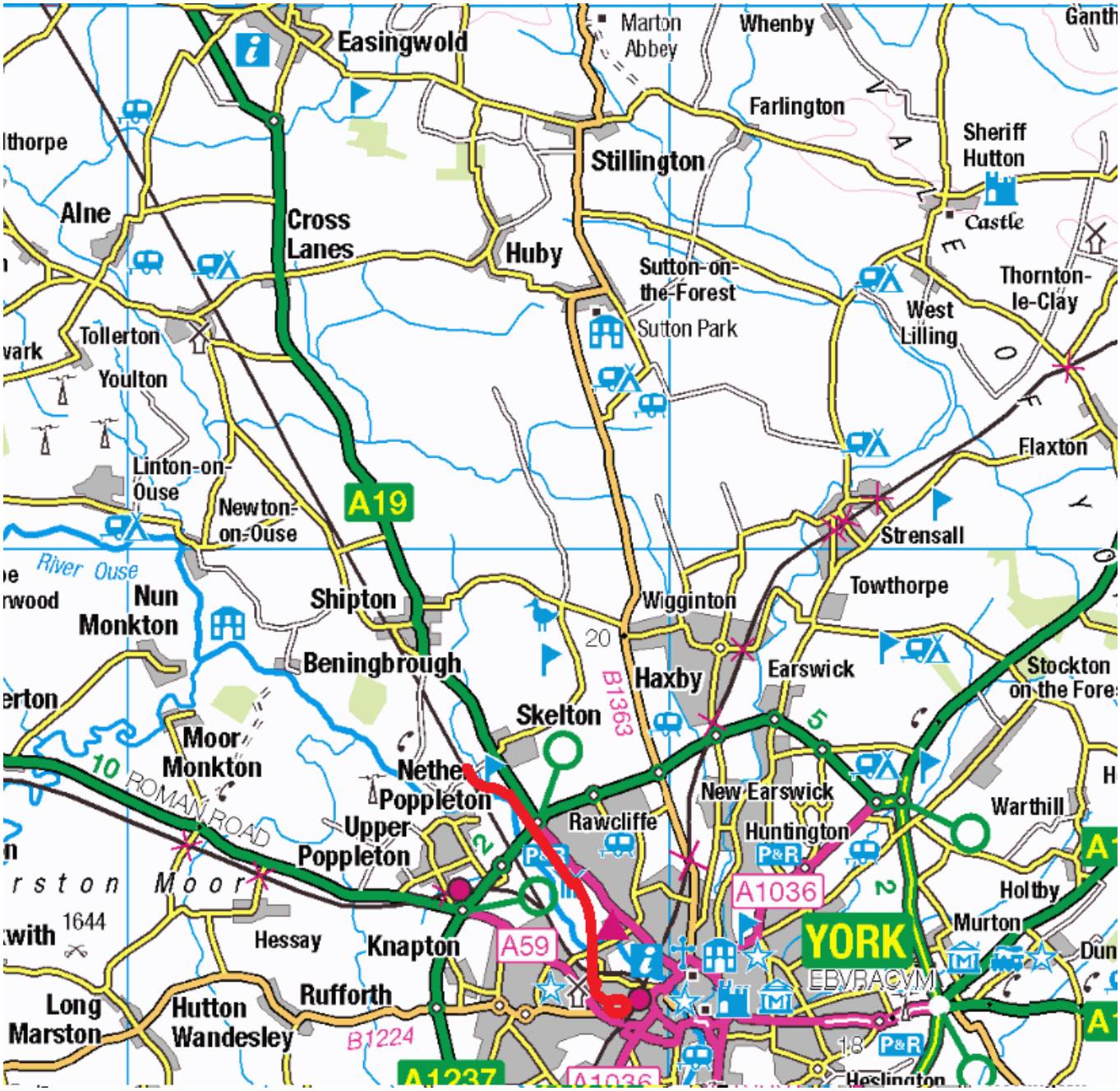
7. *Leeds New Lane – York*

This is actually, as far as Garforth, a very early instalment of HS9, the HS Northern Transpennine route, provided in advance of all the rest to allow services initially terminating at Leeds to proceed on to York, and terminate there. It also allows HS7 services to York and Newcastle to travel via Leeds, instead of proceeding directly to York.



7.2 Garforth – Copmanthorpe

I propose an unashamedly grandiose design to get across Leeds. New Lane Station is an elevated structure, with a long approach viaduct. The continuation (as HS9) eastward continues on viaduct, first along the south side of Great Wilson Street (A653) then Hunslet Lane (A61) and later Hunslet Road. From SE304328 the route crosses, still on viaduct, into the centre of the A61 dual carriageway (there's plenty of room between the carriageways) as far as SE309323, then turning east (it's still the A61), still on viaduct along the centreline. It crosses to the north side of the road when the South Accommodation



7.3 York – Easingwold Contains Ordnance Survey data © Crown copyright and database right 2013

Road comes in on a flyover. It crosses to the south side of the road just after the river bridge (at SE315324), and finally descends to ground level, to join the Hunslet East branch at SE316325, following this round to join the south side of the Leeds and Selby line at Neville Hill. This all sounds very extensive, but in fact it's barely a mile from New Lane station to joining the Hunslet East branch. The area traversed is warehousing / industrial, emphatically not residential, and has experienced a lot of new road building in recent years, so clearly it is not regarded as environmentally sensitive! I think that New Lane station and its approach from the west will be a splendid enhancement for Leeds, and this magnificent eastern approach even more so. I don't often make spectacular proposals, but this is definitely one.

The Strategi maps, at the end of the Route sections, contain a large scale map of the traverse of Leeds. This should clarify the above description.

After the Lord Mayor's Show … HS9 then proceeds boringly along the south side of the Leeds and Selby route, crossing to the north side of the alignment just before Cross Gates station, and follows that until it joins HS3, at Garforth East Junction (SE395341). Shortly before this, at Garforth West Junction (SE387342), a spur diverges to provide a connection to the classic line at Micklefield HS Junction (SE439327), for HS-C services to York and beyond, and to Hull (Northern Transpennne).

8. York – Darlington

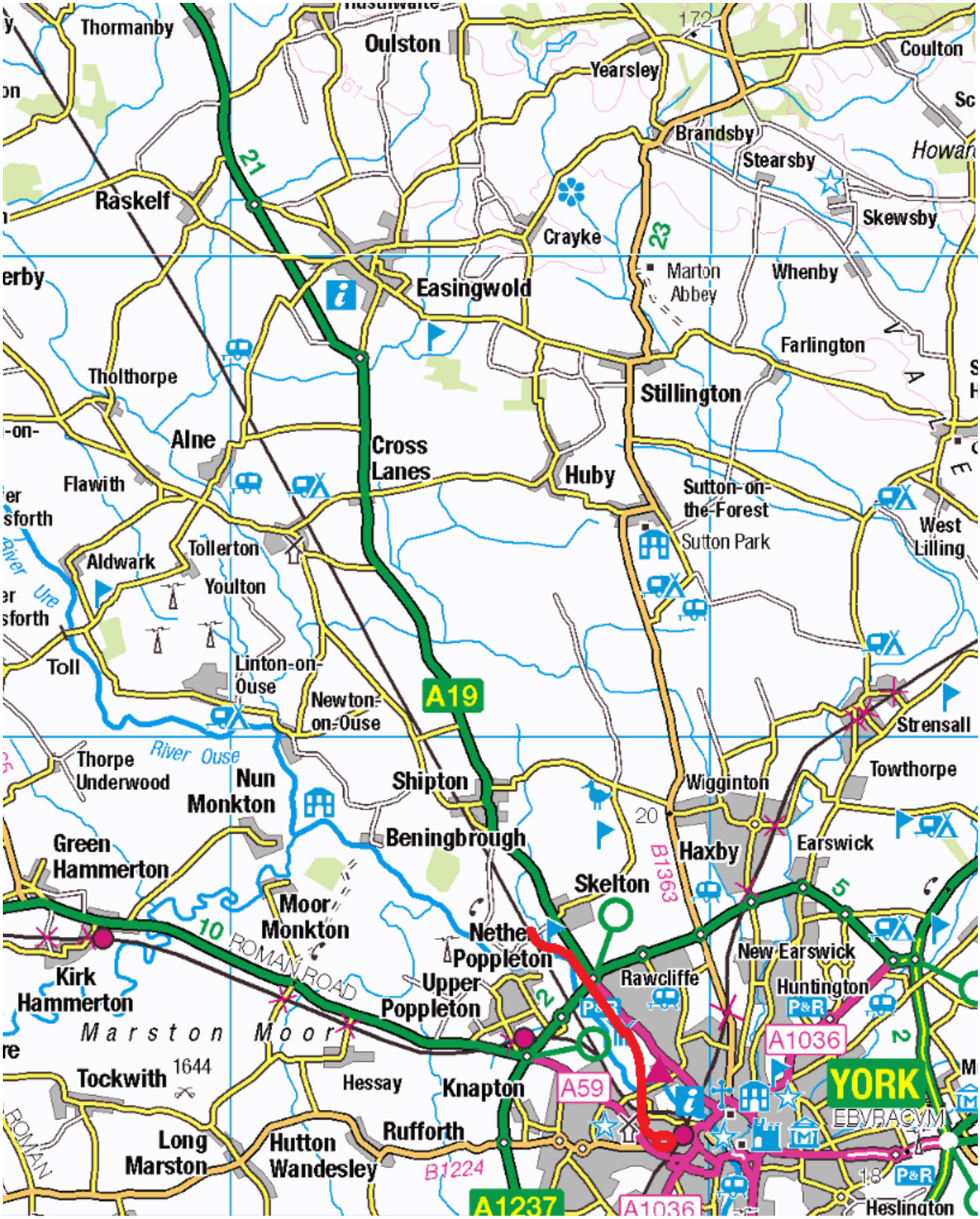
HS3 follows the classic route from Ulleskelf to York, diverging at the existing Holgate Junction, immediately before the station.

The York HS station is behind the classic one, in the former works area and station avoiding line. Given the service pattern to be supported, with several services terminating at York, four island platforms, thus eight platform lines, are desirable, the two outer pairs, 1-2 and 7-8 to accommodate through services, with cross-platform connections, and 3-6 to accommodate terminating services.

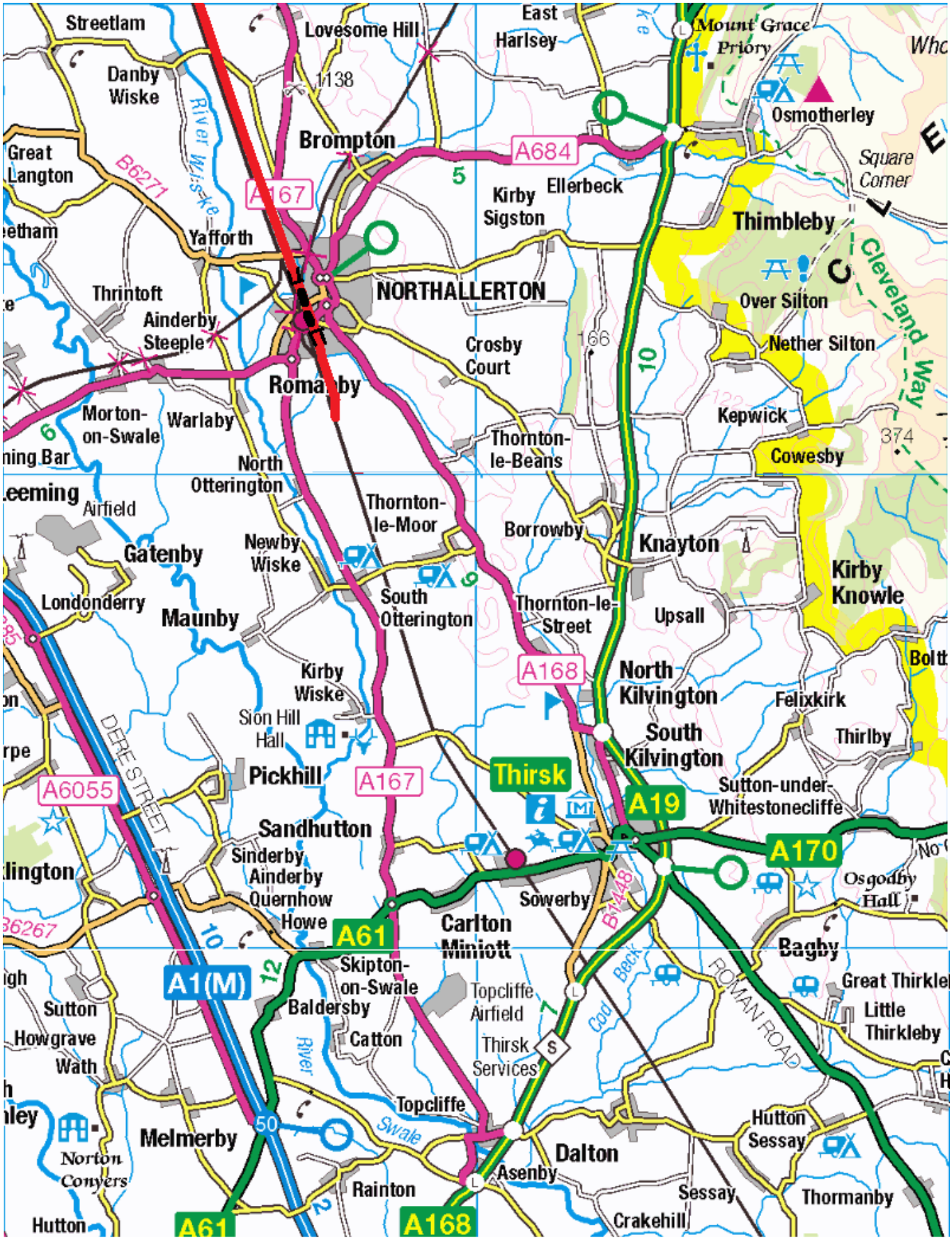
Emerging from York HS station, HS3 crosses the ECML at SE585522 and the Ouse at SE584526, to avoid a built-up area between the ECML and the river. It runs through Clifton Ings, following the east side of the river, and curving round with it, to merge with the fast lines of the ECML at Poppleton Junction (SE563558), immediately north of Skelton Bridge Junction, where the ECML takes up its 4-track parallel configuration. It follows the ECML to Romanby Junction (SE368920) just south of Northallerton, where it diverges, passing through a short (half mile) tunnel under Northallerton, between SE364930 and SE361942. It then has its own, new tracks, (the ECML being only double track north of Northallerton), on the east side of the ECML, as far as Darlington.

Darlington Bank Top station is rebuilt, with the existing station taken over by HS3 and the Tees Valley Metro, reconfigured internally with two island platforms, and new platforms built on the former through lines. Darlington has always been an architecturally superb station, with a chronically and perversely inefficient track layout. The coming of HS3 gives the opportunity to put this right, while retaining all the superb architecture. Appendix D gives details.

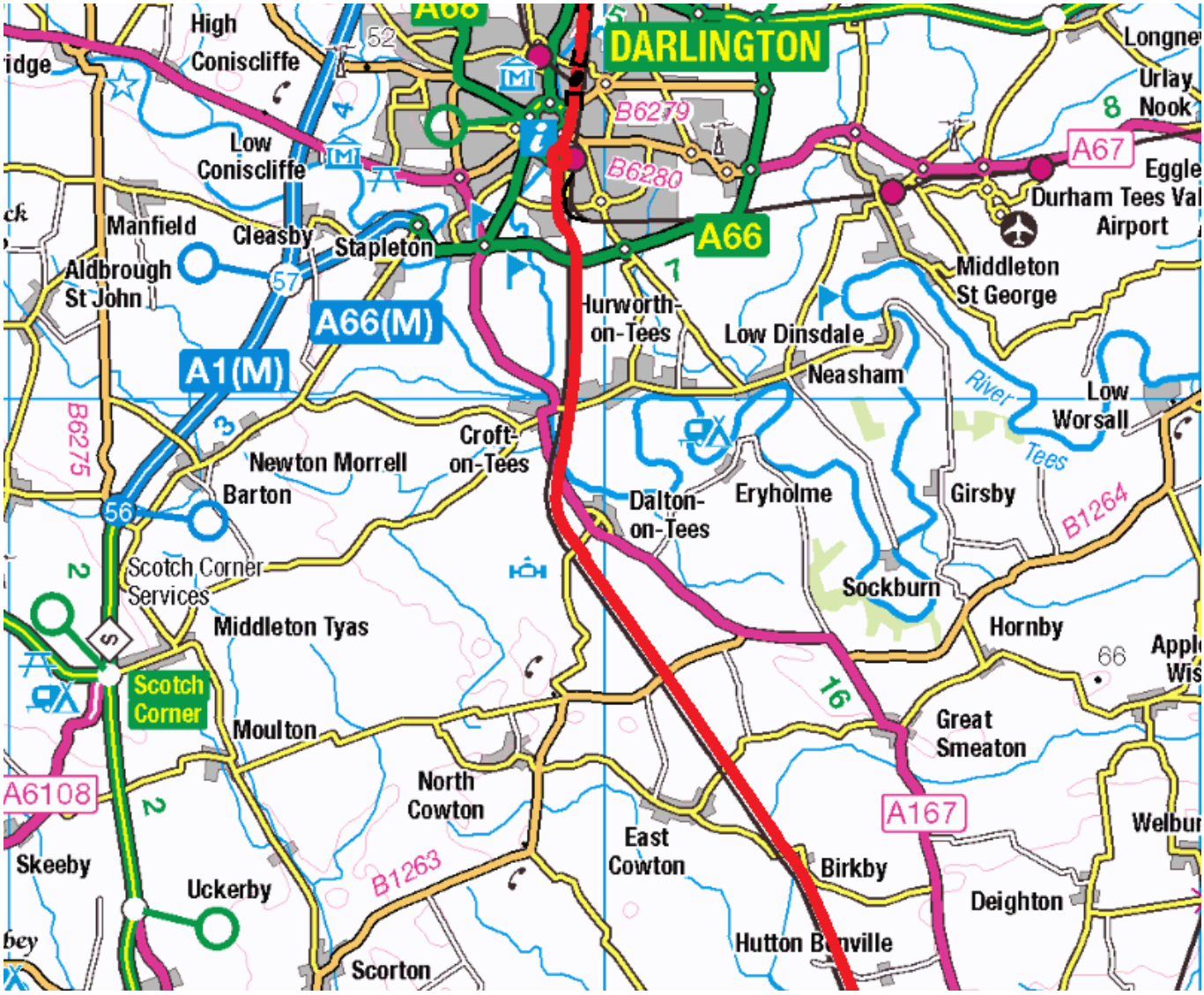
Immediately before Darlington station, at NZ294134, HS3 crosses the ECML by flyover, sharing this with the Tees Valley Metro tracks from Middlesborough and Saltburn.



8.1 York – Thormanby



8.2 Thormanby – Northallerton



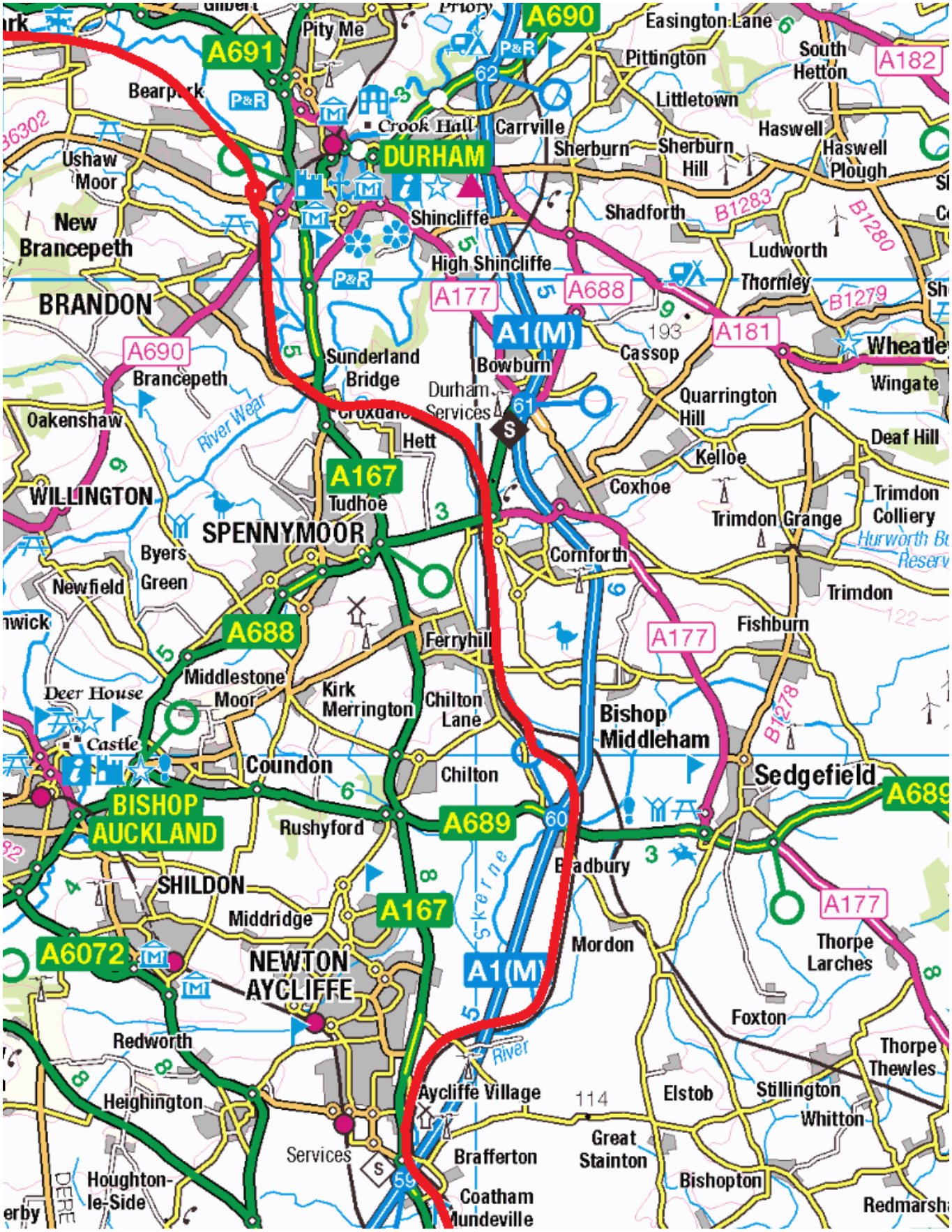
8.3 Hutton Bonville – Darlington

9. *Darlington – Newcastle (via Consett) and Newcastle – Hexham*

Leaving Darlington, HS3 remains on the west side of the ECML, passing through two short (half-mile) tunnels, between NZ296150 and NZ297157 (passing under the line to Bishop Auckland) and between NZ298168 and NZ298173 (beneath a housing estate). It follows the west side of the ECML alignment until just before Ferryhill, where it switches to the east side (at NZ310305) to avoid a built-up area. It then follows the east side to NZ254408, just before the site of the former Relly Mill Junction, where it crosses to the west side and arrives at the new Durham (Relly Mill) HS station (NZ254418). (It grieves me to propose a parkway-type station for Durham, but it's that or nothing at all. Some connecting service, bus or tram, will be required between there and Durham ECML, via the city centre.)

From here on, all the way to Newcastle, HS3 uses the alignments of railways long closed, much of which was single track, and all of which was built with no concern for high speed. For all that, the alignments are by no means bad, and they are almost completely unobstructed. They **are** in use as long distance footpaths or cycleways, and their redevelopment must preserve these facilities (albeit on slightly different alignments). I will note specific variations from the original alignment, where this is necessary to avoid demolition of property, or where desirable to gain a better (i.e. faster) alignment. But generally,

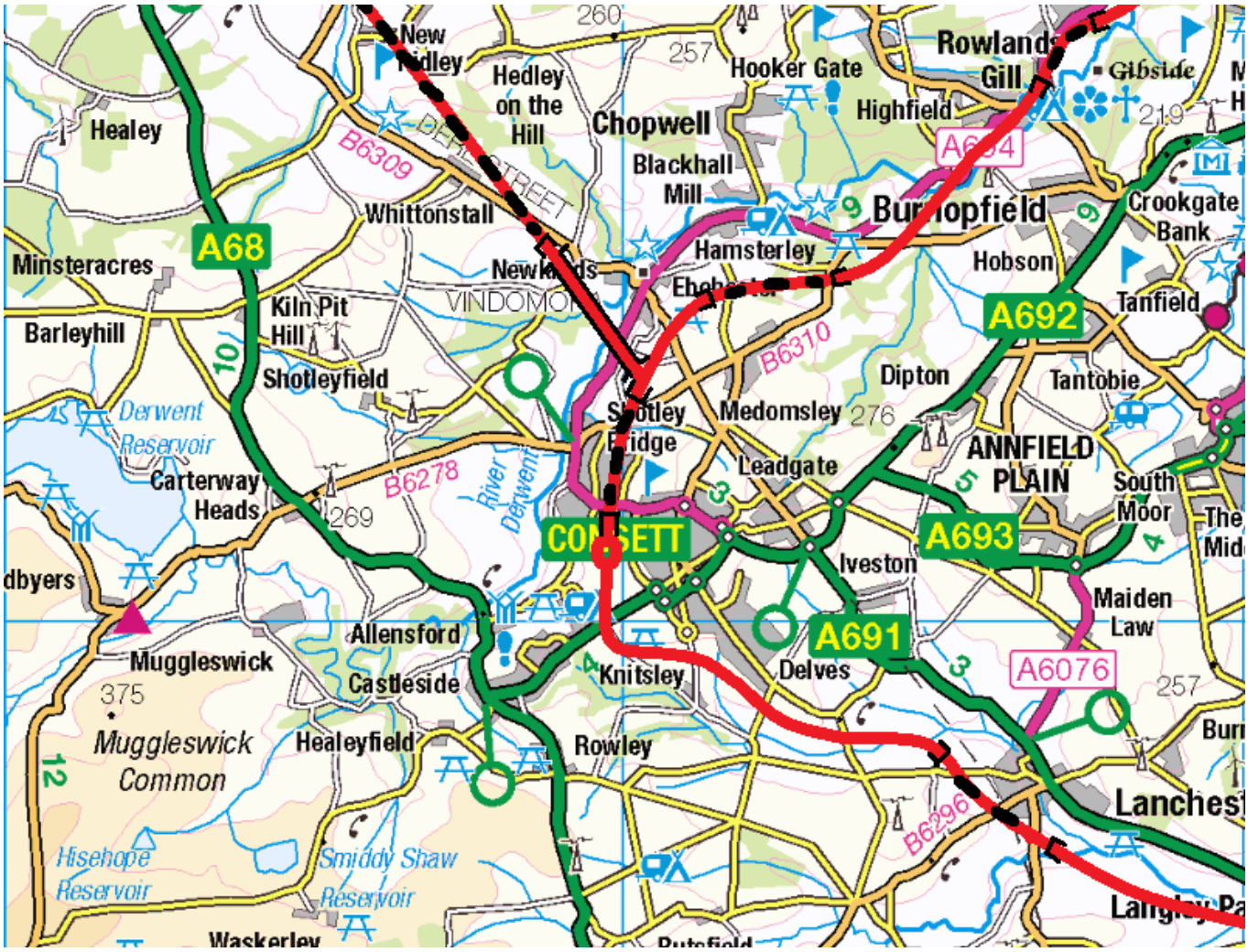
throughout, minor variations will be necessary to ease curves. It will result in a very fine, scenic route, as well as a fast one.



9.1 Newton Aycliffe – Durham

Lanchester is bypassed, to avoid extensive demolition (and also improve the alignment), via a 2 mile tunnel between NZ172468 and NZ159480. The former alignment is followed to Consett. There is a sharp curve approaching Consett, but since all trains stop there, it hardly matters. The Consett HS station is on the south side of the town, at NZ099513. Immediately to the north of the station , the line tunnels for 2 miles under Consett, to avoid demolition (and, again, to gain a better alignment), emerging at NZ103537 (Derwent Hill Junction, where HS3 to Hexham and Edinburgh diverges – see below). A further 1½ mile tunnel, between NZ109551 and NZ131559 is purely to straighten the alignment. A 1 mile tunnel between NZ167582 and NZ172594 avoids demolition in Rowlands Gill (and also …)

HS3 finally arrives near Blaydon. Extensive road junctions and the Metro Centre block further progress, so it enters 2 mile tunnel at NZ200621, passing under the Tyne and emerging at NZ220634, and following the alignment of the North Tyne line of the Newcastle and Carlisle from there into Newcastle Central station. (There is still track in place from NZ232631 to the station.)

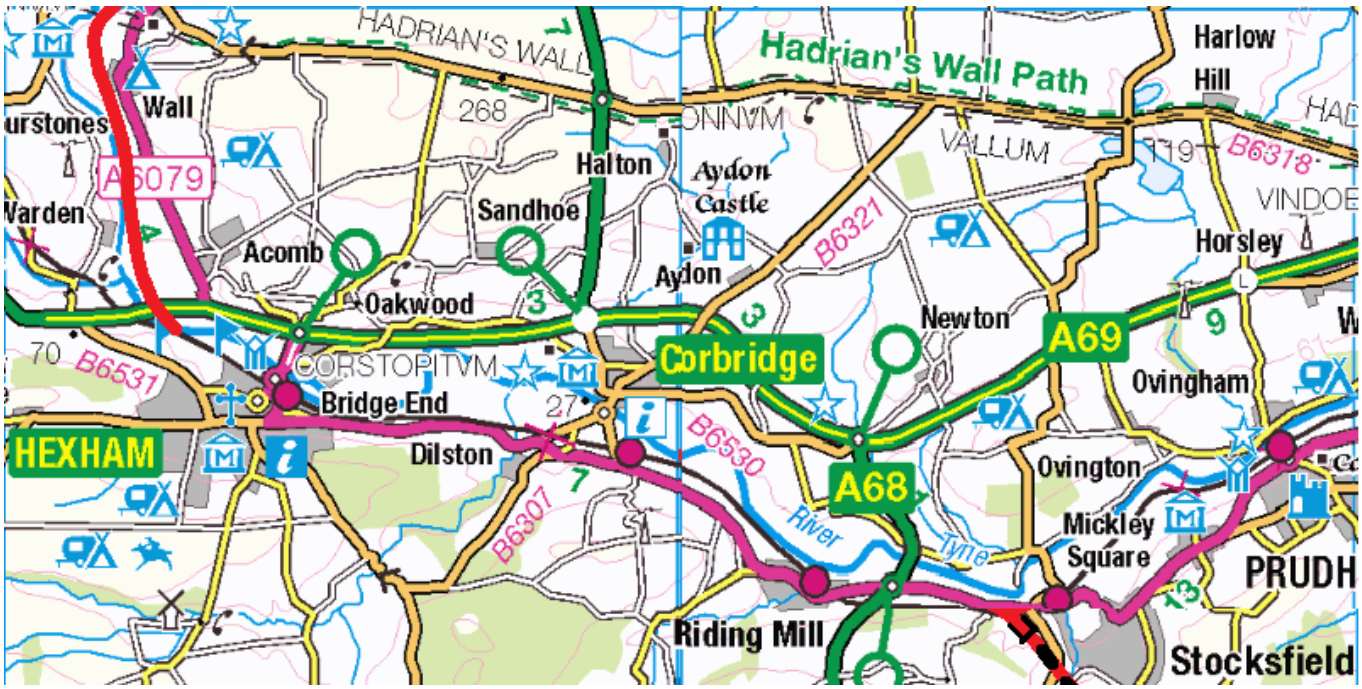


9.2/10.1 Lanchester – Rowlands Gill

The branch of HS3 from Newcastle to Hexham follows the north bank of the Tyne, diverging from the above line at NZ220634, Paradise Junction (the name is irresistable, though I doubt if the place is – it's just upstream). The Hexham branch follows the original north bank alignment (passing through Paradise, indeed), and crosses the Tyne at Scotswood Bridge – the original bridge is still there and might even be still (re-)usable, then it merges with the current alignment of the classic Newcastle – Carlisle route at the restored East Junction, NZ187635, just before Blaydon station. The odd warehouse will need to be relocated between Scotswood Bridge and Blaydon.

9.3 Newcastle – Wylam Contains Ordnance Survey data © Crown copyright and database right 2013

The line whose alignment HS3 has followed from Consett originally took a sharp S-bend at Blaydon, to gain access to the Scotswood Bridge, and the north bank line into Newcastle. That portion of the route has been obliterated by roadworks, hence tunnelling under the Tyne (which gives us a much better alignment of course).

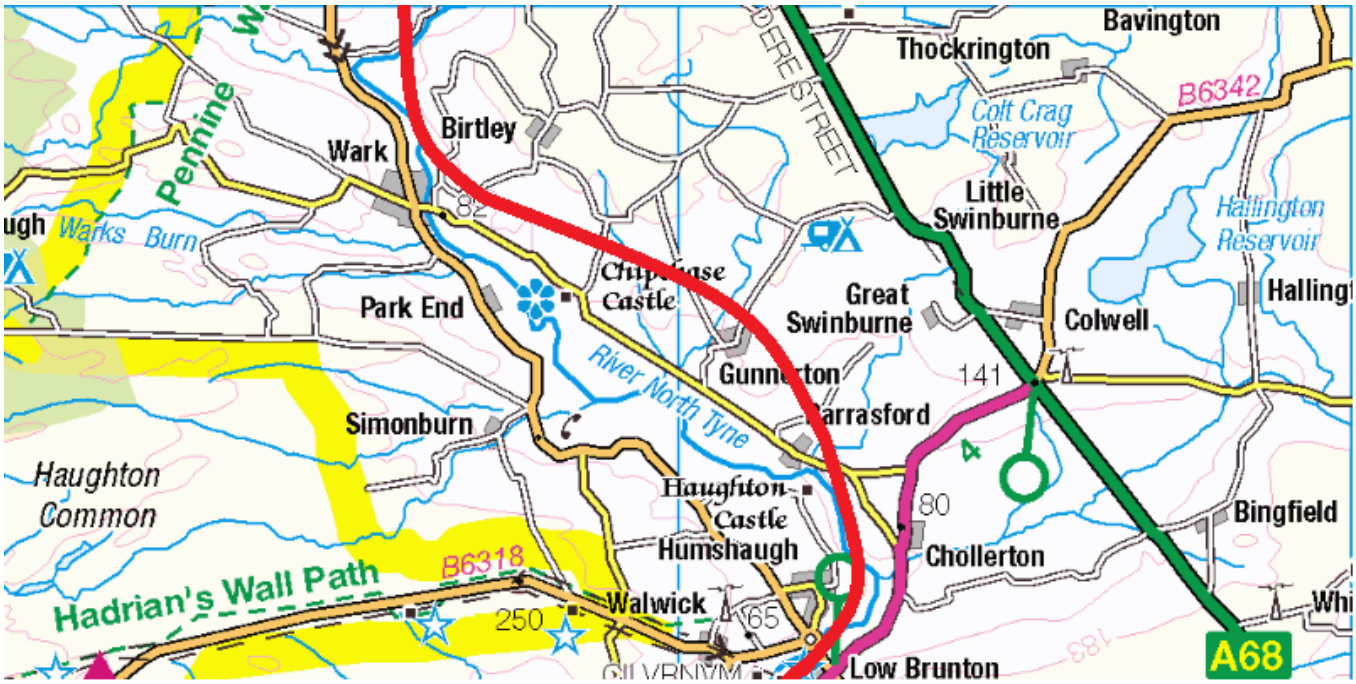


9.4/10.2 Prudhoe – Hexham Contains Ordnance Survey data © Crown copyright and database right 2013

10. Consett – Hexham – Edinburgh

The section between Consett and Hexham is in maps 9.4/10.1 and 9.4/10.2, above.

The main route to Edinburgh leaves the Newcastle line just after Consett, on emerging at NZ103537 from the tunnel under the centre of the town – Derwent Hill Junction. There follows the major engineering feature of the line, a 1½ mile long viaduct 200ft high across the valley, gaining the north side at NZ087560. It immediately enters a 4 mile tunnel, emerging at NZ050610, just west of Stocksfield station, where it joins the classic Newcastle – Carlisle line, (Stocksfield Junction,) and travels with that to

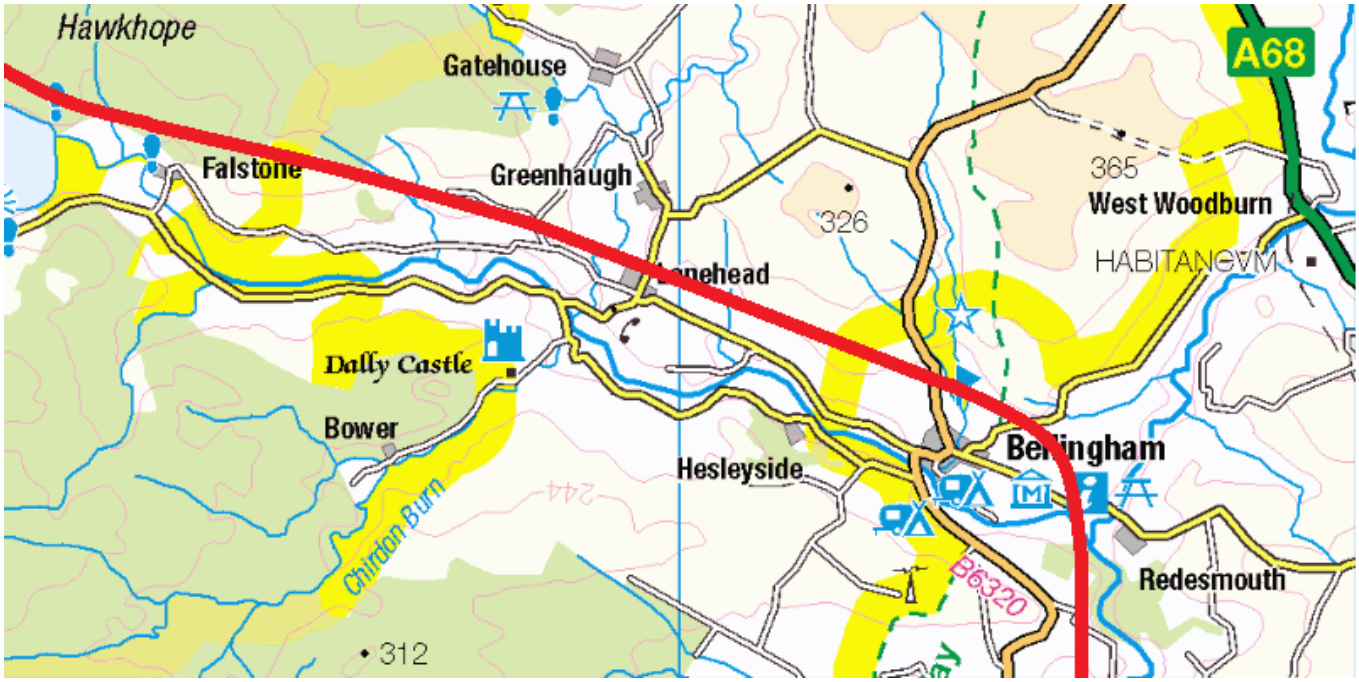


10.3 Low Brunton – Wark

Hexham. The gradient of this section is 1 in 47 if the descent is confined to the tunnel section, or 1 in 65 if it extends over the viaduct also.

HS3 continues beyond Hexham on the classic tracks until NY923651, Tynegreen Junction, where it diverges to the north up the valley of the River North Tyne.

From here on, HS3 **roughly** follows the alignment of the long-closed line to Riccarton Junction, via Kielder, a single track branch built with little concern for speed. Accordingly, HS3 will diverge freely from the former alignment to keep down curvature. Except around Bellingham, there are no obstructions to worry about. But there has been one rather significant change in the years since the line closed – between Falstone and Kielder stations, the original route is now under water – Kielder Water, to be precise. This is of less significance than might be expected; what it means in practice is that the route must gain the altitude of 650ft, by Falstone, say, rather than at Kielder. Assuming the extra climbing starts at Redesmouth (the original part of the route is essentially flat) this still only means an average gradient of 1 in 170 to Falstone – pretty trivial stuff. Following the eastern bank of Kielder Water actually allows for a much straighter alignment than the original line had, following the valley floor. I fix 3 locations, to ensure the desired gradient, and a 4th one to indicate the desired route along the reservoir: NY840843, just above Bellingham, at an altitude of 450ft, (I need to avoid Bellingham anyway; the only built-up area



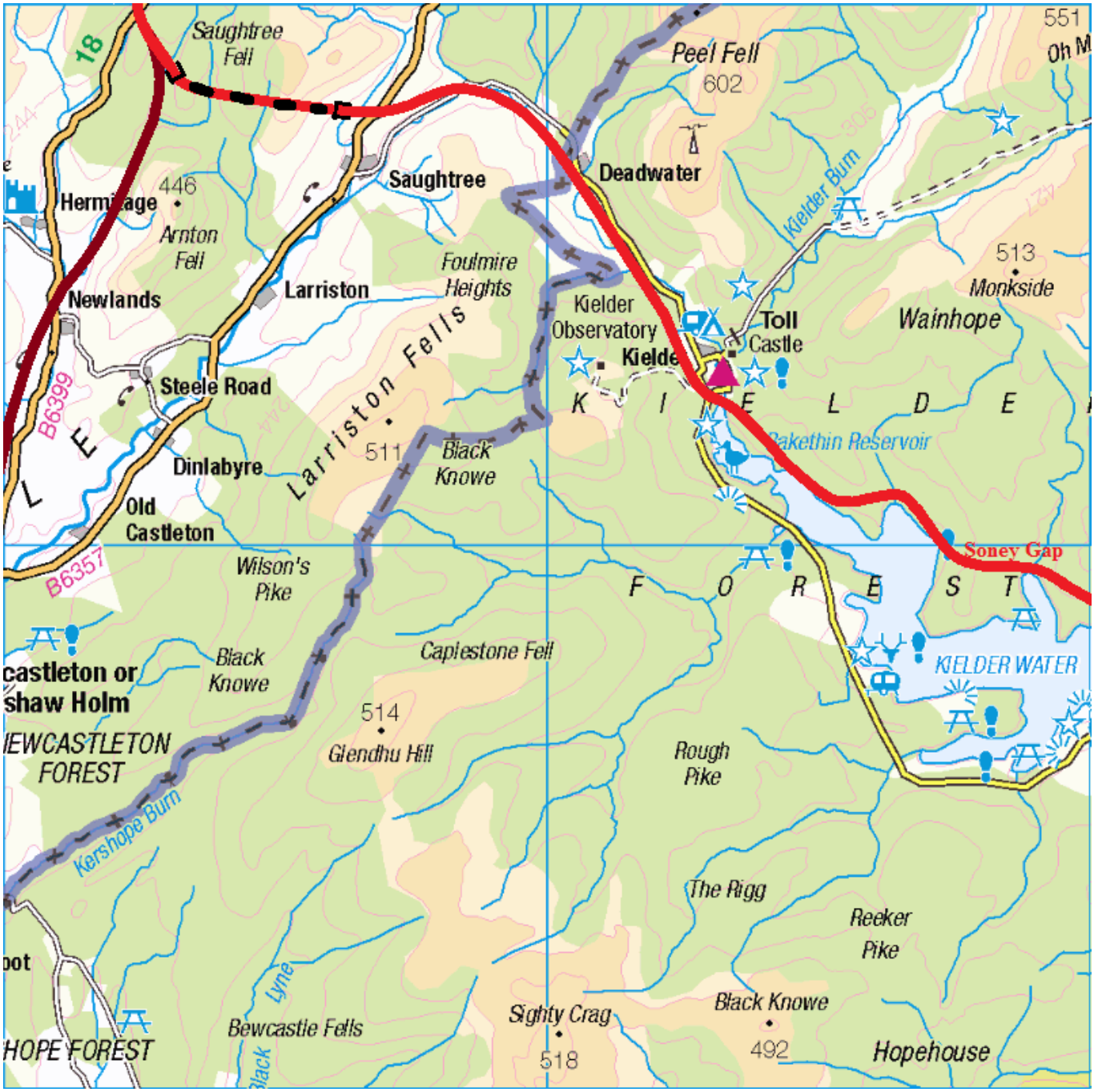
10.4 Redesmouth – Falstone

anywhere,) NY780865 at altitude 550ft, NY726880, above Falstone at the required altitude of 650ft, and NY690898 at the Soney Gap – a saddle point in the hill between two arms of the reservoir.

Beyond Kielder, HS3 diverges from the route at NY568980, where it crosses the Dawston Burn, entering a 2 mile tunnel, and emerging at NY531988, where it joins the Waverley route at Riccarton North Junction (the stretch through the original Ricarton Junction is severely curved – the tunnel diversion is specifically to avoid that). It then takes over the trackbed of the Waverley route to Ravenswood Junction, beyond Newtown St. Boswells. Tunnels are provided between NT524000 and NT522018 (1 mile, replacing the existing Whitrope tunnel, which is poorly aligned), NT529036 and NT529049 (½ mile) and between NT521061 (immediately after the viaduct) and NT509068 (¾ mile), specifically to eliminate curves. The alignment is otherwise generally good; the curves approaching Hawick scarcely matter as everything will stop there. The section between Riccarton North and Ravenswood junctions is shared with the Regional Metro Waverley service between Carlisle and Edinburgh. The entire route north of Riccarton North Junction is shared with the (extra-highly-speculative) Scottish extension of HS2.

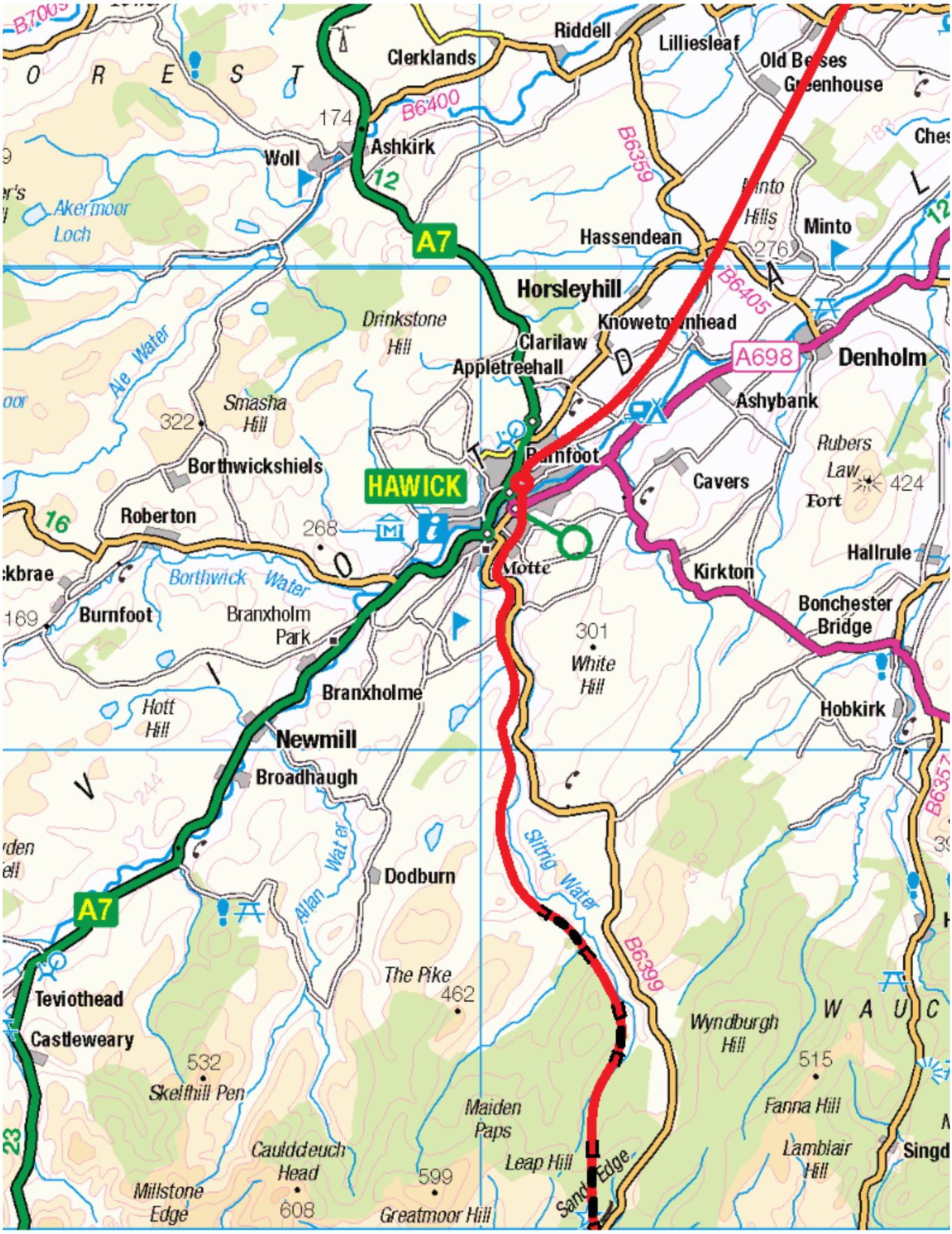
The arrangements at Hawick are deliberately left vague. Campaign for Borders Rail are pressing for reopening from Tweedbank to Hawick, but have not as yet developed any detailed plans for Hawick. Most of the alignment seems fairly free of obstruction, except in the very centre of the town, where the original station site is now occupied by a leisure centre. The most straightforward solution would seem to be to relocate this.

HS3 diverges from the Waverley route at Ravenswood Junction (NT575339), and follows, roughly, the route of the former branch to Duns and Reston for the first 2½ miles. The magnificent Leaderfoot Viaduct (grade A listed, a local authority listing – I'm not sure what protection it conveys) is still in position across the Tweed, and apparently in good condition, having been renovated in the 1990s. Unfortunately it is (of course) only single track, but, given the likely loadings on this part of the route, that could probably be tolerated (shocking though the idea of a single-track section on a HS route might seem). For all its grade A status, it seems improbable that anyone could seriously object to its being re-used for its intended purpose, especially as that would guarantee continuing, regular maintenance.



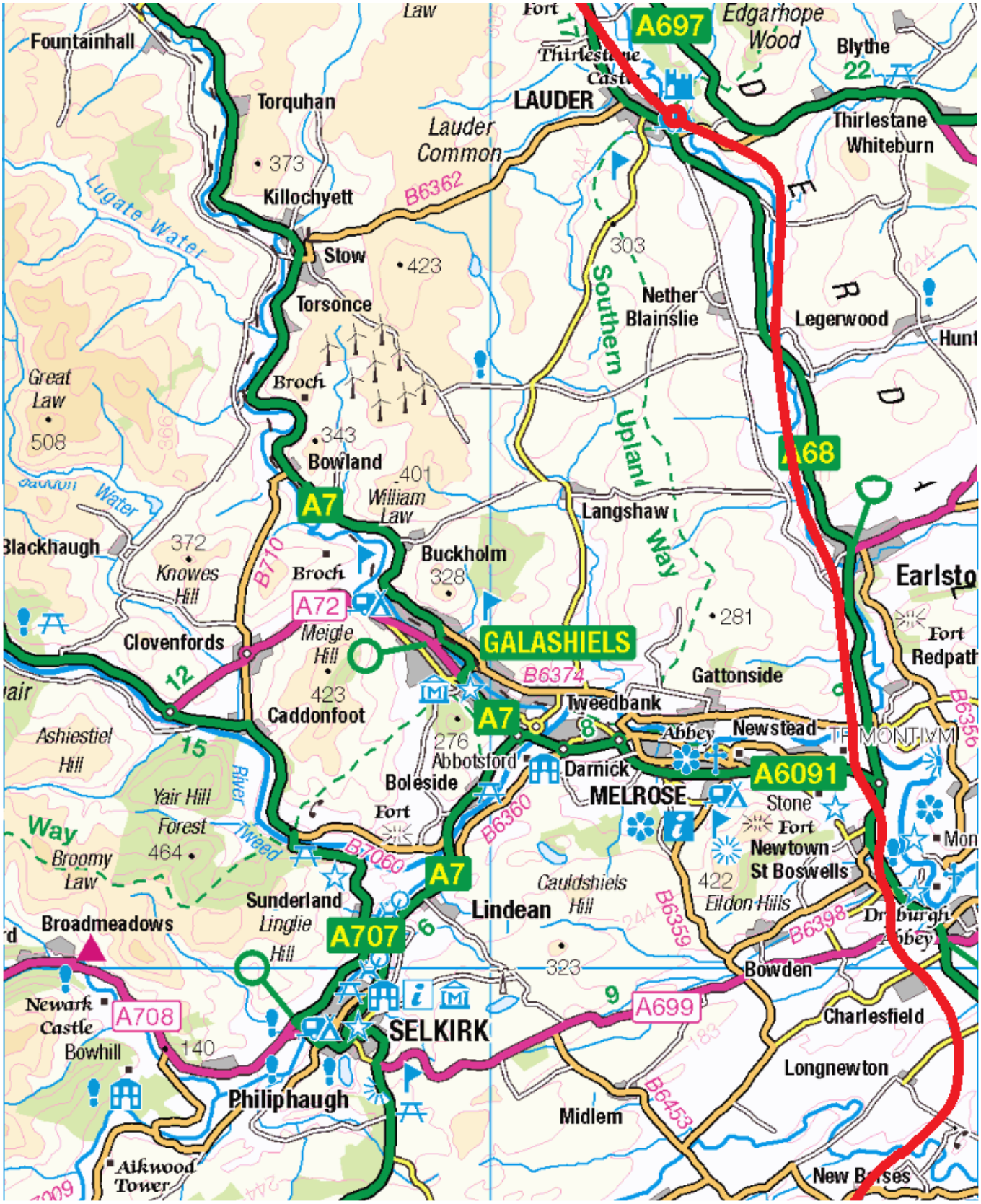
10.5 Kielder Water – Riccarton North Junction Contains Ordnance Survey data © Crown copyright and database right 2013

HS3 passes to the west of Earlston, on a completely new alignment and proceeds up Lauderdale. I like the idea of a station at Lauder. It has clearly grown considerably since it lost its branch railway, years ago, and would now be an excellent commuter town for Edinburgh, but currently is inhibited in this by poor transport links. I don't envisage stopping the London trains there, but the Newcastle service would seem very suitable. Again, given the likely loadings on this part of the route, the full HS station would seem excessive, so a simple two-platform station, with no crossing loops, should suffice. A suggested location is NT534475. (Hawick, on the other hand, does need the full HS treatment, being an important interchange station.) HS3 continues beyond Lauder to New Channelkirk (NT479553) where it enter a 3 mile tunnel, emerging at Woodcote Park (NT462605). Average gradients on these sections: 1 in 300 Ravenswood Junction – Lauder, 1 in 80 Lauder – New Channelkirk, and 1 in 100 (descending) through the tunnel to Woodcote Park. HS3 curves round the north of Pathhead and enters a 2½ mile tunnel at NT380650, emerging at NT355680. It then joins the alignment of the Waverley route at Millerhill and



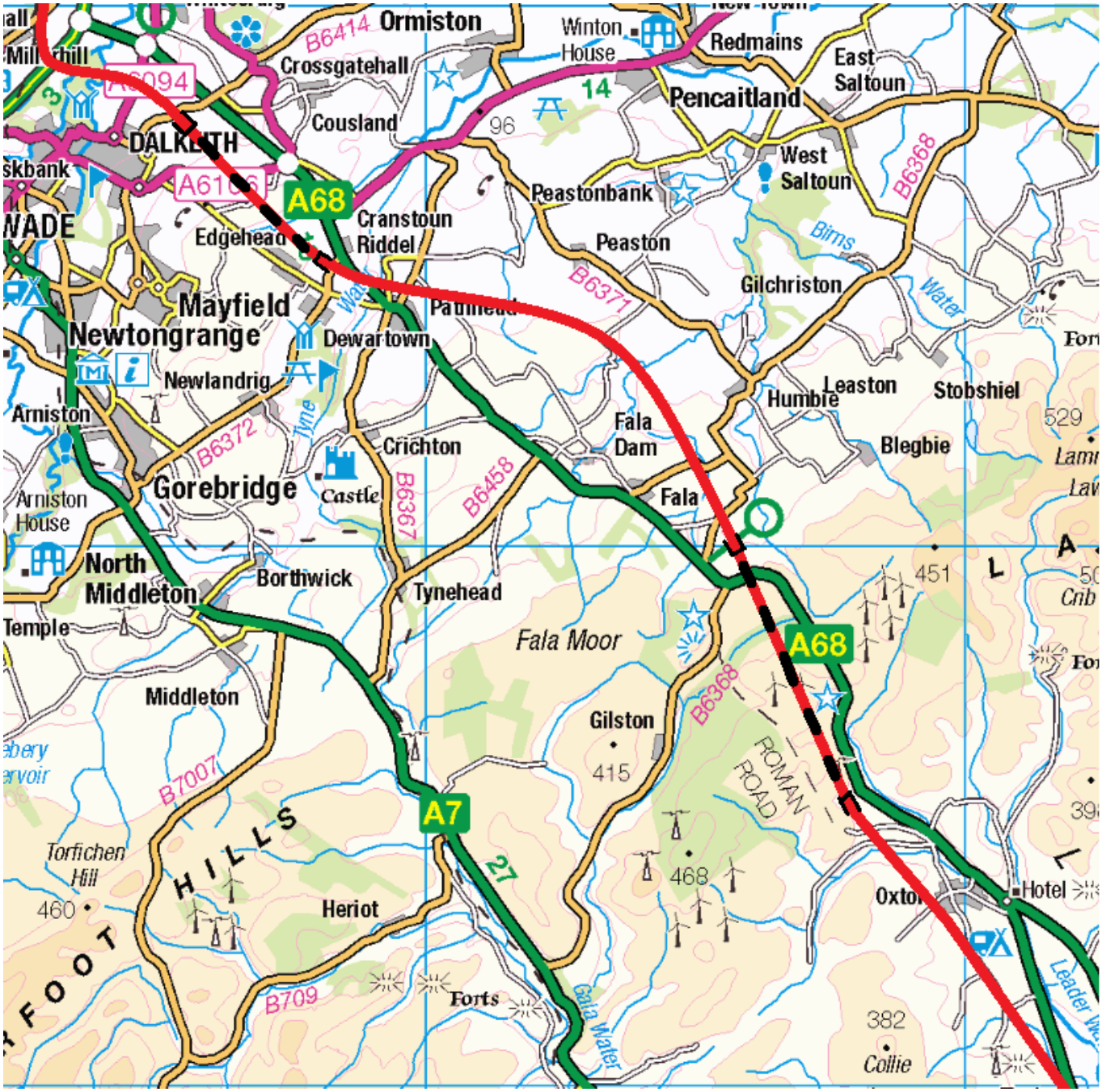
10.6 Whitrope – Lilliesleaf

follows the east / north side of this into Edinburgh. Average gradients on this section are 1 in 100 Woodcote Park – tunnel entrance, 1 in 50 through tunnel and 1 in 100 tunnel exit – Millerhill.



10.7 Longnewton – Lauder

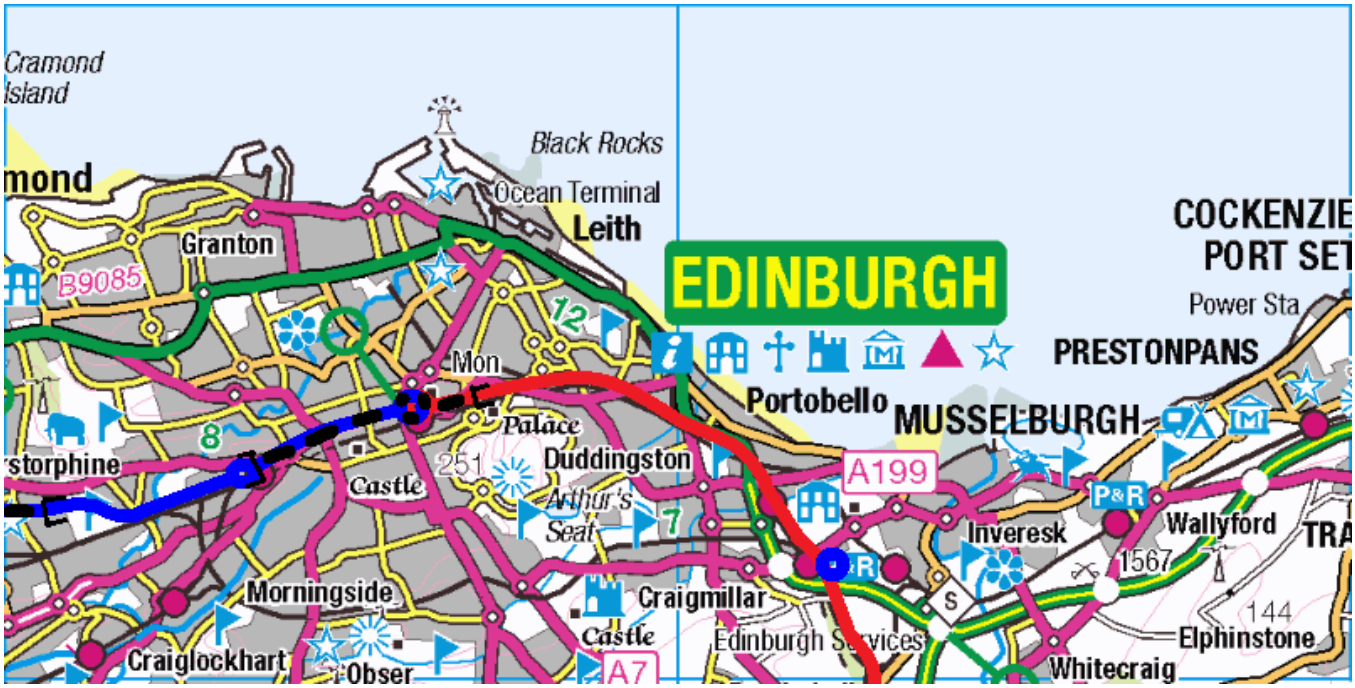
At Newcraighall, NT319708, a new station – Newcraighall HS – is provided on HS3. It is a terminal station, facing towards Edinburgh, so although accessed via HS3, cannot actually be served by HS3 (from the south). Its purpose is as an end point for the Scottish HS lines HS13 and HS14; no HS services start or terminate in Edinburgh Waverley. It is shown on the map below in blue, as an HS13 station.



10.8 Oxton – Millerhill

HS3 follows the alignment of the Waverley route, on the east / north side, into Edinburgh Waverley HS, via Protobello Junction, and with its own tunnel under Calton Hill. Initial thoughts were that the HS station would be of 4-platforms, on the north side of Waverley, underneath Princes St. This is certainly one option, though it could equally well (better!) be part of a redeveloped Waverley, keeping its overall roof but replacing everything else with 14 through platforms, on 7 islands.

Full details of these proposals, and of everything beyond Waverley, are contained in the article ‘HS Scottish Routes and Service Plans’. HS3’s services, from London (Eastbourne!) and Newcastle, continue through to Glasgow and terminate there. Refer to the Scottish article for all further information.



10.9 Newcraighall – Edinburgh

Overall Maps

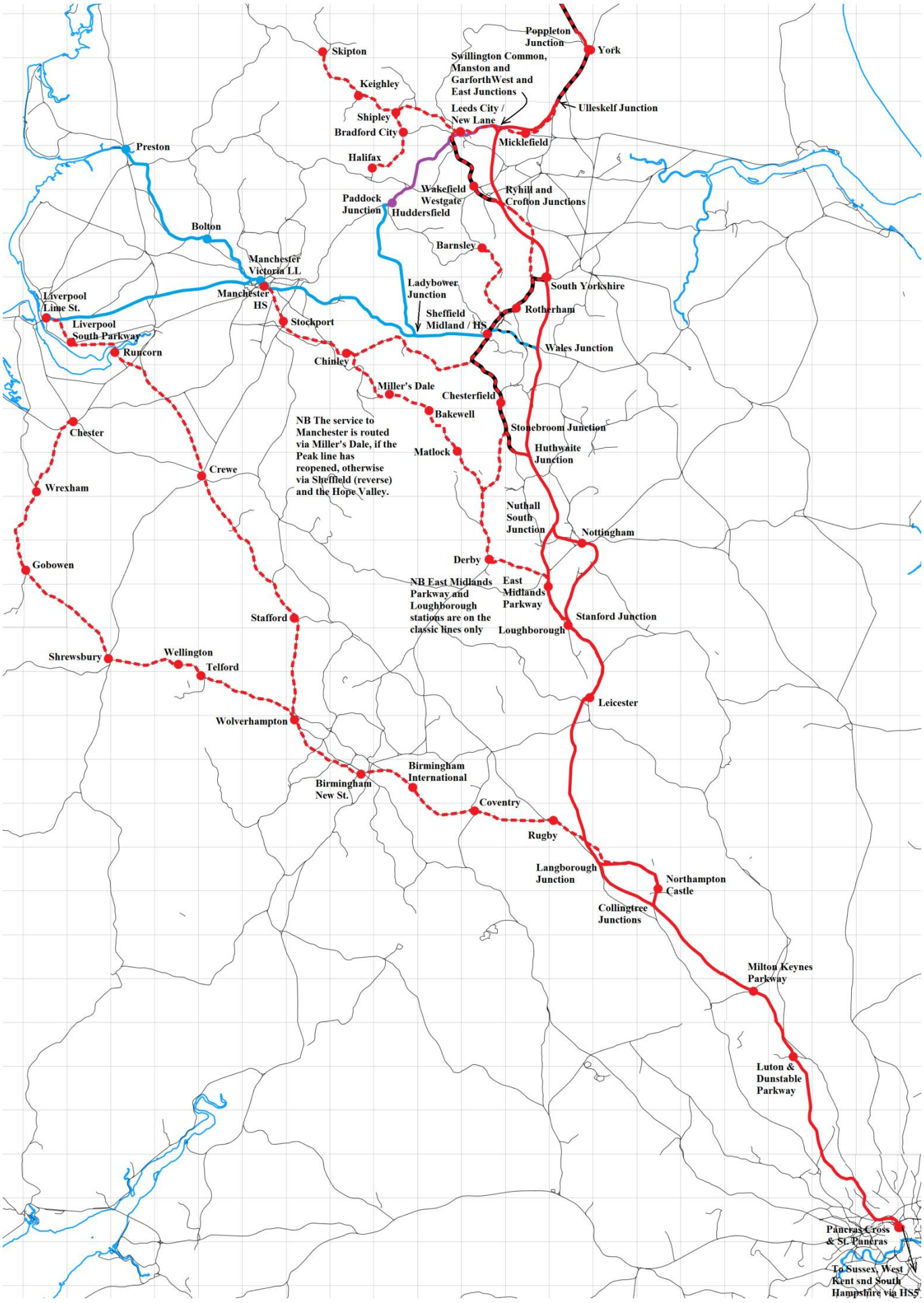
There follow maps of the overall HS3 route (and portions of other associated HS routes used by HS3's services). Those portions of the main lines of HS3 which incorporate sections of classic route, and the sections of HS3's HS-Classic services extending over classic routes beyond the HS3 main lines, are shown as dotted lines, but differently. The following schematic should clarify:

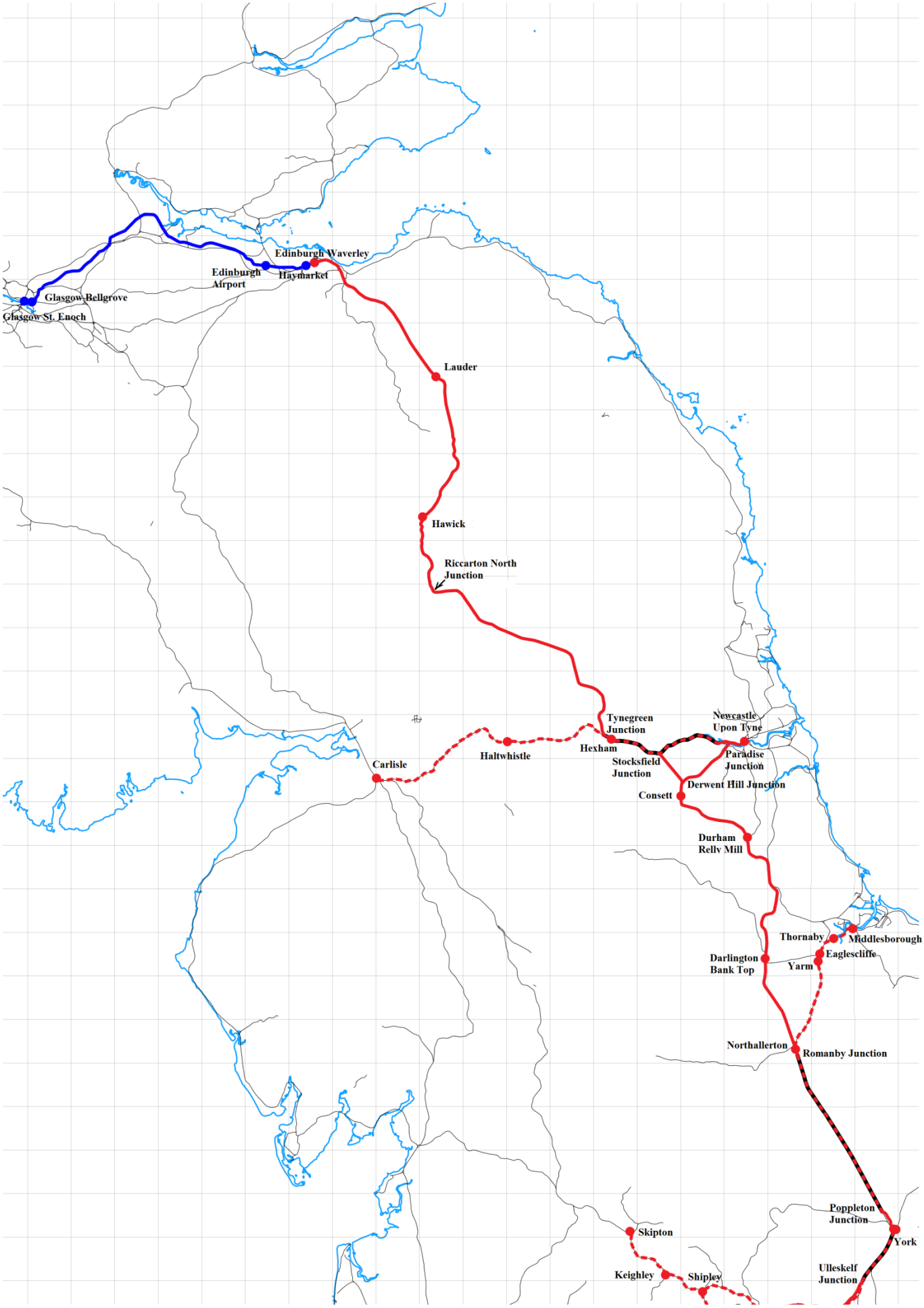
HS Line (main line - new infrastructure)

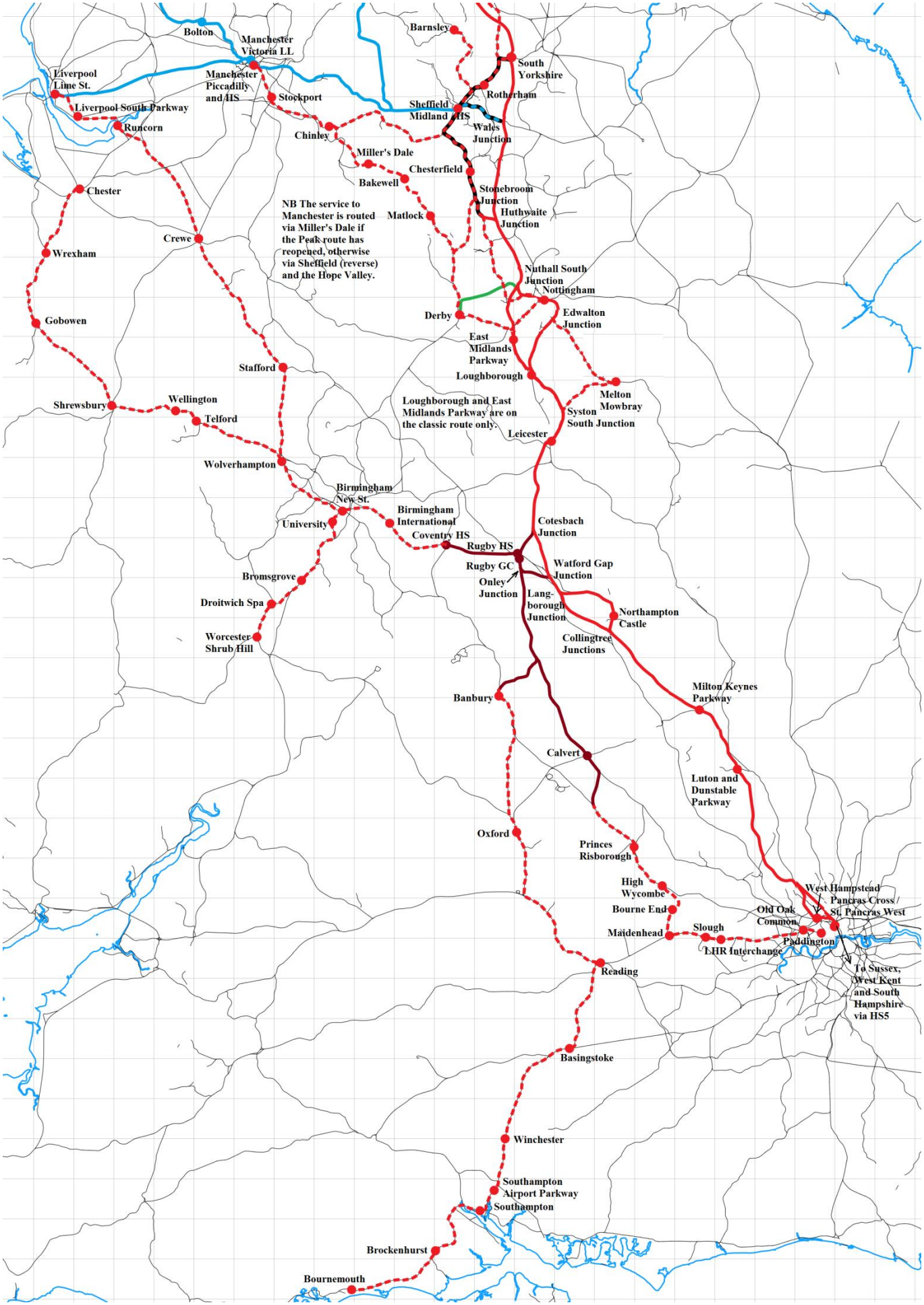
HS-Classic (classic section incorporated within HS main line)

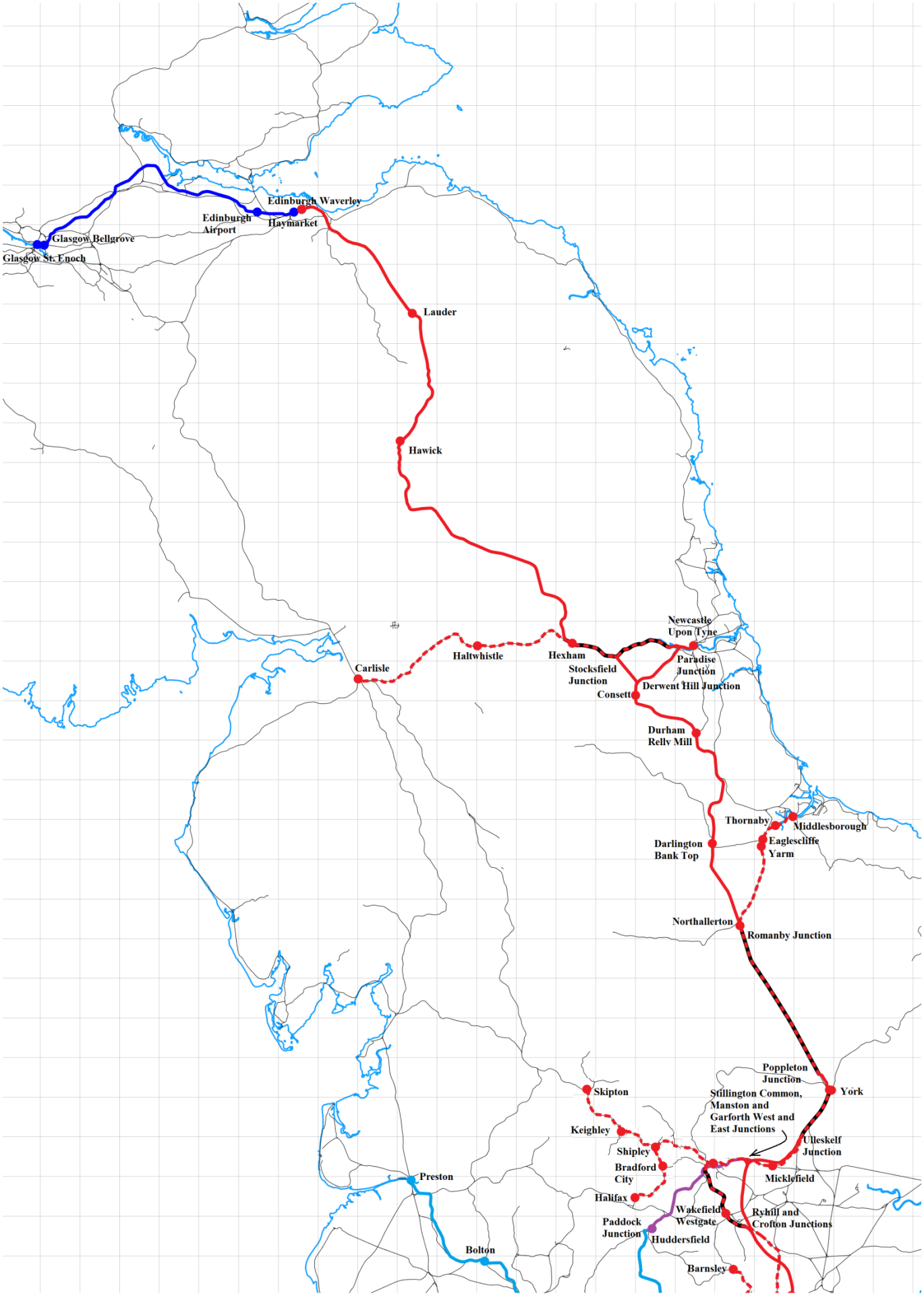
HS-Classic (HS services extending over classic lines beyond HS main line, in general as the final section of the journey, especially at the 'country end' - away from London).

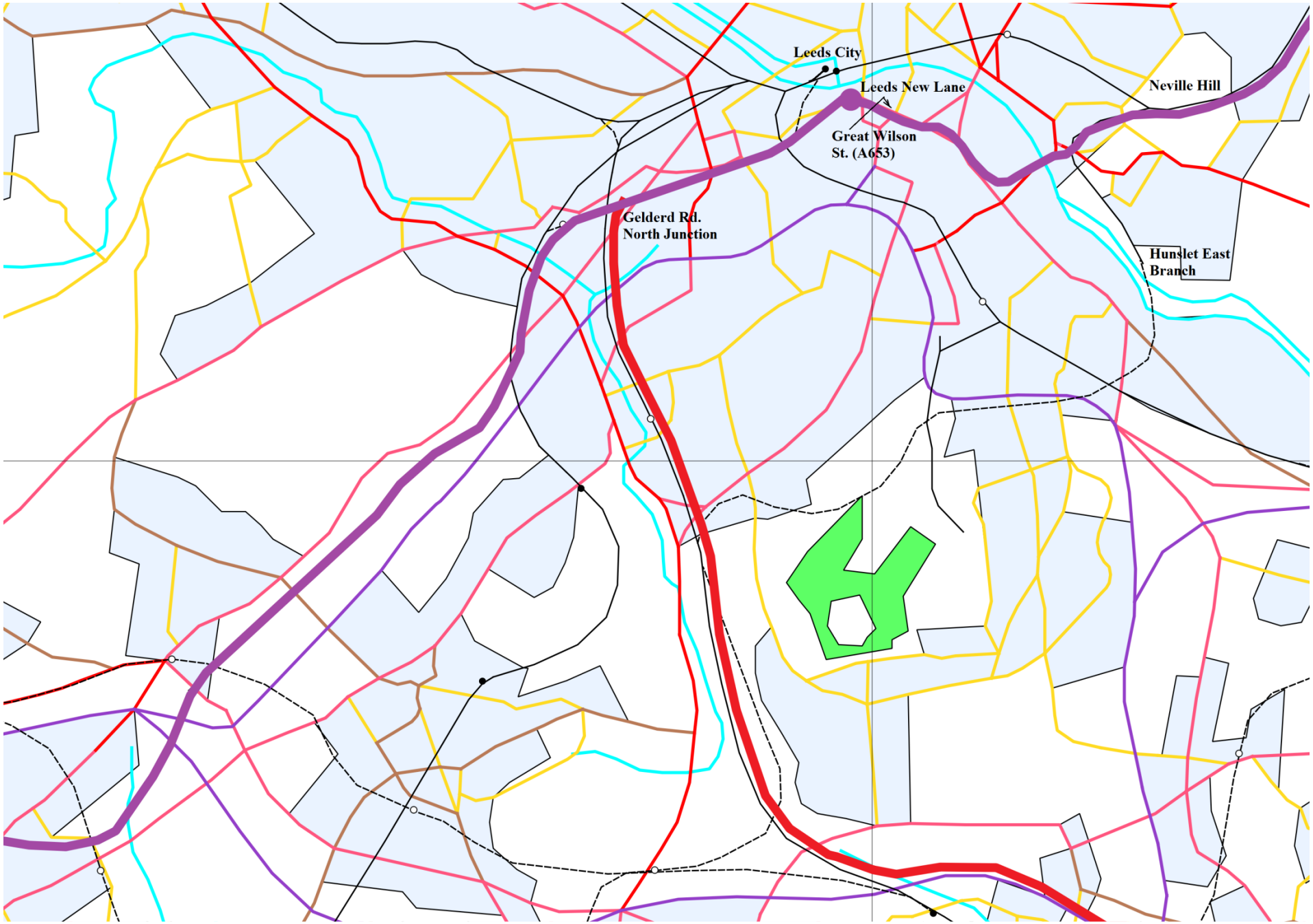
The first two maps show the HS3 routes (south and north sheets) at Mk2, but also including the newly introduced changes at Mk1A. What this means is that they includes the improved alignments south of Leicester which are part of Mk2, including the future direct route from Pancras Cross to Scratchwood Junction (though this wouldn't in fact be built until the program of quadrupling was initiated, very much later). It also shows the changed alignments, including sections of classic route incorporated into HS3, which are part of Mk1A, all of which are in fact north of Leicester. These are followed by the south sheet map of the extended HS3. (The north sheet has no changes from Mk1A.) This includes many new HS-Classic services, which are introduced to take advantage of the extra capacity made available by the quadrupling of Mk2. Next comes a large-scale map illustrating the traverse of Leeds. Finally the maps of the overall network are presented, in Mk1A and extended form. Note that these will be updated over the coming months as the various Route and Service Plans articles are reissued incorporating the Mk1A changes.

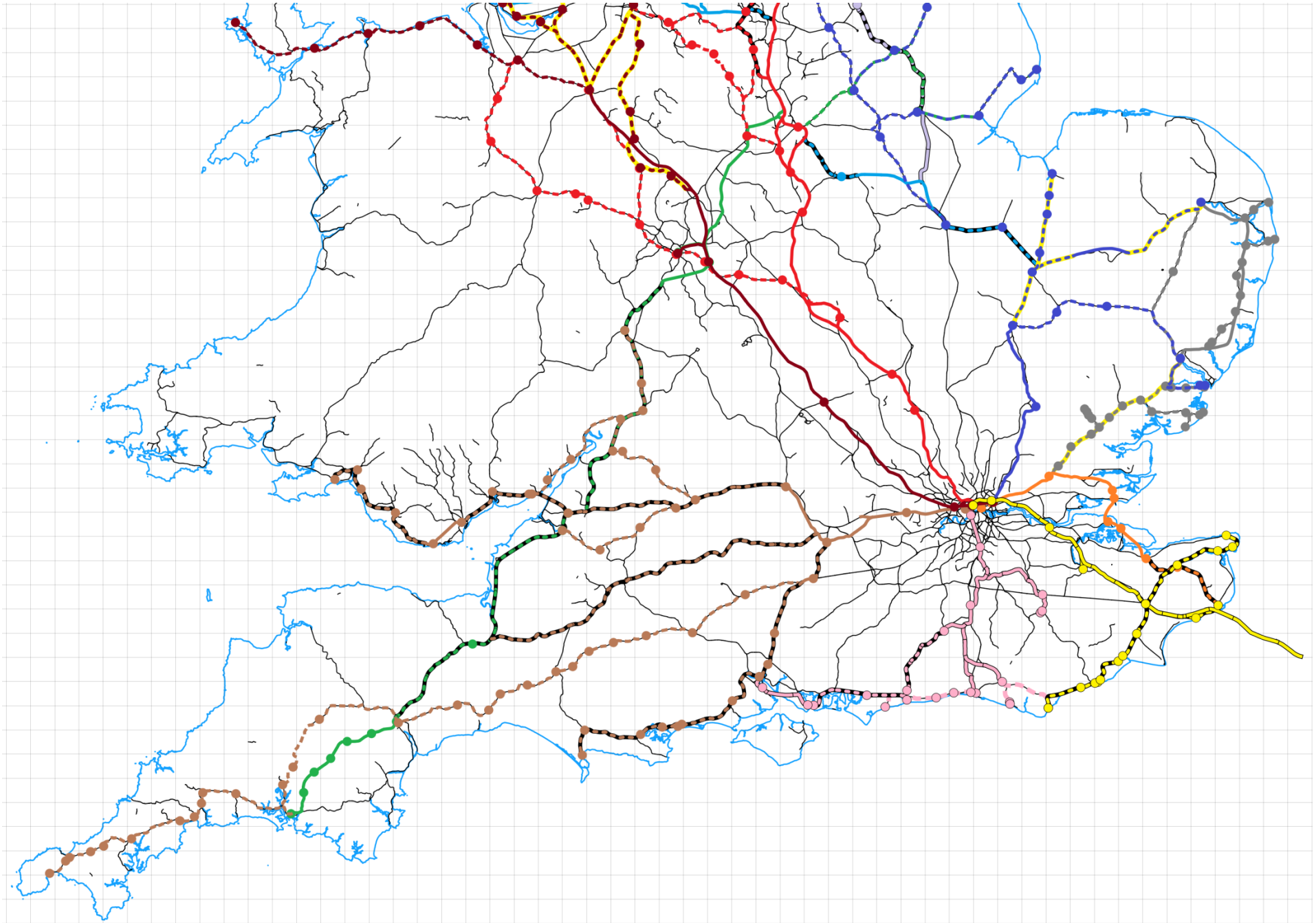




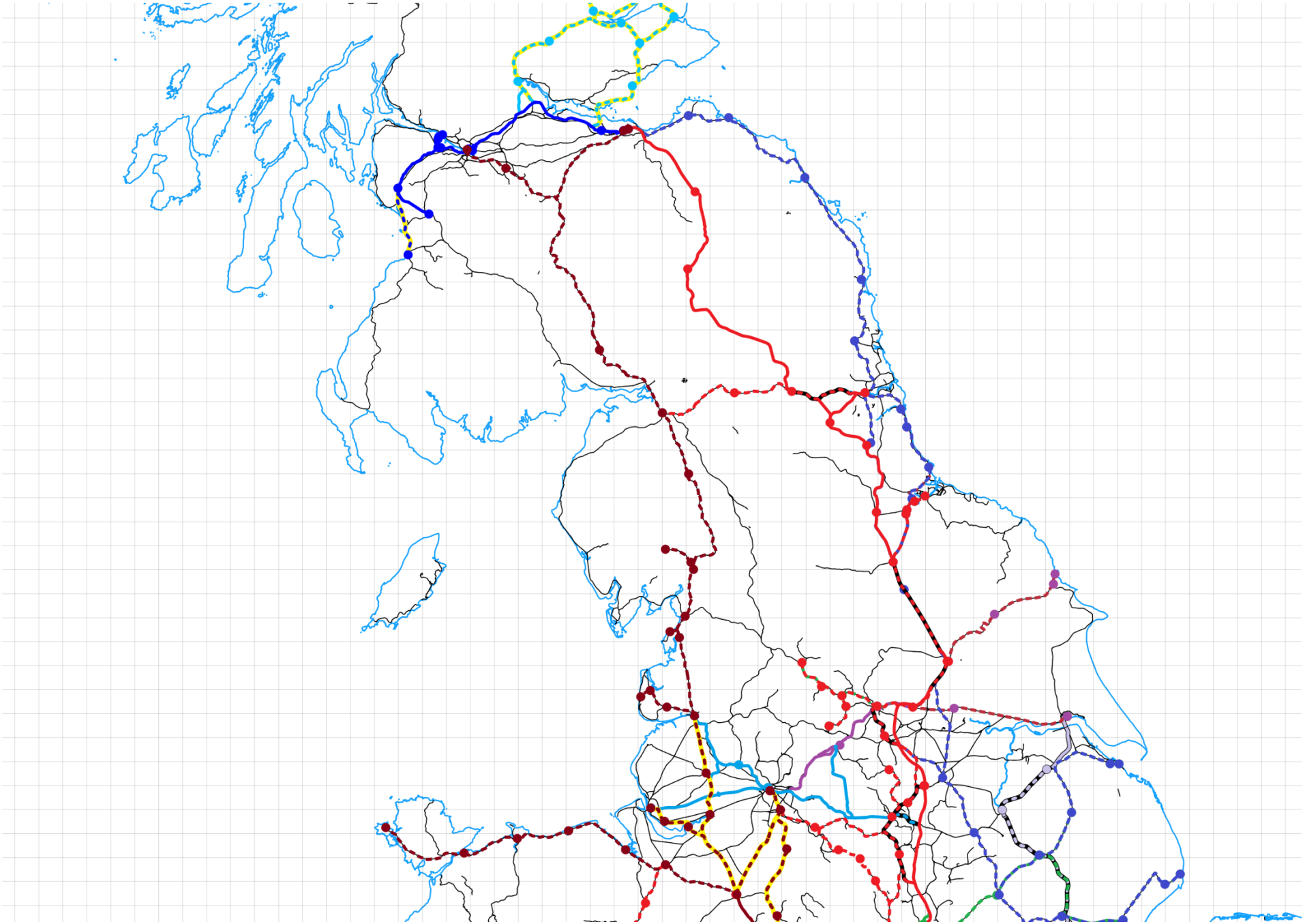


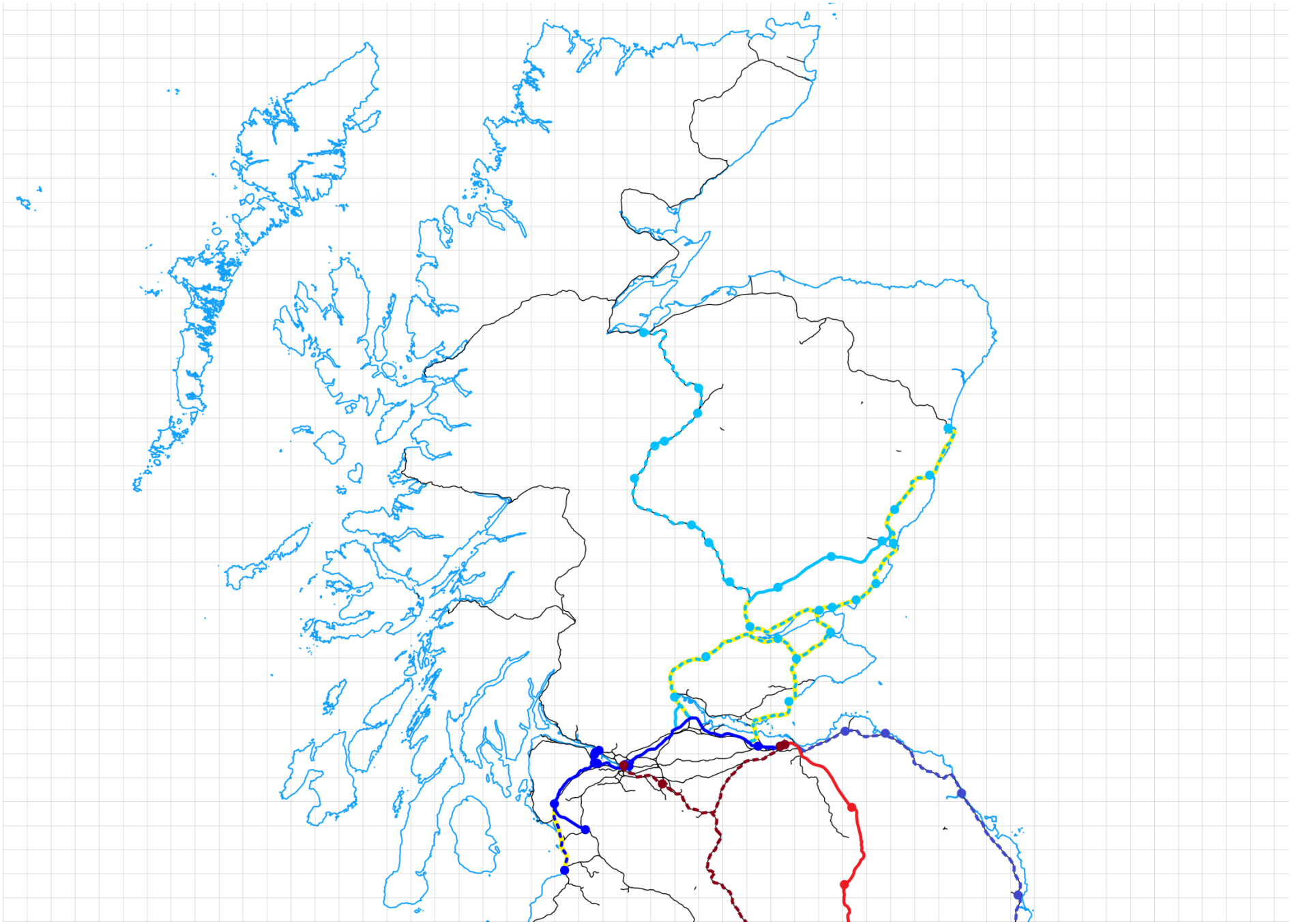


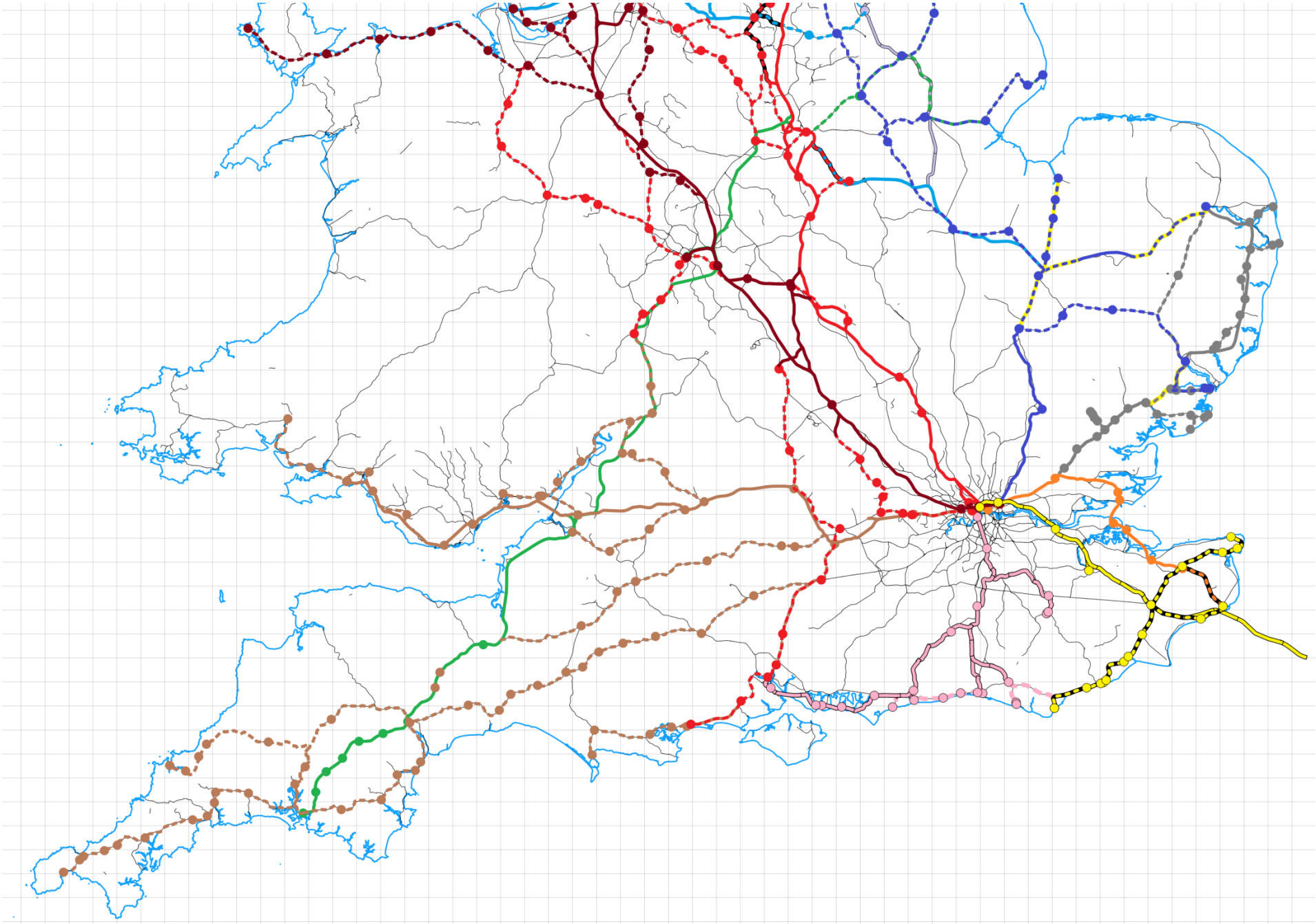


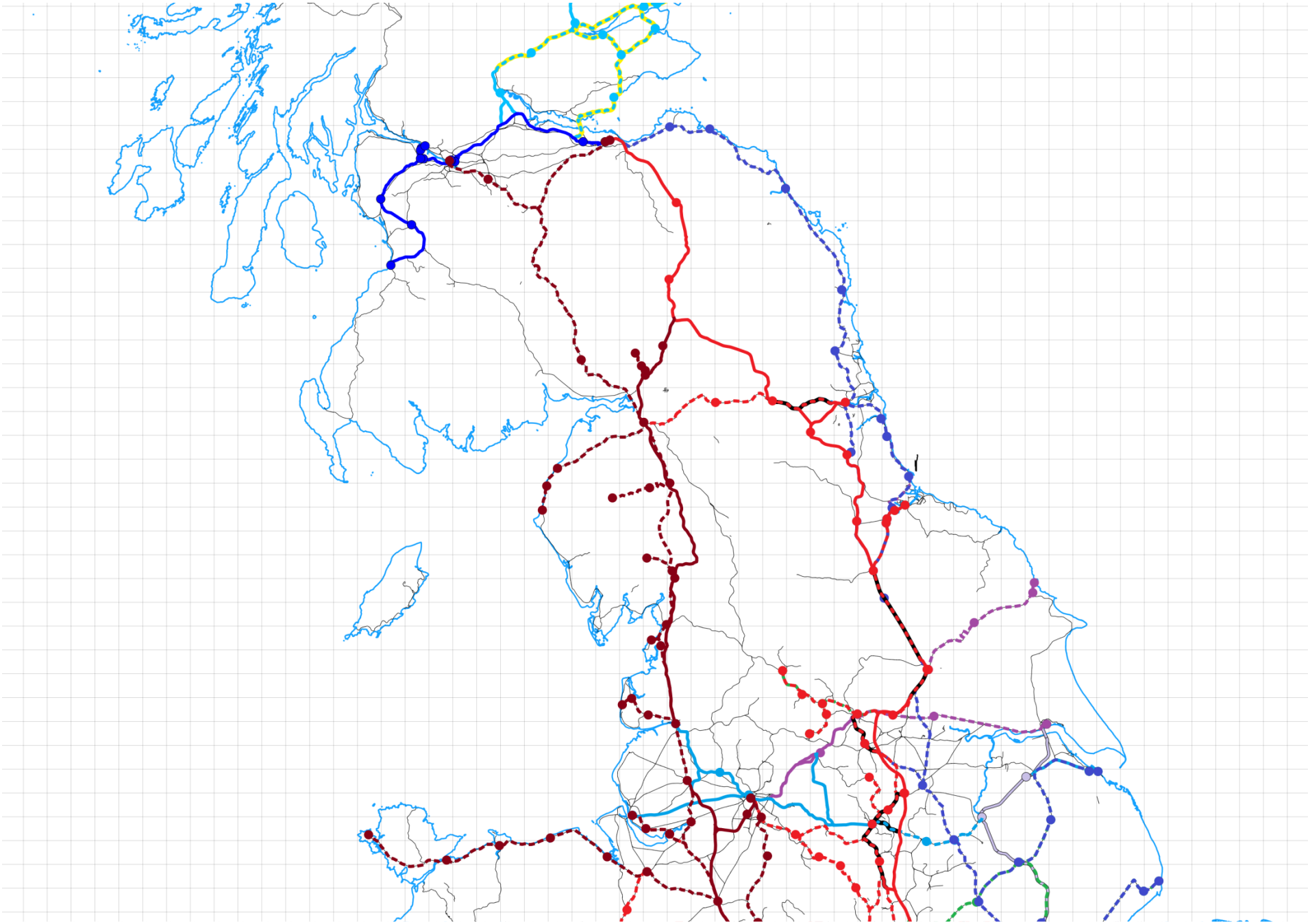


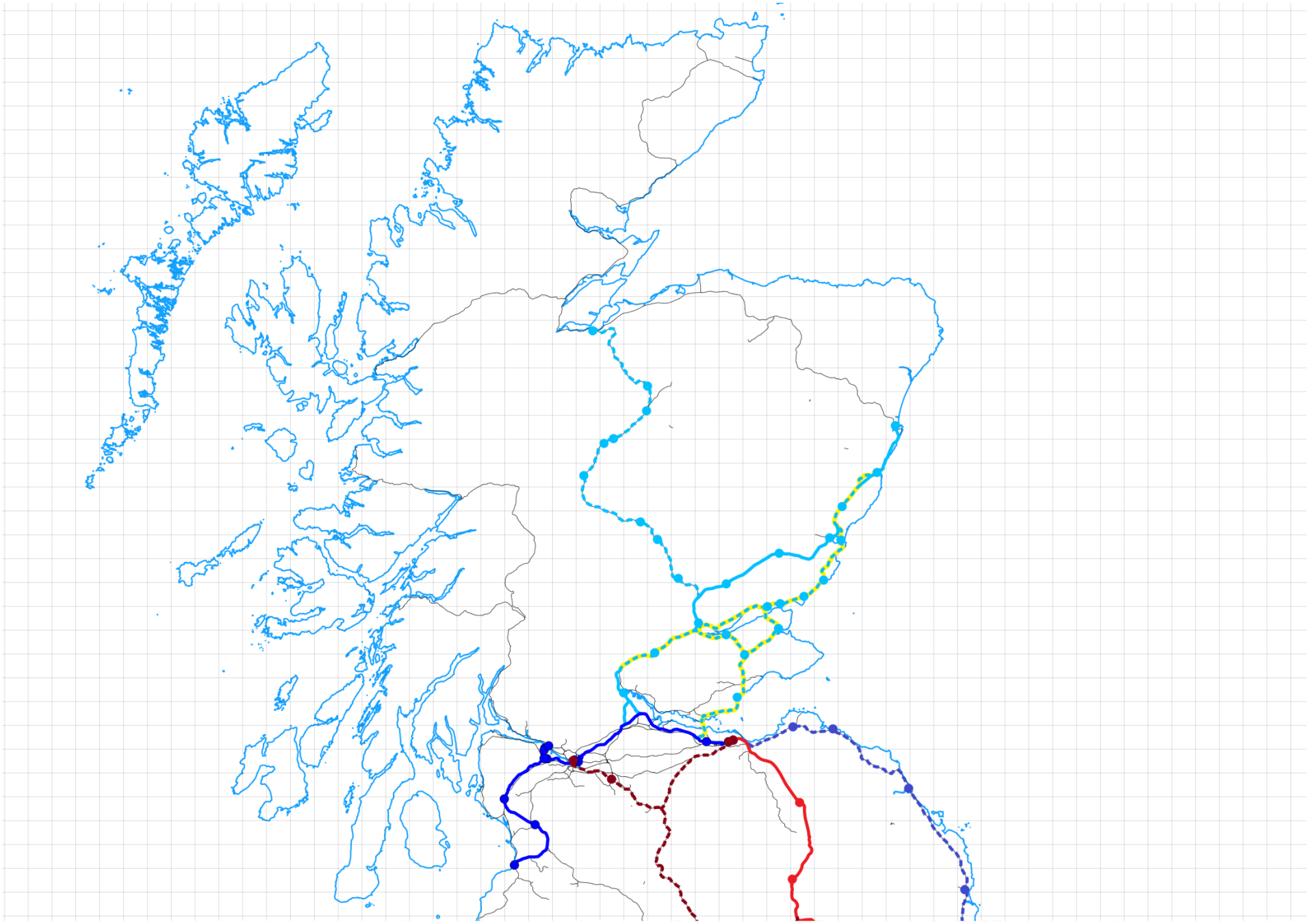
Complete HS Network, South Sheet











The Service Plans

A new service plan comes into effect when some significant change takes place which causes a change to the service loadings of one or more sections of HS3 itself. This most commonly occurs when a new section of HS3 opens, but it may also be a consequence of a change on some other HS route.

The service plans use the following notation:

- tph trains per hour
- H High Speed train – at least part of the journey being on the HS main line
- R Regional Metro train, semi-fast service
- RS Regional Metro train, stopping service (all stations)

High Speed trains invariably travel over classic lines also (even if only those sections incorporated in the HS main line). Regional Metro services generally travel their entire journey over classic lines, though this is not an absolute requirement; but if they do travel over any HS section, they must be formed of HS stock – obviously!

Occasionally other notations are used; these will be defined when used.

As was mentioned earlier, the service plans deliberately envisage maximum frequencies. The results may thus seem, at least initially, somewhat optimistic.

Service Plan 1

The first service plan comes into effect as soon as the section from West Hampstead Junction to Northampton opens. (Initially only the station loop is built at Northampton; the main line of HS3, avoiding the station, does not appear until SP3.) Only HS-classic services are involved, from St. Pancras, and these, most unusually, provide a completely new service on a classic route other that the one directly associated with HS3, specifically to Rugby, Coventry, Birmingham and stations to Liverpool and Chester. The intention is to give Coventry a good HS service (Coventry is otherwise a loser from HS2) and also to free up slots on the WCML south of Rugby. Simultaneously, the classic route form Bedford to Northampton via Olney is reopened, and the following RM services introduced / extended.

- 2tphH St. Pancras – Luton & Dunstable Parkway – Milton Keynes Parkway – Northampton – Rugby – Coventry – Birmingham Int'l – Birmingham New Street – Wolverhampton (splits/joins)– – Stafford – Crewe – Runcorn – Liverpool S. Parkway – Liverpool Lime St. – Telford – Wellington – Shrewsbury – Gobowen – Wrexham – Chester
- 2tphR St. Pancras – St. Albans – Luton Airport Parkway – Luton – Bedford – Olney – Northampton – Rugby – Coventry –Birmingham Int'l – Birmingham New Street – University – Bromsgrove – Droitwich Spa – Worcester Shrub Hill
- 2tphR (Thameslink) Brighton –> Bedford – Olney – Northampton

See also appendix G on the impact of the Coventry Variant of HS2 on these services.

Service Plan 1A

This is also the first service plan, but comes into effect shortly afterwards, when the section from Northampton to Leicester opens. Again, only HS-classic services from St. Pancras are involved, and the new ones do indeed replace the classic services to Sheffield and Manchester on the associated classic route. The RM services on the classic route are included, for completeness.

- 2tphH St. Pancras– Luton & Dunstable Parkway – Milton Keynes Parkway – Northampton – Rugby – Coventry – Birmingham International – Birmingham New Street – Wolverhampton –> Liverpool/Chester
- 2tphH St. Pancras– Luton & Dunstable Parkway – Milton Keynes Parkway – Northampton – Leicester – Loughborough – Derby – Chesterfield – Sheffield – Rotherham – Wakefield Westgate – Leeds City – Micklefield – York
- 2tphH St. Pancras– Luton & Dunstable Parkway – Milton Keynes Parkway – Northampton – Leicester – East Midlands Parkway – Derby – Matlock – Bakewell – Miller's Dale (from/to Buxton) – Chinley – Stockport – Manchester Piccadilly (alternatively: – Derby – Chesterfield – Sheffield (reverse) – Chinley – if the Peak route has not yet been reopened.)
- 2tphR St. Pancras – St. Albans – Luton & Dunstable Parkway – Luton – Bedford – Wellingborough – Kettering – Market Harborough – Leicester – Loughborough – Attenborough – Beeston – Nottingham
- 2tphR St. Pancras – St. Albans – Luton & Dunstable Parkway – Luton – Bedford – Wellingborough – Kettering – Market Harborough – Leicester – East Midlands Parkway – Attenborough – Beeston – Nottingham
- 2tphR St. Pancras – St. Albans – Luton & Dunstable Parkway – Luton – Bedford – Wellingborough – Kettering – Corby
- 2tphR St. Pancras – St. Albans – Luton Airport Parkway – Luton – Bedford – Olney – Northampton – Rugby – Coventry – Birmingham Int'l – Birmingham New St. – University – Bromsgrove – Droitwich Spa – Worcester Shrub Hill.
- 2tphR (Thameslink) Brighton –> Bedford – Olney – Northampton

With this service plan, Loughborough, East Midlands Parkway, Derby, Chesterfield, Sheffield, Rotherham, Wakefield and Leeds all retain their existing services to St. Pancras, at the same or better frequencies, but somewhat faster, and Matlock, Bakewell, Miller's Dale, Buxton and Chinley have their former services restored, but much, much improved. (This assumes that the Peak route has by then been reopened. If this is not the case, then the Manchester service travels from Derby to Chinley via Sheffield, with a reversal at Sheffield.)

Representative Hourly Non-Cross-Platform Interchange Pattern at Bedford:

00R St. Pancras – Corby
R (Thameslink) Brighton –> Northampton

07R St Pancras – Nottingham
(no connection)

15R St. Pancras – Birmingham New St. – Worcester
R (Thameslink) Gatwick Airport –> Bedford

23R St Pancras – Nottingham
(no connection)

– repeating at 30, 37, 45 and 53 minutes past.

Representative Hourly Interchange Pattern at Northampton (not cross-platform):

00H St. Pancras – Wolverhampton –> Liverpool / Chester
R (Thameslink) Brighton –> Northampton
R Euston – Rugby

07H St. Pancras – Derby – Sheffield – York
R Euston – Birmingham New St.

15R St. Pancras – Birmingham New St. – Worcester
R Euston – Rugby

23H St. Pancras – Derby – Matlock (or Sheffield) – Manchester
(no connection at this SP)

– repeating at 30, 37, 45 and 53 minutes past.

Representative Hourly Cross-Platform Interchange Pattern at Leicester:

00R St. Pancras – East Midlands Parkway – Nottingham
H St. Pancras – Loughborough – Derby – Sheffield –York

15H St. Pancras – East Midlands Parkway – Derby – Matlock (or Sheffield) – Manchester
R St. Pancras – Loughborough – Nottingham

– repeating at 30 and 45 minutes past. Note that these services depart in the order stated, thus the RM St. Pancras – Nottingham service, calling at East Midlands Parkway (but not Loughborough) departs before the HS-Classic St. Pancras – York service, calling at Loughborough (but not East Midlands Parkway). This ensures that Loughborough and East Midlands Parkway stations each have 4tph, alternatively to Derby and points north, or to Nottingham, but no HS-Classic or RM train serves both. (There is a stopping service between Leicester and Derby, which does.)

Service Plan 1 overall imposes the following loadings on HS3:

- Pancras Cross – Canley St. Junction 0tph
- Canley St. Junction – West Hampstead Junction 0tph
- St. Pancras – West Hampstead Junction 14tph
- West Hampstead Junction – Scratchwood Junction 6tph
- Canley St. Junction – Scratchwood Junction 0tph
- Scratchwood Junction – Collingtree Junctions 6tph
- Collingtree Junctions – Northampton Castle station 6tph
- Northampton Castle station – Langborough Junction 4tph
- Collingtree Junctions – Langborough Junction 0tph
- Langborough Junction – Watkin Road Junction 4tph
- Watkin Rd. Junction – Humberstone Rd. Junction (main line) 0tph
- Watkin Rd. Junction – Regent St. Junction 4tph

- Regent St Junction – Swain St. Junction 4tph *
- Swain St. Junction – Humberstone Rd. Junction 0tph
- Humberstone Rd. Junction – Stanford Junction 0tph
- Stanford Junction – Nuthall South Junction (main line) 0tph
- Stanford Junction – Edwalton Junction 0tph
- Edwalton Junction – Manvers St. Junction 0tph
- Manvers St. Junction – Nottingham station 0tph
- Nottingham station – Strelley Junction 0tph
- Awsworth Junction – Strelley Junction 0tph
- Strelley Junction – Nuthall South Junction 0tph
- Nuthall South Junction – Nuthall North Junction 0tph
- Awsworth Junction – Nuthall North Junction 0tph
- Nuthall North Junction – Huthwaite Junction 0tph
- Huthwaite Junction – Stonebroom Junction 0tph
- Stonebroon Junction – Old Denaby Junction 0tph *
- Old Denaby Junction – South Yorkshire LL station 0tph *
- Old Denaby Junction – Denaby Main Junction 0tph
- Huthwaitee Junction – Wales Junction 0tph
- Wales Junction – Waleswood Junction 0tph
- Wales Junction – Denaby Main Junction 0tph
- Denaby Main Junction – Ryhill Junction 0tph
- Ryhill Junction – Croton Junction 0tph
- Crofton Junction – Gelderd Road South Junction 0tph *
- Gelderd Road South Junction – Gelderd Road North Junction 0tph
- Ryhill Junction – Swillington Common Junction 0tph
- Swillington Common Jn. – Manston Junction 0tph
- Swillington Common Jn. – Garforth East Junction 0tph
- Gelderd Road North Junction – Garforth West Junction 0tph
- Garforth West Junction – Micklefield HS Junction 0tph
- Garforth West Junction – Garforth East Junction 0tph
- Garforth East Junction – Ulleskelf Junction 0tph
- Ulleskelf Junction – York HS station 0tph *
- York HS station – Poppleton Junction 0tph
- Poppleton Junction – Romanby Junction 0tph *
- Northallerton – Derwent Hill Junction 0tph
- Derwent Hill Junction – Paradise Junction 0tph
- Derwent Hill Junction – Stocksfield 0tph
- Newcastle – Paradise Junction 0tph
- Paradise Junction – Bladon East Junction 0tph
- Bladon East Junction – Stocksfield Junction 0tph *
- Stocksfield Junction – Tynegreen Junction 0tph *
- Tynegreen Junction – Hawick 0tph
- Hawick – Ravenswood Junction 0tph
- Ravenswood Junction – Newcraighall 0tph

- Newcraighall – Edinburgh 0tph

Those sections marked * give only the HS loadings. They are sections of classic track, incorporated in the HS line, and carry classic traffic also.

Service Plan 2

There is a long hiatus before the next section of HS3 opens. It actually opens as part of HS7's extension from Birmingham (Water Orton North Junction) to Leeds and York, HS3 providing the section from Nottingham station to Nuthall North Junction, where HS7 joins, and onwards to the north (including the links to and from the classic line through Sheffield Midland). HS7 also provides the link between Awsworth Junction and Strelley Junction, so its services can reach Nottingham. At the same time, the first section of HS9 opens, between Gelderd Rd. North Junction and Garforth East Junction (and between Garforth West Junction and Micklefield Junction), so, from the beginning, HS services can reach York either directly or via Leeds. (This is HS7 SP3 and HS8/9 SP0A.)

SP2 is not actually a service plan, as far as HS3 is concerned, since no new HS3 services are involved, but it does involve a change to the route loadings, due entirely to HS7. It also involves changes to the interchange patterns.

The HS7 services north of Birmingham are:

- 2tphH Plymouth – Exeter St. David's – Taunton – Bristol Temple Meads HS – Bristol Parkway HS – Cheltenham Spa – Worcester Shrub Hill – Birmingham Interchange – Derby – South Yorkshire – Leeds HS – York
- 2tphH Cardiff HS – Bristol Parkway HS – Cheltenham Spa – Worcester Shrub Hill – Birmingham Interchange – Derby – Nottingham
- 2tphH Birmingham HS – Derby – South Yorkshire – Wakefield Westgate – Leeds HS – York
- 2tphH Birmingham HS – Derby – Chesterfield – Sheffield Midland – South Yorkshire HL – Leeds City (splits / joins) – :
  – Shipley – Bradford City – Halifax
  – Shipley – Keighley – Skipton
- 2tphH Birmingham HS – Derby – Nottingham – Newark Castle – Lincoln Central – Market Rasen – Grimsby Town – Cleethorpes
- 2tphH Birmingham HS – Derby – Nottingham – Newark Castle – Lincoln Central – Sleaford – Boston – Wainfleet – Skegness

The following Regional Metro services are introduced / exist already:

- 2tphR Bournemouth West – Bournemouth Central – Brockenhurst – Southampton – Southampton Airport Parkway – Winchester – Basingstoke – Reading – Oxford – Banbury – Leamington Spa – Kenilworth – Coventry – Birmingham Int'l – Birmingham New St. (reverse) – Tamworth – Burton-on-Trent – Derby – Chesterfield – Sheffield – Rotherham – Wakefield Westgate – Leeds City – Micklefield – York
- 2tphR Plymouth – Ivybridge – Totnes – Newton Abbot – Teignmouth – Dawlish – Exeter St. David's – Cullompton – Tiverton Junction – Taunton – Bridgwater – Highbridge – Weston Super

Mare – Bristol Temple Meads – Bristol Parkway – Gloucester (reverse) – Cheltenham Spa – Ashchurch – Worcester Shrub Hill – Droitwich Spa – Bromsgrove – University – Birmingham New St. – Tamworth – Burton on Trent – Derby – Chesterfield – Sheffield – Rotherham – Wakefield Westgate – Leeds City – Micklefield – York

Representative Hourly (non-cross-platform) Interchange Pattern at Derby:

00H HS7 Plymouth – York
R Bournemouth West – York

05H HS7 Birmingham – York
H St. Pancras – Manchester

10H HS7 Birmingham – Cleethorpes
(no connection)

15H HS4/HS7 Cardiff – Nottingham
R Plymouth – York

20H HS7 Birmingham – Halifax / Skipton
H St. Pancras – York

25H HS7 Birmingham – Skegness
(no connection)

– repeating at 30, 35, 40, 45, 50 and 55 minutes past.

Service Plan 2A

This service plan comes into effect when HS3 (as HS7) opens from York to Newcastle, HS8 opens from (Liverpool –) Kenyon West Junction and Preston to Sheffield HS and Wales Junction, and HS9 opens from (Liverpool / Preston –) Guide Bridge HS Junction to Gelderd Rd. North Junction. As with SP2, this is not really a service plan as far as HS3 is concerned, since no new HS3 services are involved, but it does involve a change to the loadings, due to HS7, HS8 and HS9. It also involves changes to the interchange patterns.

This is a very significant event, of course. Darlington station is rebuilt to give interchange between HS3 (HS7) and the Tees Valley Metro. Durham is served by the new Relly Mill station, and Consett station opens. (This is HS7 SP3A and HS8/9 SP0A, still.)

HS7's service from Plymouth is extended:

- 2tphH Plymouth – Exeter St. David's – Taunton – Bristol Temple Meads HS – Bristol Parkway HS – Cheltenham Spa – Worcester Shrub Hill – Birmingham Interchange – Derby – South Yorkshire – Leeds HS – York HS – Darlington – Durham (Relly Mill) – Consett – Newcastle

The other services are unaffected.

The services on HS8 are:

- 2tphH Preston – Bolton – Manchester Victoria (LL) – Manchester HS – Sheffield HS – Nottingham

The services on HS9 are:

- 2tphH Liverpool Lime St. – Manchester Victoria (LL) – Manchester HS – Huddersfield – Leeds HS – York HS (splits / joins) – :
  – Darlington – Durham (Relly Mill) – Consett – Newcastle
  – Northallerton – Yarm – Eaglescliffe – Thornaby – Middlesborough
- 2tphH Liverpool Lime St. – Manchester Victoria (LL) – Manchester HS – Huddersfield – Leeds HS – Micklefield – York – Thirsk – Northallerton – Yarm – Eaglescliffe – Stockton – Hartlepool – Seaham – Sunderland – Newcastle
- 2tphH Preston – Bolton – Manchester Victoria (LL) – Manchester HS – Huddersfield – Leeds HS – Micklefield – Selby – Hull
- 2tphH Preston – Bolton – Manchester Victoria (LL) – Manchester HS – Huddersfield – Leeds HS – Micklefield – York – Malton – Seamer – Scarborough

A new Regional Metro service is introduced on the ECML:

- 2tphR York – Thirsk – Northallerton – Darlington – Durham – Chester le Street – Newcastle – Morpeth – Alnmouth – Berwick-upon-Tweed – Dunbar – Drem – Edinburgh Waverley

The Tees Valley Metro may or may not have been in service previously:

- 2tphRS Bishop Auckland – Shildon – Newton Aycliffe – Heighington –North Road – Darlington – Dinsdale – Tees-Side Airport – Allen's West – Eaglescliffe – Thornaby – Middlesborough – British Steel (Redcar) – Redcar Central – Redcar East – Marske – Saltburn

Representative Hourly Cross-Platform Interchange Pattern at Darlington:

00H Plymouth – Newcastle
RS Bishop Auckland – Middlesborough – Saltburn

15H Liverpool – Newcastle
RS Bishop Auckland – Middlesborough – Saltburn

– repeating at 30 and 45 minutes past.

Representative Hourly Cross-Platform Interchange Pattern at Newcastle:

00R Plymouth – Newcastle
R York – Edinburgh

– repeating at 30 minutes past.

Adding the new services introduced in the several stages of service plan 2 to those of plan 1 imposes the following loadings on HS3:

- Pancras Cross – Canley St. Junction 0tph
- Canley St. Junction – West Hampstead Junction 0tph

- St. Pancras – West Hampstead Junction 14tph
- West Hampstead Junction – Scratchwood Junction 6tph
- Canley St. Junction – Scratchwood Junction 0tph
- Scratchwood Junction – Collingtree Junctions 6tph
- Collingtree Junctions – Northampton Castle station 6tph
- Northampton Castle station – Langborough Junction 4tph
- Collingtree Junctions – Langborough Junction 0tph
- Langborough Junction – Watkin Road Junction 4tph
- Watkin Rd. Junction – Humberstone Rd. Junction (main line) 0tph
- Watkin Rd. Junction – Regent St. Junction 4tph
- Regent St Junction – Swain St. Junction 4tph *
- Swain St. Junction – Humberstone Rd. Junction 0tph
- Humberstone Rd. Junction – Stanford Junction 0tph
- Stanford Junction – Nuthall South Junction (main line) 0tph
- Stanford Junction – Edwalton Junction 0tph
- Edwalton Junction – Manvers St. Junction 0tph
- Manvers St. Junction – Nottingham station 0tph
- Nottingham station – Strelley Junction 8tph
- Awsworth Junction – Strelley Junction 6tph
- Strelley Junction – Nuthall South Junction 2tph
- Nuthall South Junction – Nuthall North Junction 2tph
- Awsworth Junction – Nuthall North Junction 6tph
- Nuthall North Junction – Huthwaite Junction 8tph
- Huthwaite Junction – Stonebroom Junction 2tph
- Stonebroon Junction – Old Denaby Junction 2tph *
- Old Denaby Junction – South Yorkshire LL station 0tph *
- Old Denaby Junction – Denaby Main Junction 2tph
- Huthwaite Junction – Wales Junction 6tph
- Wales Junction – Waleswood Junction 2tph
- Wales Junction – Denaby Main Junction 4tph
- Denaby Main Junction – Ryhill Junction 6tph
- Ryhill Junction – Croton Junction 4tph
- Crofton Junction – Gelderd Road South Junction 4tph *
- Gelderd Road South Junction – Gelderd Road North Junction 4tph
- Ryhill Junction – Swillington Common Junction 2tph
- Swillington Common Jn. – Manston Junction 2tph
- Swillington Common Jn. – Garforth East Junction 0tph
- Gelderd Road North Junction – Garforth West Junction 12tph
- Garforth West Junction – Micklefield HS Junction 6tph
- Garforth West Junction – Garforth East Junction 6tph
- Garforth East Junction – Ulleskelf Junction 6tph
- Ulleskelf Junction – York HS station 6tph *
- York HS station – Poppleton Junction 8tph
- Poppleton Junction – Romanby Junction 8tph *

- Romanby Junction – Derwent Hill Junction 4tph
- Derwent Hill Junction – Paradise Junction 0tph
- Derwent Hill Junction – Stocksfield 0tph
- Newcastle – Paradise Junction 4tph
- Paradise Junction – Bladon East Junction 0tph
- Bladon East Junction – Stocksfield Junction 0tph *
- Stocksfield Junction – Tynegreen Junction 0tph *
- Tynegreen Junction – Hawick 0tph
- Hawick – Ravenswood Junction 0tph
- Ravenswood Junction – Newcraighall 0tph
- Newcraighall – Edinburgh 0tph

Those sections marked * give only the HS loadings. They are sections of classic track, incorporated in the HS line, and carry classic traffic also.

At this stage, no services are using the section between Swillington Common Junctio and Garforth East Junction – all are travelling via Leeds.

Service Plan 3

This service plan comes into effect when HS3 opens from Pancras Cross to West Hampstead Junction, the section of main line avoiding Northampton station, and from Leicester to Nuthall South Junction and Nottingham, and HS8 opens between Ladybower Junction and Paddock Junction. Five category1 HS services are introduced, to Newcastle and Middlesborough, to Manchester and Liverpool via Sheffield, to York via Leeds, to Halifax and Skipton via Leeds and to South Yorkshire. HS Metro services are introduced to York and Preston. In addition, the classic route between Melton Mowbray and Nottingham reopens, and the St. Pancras – Corby service is extended to York.

With the opening of HS8 between Ladybower Junction and Paddock Junction, HS7's services to York and Newcastle are rerouted via Sheffield HS and Huddersfield. (This is HS8/9 SP2 and HS7 SP4.)

HS3 Long Distance UHS:

- 2tphH Pancras Cross – South Yorkshire – York HS (splits / joins) – :
  - Darlington – Durham (Relly Mill) – Consett – Newcastle
  – Northallerton – Yarm – Eaglescliffe – Thornaby – Middlesborough
- 2tphH Pancras Cross – South Yorkshire HL – Wakefield Westgate – Leeds HS – York HS
- 2tphH Pancras Cross – South Yorkshire HL – Leeds City (splits / joins) – :
  – Shipley – Bradford City – Halifax
  – Shipley – Keighley – Skipton
- 2tphH Pancras Cross – Sheffield HS – Manchester HS – Victoria LL – Liverpool Lime St.
- 2tphH Pancras Cross – Chesterfield – Sheffield Midland (splits / joins) – :
  – Rotherham – South Yorkshire LL
  – Barnsley

HS3 Metro:

- 2tphH Pancras Cross – Luton & Dunstable Parkway – Milton Keynes Parkway – Northampton – Leicester – Nottingham – Sheffield HS – Huddersfield – Leeds HS – York HS
- 2tphH Pancras Cross – Luton & Dunstable Parkway – Milton Keynes Parkway – Northampton – Leicester – Nottingham – Sheffield HS – Manchester HS – Manchester Victoria (LL) – Bolton – Preston

Regional Metro:

- 2tphR St. Pancras – St. Albans – Luton Airport Parkway – Luton – Bedford – Wellingborough – Kettering – Corby – Oakham – Melton Mowbray – Nottingham – Langley Mill – Alfreton & Mansfield Parkway – Chesterfield – Sheffield – Rotherham – Pontefract – York.
- 2tphR Worcester Shrub Hill – Droitwich Spa – Bromsgrove – University – Birmingham New St. – Coleshill Parkway – Nuneaton – Hinckley – Leicester – Melton Mowbray – Oakham – Stamford – Peterborough – March – Ely – Bury St. Edmunds – Ipswich – Harwich International – Harwich Town

There are new interchange facilities at Leicester, between the HS Metro service to Preston and the above Regional Metro service from Birmingham to Harwich, and at Nottingham, between the HS Metro service to York via Leeds, and the Regional Metro service from St. Pancras to York via Melton Mowbray.

Representative Hourly Cross-Platform Interchange Pattern at Leicester:

00R St. Pancras – East Midlands Parkway – Nottingham
H St. Pancras – Loughborough – Derby – Sheffield –York

07H Pancras Cross – York
(no connection)

15H St. Pancras – East Midlands Parkway – Derby – Matlock (or Sheffield) – Manchester
R St. Pancras – Loughborough – Nottingham

23H Pancras Cross – Preston
R Harwich Town – Worcester Shrub Hill

– repeating at 30, 45 and 53 minutes past.

Representative Hourly Cross-Platform Interchange Pattern at Nottingham:

00H Pancras Cross – Leeds (HS Metro)
R St. Pancras – Melton Mowbray – York

– repeating at 30 minutes past.

This service plan imposes an additional load on HS3 of 16tph between Pancras Cross and Watkin Rd. Junction, 12tph between Watkin Rd. Junction and Nuthall South Junction (main line), 4tph between Watkin Rd. Junction and Nuthall South Junction (Leicester station and Nottingham branches), 16tph between Nuthall South Junction and Huthwaite Junction, 14tph between Huthwaite and Wales Junctions, and 4, 6 or 8 elsewhere. (The loading between Wales Junction and Gelderd Rd. North Junction is reduced by a net 2tph because the HS7 services to York and Newcastle / Middlesborough now run via Sheffield

HS and Huddersfield.) Additionally the restored classic service via Melton Mowbray imposes 2tph between Edwalton and Manvers St. Junctions.

Service Plan 3A

This service plan comes into effect when HS3 opens between Derwent Hill Junction and Edinburgh, and simultaneously the HS route between Newcastle and Hexham. The HS-Classic services from London to Scotland via HS2 and the WCML are withdrawn, and all HS Scottish services now run on HS3. It is likely that HS services in Scotland will have been running for some time, at least between Edinburgh and Glasgow, before HS3 reaches Edinburgh. The article 'HS Scottish Routes and Service Plans' give full details of these, and also of the RM services from Hawick, mentioned below, and this will not be repeated here.

There are four extra services:

- 2tphH Pancras Cross – York – Darlington – Durham (Relly Mill) – Consett – Hexham – Hawick – Edinburgh Waverley – Haymarket – Edinburgh Airport – Bellgrove – Glasgow St. Enoch
- 2tphH Newcastle – Hexham –stations to Carlisle
- 2tphH Newcastle – Hexham – Hawick – Lauder – Edinburgh – Haymarket – Edinburgh Airport – Bellgrove – Glasgow St. Enoch
- 2tphH Hawick – Lauder – Edinburgh –> Inverness

Representative Hourly Cross-Platform Interchange Pattern at Hexham:

00H Pancras Cross – Glasgow
H Newcastle – Carlisle
RS Newcastle – Hexham (all stations)

15H Newcastle – Glasgow
(no interchange)

– repeating at 30 and 45 minutes past.

Representative Hourly Cross-Platform Interchange Pattern at Hawick:

00H Pancras Cross – Glasgow
H Hawick – Inverness
R Hawick – Aberdeen via the bridges

15H Newcastle – Glasgow
R Hawick – Dundee via the bridges

– repeating at 30 and 45 minutes past.

This imposes a load of 2tph between Pancras Cross and Hexham, 4tph between Newcastle and Hexham, 4tph between Hexham and Hawick, and 6tph between Hawick and Edinburgh. In addition the RM services from Hawick travel on HS3 as far as Ravenswood Junction, adding a further 4tph, and the Scottish HS services starting at Newcraighall HS add an extra 8tph between there and Edinburgh (see the HS Scottish Routes and Service Plans article for full details).

Adding the new services introduced in the several stages of service plan 3 to those of plan 2 imposes the following loadings on HS3:

- Pancras Cross – Canley St. Junction 16tph
- Canley St. Junction – West Hampstead Junction 16tph
- St. Pancras – West Hampstead Junction 14tph
- West Hampstead Junction – Scratchwood Junction 22tph
- Canley St. Junction – Scratchwood Junction 0tph
- Scratchwood Junction – Collingtree Junctions 22tph
- Collingtree Junctions – Northampton Castle station 10tph
- Northampton Castle station – Langborough Junction 8tph
- Collingtree Junctions – Langborough Junction 12tph
- Langborough Junction – Watkin Road Junction 20tph
- Watkin Rd. Junction – Humberstone Rd. Junction (main line) 12tph
- Watkin Rd. Junction – Regent St. Junction 8tph
- Regent St Junction – Swain St. Junction 8tph *
- Swain St. Junction – Humberstone Rd. Junction 4tph
- Humberstone Rd. Junction – Stanford Junction 16tph
- Stanford Junction – Nuthall South Junction (main line) 12tph
- Stanford Junction – Edwalton Junction 4tph
- Edwalton Junction – Manvers St. Junction 10tph
- Manvers St. Junction – Nottingham HS station 12tph
- Nottingham HS station – Strelley Junction 12tph
- Awsworth Junction – Strelley Junction 6tph
- Strelley Junction – Nuthall South Junction 6tph
- Nuthall South Junction – Nuthall North Junction 18tph
- Awsworth Junction – Nuthall North Junction 6tph
- Nuthall North Junction – Huthwaite Junction 24tph
- Huthwaite Junction – Stonebroom Junction 4tph
- Stonebroom Junction – Old Denaby Junction 4tph *
- Old Denaby Junction – South Yorkshire LL station 2tph *
- Old Denaby Junction – Denaby Main Juntion 2tph
- Huthwaite Junction – Wales Junction 20tph
- Wales Junction – Waleswood Junction 12tph
- Waleswood Junction – Ladybower Junction 12tph
- Ladybower Junction – Guide Bridge HS Juncyion 6tph
- Ladybower Junction – Paddock Junction 6tph
- Paddock Junction – Gelderd Road North Junction 14tph
- Wales Junction – Denaby Main Junction 8tph
- Denaby Main Junction – Ryhill Junction 12tph
- Ryhill Junction – Crofton Junction 2tph
- Crofton Junction – Gelderd Road South Junction 4tph *
- Gelderd Road South Junction – Gelderd Road North Junction 2tph
- Ryhill Junction – Swillington Common Junction 8tph
- Swillington Common Jn. – Manston Junction 4tph

- Swillington Common Jn. – Garforth East Junction 4tph
- Gelderd Road North Junction – Garforth West Junction 16tph
- Garforth West Junction – Micklefield HS Junction 6tph
- Garforth West Junction – Garforth East Junction 10tph
- Garforth East Junction – Ulleskelf Junction 14tph
- Ulleskelf Junction – Holgate Junction 16tph *
- Holgate Junction – York HS station 14tph
- York HS station – Poppleton Junction 14tph
- Poppleton Junction – Romanby Junction 18tph *
- Romanby Junction – Derwent Hill Junction 8tph
- Derwent Hill Junction – Paradise Junction 6tph
- Derwent Hill Junction – Stocksfield 2tph
- Newcastle – Paradise Junction 10tph
- Paradise Junction – Bladon East Junction 4tph
- Bladon East Junction – Stocksfield Junction 4tph *
- Stocksfield Junction – Tynegreen Junction 6tph *
- Tynegreen Junction – Hawick 4tph
- Hawick – Ravenswood Junction 10tph
- Ravenswood Junction – Newcraighall 6tph
- Newcraighall – Edinburgh 14tph

Those sections marked * give only the HS loadings. They are sections of classic track, incorporated in the HS line, and carry classic traffic also. (The Newcraighall – Edinburgh section includes HS13 loadings.)

HS3 is now complete. There are further service plans, reflecting changes elsewhere, but only marginal, peripheral changes to HS3's route loadings and interchange patterns.

Service Plan 4

This service plan comes into effect when HS5 opens between Pancras Cross and Brighton / Newhaven / Eastbourne (this is HS5 SP1). This is an immensely important event, but the only change made to HS3's services is that they now start in Sussex, rather than at Pancras Cross, specifically:

HS3 Long Distance UHS:

- 2tphH Eastbourne – Lewes – Gatwick Airport – East Croydon – Victoria (LL) – Pancras Cross – York – Darlington – Durham (Relly Mill) – Consett – Hexham – Hawick – Edinburgh Waverley – Haymarket – Edinburgh Airport – Bellgrove – Glasgow St. Enoch
- 2tphH Newhaven Marine – Newhaven Town – Lewes – Gatwick Airport – East Croydon – Victoria (LL) – Pancras Cross – South Yorkshire HS – York (splits / joins) – :
  – Darlington – Durham (Relly Mill) – Newcastle
  – Northallerton – Yarm – Eaglescliffe – Tharnaby – Middlesborough
- 2tphH East Croydon – Victoria (LL) – Pancras Cross – South Yorkshire HS – Wakefield Westgate – Leeds HS – York HS

- 2tphH East Croydon – Victoria (LL) Pancras Cross – South Yorkshire HS – Leeds City (splits / joins) –
  – Shipley – Bradford City – Halifax
  – Shipley – Keighley – Skipton
- 2tphH East Croydon – Victoria (LL) – Pancras Cross – Sheffield HS – Manchester HS – (Manchester) Victoria LL – Liverpool Lime St.
- 2tphH Pancras Cross – Chesterfield – Sheffield Midland (splits / joins) – :
  – Rotherham – South Yorkshire LL
  – Barnsley

HS3 Metro:

- 2tphH Brighton – Gatwick Airport – East Croydon – Victoria (LL) – Pancras Cross – Luton & Dunstable Parkway – Milton Keynes Parkway – Northampton – Leicester – Nottingham – Sheffield HS – Huddersfield – Leeds HS – York HS
- 2tphH Brighton – Gatwick Airport – East Croydon – Victoria (LL) – Pancras Cross – Luton & Dunstable Parkway – Milton Keynes Parkway – Northampton – Leicester – Nottingham – Sheffield HS – Manchester HS – Manchester Victoria (LL) – Bolton – Preston

Service Plan 4A

This service plan comes into effect when HS5 opens between East Croydon and Tunbridge Wells (this is HS5 SP1A). The UHS services to Liverpool, York and Halifax / Skipton now begins in Tunbridge Wells:

- 2tphH Tunbridge Wells – Tonbridge – East Croydon – Victoria (LL) – Pancras Cross – South Yorkshire HS – Leeds HS – York HS
- 2tphH Tunbridge Wells – Tonbridge – East Croydon – Victoria (LL) – Pancras Cross – South Yorkshire HS – Leeds City(splits / joins) – :
  – Shipley – Bradford City – Halifax
  – Shipley – Keighley – Skipton
- 2tphH Tunbridge Wells – Tonbridge – East Croydon – Victoria (LL) – Pancras Cross – Sheffield HS – Manchester HS – (Manchester) Victoria LL – Liverpool Lime St.

Service plan 4 overall makes no change to HS3's route loadings, nor to the various interchange patterns.

Service Plan 5

Service Plan 5 comes into effect when the Southampton arm of HS5 opens as far as Horsham (and thus, via classic tracks, to Portsmouth and Southsea – this is HS5 SP2,) and, simultaneously, HS6 opens between Pancras Cross and King's Lynn. This involves no changes to HS3's services, but obviously affects the route loadings at Pancras Cross itself.

Service Plan 5A

Service Plan 5A comes into effect when HS5 opens between Barnham Junction (Bognor) and Southampton, (this is HS5 SP3,) and, simultaneously, HS6 opens between Ely and Norwich. At the same time, HS8 opens between Asfordby Junction (Melton Mowbray) and Ely. Again, this involves no change to HS3 itself, but the existing services from Cardiff HS and Preston to Nottingham are extended through to Norwich.

The Regional Metro service is introduced:

- 2tphR Norwich – Wymondham – Thetford – Ely (reverse) –
  2tphR Stansted Airport – Cambridge – Ely (join/split) –
  – March – Peterborough – Stamford – Oakham – Melton Mowbray – Nottingham – Langley Mill – Alfreton and Mansfield Parkway – Chesterfield – Sheffield (reverse) – Chinley – Stockport – Manchester Piccadilly – Manchester Oxford Road – Salford Crescent – Bolton – Horwich Parkway – Chorley – Leyland – Preston – Lancaster – Morecambe

Representative Hourly Cross-Platform Interchange Pattern at Nottingham:

00H HS8 Norwich – Preston
(no connection)

07H Pancras Cross – York (HS Metro)
H HS7 Birmingham – Skegness
R St. Pancras – Melton Mowbray – York
R Norwich / Stansted Airport – Morecambe

15H HS8/HS7 Norwich – Swansea
(no connection*)

23H HS3/HS8 Brighton – Preston (HS Metro)
H HS7 Birmingham – Cleethorpes

– repeating at 30, 37 and 53 minutes past. (* The Norwich – Swansea service connects into the following service to Preston.)

The main point of the Nottingham interchanges is to provide a HS London – Derby service, by a single change.

Representative Hourly Cross-Platform Interchange Pattern at Sheffield HS/Midland (refer to the HS Transpennine Routes and Service Plans article for full details of the Regional Metro services). The HS services have cross-platform interchange, and the RM services have longer stops, to allow for the platform change. The pattern is:

00H Brighton –York (HS Metro)
H HS8 Norwich – Preston
R Skegness - Liverpool

07H HS7 Plymouth – Newcastle / Middlesborough
(no cross-platform connection)
R Cleethorpes – Blackpool

15H HS3/HS8 Brighton – Preston
H HS7 Birmingham HS – York
R Norwich / Stansted Airport – Morecambe

23H HS3/HS8 Tunbridge Wells - Liverpool
(no cross-platform connection)
R Hull – Southport

– repeating at 30, 37, 45 and 53 minutes past.

Service Plan 5B

This service plan comes into effect when HS4 opens between Cardiff HS and Swansea. The existing HS7 service from Cardiff to Nottingham is extended to start from Swansea. This has no effect on HS3 loadings. The HS7 services to the north of Birmingham are thus now:

- 2tphH Plymouth – Exeter St. David's – Taunton – Bristol Temple Meads HS – Bristol Parkway HS – Cheltenham Spa – Worcester Shrub Hill – Birmingham Interchange – Derby – Sheffield HS – Huddersfield – Leeds HS – York – Darlington (Relly Mill) – Consett – Newcastle
- 2tphH Birmingham HS – Derby – Sheffield HS – Huddersfield – Leeds HS – York
- 2tphH Birmingham HS – Derby – Chesterfield – Sheffield Midland – South Yorkshire HL – Leeds City (splits / joins) – :
  – Shipley – Bradford City – Halifax
  – Shipley – Keighley - Skipton
- 2tphH Swansea – Port Talbot – Cardiff (Rhoose) Airport – Cardiff HS – Bristol Parkway HS – Cheltenham Spa – Worcester Shrub Hill – Birmingham Interchange – Derby – Nottingham – Peterborough – Norwich
- 2tphH Birmingham HS – Derby – Nottingham – Newark Castle – Lincoln – Market Rasen – Grimsby Town – Cleethorpes
- 2tphH Birmingham HS – Derby – Nottingham – Newark Castle – Lincoln – Sleaford – Boston – Wainfleet - Skegness

Adding the new services introduced in the several stages of service plan 5 to those of plan 4 (3, actually) imposes the following, final (according to the present plans) loadings on HS3:

• Pancras Cross	– Canley St. Junction	16tph
• Canley St. Junction	– West Hampstead Junction	16tph
• St. Pancras	– West Hampstead Junction	14tph
• West Hampstead Junction	– Scratchwood Junction	22tph
• Canley St. Junction	– Scratchwood Junction	0tph
• Scratchwood Junction	– Collingtree Junctions	22tph
• Collingtree Junctions	– Northampton Castle station	10tph
• Northampton Castle station	– Langborough Junction	8tph
• Collingtree Junctions	– Langborough Junction	12tph
• Langborough Junction	– Watkin Road Junction	20tph
• Watkin Rd. Junction	– Humberstone Rd. Junction (main line)	12tph

- Watkin Rd. Junction – Regent St. Junction 8tph
- Regent St Junction – Swain St. Junction 8tph *
- Swain St. Junction – Humberstone Rd. Junction 4tph
- Humberstone Rd. Junction – Stanford Junction 16tph
- Stanford Junction – Nuthall South Junction (main line) 12tph
- Stanford Junction – Edwalton Junction 4tph
- Edwalton Junction – Manvers St. Junction 10tph
- Manvers St. Junction – Nottingham HS station 12tph
- Nottingham HS station – Strelley Junction 12tph
- Awsworth Junction – Strelley Junction 6tph
- Strelley Junction – Nuthall South Junction 6tph
- Nuthall South Junction – Nuthall North Junction 18tph
- Awsworth Junction – Nuthall North Junction 6tph
- Nuthall North Junction – Huthwaite Junction 24tph
- Huthwaite Junction – Stonebroom Junction 4tph
- Stonebroom Junction – Old Denaby Junction 4tph *
- Old Denaby Junction – South Yorkshire LL station 2tph *
- Old Denaby Junction – Denaby Main Juntion 2tph
- Huthwaite Junction – Wales Junction 20tph
- Wales Junction – Waleswood Junction 12tph
- Waleswood Junction – Ladybower Junction 12tph
- Ladybower Junction – Guide Bridge HS Juncyion 6tph
- Ladybower Junction – Paddock Junction 6tph
- Paddock Junction – Gelderd Road North Junction 14tph
- Wales Junction – Denaby Main Junction 8tph
- Denaby Main Junction – Ryhill Junction 12tph
- Ryhill Junction – Crofton Junction 2tph
- Crofton Junction – Gelderd Road South Junction 4tph *
- Gelderd Road South Junction – Gelderd Road North Junction 2tph
- Ryhill Junction – Swillington Common Junction 8tph
- Swillington Common Jn. – Manston Junction 4tph
- Swillington Common Jn. – Garforth East Junction 4tph
- Gelderd Road North Junction – Garforth West Junction 16tph
- Garforth West Junction – Micklefield HS Junction 6tph
- Garforth West Junction – Garforth East Junction 10tph
- Garforth East Junction – Ulleskelf Junction 14tph
- Ulleskelf Junction – Holgate Junction 20tph *
- Holgate Junction – York HS station 14tph
- York HS station – Poppleton Junction 14tph
- Poppleton Junction – Romanby Junction 18tph *
- Romanby Junction – Derwent Hill Junction 8tph
- Derwent Hill Junction – Paradise Junction 6tph
- Derwent Hill Junction – Stocksfield 2tph
- Newcastle – Paradise Junction 10tph

- Paradise Junction – Bladon East Junction 4tph
- Bladon East Junction – Stocksfield Junction 4tph *
- Stocksfield Junction – Tynegreen Junction 6tph *
- Tynegreen Junction – Hawick 4tph
- Hawick – Ravenswood Junction 10tph
- Ravenswood Junction – Newcraighall 6tph
- Newcraighall – Edinburgh 14tph

Those sections marked * give only the HS loadings. They are sections of classic track, incorporated in the HS line, and carry classic traffic also. (The Newcraighall – Edinburgh section includes HS13 loadings.)

Service Plan 5 Summary

It's worth summarising the full set of services at service plan 5, as this represents the final, complete state of the Mk1A plans, and the services have so far been introduced piecemeal, at the various stages. Note also that the order of the HS Metro and HS-C services has been rearranged slightly.

This is, of course, the initial, 2-track railway. The effect of quadrupling will be examined later.

HS3 Long Distance UHS:

- 2tphH Eastbourne – Lewes – Gatwick Airport – East Croydon – Victoria (LL) – Pancras Cross – York – Darlington – Durham (Relly Mill) – Consett – Hexham – Hawick – Edinburgh Waverley HS – Haymarket – Edinburgh Airport – Glasgow Bellgrove – Glasgow St. Enoch
- 2tphH Newhaven Marine – Newhaven Town – Lewes – Gatwick Airport – East Croydon – Victoria (LL) – Pancras Cross – South Yorkshire HL – York HS (splits / joins) – :
– Darlington – Durham (Relly Mill) – Consett – Newcastle
– Northallerton – Yarm – Eaglescliffe – Thornaby – Middlesborough
- 2tphH Tunbridge Wells – Tonbridge – East Croydon – Victoria (LL) – Pancras Cross – South Yorkshire HL – Wakefield Westgate – Leeds HS – York HS
- 2tphH Tunbridge Wells – Tonbridge – East Croydon – Victoria (LL) – Pancras Cross – South Yorkshire HL – Leeds City (splits / Joins) – :
– Shipley – Bradford City – Halifax
– Shipley – Keighley – Skipton
- 2tphH Tunbridge Wells – Tonbridge – East Croydon – Victoria (LL) – Pancras Cross – Chesterfield – Sheffield Midland (splits / joins) – :
– Rotherham – South Yorkshire LL
– Barnsley
- 2tphH Tunbridge Wells – Tonbridge – East Croydon – Victoria (LL) – Pancras Cross – Sheffield HS – Manchester HS – (Manchester) Victoria LL – Liverpool Lime St.
- 2tphH Newcastle – Hexham – stations to Carlisle
- 2tphH Newcastle – Hexham – Hawick – Lauder – Edinburgh Waverley HS – Haymarket – Edinburgh Airport – Glasgow Bellgrove – Glasgow St. Enoch
- 2tphH Hawick – Lauder – Edinburgh –> Inverness

(Note that the Newcastle – Hexham and Hawick – Inverness services are included in the UHS section because they interface with the Glasgow service.)

HS3 Metro:

- 2tphH Brighton – Gatwick Airport – East Croydon – Victoria (LL) – Pancras Cross – Luton & Dunstable Parkway – Milton Keynes Parkway – Northampton – Leicester – Nottingham – Sheffield HS – Huddersfield – Leeds HS – York HS
- 2tphH Brighton – Gatwick Airport – East Croydon – Victoria (LL) – Pancras Cross – Luton & Dunstable Parkway – Milton Keynes Parkway – Northampton – Leicester – Nottingham – Sheffield HS – Manchester HS – Manchester Victoria (LL) – Bolton – Preston
- 2tphH St. Pancras – Luton & Dunstable Parkway – Milton Keynes Parkway – Northampton – Leicester – Loughborough – Derby – Chesterfield – Sheffield Midland –Rotherham – Wakefield Westgate – Leeds City – Micklefield – York

- 2tphH St. Pancras– Luton & Dunstable Parkway – Milton Keynes Parkway – Northampton – Leicester – East Midlands Parkway – Derby – Matlock – Bakewell – Miller's Dale (from/to Buxton) – Chinley – Stockport – Manchester Piccadilly (alternatively: – Derby – Chesterfield – Sheffield (reverse) – Chinley – if the Peak route has not yet been reopened.)
- 2tphH St. Pancras – Luton & Dunstable Parkway – Milton Keynes Parkway – Northampton – Rugby – Coventry – Birmingham International – Birmingham New Street – Wolverhampton – :
  1) – Stafford – Crewe – Runcorn – Liverpool South Parkway – Liverpool Lime Street
  2) – Telford – Wellington – Shrewsbury – Gobowen – Wrexham – Chester

MML and other Regional Metro:

- 2tphR St. Pancras – St. Albans – Luton Airport Parkway – Luton – Bedford – Wellingborough – Kettering – Market Harborough – Leicester – Loughborough – Attenborough – Beeston - Nottingham
- 2tphR St. Pancras – St. Albans – Luton Airport Parkway – Luton – Bedford – Wellingborough – Kettering – Market Harborough – Leicester – East Midlands Parkway – Attenborough – Beeston - Nottingham
- 2tphR St. Pancras – St. Albans – Luton Airport Parkway – Luton – Bedford – Wellingborough – Kettering – Corby – Oakham – Melton Mowbray – Nottingham – Langley Mill – Alfreton & Mansfield Parkway – Chesterfield – Sheffield Midland – Rotherham – Pontefract – York
  (note that this uses HS3 on the approach to Nottingham)
- 2tphR St. Pancras – St. Albans – Luton Airport Parkway – Luton – Bedford – Olney – Northampton – Rugby – Coventry – Birmingham Int'l – Birmingham New St. – University – Bromsgrove – Droitwich Spa – Worcester Shrub Hill.
- 2tphR (Thameslink) Brighton –> Bedford – Olney – Northampton
- 2tphR Birmingham New St. – Coleshill Parkway – Nuneaton – Hinckley – Leicester – Melton Mowbray – Oakham – Stamford – Peterborough – March – Ely – Bury St. Edmunds – Ipswich – Harwich International – Harwich Town
- 2tphR Bournemouth West – Bournemouth Central – Brockenhurst – Southampton – Southampton Airport Parkway – Winchester – Basingstoke – Reading – Oxford – Banbury – Leamington Spa – Kenilworth – Coventry – Birmingham Int'l – Birmingham New St. (reverse) – Tamworth – Burton-on-Trent – Derby – Chesterfield – Sheffield – Rotherham – Wakefield Westgate – Leeds City – Micklefield – York
- 2tphR Plymouth – Ivybridge – Totnes – Newton Abbot – Teignmouth – Dawlish – Exeter St. David's – Cullompton – Tiverton Junction – Taunton – Bridgwater – Highbridge – Weston Super Mare – Bristol Temple Meads – Bristol Parkway – Gloucester (reverse) – Cheltenham Spa – Ashchurch – Worcester Shrub Hill – Droitwich Spa – Bromsgrove – University – Birmingham New St. – Tamworth – Burton on Trent – Derby – Chesterfield – Sheffield – Rotherham – Wakefield Westgate – Leeds City – Micklefield – York
- 2tphR Norwich – Wymondham – Thetford – Ely (reverse) –
  2tphR Stansted Airport – Cambridge – Ely (joins / splits) –
  – March – Peterborough – Stamford – Oakham – Melton Mowbray – Nottingham – Langley Mill – Alfreton and Mansfield Parkway – Chesterfield – Sheffield (reverse) – Chinley – Stockport – Manchester Piccadilly – Manchester Oxford Road – Salford Crescent – Bolton – Horwich Parkway – Chorley – Leyland – Preston – Lancaster – Morecambe
- 2tphR York – Thirsk – Northallerton – Darlington – Durham – Chester le Street – Newcastle – Morpeth – Alnmouth – Berwick-upon-Tweed – Dunbar – Drem – Edinburgh Waverley

- 2tphRS (Tees Valley Metro) Bishop Auckland – Shildon – Newton Aycliffe – Heighington – North Road – Darlington – Dinsdale – Tees-Side Airport – Allen's West – Eaglescliffe – Thornaby – Middlesborough – British Steel (Redcar) – Redcar Central – Redcar East – Marske – Saltburn

HS7 North of Birmingham:

- 2tphH Plymouth – Exeter St. David's – Taunton – Bristol Temple Meads HS – Bristol Parkway HS – Cheltenham Spa – Worcester Shrub Hill – Birmingham Interchange – Derby – Sheffield HS – Huddersfield – Leeds HS – York HS (splits / joins) – :
  – Darlington – Durham (Relly Mill) – Consett – Newcastle
  – Northallerton – Yarm – Eaglescliffe – Thornaby – Middlesborough
- 2tphH Swansea – Port Talbot – Cardiff (Rhoose) Airport – Cardiff HS – Bristol Parkway HS – Cheltenham Spa – Worcester Shrub Hill – Birmingham Interchange – Derby – Nottingham – Melton Mowbray – Peterborough – Norwich
- 2tphH Birmingham HS – Derby – Sheffield HS – Huddersfield – Leeds HS – York
- 2tphH Birmingham HS – Derby – Chesterfield – Sheffield Midland – South Yorkshire HL – Leeds City (splits / joins) – :
  – Shipley – Bradford City – Halifax
  – Shipley – Keighley – Skipton
- 2tphH Birmingham HS – Derby – Nottingham – Newark Castle – Lincoln Central – Market Rasen – Grimsby Town – Cleethorpes
- 2tphH Birmingham HS – Derby – Nottingham – Newark Castle – Lincoln Central – Sleaford – Boston – Wainfleet – Skegness

HS8:

- 2tphH Norwich – Peterborough – Melton Mowbray – Nottingham – Sheffield HS – Manchester HS – Manchester Victoria LL – Bolton – Preston

HS9:

- 2tphH Liverpool Lime Street – Manchester Victoria (LL) – Manchester HS – Huddersfield – Leeds HS – York HS (splits / joins) – :
  – Darlington – Durham (Relly Mill) – Consett – Newcastle
  – Northallerton – Yarm – Eaglescliffe – Thornaby – Middlesborough
- 2tphH Liverpool Lime Street – Manchester Victoria (LL) – Manchester HS – Huddersfield – Leeds HS – Micklefield – York – Thirsk – Northallerton – Yarm – Eaglescliffe – Stockton – Hartlepool – Seaham – Sunderland – Newcastle
- 2tphH Preston – Bolton – Manchester Victoria (LL) – Manchester HS – Huddersfield – Leeds HS – Micklefield – Selby – Hull
- 2tphH Preston – Bolton – Manchester Victoria (LL) – Manchester HS – Huddersfield – Leeds HS – Micklefield – York – Malton – Seamer – Scarborough

HS6:

- 2tphH St. Pancras (East) – Stratford HS – Stansted Airport – Cambridge – Ely – Peterborough – Doncaster – York HS (splits / joins) –:
  – Darlington – Durham – Newcastle – Morpeth – Alnmouth – Berwick upon Tweed – Dunbar - Drem – Edinburgh Waverley
  – Thirsk – Northallerton – Yarm – Eaglescliffe – Stockton – Hartlepool – Seaham – Sunderland - Newcastle
- 2tphH St. Pancras (East) – Stratford HS – Stansted Airport – Cambridge – Ely – Peterborough – Grantham – Newark Northgate – Retford HL – Doncaster – Wakefield Westgate – Leeds City

Representative Hourly Non-Cross-Platform Interchange Pattern at Bedford:

00R St. Pancras – York via Melton Mowbray
R (Thameslink) Brighton – Bedford

07R St. Pancras – Nottingham (calling at East Midlands Parkway)
R (Thameslink) Horsham – Northampton

15R St. Pancras – Birmingham New St. – Worcester
R (Thameslink) Brighton – Corby

23R St. Pancras – Nottingham (calling at Loughborough)
R (Thameslink) Horsham – Northampton

– repeating at 30, 37, 45 and 53 minutes past.

Connections are made between HS3 and East-West-Rail services at Milton Keynes Parkway (incorporating the former Ridgmont station on EWR). Both HS3 and EWR have two island platforms and EWR services make cross-platform connections (usually by an all-stations service interchanging with a RM semi-fast, which overtakes it there). The Hourly Interchange Pattern is:

00H Brighton – York (not cross-platform)
R Plymouth – Norwich
RS Buckingham – Bedford

05H St Pancras – Wolverhampton – Liverpool / Chester
(connects into the following EWR services)

07H St. Pancras – Derby – Sheffield – York (not cross-platform)
RS Oxford – Cambridge
RS Milton Keynes – Bedford

15H Brighton – Preston (not cross-platform)
R Plymouth – Cleethorpes
RS Buckingham – Bedford

23H St. Pancras – Derby – Matlock (or Sheffield) – Manchester (not cross-platform)
R Weymouth – York
RS Milton Keynes – Bedford

– repeating at 30, 35, 37, 45 and 53 minutes past.

Representative Hourly Interchange Pattern at Northampton (the HS3/MML connections are not cross-platform, but the intra-WCML ones are; see the WCML Service Plans article for full details of these):

00H Brighton – York (not cross-platform)
R Euston – Crewe via Stoke
R Euston – Rugby

05H St. Pancras – Wolverhampton – Liverpool / Chester (not cross-platform)
R (Thameslink) Brighton – Northampton

07H St. Pancras – Derby – Sheffield – York (not cross-platform)
R Euston – Birmingham New St.

15H Brighton – Preston (not cross-platform)
R Euston – Crewe via Stafford
R Euston – Rugby

15R St. Pancras – Birmingham New St. – Worcester
R (Thameslink) Brighton – Northampton

23H St. Pancras – Derby – Matlock (or Sheffield) – Manchester (not cross-platform)
R Euston – Barrow in Furness

– repeating at 30, 35, 37, 45, 50 and 53 minutes past.

Representative Hourly Cross-Platform Interchange Pattern at Leicester:

00H Brighton – York
(no connection)

05R St. Pancras – East Midlands Parkway – Nottingham
H St. Pancras – Loughborough – Derby – Sheffield –York

15H Brighton – Preston
R Harwich Town – Worcester Shrub Hill

23H St. Pancras – East Midlands Parkway – Derby – Matlock/Sheffield – Manchester
R St. Pancras – Loughborough – Nottingham

– repeating at 30, 45 and 53 minutes past. Note that these services depart in the order stated, thus the RM St. Pancras – Nottingham service, calling at East Midlands Parkway (but not Loughborough) departs before the HS-C St. Pancras – York service, calling at Loughborough (but not East Midlands Parkway). This ensures that Loughborough and East Midlands Parkway stations each have 4tph, alternatively to Derby and points north, or to Nottingham, but no HS-C or RM train serves both. (There is a stopping service between Leicester and Derby, which does.)

Representative Hourly (non-cross-platform) Interchange Pattern at Derby:

00H HS7 Plymouth – Newcastle / Middlesborough
R Bournemouth West – York

05H HS7 Birmingham – York
H St. Pancras – Matlock (or Sheffield) – Manchester

10H HS7 Birmingham – Cleethorpes
(no connection)

15H HS4/HS7 Swansea – Norwich
R Plymouth – York

20H HS7 Birmingham – Halifax / Skipton
H St. Pancras – Sheffield – York

25H HS7 Birmingham – Skegness
(no connection)

– repeating at 30, 35, 40, 45, 50 and 55 minutes past.

Representative Hourly Cross-Platform Interchange Pattern at Nottingham:

00H HS8 Norwich – Preston
(no connection)

07H Brighton – York
H HS7 Birmingham – Skegness
R St. Pancras – Melton Mowbray – York
R Norwich / Stansted Airport – Morecambe

15H HS8/HS7 Norwich – Swansea
(no connection*)

23H HS3/HS8 Brighton – Preston
H HS7 Birmingham – Cleethorpes

– repeating at 30, 37 and 53 minutes past. (* The Norwich – Swansea service connects into the following service to Preston.)

Representative Hourly Cross-Platform Interchange Pattern at Sheffield. (Refer to the Transpennine Routes and Service Plans article for full details of the Regional Metro services). The HS services have cross-platform interchange, and the RM services have longer stops, to allow for the platform change. The pattern is:

00H Brighton –York (HS Metro)
H HS8 Norwich – Preston
R Skegness – Liverpool

07H HS7 Plymouth – Newcastle / Middlesborough
(no cross-platform connection)
R Cleethorpes – Blackpool

15H HS3/HS8 Brighton – Preston
H HS7 Birmingham HS – York
R Norwich / Stansted Airport – Morecambe

23H HS3/HS8 Tunbridge Wells - Liverpool
(no cross-platform connection)
R Hull – Southport

– repeating at 30, 37, 45 and 53 minutes past.

Representative Hourly Cross-Platform Interchange and Terminating Pattern at York

00H Eastbourne – Glasgow
H Brighton – York (HS Metro)

07H Tunbridge Wells – York (UHS, Leeds fast)
H HS7 Plymouth – Newcastle / Middlesborough
H St.Pancras (West) – York (via Derby – not cross platform)

15H Newhaven – Newcastle / Middlesborough
H HS7 Birmingham HS – York

23H Liverpool – Newcastle / Middlesborough
H St. Pancras (East) – Edinburgh
R St. Pancras (West) – York (via Melton Mowbray – not cross-platform)

– repeating at 30, 40, 45 and 55 minutes past. The services terminating at 07 and 23 minutes past are obviously intended for (non-cross-platform) connection into those 7 / 8 minutes later.

Representative Hourly Cross-Platform Interchange Pattern at Darlington:

00H Eastbourne – Glasgow
RS Bishop Auckland – Middlesborough – Saltburn

07H Plymouth – Newcastle (/ Middlesborough)
RS Bishop Auckland – Middlesborough – Saltburn

15H Newhaven – Newcastle (/ Middlesborough)
RS Bishop Auckland – Middlesborough – Saltburn

23H Liverpool – Newcastle (/ Middlesborough)
H St. Pancras (East) – Edinburgh (not cross-platform – uses ECML platforms)
RS Bishop Auckland – Middlesborough – Saltburn

– repeating at 30, 37, 45 and 53 minutes past.

Representative Hourly Cross-Platform Interchange Pattern at Newcastle:

00H Plymouth – Newcastle (/ Middlesborough)
R York – Edinburgh

07H Newhaven – Newcastle (/ Middlesborough)
(no connection)

15G Liverpool – Newcastle (/ Middlesborough)
H St. Pancras (East) – Edinburgh

– repeating at 30, 37 and 45 minutes past.

Representative Hourly Cross-Platform Interchange Pattern at Hexham:

00H Eastbourne – Glasgow
H Newcastle – Carlisle
R Newcastle – Hexham (all stations)

15H Newcastle – Glasgow (calls Lauder)
(no connection)

– repeating at 30 and 45 minutes past.

Representative Hourly Cross-Platform Interchange Pattern at Hawick:

00H Eastbourne – Glasgow
H Hawick – Inverness (calls Lauder)
R Hawick – Perth via Ladybank

15H Newcastle – Glasgow (calls Lauder)
R Hawick – Dundee via Ladybank

– repeating at 30 and 45 minutes past.

Estimated Journey Times

The conditions governing acceleration, deceleration, behaviour at junctions and line capacity of high speed lines are dealt with exhaustively in appendix B of the article 'Same Speed Railways'. Likewise the details of journey time calculations are dealt with in appendix C. Technically-minded readers, who want all the hard details, should look there. Only the required results are quoted here.

The following calculations are only approximate. Distances, to the nearest km, are derived from my own maps. However, comparing my estimated distances with actual distances, where these are available, leads me to believe they are accurate to well within 2%.

The crudest approximation is the assumption that, once line speed has been reached, that speed (360kph on new infrastructure as far as Darlington, and north of Hawick, and 300kph elsewhere, also between Sheffield and Leeds via Huddersfield) is maintained until it becomes necessary to decelerate for a junction or a station stop.

The results are, nonetheless, valuable in giving a **feel** for the journey times possible.

Two versions are produced for each table, the summary version, containing results only for stations at which the service stops, and any locations, (invariably junctions,) where there is a change of line speed. The second version, suffixed P, contains the same results as previously, and, in addition, *passing times* (so indicated) for all other locations which are of interest for one reason or another. Note that **station loop junctions** are included in the passing times, where this is appropriate (does not apply to routes where the services are of type HS Metro, where there is no requirement for overtaking at stations). These junction locations are easily derived from the location of the station:

- a diverging junction (to stop at the station) is 4.1km before the station
- a converging junction (to re-join the main line after the station) is 6.8km after the station

My estimated distances are:

• Pancras Cross – Scratchwood Junction	17km (#)	(360kph)
• Scratchwood Jn. – Luton & Dunstable Parkway	34km	(360kph)
• Luton & Dunstable Pkwy – Milton Keynes Pkwy	18km	(360kph *)
• Milton Keynes Parkway – Northampton Castle	33km	(360kph)
• Northampton Castle – Langborough Junction	18km	(360kph *)
• Milton Keynes Parkway – Langborough Jn. direct	44km	(360kph)
• Langborough Junction – Leicester station (†)	40km	(360kph)
• Northampton Castle – Leicester station	58km	(360kph)
• Pancras Cross – Leicester (direct †)	153km	(360kph)
• Leicester – Stanford Junction	20km	(360kph *)
• Stanford Junction – Edwalton Junction	15.2km	(360kph)
• Edwalton Junction – Nottingham	6.8km	(360kph *)
• Stanford Junction – Nottingham	22km	(360kph)
• Leicester – Nottingham	42km	(360kph)
• Pancras Cross – Nottingham (direct †)	195km	(360kph)
• Nottingham – Derby	26km	(360kph *)
• Nottingham – Strelley Junction	7.0km	(360kph *)

- Strelley Junction – Nuthall South Junction 0.38km (230kph *)
- Strelley Junction – Awsworth Junction 3.5km (360kph)
- Awsworth Junction – Derby 15.5km (360kph *)
- Nuthall South Junction – Nuthall North Junction 4.5km (360kph)
- Awsworth Junction – Nuthall North Junction 4.7km (360kph)
- Stanford Junction – Nuthall South Junction 23km (360kph)
- Nuthall South Junction – Huthwaite Junction 18km (360kph)
- Nuthall North Junction – Huthwaite Junction 13.5km (360kph)
- Leicester – Huthwaite Junction (direct) 61km (360kph)
- Pancras Cross – Huthwaite Junction (direct †) 214km (360kph)
- Huthwaite Junction – Stonebroom Junction 5km (230kph)
- Stonebroom Junction – Chesterfield 10km (200kph)
- Rotherham – South Yorkshire LL 11km (160kph)
- Huthwaite Junction – Wales Junction 25km (360kph)
- Nottingham – Wales Junction 50km (360kph)
- Leicester – Wales Junction (direct) 86km (360kph)
- Pancras Cross – Wales Junction (direct †) 239km (360kph)
- Wales Junction – South Yorkshire 17km (360kph)
- Leicester – South Yorkshire (direct) 103km (360kph)
- Pancras Cross – South Yorkshire (direct †) 256km (360kph)
- South Yorkshire – Ryhill Junction (§) 19km (360kph *)
- Ryhill Junstion – Crofton Junction (§) 1km (230kph)
- Crofton Junction – Wakefield Westgate (§) 7km (230kph)
- Wakefield Westgate – Gelderd Rd. North Junction 11km (160kph)
- Gelderd Rd. North Junction – Leeds New Lane 4km (160kph)
- Wakefield Westgate – Leeds New Lane 15km (160kph)
- Leeds New Lane – Garforth West Junction 10km (360kph *)
- Garforth West Junction – Garforth East Junction 0.82km (*)
- Garforth East Junction – Ulleskelf Junction 15km (360kph)
- South Yorkshire – Ulleskelf Junction (direct) 53km (360kph)
- Pancras Cross – Ulleskelf Junction (direct †) 309km (360kph)
- Ulleskelf Junction – York HS 14km (225kph)
- South Yorkshire – Swillington Common Junction 36km (360kph)
- Swillington Common Junction – Manston Junction 1.94km (230kph)
- Manston Junction – Leeds City 8km (200kph)
- Wales Junction – Waleswood Junction 0.78km (230kph)
- Waleswood Junction – Sheffield HS 10.55km (225kph)
- Waleswood Junction – Woodburn Junction 9.0km (225kph)
- Woodburn HS Junction – Sheffield HS 1.55km (*)
- Sheffield HS – Ladybower Junction 17km (300kph)
- Ladybower Junction – Huddersfield 34km (300kph)
- Sheffield HS – Huddersfield 51km (300kph)
- Huddersfield – Leeds New Lane 24km (300kph)
- Ladybower Junction – Manchester HS 38km (300kph)

- Sheffield HS – Manchester HS 55km (300kph)
- Manchester HS – Victoria LL 0.5km (*)
- Victoria LL – Broughton Junction 3km (360kph *)
- Victoria LL – Bolton 17km (360kph *)
- Bolton – Gibb Farm Junction 8km (360kph *)
- Gibb Farm Junction – Preston 24km (360kph)
- Victoria LL – Liverpool Lime St. 49km (360kph)
- Victoria – Kenyon West Junction 20km (360kph)
- Kenyon West Junction – Liverpool Lime St. 29km (360kph)
- York HS – Romanby Junction 46km (225kph)
- Romanby Junction – Darlington 24km (360kph)
- Darlington – Durham Relly Mill 33km (300kph)
- Durham Relly Mill – Consett 20km (300kph)
- Consett – Newcastle 20km (300kph §§)
- Consett – Derwent Hill Junction 2km (300kph §§)
- Derwent Hill Junction – Paradise Junction 15km (300kph §§)
- Paradise Junction – Newcastle 3km (300kph §§)
- Consett – Hexham 23km (200kph §§)
- Consett – Derwent Hill Junction 2km (200kph §§)
- Derwent Hill Junction – Stocksfield Junction 9km (200kph §§)
- Consett – Stocksfield Junction 11km (200kph §§)
- Stocksfield Junction – Hexham 12km (200kph §§)
- Newcastle – Bladon East Junction 7km (200kph §§)
- Blaydon East Junction – Hexham 25km (200kph §§)
- Hexham – Riccarton North Junction 60km (300kph)
- Riccarton North Junction – Hawick 20km (360kph)
- Hawick – Ravenswood Junction 21km (360kph)
- Ravenswood Junction – Birkenside (North) Jn. 11.9km (360kph)
- Birkenside (North) Junction – Lauder 4.1km (360kph)
- Hawick – Lauder 37km (360kph)
- Lauder – Edinburgh 45km (360kph)
- Lauder – Wiselawmill (North) Junction 6.8km (360kph)
- Wiselawmill (North) Junction – Newcraighall HS 31km (360kph)
- Lauder – Newcraighall HS 37.8km (360kph)
- Newcraighall HS – Edinburgh 7.2km (360kph)
- Hawick – Edinburgh (non-stop) 82km (360kph)

(*) For these sections the times are stated explicitly, for one of several reasons. This is explained shortly, when it is explained how the line speeds are chosen.

(†) Travelling non-stop through Leicester avoids the station, which saves a (very) short distance (<1km!) We thus take the notional Leicester passing point (‘Leicester Avoiding Line’) as the same distance as Leicester station (thus 40km north of Langborough Junction. ‘Direct’ means bypassing as many as are relevant of Northampton, Leicester and Nottingham stations.

(#) Travelling from Pancras Cross via the direct, tunnel route (when this becomes available, with the 4-tracking) saves 3km compared with the original route along the MML, thus Pancras Cross – Scratchwood Junction (direct) is 14km.

(§) Ryhill is a propinquant junction. A line speed of 230kph is specified for the Ryhill Junction – Wakefield Westgate section, but very little enhancement will be required to the classic route to accommodate this. Southbound, the distance to Crofton Junction is only just sufficient (7km vs.6.8km) for speed to have even reached 230kph. Northbound, speed will have reduced to 160kph 2km before the station, well before the approach viaduct.

(§§) The section from Consett to Newcastle is suitable for 300kph and Newcastle services from the south travel at that line speed. But the section from Paradise Junction to Blaydon East Junction and on to Hexham has a line speed of 200kph, and services from Newcastle to Hexham and on to Edinburgh take the entire Newcastle – Hexham section as 200kph. Likewise the section from Derwent Hill Junction to Stocksfield Junction is taken at 200kph.

The above are all distances on HS3's new infrastructure. In addition, they share the following sections of classic routes, whose lengths are known exactly! (Refer to Appendix J.)

- Northampton Castle – Rugby (WCML) 30.5km (200kph)
- Rugby (WCML) – Coventry 18.5km (200kph)
- Coventry – Birmingham International 17.2km (200kph)
- Birmingham International – Birmingham New St. 13.3km (200kph)
- Birmingham New St. – Wolverhampton 20.7km (160kph)
- Wolverhampton – Stafford 26.0km (200kph)
- Stafford – Crewe 39.4km (225kph)
- Crewe – Runcorn 36.2km (225kph)
- Runcorn – Liverpool South Parkway 12.0km (200kph)
- Liverpool South Parkway – Liverpool Lime St. 9.2km (200kph)
- Wolverhampton – Telford 25.2km (225kph)
- Telford – Wellington 6.2km (225kph *)
- Wellington – Shrewsbury 16.5km (225kph)
- Shrewsbury – Gobowen 29.0km (225kph)
- Gobowen – Wrexham 19.6km (200kph)
- Wrexham – Chester 19.4km (200kph)
- Birmingham New St. – University 4.2km (*)
- University – Kings Norton 4.6km (160kph)
- Kings Norton – Barnt Green 6.5km (160kph)
- Barnt Green - Bromsgrove 5.7km (200kph)
- Bromsgrove – Stoke Works Junction 3.5km (200kph)
- Stoke Works Junction – Droitwich Spa 6.8km (200kph)
- Droitwich Spa – Worcester Shrub Hill 9.0km (200kph)
- Leicester – Syston South Junction 7.6km (200kph)
- Syston South Junction – Melton Mowbray 6.5km (200kph)
- Syston South Junction – Loughborough 12.5km (200kph)
- Loughborough – East Midlands Parkway 10.8km (200kph)

- Leicester – Loughborough 20.1km (200kph)
- Loughborough – Derby 26.2km (200kph)
- Leicester – East Midlands Parkway 30.9km (200kph)
- East Midlands Parkway – Derby 15.4km (200kph)
- Derby – Clay Cross Junction 32.2km (200kph)
- Clay Cross Junction – Chesterfield 6.6km (200kph)
- Derby – Chesterfield 38.8km (200kph)
- Chesterfield – Dore Station Junction 13.6km (200kph)
- Dore Station Junction – Sheffield Midland 6.2km (200kph)
- Chesterfield – Sheffield Midland 19.8km (200kph)
- Sheffield Midland – Barnsley 25.8km (160kph)
- Sheffield Midland – Rotherham Central 9.7km (160kph)
- Rotherham C. – Wakefield Wg. (via Moorthorpe) 36.8km (160kph)
- Wakefield Westgate – Leeds City 16.2km (160kph)
- Leeds City – Micklefirld 15.7km (160kph)
- Micklefield – Ulleskelf Junction 11.1km (225kph)
- Ulleskelf Junction – York (classic) 14.3km (225kph)
- Micklefield – York (classic) 25.4km (225kph)
- Sheffield Midland – Dore Station Junction 6.2km (160kph – relief lines)
- Dore Station Junction – Chinley 25.8km (160kph)
- Sheffield Midland – Chinley 32.0km (160kph)
- Chinley – Hazel Grove 13.7km (160kph)
- Hazel Grove – Stockport 4.km (160kph)
- Chinley – Stockport 18.2km (160kph)
- Stockport – Manchester Piccadilly 9.4km (200kph)
- Leeds City – Shipley 17.3km (160kph)
- Shipley – Bradford City (†) 4.9km (160kph *)
- Bradford Interchange (site of) – Halifax 12.8km (160kph)
- Shipley – Keighley 10.0km (160kph)
- Keighley – Skipton 16.4km (160kph)
- York HS – Northallerton 48.2km (225kph)
- Northallerton – Yarm 18.9km (225kph)
- Yarm Eaglescliffe 4.1km (*)
- Eaglescliffe – Thornaby 4.8km (*)
- Thornaby – Middlesborough 5.2km (*)

(†) Bradford City is taken as being on the same site as Bradford Interchange (it is actually very slightly to the north of that). The distance between Bradford Forster Square (site of) and Interchange = City is 0.5km.

The line speeds are chosen as follows:

- All new HS3 infrastructure has a line speed of 360kph, except for the section between Darlington and Newcastle, and between Hexham and Riccarton North Junction, where 300kph is chosen, and between Consett and Stocksfield Junction, where 200kph is deemed sufficient, as the distances between stations are not really long enough to justify the higher speed. Note that between

Riccarton North Junction and Edinburgh, the line speed reverts to 360kph. This section is foreseen as being shared with HS2 if and when that route's Scottish extension is implemented.

- The following sections of classic route merged with HS3 are upgraded to 225kph: Ulleskelf Junction – York HS, York HS – Northallerton, Northallerton – Yarm, and Waleswood Junction – Sheffield HS.
- The following sections of classic route over which HS3 or associated RM services travel, but not incorporated into the HS3 (but may be into another HS route's) main line are also upgraded as necessary to 225kph: Stafford – Runcorn, Wolverhampton – Shrewsbury, and Shrewsbury – Gobowen.
- The following sections of classic route over which HS3 or associated RM services travel, but not incorporated into the HS3 (or other HS route) main line are upgraded as necessary to 200kph: all of the MML south of Sheffield, the Newcastle – Carlisle line between Paradise Junction and Hexham, Northampton – Birmingham New St., Wolverhampton – Stafford, Runcorn – Liverpool Lime St., Gobowen – Chester. And Barnt Green – Worcester Shrub Hill.
- 160kph is taken as the line speed everywhere else, when nothing higher seems reasonable; no respectable railway should ever be slower than this.
- Those sections marked (*) are between Adjacent Stations, or between a station and a propinquant junction. For these sections, the elapsed time is derived from tables and stated explicitly. Refer to the article 'Same Speed Railways (Appendices C and D) for the necessary explanations and values; only those values are stated here.

Acceleration/deceleration distances and times (taken from 'Same Speed Railways' appendix B) are:

- Acceleration from stationary to 400kph, 250mph, takes 20.58km and 370 seconds
- Acceleration from stationary to 360kph, 225mph, takes 16.67km and 333 seconds
- Acceleration from stationary to 300kph, 187.5mph, takes 11.57km and 278 seconds
- Acceleration from stationary to 230kph, 143.8mph, takes 6.80km and 213 seconds
- Acceleration from stationary to 225kph, 140mph, takes 6.51km and 208 seconds
- Acceleration from stationary to 200kph, 125mph, takes 5.14km and 185 seconds
- Acceleration from stationary to 160kph, 100mph, takes 3.29km and 148 seconds
- Deceleration from 400kph to stationary takes 12.35km and 222 seconds
- Deceleration from 360kph to stationary takes 10.00km and 200 seconds
- Deceleration from 300kph to stationary takes 6.945km and 167 seconds
- Deceleration from 2300kph to stationary takes 4.08km and 128 seconds
- Deceleration from 225kph to stationary takes 3.91km and 125 seconds
- Deceleration from 200kph to stationary takes 3.07km and 111 seconds
- Deceleration from 160kph to stationary takes 1.98km and 89 seconds
- Time to travel from Luton & Dunstable Parkway to Milton Keynes Parkway (18km start to stop) is 438 seconds
- Time to travel from Northampton Castle to Langborough Junction (18km start to pass) is 358 sec.
- Time to travel from Leicester (station) to Stanford Junction (20km start to pass) is 379 seconds
- Time to travel from Edwalton Junction to Nottingham, **for trains from Melton Mowbray only**, (7km pass to stop) is 168 seconds
- Time to travel from Nottingham to Strelley Junction (7.0km start to pass) is 216 seconds
- Time to travel from Strelley Junctiion to Nuthall South Junction (0.38km pass to pass) is 6 sec.
- Time to travel from Leeds New Lane to Garforth West Junction (10km start to pass) is 260 sec.

- Time to travel from Garforth West Junction to Garforth East Jn. (0.28km pass to pass) is 12 sec.
- Time to travel from Shipley to Bradford City (4.9km stsrt to stop) is 229 seconds.
- Time to travel from Manchester HS to Victoria LL (0.5km start to stop) is 73 seconds.
- Time to travel from Victoria LL to Bolton (17km start to stop) is 426 seconds
- Time to travel from Bolton to Gibb Farm Junction (8km start to pass) is 231 seconds
- Time to travel from Shipley to Bradford City (5km start to stop) is 231 seconds.
- Time to travel from Yarm to Eaglescliffe (4.1km start to stop) is 209 seconds.
- Time to travel from Eaglescliffe to Thornaby (4.8km start to stop) is 216 seconds.
- Time to travel from Thornaby to Middlesborough (5.2km start to stop) is 235 seconds.
- Time to travel from Telford to Wellington (6.2km start to stop) is 257 seconds.
- Time to travel from Birmingham New St. to University (4.2km start to stop) is 212 seconds.

Whereas it is useful to quote the specific values input explicitly to the journey time spreadsheets for the routes dealt with in the current article, there is no point in describing the methodology other than at the most superficial level. The calculation of journey times is described in full and exhaustive detail in Appendix C of the 'Same Speed Railways' article, and Appendix D of the same article lists all the explicit times encountered throughout the network, explaining precisely what they are and why they are specified explicitly. To reproduce this information would inflate the current article (and every other Route and Service Plans article) by some forty-odd pages with negligible benefit – they're long enough anyway. The general reader needs to be interested only in the results. Those geeks who just have to have the really raw, hard-core stuff know where they can find it. (As a fully-paid-up geek myself, I love this stuff and it has been an immense pleasure and satisfaction to derive and document it, but I don't kid myself that it's of interest to more than a handful of people in the UK, or indeed the world. Nor need it be.)

The various section times are accumulated to obtain the overall journey times. One further refinement: a standard wait time of 3 minutes is assumed at intermediate stations, and this is added into the accumulated time at each stop.

1. UHS Services London – South Yorkshire (LL) / Barnsley / York / Halifax / Skipton (3/2/3/4/4 stops)

Section	Distance (km)	Cumulative Distance (km)	Section Time (minutes)	Cumulative Journey Time (minutes)	Elapsed Time from London, inc. Station Wait Times
Pancras Cross - Huthwaite Jn.	214.0	214.0	38.7	38.7	
Huthwaite Jn.- Stonebroom Jn.	5.0	219.0	1.3	40.0	
Stonebroom Jn. - Chesterfield	10.0	229.0	3.9	43.9	43.9
Chesterfield - Sheffield Midland	19.8	248.8	8.4	52.3	55.3
Sheffield Midland - Rotherham	9.7	258.5	5.6	57.9	63.9
Rotherham - South Yorkshire LL	11.0	269.5	6.1	64.0	73.0
Sheffield Midland - Barnsley	25.8	284.3	11.7	75.7	72.0
Pancras Cross - South Yorkshire HL	256.0	256.0	47.1	47.1	47.1
South Yorkshire HL - Ryhill Junctionn	19.0	275.0	6.1	53.2	
Ryhill Junctionn - Wakefield Westgate	8.0	283.0	3.2	56.4	59.4
Wakefield Westgate - Leeds New Lane	15.0	298.0	7.6	64.0	70.0
Leeds New Lane - Garforth East Junction	10.8	308.8	4.6	68.5	
Garforth East Junction - Ulleskelf Junction	15.0	323.8	3.1	71.7	
Ulleskelf Jn. - York HS	14.0	337.8	4.8	76.5	85.5
South Yorkshire HL - Swillington Common Jn.	36.0	292.0	9.0	56.1	
Swillington Common Jn. - Manston Junction	1.9	293.9	0.5	56.6	
Manston Jn. - Leeds City	8.0	301.9	3.3	60.0	63.0
Leeds City - Shipley	17.3	319.2	8.5	68.4	74.4
Shipley - Bradford City	4.9	324.1	3.8	72.2	81.2
Bradford City - Halifax	12.8	336.9	6.8	79.0	91.0
Leeds City - Shipley	17.3	319.2	8.5	68.4	76.4
Shipley - Keighley	10.0	329.2	5.7	74.1	85.1
Keighley - Skipton	16.4	345.6	8.1	82.3	96.3

Current fastest time (minutes) from London (with HS2 Ltd.'s estimates) [and the above values] to:

- Chesterfield 105 [44]
- Sheffield 120 (69/79*) [55]
- Rotherham 136 (1 change) [64]
- Barnsley 155 (1 change) [72]
- Wakefield 115 [59]
- Leeds 131 (83) [70/63]
- York 110 [86]
- Shipley 152 (1 change) [74]
- Bradford 168 (2 changes) [81]
- Halifax 171 [91]
- Keighley 166 (1 change) [85]
- Skipton 184 (1 change) [96]

(*) 69 minutes is HS2 Ltd.'s estimate from London to the old South Yorkshire (Meadowhall), and 79 minutes to Sheffield Midland. These values, and that for Leeds, show very clearly the time penalty imposed by the ridiculous routing via Birmingham. Note that the above service to Sheffield is not the fastest – see section 2, following. Likewise the service to York – via Leeds – is very much not the fastest – see sections 2 and 3.

The services to South Yorkshire LL and Barnsley split / join at Sheffield Midland. The Barnsley portion is given a 5 minute station wait at Sheffield, departing 2 minutes after / arriving 2 minutes before the South Yorkshire portion. Likewise the services to Halifax and Skipton split / join at Leeds City, the Skipton portion having a 5 minute wait there.

1P. UHS Services London – South Yorkshire (LL) / Barnsley / York / Halifax / Skipton (3/2/3/4/4 stops; with passing times)

Section	Distance (km)	Cumulative Distance (km)	Section Time (minutes)	Cumulative Journey Time (minutes)	Elapsed Time from London, inc. Station Wait Times
Pancras Cross - *Scratchwood Junction (pass)*	17.0	17.0	5.6	*5.6*	*5.6*
Scratchwood Junction (pass) - Slip End (North) Junction (pass)	29.9	46.9	5.0	*10.6*	*10.6*
Slip End (North) Junction (pass) - Luton & Dunstable Pkwy (pass)	4.1	51.0	0.7	*11.3*	*11.3*
Luton & Dunstable Pkwy (pass) - Milton Keynes Pkwy (pass)	18.0	69.0	3.0	*14.3*	*14.3*
Milton Keynes Parkway (pass) - Newport Pagnell (N.) Jn. (pass)	6.8	75.8	1.1	*15.4*	*15.4*
Newport Pagnell (N.) Jn. (pass) - Collingtree (West) Jn. (pass)	22.1	97.9	3.7	*19.1*	*19.1*

Collingtree (West) Jn. (pass) - Langborough Junction (pass)	15.1	113.0	2.5	*21.6*	*21.6*
Langborough Junction (pass) - Aylestone (North) Junction (pass)	35.9	148.9	6.0	*27.6*	*27.6*
Aylestone (North) Junction (pass) - Leicester Avoiding Line (pass)	4.1	153.0	0.7	*28.3*	*28.3*
Leicester Avoiding Line (pass) - Thurmaston (North) Jn. (pass)	6.8	159.8	1.1	*29.4*	*29.4*
Thurmaston (North) Jn. (pass) - Stanford Junction (pass)	13.2	173.0	2.2	*31.6*	*31.6*
Stanford Junction (pass) - Nuthall South Junction (pass)	23.0	196.0	3.8	*35.4*	*35.4*
Nuthall South Junction (pass) - Nuthall North Junction (pass)	4.5	200.5	0.8	*36.2*	*36.2*
Nuthall North Junction (pass) - Huthwaite Junction (pass)	13.5	214.0	2.5	*38.7*	*38.7*
Huthwaite Junction (pass) - Stonebroom Junction (pass)	5.0	219.0	1.3	*40.0*	*40.0*
Stonebroom Jn. (pass) - Chesterfield	10.0	229.0	3.9	43.9	43.9
Chesterfield - Sheffield Midland	19.8	248.8	8.4	52.3	55.3
Sheffield Midland - Rotherham	9.7	258.5	5.6	57.9	63.9
Rotherham - South Yorkshire LL	11.0	269.5	6.1	64.0	73.0
Sheffield Midland - Barnsley	25.8	274.6	11.7	64.0	72.0
Nuthall North Junction (pass) - Huthwaite Junction (pass)	13.5	214.0	2.3	*38.4*	*38.4*
Huthwaite Junction (pass) - Wales Junction (pass)	25.0	239.0	4.2	*42.6*	*42.6*
Wales Junction (pass) - Ravenfield (North) Junction (pass)	12.9	251.9	2.4	*45.0*	*45.0*
Ravenfield (North) Junction (pass) - South Yorkshire HL	4.1	256.0	2.1	47.1	47.1
South Yorkshire HL - *Hickleton (North) Junction (pass)*	6.8	262.8	3.5	50.7	53.7
Hickleton (North) Junction (pass) - Ryhill Junction (pass)	12.2	275.0	2.6	53.2	56.2
Ryhill Junction)pass) - Crofton Junction (pass)	1.0	276.0	0.3	*53.5*	56.5
Crofton Junction (pass) - Wakefield Westgate	7.0	283.0	2.9	56.4	59.4
Wakefield Westgate - *Gelderd Rd. North Junction (pass)*	11.0	294.0	5.4	*61.8*	*67.8*
Gelderd Rd. North Junction (pass) - Leeds New Lane	4.0	298.0	2.2	64.0	70.0
Leeds New Lane - *Garforth West Junction (pass)*	10.0	308.0	4.3	*68.3*	*77.3*

Garforth West Junction (pass) - Garforth East Junction (pass)	0.8	308.8	0.2	*68.5*	*77.5*
Garforth East Junction (pass) - Ulleskelf Junction (pass)	15.0	323.8	3.1	*71.7*	*80.7*
Ulleskelf Junction (pass) - York HS	14.0	337.8	4.8	76.5	85.5
South Yorkshire HL - *Hickleton (North) Junction (pass)*	6.8	262.8	3.9	*51.0*	*54.0*
Hickleton (North) Jn. (pass) - Ryhill Junction (pass)	12.2	275.0	2.0	*53.1*	*56.1*
Ryhill Junction (pass) - Swillington Common Junction (pass)	17.0	292.0	3.1	*56.1*	*59.1*
Swillington Common Junction (pass) - Manston Junction (pass)	1.9	293.9	0.5	*56.6*	*59.6*
Manston Junction (pass) - Leeds City	8.0	301.9	3.3	60.0	63.0
Leeds City - Shipley	17.3	319.2	8.5	68.4	74.4
Shipley - Bradford City	4.9	324.1	3.8	72.2	81.2
Bradford City - Halifax	12.8	336.9	6.8	79.0	91.0
Leeds City - Shipley	17.3	319.2	8.5	68.4	76.4
Shipley - Keighley	10.0	329.2	5.7	74.1	85.1
Keighley - Skipton	16.4	345.6	8.1	82.3	96.3

Note that the passing time for Huthwaite Junction must be recalculated, since the first service, to Sheffield Midland and South Yorkshire LL / Barnsley diverges at the junction, and must therefore decelerate down to 230kph, whereas the services to York and Halifax / Skipton travel directly to South Yorkshire HL, passing through Huthwaite Junction at line speed, 360kph.

Note also that Hickleton (North) Junction features in the service to Halifax / Skipton, but not in the service to York via Leeds, since this service does not re-join the main line on departure from South Yoekshire, but travels on relief tracks to Ryhill Junction.

2. UHS Services London – Liverpool / York / Middlesborough / Newcastle (3/2/6/5 stops):

Section	Distance (km)	Cumulative Distance (km)	Section Time (minutes)	Cumulative Journey Time (minutes)	Elapsed Time from London, inc. Station Wait Times
Pancras Cross - Wales Junction	239.0	239.0	42.8	42.8	
Wales Junction - Waleswood Junction	0.8	239.8	0.2	43.0	
Waleswood Junction - Sheffield HS	10.6	250.3	3.9	46.9	46.9
Sheffield HS - Manchester HS	55.0	305.3	14.7	61.6	64.6
Manchester HS - M/C Victoria LL	0.5	305.8	1.2	62.8	68.8
M/C Victoria LL - Liverpool Lime St.	49.0	354.8	12.6	75.4	84.4
Pancras Cross - South Yorkshire HL	256.0	256.0	47.1	47.1	47.1
South Yorkshire HL - Ulleskelf Jn.	53.0	309.0	11.8	59.0	
Ulleskelf Jn. - York HS	14.0	323.0	4.8	63.7	66.7
York HS - Northallerton	48.2	371.2	15.6	79.4	87.4
Northallerton - Yarm	19.4	390.6	8.0	87.3	98.3
Yarm - Eaglescliffe	4.1	394.7	3.5	90.8	104.8
Eaglescliffe - Thornaby	4.8	399.5	3.8	94.6	111.6
Thornaby - Middlesborough	5.2	404.7	3.9	98.5	118.5
York - Romanby Junction	46.0	369.0	14.0	77.7	
Romanby Junction - Darlington	24.0	393.0	6.1	83.8	89.8
Darlington - Durham Relly Mill	33.0	426.0	10.3	94.1	103.1
Durham Relly Mill - Consett	20.0	446.0	7.7	101.8	113.8
Consett - Newcastle	20.0	466.0	7.7	109.5	124.5

Current fastest time (minutes) from London (with HS2 Ltd.'s estimates) [and the above values] to:

- Sheffield 120 [47]
- Manchester 127 (68) [65]
- Liverpool 128 (96) [84]
- York 110 [67]
- Northallerton 144 [87]
- Yarm 174 (1 change) [98]
- Eaglescliffe 163 [105]
- Thornaby 169 (1 change) [111]
- Middlesborough 176 (1 change) [119]
- Darlington 139 [90]
- Durham 173 [103]
- Newcastle 169 [125]

The above time to York is still not the fastest – see section 3, following.

The services to Newcastle and Middlesborough split / join at York. The Middlesborough portion is given a 5 minute station wait at York, departing 2 minutes after / arriving 2 minutes before the Newcastle portion.

Pancras Cross – Sheffield HS non-stop takes 47 minutes at an average speed of 200.6mph. Pancras Cross – Manchester HS with 1 stop takes 65 minutes at an average speed of 176mph. This actually takes 3 minutes less than HS2's time from Euston Cross to Manchester, although that journey is 6km shorter, but of course that journey has 2 intermediate stops rather than just 1, and the extra stop, Manchester Interchange, is only 5 miles from Manchester HS, which means in effect that the deceleration for the final station begins 5 miles further out, and the final 5 miles are taken at an average speed of only 60mph, and the overall journey at an average speed of 167mph.

The above time Pancras Cross – Liverpool is 12 minutes longer than HS2 by my plans, new HS infrastructure all the way, but 15 minutes shorter than my value for the HS-C service to Liverpool, along the classic route between Crewe and Liverpool (using current timetable times between Crewe and Liverpool) and 11 minutes shorter than HS2 Ltd.'s time to Liverpool (they've clearly assumed some acceleration on the WCML).

2P. UHS Services London – Liverpool / York / Middlesborough / Newcastle (3/2/6/5 stops; with passing times):

Section	Distance (km)	Cumulative Distance (km)	Section Time (minutes)	Cumulative Journey Time (minutes)	Elapsed Time from London, inc. Station Wait Times
Pancras Cross - *Scratchwood Junction (pass)*	17.0	17.0	5.6	*5.6*	*5.6*
Scratchwood Junction (pass) - Slip End (North) Junction (pass)	29.9	46.9	5.0	*10.6*	*10.6*
Slip End (North) Junction (pass) - Luton & Dunstable Pkwy (pass)	4.1	51.0	0.7	*11.3*	*11.3*
Luton & Dunstable Pkwy (pass) - Milton Keynes Partkway (pass)	18.0	69.0	3.0	*14.3*	*14.3*
Milton Keynes Parkway (pass) - Newport Pagnell (N.) Jn. (pass)	6.8	75.8	1.1	*15.4*	*15.4*
Newport Pagnell (N.) Jn. (pass) - Collingtree (West) Jn. (pass)	22.1	97.9	3.7	*19.1*	*19.1*
Collingtree (West) Jn. (pass) - Langborough Junction (pass)	15.1	113.0	2.5	*21.6*	*21.6*
Langborough Junction (pass) - Aylestone (North) Junstion (pass)	35.9	148.9	6.0	*27.6*	*27.6*
Aylestone (North) Junction (pass) - Leicester Avoiding Line (pass)	4.1	153.0	0.7	*28.3*	*28.3*
Leicester Avoiding Line (pass) - Thurmaston (North) Jn. (pass)	6.8	159.8	1.1	*29.4*	*29.4*
Thurlestone (North) Jn. (pass) - Stanford Junction (pass)	13.2	173.0	2.2	*31.6*	*31.6*
Stanford Junction (pass) - Nuthall South Junction (pass)	23.0	196.0	3.8	*35.4*	*35.4*
Nuthall South Junction (pass) - Nuthall North Junction (pass)	4.5	200.5	0.8	*36.2*	*36.2*
Nuthall North Junction (pass) - Huthwaite Junction (pass)	13.5	214.0	2.3	*38.4*	*38.4*
Huthwaite Junction (pass) - Wales Junction (pass)	25.0	239.0	4.4	*42.8*	*42.8*
Wales Junction (pass) - Waleswood Junction (pass)	0.8	239.8	0.2	*43.0*	*43.0*
Waleswood Junction (pass) - Woodburn HS Juncione (pass)	9.0	248.8	2.5	*45.6*	*45.6*
Woodburn HS Junction (pass) - Sheffield HS	1.6	250.3	1.3	46.9	46.9
Sheffield HS - *Ladybower Junction (pass)*	17.0	267.3	5.7	*52.6*	*55.6*
Ladybower Junction (pass) - Guide Bridge HS Jn. (pass)	30.0	297.3	6.0	*58.6*	*61.6*

Guide Bridge HS Jn (pass) - Manchester HS	8.0	305.3	3.0	*61.6*	64.6
Manchester HS - Manchester Victoria LL	0.5	305.8	1.2	62.8	68.8
Manchester Victoria LL - *Broughton Junction (pass)*	3.0	308.8	2.4	*65.2*	*74.2*
Broughton Junction (pass) - *Kenyon West Junction (pass)*	17.0	325.8	3.8	*68.9*	*77.9*
Kenyon West Junction (pass) - Liverpool Lime St.	29.0	354.8	6.5	75.4	84.4
Huthwaite Junction (pass) - *Wales Junction (pass)*	25.0	239.0	4.2	*42.6*	*42.6*
Wales Junction (pass) - *Ravenfield (North) Jn. (pass)*	12.9	251.9	2.2	*44.8*	*44.8*
Ravenfield (North) Jn. (pass) - South Yorkshire HL	4.1	256.0	2.3	47.1	47.1
South Yorkshire HL - *Hickleton (North) Jn. (pass)*	6.8	262.8	3.5	*50.7*	*53.7*
Hickleton (North) Jn. (pass) - *Ryhill Junction (pass)*	12.2	275.0	2.4	*53.1*	*56.1*
Ryhill Junction (pass) - *Swillington Common Jn. (pass)*	17.0	292.0	2.8	*55.9*	*58.9*
Swillington Common Jn. (pass) - *Garforth East Jn. (pass)*	2.0	294.0	0.3	*56.2*	*59.2*
Garforth East Junction (pass) - *Ulleskelf Junction (pass)*	15.0	309.0	2.7	*59.0*	*62.0*
Ulleskelf Junction (pass) - York HS	14.0	323.0	4.8	63.7	66.7
York HS - Northallerton	48.2	371.2	15.6	79.4	87.4
Northallerton - Yarm	19.4	390.6	8.0	87.3	98.3
Yarm - Eaglescliffe	4.1	394.7	3.5	90.8	104.8
Eaglescliffe - Thornaby	4.8	399.5	3.8	94.6	111.6
Thornaby - Middlesborough	5.2	404.7	3.9	98.5	118.5
York HS - *Romanby Junction (pass)*	46.0	369.0	14.0	*77.7*	*83.7*
Romanby Junction (pass) - Darlington	24.0	393.0	6.1	83.8	89.8
Darlington - Durham Relly Mill	33.0	426.0	10.3	94.1	103.1
Durham Relly Mill - Consett	20.0	446.0	7.7	101.8	113.8
Consett - *Derwent Hill Junction (pass)*	2.0	448.0	1.9	*103.7*	*118.7*
Derwent Hill Junction (pass) - *Paradise Junction (pass)*	15.0	463.0	4.0	*107.7*	*122.7*

Paradise Junction (pass) - Newcastle	3.0	466.0	1.8	109.5	124.5

Note that the passing time for Wales Junction must be recalculated, since the first service, to Liverpool, diverges at the junction, and must therefore decelerate down to 230kph, whereas the services to Newcastle / Middlesborough travel directly to South Yorkshire HL, passing through Wales Junction at line speed.

3. UHS Services London / Newcastle – Edinburgh (6/3 stops):

Section	Distance (km)	Cumulative Distance (km)	Section Time (minutes)	Cumulative Journey Time (minutes)	Elapsed Time from London, inc. Station Wait Times
Pancras Cross - Ulleskelf Jn.	309.0	309.0	54.5	54.5	
Ulleskelf Jn. - York HS	14.0	323.0	4.8	59.3	59.3
York HS - Romanby Jn.	46.0	369.0	14.0	73.3	
Romanby Jn. - Darlington	24.0	393.0	6.1	79.3	82.3
Darlington - Durham Relly Mill	33.0	426.0	10.3	89.7	95.7
Durham Relly Mill - Consett	20.0	446.0	7.7	97.4	106.4
Consett - Derwent Hill Jn.	2.0	448.0	1.9	99.3	
Derwent Hill Jn. - Hexham	21.0	469.0	7.4	106.7	118.7
Hexham - Riccarton North Jn.	60.0	529.0	14.4	121.1	
Riccarton North Jn. - Hawick	20.0	549.0	5.4	126.5	141.5
Hawick - Edinburgh	82.0	631.0	18.1	144.6	162.6
Newcastle - Hexham	32.0	32.0	12.1	12.1	12.1
Hexham - Riccarton North Jn,	60.0	92.0	14.4	26.5	
Riccarton North Jn. - Hawick	20.0	112.0	5.4	31.9	34.9
Hawick - Lauder	37.0	149.0	10.6	42.5	48.5
Lauder - Edinburgh	45.0	194.0	11.9	54.4	63.4

Current fastest time (minutes) from London [and the above values] to:

- York 110 [59]
- Darlington 139 [82]
- Durham 173 [96]
- Consett [106]
- Hexham 235 (1 change) [119]
- Hawick [142]
- Edinburgh 260 [163]

And from Newcastle:

- Hexham 31 [12]
- Hawick [35]
- Lauder [49]
- Edinburgh 85 (via ECML, of course). [63]

3P. UHS Services London / Newcastle – Edinburgh (6/3 stops; with passing times):

Section	Distance (km)	Cumulative Distance (km)	Section Time (minutes)	Cumulative Journey Time (minutes)	Elapsed Time from London, inc. Station Wait Times
Pancras Cross - *Scratchwood Junction (pass)*	17.0	17.0	5.6	*5.6*	*5.6*
Scratchwood Junction (pass) - Slip End (North) Jn. (pass)	29.9	46.9	5.0	*10.6*	*10.6*
Slip End (North) Jn. (pass) - Luton & Dunstable Pkwy (pass)	4.1	51.0	0.7	*11.3*	*11.3*
Luton & Dunstable Pkwy (pass) - Milton Keynes Partkway (pass)	18.0	69.0	3.0	*14.3*	*14.3*
Milton Keynes Parkway (pass) - Newport Pagnell (N.) Jn. (pass)	6.8	75.8	1.1	*15.4*	*15.4*
Newport Pagnell (N.) Jn. (pass) - Collingtree (West) Jn. (pass)	22.1	97.9	3.7	*19.1*	*19.1*
Collingtree (West) Jn. (pass) - Langborough Junction (pass)	15.1	113.0	2.5	*21.6*	*21.6*
Langborough Junction (pass) - Aylestone (North) Junstion (pass)	35.9	148.9	6.0	*27.6*	*27.6*
Aylestone (North) Junction (pass) - Leicester Avoiding Line (pass)	4.1	153.0	0.7	*28.3*	*28.3*
Leicester Avoiding Line (pass) - Thurmaston (North) Jn. (pass)	6.8	159.8	1.1	*29.4*	*29.4*
Thurlestone (North) Jn. (pass) - Stanford Junction (pass)	13.2	173.0	2.2	*31.6*	*31.6*
Stanford Junction (pass) - Nuthall South Junction (pass)	23.0	196.0	3.8	*35.4*	*35.4*
Nuthall South Junction (pass) - Nuthall North Junction (pass)	4.5	200.5	0.8	*36.2*	*36.2*
Nuthall North Junction (pass) - Huthwaite Junction (pass)	13.5	214.0	2.3	*38.4*	*38.4*
Huthwaite Junction (pass) - Wales Junction (pass)	25.0	239.0	4.2	*42.6*	*42.6*

Wales Junction (pass) - Ravenfield (North) Jn. (pass)	12.9	251.9	2.2	*44.8*	*44.8*
Ravenfield (North) Jn. (pass) - South Yorkshire HL (pass)	4.1	256.0	0.7	*45.4*	*45.4*
South Yorkshire HL (pass) - Hickleton (North) Jn. (pass)	6.8	262.8	1.1	*46.6*	*46.6*
Hickleton (North) Jn. (pass) - Ryhill Junction (pass)	12.2	275.0	2.0	*48.6*	*48.6*
Ryhill Junction (pass) - Swillington Common Jn. (pass)	17.0	292.0	2.8	*51.4*	*51.4*
Swillington Common Jn. (pass) - Garforth East Jn. (pass)	2.0	294.0	0.3	*51.8*	*51.8*
Garforth East Junction (pass) - Ulleskelf Junction (pass)	15.0	309.0	2.7	*54.5*	*54.5*
Ulleskelf Junction (pass) - York HS	14.0	323.0	4.8	59.3	59.3
York HS - *Romanby Junction (pass)*	46.0	369.0	14.0	*73.3*	*76.3*
Romanby Junction (pass) - Darlington	24.0	393.0	6.1	79.3	82.3
Darlington - Durham Relly Mill	33.0	426.0	10.3	89.7	95.7
Durham Relly Mill - Consett	20.0	446.0	7.7	97.4	106.4
Consett - *Derwent Hill Junction (pass)*	2.0	448.0	1.9	*99.3*	*111.3*
Derwent Hill Junction (pass) - Stocksfield Junction (pass)	9.0	457.0	2.9	*102.2*	*114.2*
Stocksfield Junction (pass) - Hexham	12.0	469.0	4.5	106.7	118.7
Hexham - *Riccarton North Junction (pass)*	60.0	529.0	14.4	*121.1*	*136.1*
Riccarton North Junction (pass) - Hawick	20.0	549.0	5.4	126.5	141.5
Hawick - *Ravenswood Jn. (pass)*	21.0	570.0	6.3	*132.8*	*150.8*
Ravenswood Jn. (pass) - Birkenside (North) Jn. (pass)	11.9	581.9	2.0	*134.8*	*152.8*
Birkenside (North) Jn. (pass) - Lauder (pass)	4.1	586.0	0.7	*135.5*	*153.5*
Lauder (pass) - Wiselawmill (North) Jn. (pass)	6.8	592.8	1.1	*136.6*	*154.6*
Wiselawmill (North) Jn. (pass) - Newcraighall HS (pass)	31.0	623.8	5.2	*141.8*	*159.8*
Newcraighall HS (pass) - Edinburgh	7.2	631.0	2.8	144.6	162.6
Newcastle - *Paradise Junction (pass)*	3.0	3.0	2.4	*2.4*	*2.4*

Paradise Junction (pass) - Bladon Junction East (pass)	4.0	7.0	1.3	*3.6*	*3.6*
Bladon Junction East (pass) - Stocksfield Junction (pass)	13.0	20.0	3.9	*7.5*	*7.5*
Stocksfield Junction (pass) - Hexham	12.0	32.0	4.5	12.1	12.1
Hexham - *Riccarton North Junction (pass)*	60.0	92.0	14.4	*26.5*	*29.5*
Riccarton North Junction (pass) - Hawick	20.0	112.0	5.4	31.9	34.9
Hawick - *Ravenswood Jn. (pass)*	21.0	133.0	6.3	*38.1*	*44.1*
Ravenswood Jn. (pass) - Birkenside (North) Jn. (pass)	11.9	144.9	2.2	*40.3*	*46.3*
Birkenside (North) Jn. (pass) - Lauder	4.1	149.0	2.1	42.5	48.5
Lauder - *Wiselawmill (North) Jn. (pass)*	6.8	155.8	3.5	46.0	*55.0*
Wiselawmill (North) Jn. (pass) - Newcraighall HS (pass)	31.0	186.8	5.6	51.6	*60.6*
Newcraighall HS (pass) - Edinburgh	7.2	194.0	2.8	54.4	63.4

4. UHS Elapsed Times Summary:

Section	Pancras Cross - Liverp'l	Pancras Cross - South Yorks	Pancras Cross - York	Pancras Cross - Middlesbrough	Pancras Cross - N'castle	Pancras Cross - West Yorks.	Pancras Cross - Ed'b'gh	N'castle - Ed'b'gh
Pancras Cross - Sheffield HS	46.8							
Sheffield HS - Manchester HS	64.5							
Manchester HS - Victoria LL	68.8							
Victoria LL - Liverpool Lime St.	84.4							
Pancras Cross - Chesterfield		43.9						

Chesterfield - Sheffield Midland		55.3						
Sheffield Midland - Rotherham		63.9						
Rotherham - South Yorkshire LL		73.0						
Sheffield Midland - Barnsley		72.0						
Pancras Cross - South Yorkshire			47.1	47.1	47.1	47.1		
South Yorkshire - Wakefield Westgate			59.4	|	|	|		
Wakefield Westgate - Leeds New Lane			70.0	|	|	|		
South Yorkshire / Leeds - York HS			85.5	66.7	66.7	|		
York HS - Northallerton				87.4	|	|		
Northallerton - Yarm				98.2	|	|		
Yarm - Eaglescliffe				104.7	|	|		
Eaglescliffe - Thornaby				111.5	|	|		
Thornaby - Middlesborough				118.4	|	|		
York HS - Darlington					89.8	|		
Darlington - Durham Relly Mill					103.1	|		

Durham Relly Mill - Consett					113.8			
Consett - Newcastle					124.5			
South Yorkshire - Leeds City						63.6		
Leeds City - Shipley						75.1		
Shipley - Bradford City						81.9		
Bradford City - Halifax						91.7		
Shipley - Keighley						85.8		
Keighley - Skipton						96.9		
Pancras Cross - York							59.3	
York - Darlington							82.3	
Darlington - Durham Relly Mill							95.7	
Durham Relly Mill - Consett							106.4	
Consett - Hexham							118.7	
Hexham - Hawick							141.5	
Hawick - Edinburgh							162.6	
Newcastle - Hexham								12.1
Hexham - Hawick								34.9
Hawick - Lauder								48.5
Lauder - Edinburgh								63.4

5. HS Metro Services London – York / Preston (8/9 stops):

Section	Distance (km)	Cumulative Distance (km)	Section Time (minutes)	Cumulative Journey Time (minutes)	Elapsed Time from London, inc. Station Wait Times
Pancras Cross - Luton & Dunstable Pkwy	51.0	51.0	12.9	12.9	12.9
Luton & Dunstable Pkwy - Milton Keynes Parkway	18.0	69.0	7.3	20.2	23.2
Milton Keynes Parkway - Northampton Castle	33.0	102.0	9.9	30.2	36.2
Northampton Castle - Langborough Junction	18.0	120.0	6.0	36.2	
Langborough Junction - Leicester	40.0	160.0	8.7	44.9	53.9
Leicester - Stanford Junction	20.0	180.0	6.3	51.2	
Stanford Junction - Nottingham	22.0	202.0	5.7	56.9	68.9
Nottingham - Derby	26.0	228.0	8.8	65.7	80.7
Nottingham - Nuthall South Junction.	7.4	209.4	3.7	60.6	
Nuthall South Junction - Wales Junction	43.0	252.4	7.8	68.4	
Wales Junction - Waleswood Junction	0.8	253.2	0.2	68.6	
Waleswood Jinction - Sheffield HS	10.6	263.7	3.9	72.4	89.4
Sheffield HS - Huddersfield	51.0	314.7	14.1	86.6	106.6
Huddersfield - Leeds New Lane	24.0	338.7	8.5	95.1	118.1
Leeds New Lane - Garforth East Jn.	10.8	349.5	4.6	99.6	
Garforth East Junction - Ulleskelf Junction	15.0	364.5	3.1	102.7	
Ulleskelf Jn. - York HS	14.0	378.5	4.8	107.5	133.5
Sheffield HS - Manchester HS	55.0	318.7	14.7	87.1	107.1
Manchester HS - Victoria LL	0.5	319.2	1.2	88.3	111.3
Victoria LL - Bolton	17.0	336.2	7.1	95.4	121.4
Bolton - Gibb Farm Junction	8.0	344.2	3.9	99.3	

Gibb Farm Junction - Preston	24.0	360.2	6.1	105.4	134.4

Note that the service to Derby involves one change – a (cross-platform) connection at Nottingham into an HS7 service, either Skegness or Cleethorpes to Birmingham. The HS3 service accordingly is given a 5 minute wait at Nottingham, since the HS7 service has the main line through Strelley and Awsworth junctions, whereas the HS3 service has to slow to diverge at Strelley.

Current fastest time (minutes) from London (with HS2 Ltd.'s estimates) [and the above values] to:

- Luton [& Dunstable Pkwy] 21 [13]
- Milton Keynes [Parkway] 30 [23]
- Northampton 51 [36]
- Leicester 62 [54]
- Nottingham 100 (51/68*) [69]
- Derby 85 (51/71*) [81]
- Sheffield 120 [89]
- Huddersfield 162 (with 1 change) [107]
- Leeds 131 [118]
- York 110 [133]
- Manchester HS 127 [107]
- Bolton 164 (with 1 change) [121]
- Preston 128 [134]

(*) 51 minutes is HS2 Ltd.'s estimate from London to Toton (with 1 stop), 68 minutes to Nottingham Midland and 71 to Derby Midland. HS3's value of 68 minutes to Nottingham is with 3 stops, and 80minutes to Derby is with 4 stops and 1 change. Purely for illustration, a non-stop London – Nottingham service by HS3 would take 38 minutes, and reach Derby in 49 minutes. I was not actually proposing such a service, initially, but, having seen what would be possible, this will certainly be one of the additional services enabled by HS3 Mk2's capacity enhancements. (See below, following SP6, for illustrative non-stop times.)

Okay, so even a HS Metro train can't, travelling via Huddersfield and with 7 intermediate stops, beat a non-stop service to York, straight up the ECML. But see the corresponding UHS services to York. Remarkably, it still beats the fastest service to Leeds, by a comfortable margin (but, again, see the UHS service to Leeds and on to York).

Moreover, even travelling via the East Midlands, with 6 intermediate stops, the HS Metro service still beats the current best time to Manchester (comfortably) and, with 8 intermediate stops, is just 6 minutes slower to Preston

5P. HS Metro Services London – York / Preston (8/9 stops, with passing times):

Section	Distance (km)	Cumulative Distance (km)	Section Time (minutes)	Cumulative Journey Time (minutes)	Elapsed Time from London, inc. Station Wait Times
Pancras Cross - *Scratchwood Junction (pass)*	17.0	17.0	5.6	*5.6*	*5.6*
Scratchwood Junction (pass) - Slip End (North) Junction (pass)	29.9	46.9	5.2	*10.8*	*10.8*
Slip End (North) Junction (pass) - Luton & Dunstable Parkway	4.1	51.0	2.1	12.9	12.9
Luton & Dunstable Parkway - Milton Keynes Parkway	18.0	69.0	7.3	20.2	23.2
Milton Keynes Parkway - *Newton Pagnell (N.) Jn. (pass)*	6.8	75.8	3.5	*23.8*	*29.8*
Newton Pagnell (N.) Jn. (pass) - Collingtree (West) Jn. (pass)	22.1	97.9	4.3	*28.1*	*34.1*
Collingtrrr (West) Jn. (pass) - Northampton Castle	4.1	102.0	2.1	30.2	36.2
Northampton Castle - *Langborough Junction (pass)*	18.0	120.0	6.0	*36.2*	*45.2*
Langborough Junction (pass(- Aylestone (North) Jn. (pass)	35.9	155.9	6.6	*42.7*	*51.7*
Aylestone (North) Jn. (pass) - Leicester	4.1	160.0	2.1	44.9	53.9
Leicester - *Thurmaston (North) Jn. (pass)*	6.8	166.8	3.5	*48.4*	*60.4*
Thurmaston (North) Jn. (pass) - Stanford Junction (pass)	13.2	180.0	2.8	*51.2*	*63.2*
Stanford Junction (pass) - Edwalton Junction (pass)	15.0	195.0	2.9	*54.1*	*66.1*
Edwalton Junction (pass) - Nottingham	7.0	202.0	2.8	56.9	68.9
Nottingham - *Strelley Junction (pass)*	7.0	209.0	3.6	*60.5*	*75.5*
Strelley Junction (pass) - Awsworth Junction (pass)	3.5	212.5	1.0	*61.5*	*76.5*
Awsworth Junction (pass) - Derby	15.5	228.0	4.1	65.7	80.7
Nottingham - *Strelley Junction (pass)*	7.0	209.0	3.6	*60.5*	*77.5*
Strelley Junction (pass) - Nuthall South Junction (pass)	0.4	209.4	0.1	*60.6*	*77.6*

Nuthall South Junction (pass) - Nuthall (North) Junction (pass)	4.5	213.9	1.0	*61.6*	*78.6*
Nuthall (North) Junction (pass) - Huthwaite Junction (pass)	13.5	227.4	2.3	*64.0*	*81.0*
Huthwaite Junction (pass) - Wales Junction (pass)	25.0	252.4	4.4	*68.4*	*85.4*
Wales Junction (pass) - Waleswood Junction (pass)	0.7	253.1	0.2	*68.6*	*85.6*
Waleswood Junction (pass) - Woodburn HS Junction (pass)	9.0	262.1	2.5	*71.1*	*88.1*
Woodburn HS Junction (pass) - Sheffield HS	1.6	263.7	1.3	72.4	89.4
Sheffield HS - *Ladybower Junction (pass)*	17.0	280.7	5.8	*78.2*	*98.2*
Ladybower Junction (pass) - Huddersfield	34.0	314.7	8.3	86.5	106.5
Huddersfield - Leeds New Lane	24.0	338.7	8.5	95.0	118.0
Leeds New Lane - *Garforth West Junction (pass)*	10.0	348.7	4.3	*99.3*	*125.3*
Garforth West Junction (pass) - Garforth East Junction (pass)	0.8	349.5	0.2	*99.5*	*125.5*
Garforth East Junction (pass) - Ulleskelf Junction (pass)	15.0	364.5	3.1	*102.7*	*128.7*
Ulleskelf Junction (pass) - York HS	14.0	378.5	4.8	107.4	133.4
Sheffield HS - *Ladybower Junction (pass)*	17.0	280.7	5.7	*78.1*	*98.1*
Ladybower Junction (pass) - Guide Bridge HL Junction (pass)	30.0	310.7	6.0	*84.1*	*104.1*
Guide Bridge HL Junction (pass) - Manchester HS	8.0	318.7	3.0	87.1	107.1
Manchester HS - Manchester Victoria LL	0.5	319.2	1.2	88.3	111.3
Manchester Victoria LL - *Broughton Junction (pass)*	3.0	322.2	2.4	*90.7*	*116.7*
Broughton Junction (pass) - Bolton	14.0	336.2	4.7	95.4	121.4
Bolton - *Gibb Farm Junction (pass)*	8.0	344.2	3.9	*99.3*	*128.3*
Gibb Farm Jinction (pass) - Preston	24.0	368.2	6.1	105.3	134.3

[Note that the calculation of section time between Nuthall South and North junctions requires use of the general formula $t = (\sqrt{(v_0^2 + 2as)} - v_0)/a$. This is a very rare situation. (Don't forget the junction-crossing effect in the value of s, and to add the junction crossing time.)]

6. HS-C St. Pancras West – York / Manchester / Liverpool / Chester (12/10/12/13 stops):

Section	Distance (km)	Cumulative Distance (km)	Section Time (minutes)	Cumulative Journey Time (minutes)	Elapsed Time from London, inc. Station Wait Times
St. Pancras - Luton & Dunstable Pkwy	51.0	51.0	12.9	12.9	12.9
Luton & Dunstable Pkwy - Milton Keynes Pkwy	18.0	69.0	7.3	20.2	23.2
Milton Keynes Pkwy - Northampton Castle	33.0	102.0	9.9	30.2	36.2
Northampton Castle - Langborough Junction	18.0	120.0	6.0	36.2	
Langborough Junction - Leicester	40.0	142.0	8.7	50.5	53.9
Leicester - Loughborough	20.1	162.1	8.5	59.0	65.4
Loughborough - Derby	26.2	188.3	10.3	69.3	78.7
Leicester - East Midlands Pkwy	30.9	172.9	11.7	62.2	68.6
East Midlands Pkwy - Derby	15.4	188.3	7.1	69.3	78.7
Derby - Chesterfield	38.8	227.1	14.1	83.4	95.8
Chesterfield - Sheffield	19.8	246.9	8.4	91.9	107.2
Sheffield - Rotherham	9.7	256.6	5.6	97.5	115.8
Rotherham - Wakefield Westgate	36.8	293.4	15.8	113.2	134.6
Wakefield Westgate - Leeds City	16.2	309.6	8.1	121.3	145.6
Leeds City - Micklefield	15.7	325.3	7.9	129.2	156.5
Micklefield - York	25.5	350.8	9.6	138.7	169.1
Sheffield - Chinley	32.0	278.9	14.0	105.8	126.2
Chinley - Stockport	18.2	297.1	8.8	114.6	138.0
Stockport - Manchester Piccadilly	9.4	306.5	5.3	119.9	146.3
Northampton Castle - Rugby	30.5	132.5	11.6	41.8	50.8
Rugby - Coventry	18.5	151.0	8.0	49.8	61.8
Coventry - Birmingham International	17.2	168.2	7.6	57.5	72.5
Birmingham International - Birmingham New St.	13.3	181.5	6.5	63.9	81.9

Birmingham New St. = Wolverhampton	20.7	202.2	9.7	73.7	94.7
Wolverhampton - Stafford	26.0	228.2	10.3	83.9	107.9
Stafford - Crewe	39.4	267.6	13.3	97.2	124.2
Crewe - Runcorn	36.2	303.8	12.4	109.6	139.6
Runcorn - Liverpool South Parkway	12.0	315.8	6.1	115.7	148.7
Liverpool South Parkway - Liverpool Lime St.	9.2	325.0	5.2	120.9	156.9
Wolverhampton - Telford	25.2	227.4	9.5	83.2	107.2
Telford - Wellington	6.2	233.6	4.3	87.4	114.4
Wellington - Shrewsbury	16.5	250.1	7.2	94.6	124.6
Shrewsbury - Gobowen	29.0	279.1	10.5	105.1	138.1
Gobowen - Wrexham	19.6	298.7	8.3	113.5	149.5
Wrexham - Chester	19.4	318.1	8.3	121.8	160.8

Current fastest time (minutes) from London [and the above values] to:

- Luton [& Dunstable Parkway] 21 [13]
- Milton Keynes [Parkway] 30 [23]
- Northampton 51 [36]
- Leicester 62 [54]
- Loughborough 73 [65]
- East Midlands Parkway 81 [69]
- Derby 85 [79]
- Chesterfield 105 [96]
- Sheffield 120 [107]
- Rotherham 136 (1 change) [116]
- Wakefield Westgate 114 [135]
- Leeds 131 [146]
- Micklefield 140 (1 change) [157]
- York 110 [169]
- Chinley 177 (1 change) [126]
- Stockport 115 [138]
- Manchester Piccadilly 123 [146]
- Rugby 48 [51]
- Coventry 59 [62]
- Birmingham International 70 [73]
- Birmingham New St. 82 [82]
- Wolverhampton 107 [95]
- Stafford 77 [108]
- Crewe 90 [114]
- Runcorn 113 [140]

- Liverpool South Parkway 140 [149]
- Liverpool Lime St. 132 [157]
- Telford 124 [107]
- Wellington 161 [114]
- Shrewsbury 148 [125]
- Gobowen 163 (1 change) [138]
- Wrexham 144 (1 change) [150]
- Chester 121 [161]

Wakefield, Leeds and York (current) times are, of course, via the ECML, likewise Stafford, Crewe, Stockport, Manchester, Runcorn, Liverpool and Chester via the WCML, which isn't really comparing like with like.

The Manchester times are given via Sheffield (reverse) and the Hope Valley, though via the High Peak would be much preferable. The High Peak route should be reopened without delay. Sheffield has plenty of services, and can easily spare a few for Matlock, Bakewell and Buxton (by connection).

Note that only one of either Loughborough or East Midland Parkway is served by a given train – the York trains serve Loughborough and the Manchester trains serve East Midlands Parkway.

The HS-C times to Rugby, Coventry and the Birmingham stations are essentially the same as the current best, but that to Northampton very much better (naturally).

Likewise the HS-C times as far as Leicester are very much better than current times. The times beyond Leicester (until Wakefield!) remain much better than current times, but not quite as good as those up as far as Leicester.

6P. HS-C St. Pancras West –York / Manchester / Liverpool / Chester (12/10/12/13 stops, with passing times):

Section	Distance (km)	Cumulative Distance (km)	Section Time (minutes)	Cumulative Journey Time (minutes)	Elapsed Time from London, inc. Station Wait Times
Pancras Cross - *Scratchwood Junction (pass)*	17.0	17.0	5.6	*5.6*	*5.6*
Scratchwood Junction (pass) - Slip End (North) Jn. (pass)	29.9	46.9	5.2	*10.8*	*10.8*
Slip End (North) Jn. (pass) - Luton & Dunstable Parkway	4.1	51.0	2.1	12.9	12.9
Luton & Dunstable Parkway - Milton Keynes Partkway	18.0	69.0	7.3	20.2	23.2
Milton Keynes Parkway - *Newton Pagnell (N.) Jn. (pass)*	6.8	75.8	3.5	*23.8*	*29.8*
Newton Pagnell (N.) Jn. (pass) - Collingtree (West) Jn. (pass)	22.1	97.9	4.3	*28.1*	*34.1*
Collingtrrr (West) Jn. (pass) - Northampton Castle	4.1	102.0	2.1	30.2	36.2
Northampton Castle - *Langborough Junction (pass)*	18.0	120.0	6.0	*36.2*	*45.2*
Langborough Junction (pass(- Aylestone (North) Jn. (pass)	35.9	155.9	6.6	*42.7*	*51.7*
Aylestone (North) Jn. (pass) - Leicester	4.1	160.0	2.1	44.9	53.9
Leicester - *Syston South Junction (pass)*	7.6	167.6	3.8	*48.7*	*60.7*
Syston South Junction (pass) - Loughborough	12.5	180.1	4.7	53.4	65.4
Loughborough - *East Midlands Parkway (pass)*	10.8	190.9	4.8	*58.1*	*73.1*
East Midlands Parkway (pass) - Derby	15.4	206.3	5.5	63.7	78.7
Syston South Junction (pass) - Loughborough (pass)	12.5	180.1	3.8	*52.4*	*64.4*
Loughborough (pass) - East Midlands Parkway	10.8	190.9	4.2	56.6	68.6
East Midlands Parkway - Derby	15.4	206.3	7.1	63.7	78.7
Derby - *Clay Cross Junction (pass)*	32.2	238.5	11.2	*74.9*	*92.9*
Clay Cross Junction (pass) - Chesterfield	6.6	245.1	2.9	77.8	95.8

Chesterfield - *Dore Station Junction (pass)*	13.6	258.7	5.6	*83.4*	*104.4*
Dore Station Junction (pass) - Sheffield Midland	6.2	264.9	2.8	86.2	107.2
Sheffield Midland - Rotherham	9.7	274.6	5.6	91.8	115.8
Rotherham - Wakefield Westgate	36.8	311.4	15.8	107.6	134.6
Wakefield Westgate - Leeds City	16.2	327.6	8.1	115.6	145.6
Leeds City - Micklefield	15.7	343.3	7.9	123.5	156.5
Micklefield - *Ulleskelf Junction (pass)*	11.1	354.4	4.7	*128.2*	*164.2*
Ulleskelf Junction (pass) - York	14.3	368.7	4.9	133.1	169.1
Sheffield Midland - *Dore Station Junction (pass)*	6.2	271.1	3.6	*89.8*	*115.8*
Dore Station Junction (pass) - Chinley	25.8	290.7	10.4	100.2	126.2
Chinley - Stockport	18.2	308.9	8.8	109.0	138.0
Stockport - Manchester Piccadilly	9.4	318.3	5.3	114.3	146.3
Northampton Castle - Rugby	30.5	132.5	11.6	41.8	50.8
Rugby - Coventry	18.5	151.0	8.0	49.8	61.8
Coventry HS - Birmingham International	17.2	168.2	7.6	57.5	72.5
Birmingham International - Birmingham New St.	13.3	181.5	6.5	63.9	81.9
Birmingham New St. - Wolverhampton	20.7	202.2	9.7	73.7	94.7
Wolverhampton - Stafford	26.0	228.2	10.3	83.9	107.9
Stafford - Crewe	39.4	267.6	13.3	97.2	124.2
Crewe - Runcorn	36.2	303.8	12.4	109.6	139.6
Runcorn - Liverpool South Parkway	12.0	315.8	6.1	115.7	148.7
Liverpool Soutg Parkway - Liverpool Lime St.	9.2	325.0	5.2	120.9	156.9
Wolverhampton - Telford	25.2	227.4	9.5	83.2	107.2
Telford - Wellington	6.2	233.6	4.3	87.4	114.4
Wellington - Shrewsbury	16.5	250.1	7.2	94.6	124.6
Shrewsbury - Gobowen	29.0	279.1	10.5	105.1	138.1
Gobowen - Wrexham	19.6	298.7	8.3	113.5	149.5
Wrexham - Chester	19.4	318.1	8.3	121.8	160.8

7. HS Metro and HS-C Elapsed Times Summary:

Section	HS Metro Pancras Cross - York	HS Metro Pancras Cross - Preston	HS-C St. Pancras - Wolverhampton - Liverpool / Cheater	HS-C St. Pancras - York	HS-C St. Pancras - Manchester
Pancras Cross - Luton & Dunstable Parkway	12.9	12.9			
St. Pancras - Luton & Dunstable Parkway	|	|	12.9	12.9	12.9
Luton & Dunstable Parkway - Milton Keynes Parlway	23.2	23.2	23.2	23.2	23.2
Milton Keynes Parkway - Northampton Castle	36.2	36.2	36.2	36.2	36.2
Northampton Castle - Leicester	53.9	53.9	|	53.9	53.9
Leicester - Nottingham	68.9	68.9	|	|	|
Nottingham - Derby	80.7	80.7	|	|	|
Nottingham - Sheffield HS	89.4	89.4	|	|	|
Sheffield HS - Huddersfield	106.5	|	|	|	|
Huddersfield - Leeds New Lane	118.0	|	|	|	|
Leeds New Lane - York	133.4	|	|	|	|
Sheffield HS - Manchester HS		107.1	|	|	|
Manchester HS - Victoria LL		111.3	|	|	|
Victoria LL - Bolton		121.4	|	|	|
Bolton - Preston		134.3	|	|	|
Northampton Castle - Rugby HS			50.8	|	|
Rugby HS - Coventry HS			61.8	|	|
Coventry HS - Birmingham International			72.5	|	|
Birmingham International - Birmingham New St.			81.9	|	|
Birmingham New St. - Wolverhampton			94.7	|	|
Wolverhampton - Stafford			107.9	|	|
Stafford - Crewe			124.2	|	|
Crewe - Runcorn			139.6	|	|
Runcorn - Liv. S, Parkway			148.7	|	|
Liv. S. Pkwy - Liv. Lime St.			156.9	|	|

Wolverhampton - Telford			107.2		
Telford - Wellington			114.4		
Wellington - Shrewsbury			124.6		
Shrewsbury - Gobowen			138.1		
Gobowen - Wrexham			149.5		
Wrexham - Chester			160.8		
Leicester - Loughborough				65.4	
Loughborough - Derby				78.7	
Leicester - East Midlands Parkway					68.6
East Midlands Parkway - Derby					78.7
Derby - Chesterfield				95.8	95.8
Chesterfield - Sheffield				107.2	107.2
Sheffield - Rotherham				115.8	
Rotherham - Wakefield Westgate				134.6	
Wakefield Westgate - Leeds City				145.6	
Leeds City - Micklefield				156.5	
Micklefield - York				169.1	
Sheffield - Chinley					126.2
Chinley - Stockport					138.0
Stockport - Manchester Piccadilly					146.3

HS3 Mk2 Enhancements

All the preceding service plans are as proposed for the original 2-track HS3, albeit now with an improved alignment south of Leicester, which involves very slight changes to the journey times. The only 4-tracking is in the station loops or branches (the station loops continuing between Luton & Dunstable Parkway and Milton Keynes Parkway stations, and Northampton now also being on a branch off the main line). There are effectively 4 tracks between Wales Junction and Leeds, but that is because there are two quite separate routes available between those locations.

The improved alignment of Mk2 enables the provision of 4 tracks over all the rest of the route between London and Wales Junction. This involves only one section of new line, the direct, tunnel route between Pancras Cross and Scratchwood Junction (which saves 3km – 14 against 17 – as compared with the route via West Hampstead Junction). Elsewhere the quadrupling is in-situ, by adding an extra track on each side of the original pair, (passive provision for this having been made during the original construction, of course,) in a parallel running arrangement. Since the original layout has high-speed turnouts for each of Luton & Dunstable Parkway also Milton Keynes Parkway, Northampton Castle and Leicester stations, and for the Nottingham branch, this means that there are more connections between main (the centre pair) and the (equally fast) relief tracks than are strictly necessary, since the UHS services would normally use the main tracks throughout, and the HS Metro and HS-Compatible services the reliefs throughout. But that is hardly a fault, and provides an extra degree of operational flexibility and resilience.

Given that all the UHS services now travel directly from Pancras Cross to Scratchwood Junction, there are now only 6tph on the lines between Pancras Cross and West Hampstead Junction (compared with 16tph at Mk1A). It now makes good sense to add a single platform in each direction on the HS tracks at West Hampstead itself, and also stop the St. Pancras West services at the MML platforms. This gives worthwhile connectional enhancements to and from Thameslink, Overground and Underground, and Crossrail 4. (This was not proposed for Mk1A because of space constraints at West Hampstead.)

It is assumed that the Waverley route will by this time have been reinstated between Tweedbank and Ravenswood Junction, and between Riccarton North Junction and Carlisle, ideally with a new HS alignment between Riccarton North Junction and Newcastleton. This is **not** (yet!) the HS2 Scottish extension, but does introduce a new service (Whitehaven – Glasgow) on the northernmost section of HS3. (It also introduces a second new service, from Keswick to Langholm, but this makes no use of HS3.) The Whitehaven – Glasgow service serves (north of Carlisle) Riddings, Newcastleton, Hawick and Lauder, sharing the Lauder – Edinburgh service with Newcastle – Glasgow.

It **is** assumed that HS2's Coventry Variant extension **is** in place, and certain HS3 HS-C services use it between Watford Gap Junction and Warwich Road Junction (Coventry), and between Banbury and Cotesbach junctions . (A note is also included of what further new services would apply on that northernmost section following HS2's Scottish extension.)

Service Plan 6

The following new services are introduced. It is assumed that the HS2 Coventry Variant is also available (see appendix G). (This corresponds to HS5 SP4.)

UHS:

- 2tphH Tunbridge Wells West – Tunbridge Wells – Tonbridge – East Croydon – Victoria (LL) – Pancras Cross – Sheffield HS – Manchester HS – Manchester Victoria (LL) – Bolton – Preston
- 2tphH Portsmouth & Southsea – Hayling Island – Chichester – Arundel HS – Horsham – Gatwick Airport – East Croydon – Victoria (LL) – Pancras Cross – Nottingham – Derby
- 2tphH Portsmouth & Southsea – Hayling Island – Chichester – Arundel HS – Horsham – Gatwick Airport – East Croydon – Victoria (LL) – Pancras Cross – Chesterfield – Sheffield Midland (splits / joins) – :
  – Rotherham – South Yorkshire LL
  – Barnsley
  (NB this is an existing service, but formerly started from Tunbridge Wells.)
- 2tphH Portsmouth & Southsea – Hayling Island – Chichester – Arundel HS – Horsham – Gatwick Airport – East Croydon – Victoria (LL) – Pancras Cross – Chesterfield – Sheffield Midland – Rotherham – South Yorkshire LL – Doncaster – Goole – Gilberdyke – Hull Paragon

HS Metro:

- 2tphH Chichester – Worthing – Shoreham-by-Sea – Hove – Gatwick Airport – East Croydon – Victoria (LL) – Pancras Cross – West Hampstead – Luton & Dunstable Parkway – Milton Keynes Parkway – Northampton Castle – Leicester – Melton Mowbray (reverse) – Nottingham – Derby
- 2tphH St. Pancras West – West Hampstead – Luton & Dunstable Parkway – Milton Keynes Parkway – Northampton Castle – Rugby HS – Coventry HS – Birmingham International – Birmingham New St. – University – Bromsgrove – Droitwich Spa – Worcester Shrub Hill
  (NB this was formerly a RM service)
- 2tphH Bournemouth West – Bournemouth Central – Brockenhurst – Southampton Central – Southampton Airport Parkway – Winchester – Basingstoke HS – Reading Parkway HL – Oxford – Banbury – Rugby (GC) – Leicester – Nottingham –South Yorkshire HL –
  York HS (splits / joins) – :
  – Darlington – Durham Relly Mill – Consett – Newcastle
  – Northallerton – Yarm – Eaglescliffe – Thornaby – Middlesborough
  (NB this is in addition to the RM Bournemouth West – York service)
- 2tphH Hull Paragon – Brigg – Gainsborough Central – Retford (LL) – Worksop – Sheffield HS – Manchester HS – Victoria LL – Liverpool Lime St.
- 2tphH Cleethorpes – Grimsby Town – Brigg – Gainsborough Central – Retford (LL) – Worksop – Sheffield HS – Manchester HS – Victoria LL – Bolton – Preston
- 2tphH Skegness – Wainfleet – Boston – Sleaford – Lincoln – Gainsborough Lea Rd. – Retford (LL) – Worksop – Sheffield HS – Manchester HS – Victoria LL – Liverpool Lime St.
  (NB this was formerly a RM service)
- 2tphH Paddington – Old Oak Common – LHR Interchange – Slough – Maidenhead – Bourne End (to/from Marlow) – High Wycombe – Princes Risborough – Calvert – Rugby (GC) – Leicester – Melton Mowbray (reverse) – Nottingham – Derby

The full service plan is:

HS3 UHS:

- 2tphH Eastbourne – Lewes – Gatwick Airport – East Croydon – Victoria (LL) – Pancras Cross – York HS – Darlington Bank Top – Durham Relly Mill – Consett – Hexham – Hawick – Edinburgh Waverley HS – Haymarket HS – Edinburgh Airport – Bellgrove – Glasgow St. Enoch
- 2tphH Newhaven Marine – Newhaven Town – Lewes – Gatwick Airport – East Croydon – Victoria (LL) – Pancras Cross – South Yorkshire HL – York HS (splits / joins) – :
  – Darlington Bank Top – Durham Relly Mill – Consett – Newcastle
  – Northallerton – Eaglescliffe – Yarm – Thornaby – Middlesborough
- 2tphH Tunbridge Wells West – Tunbridge Wells – Tonbridge – East Croydon – Victoria (LL) – Pancras Cross – Sheffield HS – Manchester HS – Manchester Victoria (LL) – Liverpool Lime St.
- 2tphH Tunbridge Wells West – Tunbridge Wells – Tonbridge – East Croydon – Victoria (LL) – Pancras Cross – Sheffield HS – Manchester HS – Manchester Victoria (LL) – Bolton – Preston
- 2tphH Tunbridge Wells West – Tunbridge Wells – Tonbridge – East Croydon – Victoria (LL) – Pancras Cross – South Yorkshire – Wakefield Westgate – Leeds HS – York HS
- 2tphH Tunbridge Wells West – Tunbridge Wells – Tonbridge – East Croydon – Victoria (LL) – Pancras Cross – South Yorkshire HL – Leeds City (splits / joins) – :
  – Shipley – Bradford City – Halifax
  – Shipley – Keighley – Skipton
- 2tphH Portsmouth & Southsea – Hayling Island – Chichester – Arundel HS – Horsham – Gatwick Airport – East Croydon – Victoria (LL) – Pancras Cross – Chesterfield – Sheffield Midland (splits / joins) – :
  – Rotherham – South Yorkshire LL
  – Barnsley
- 2tphH Portsmouth & Southsea – Hayling Island – Chichester – Arundel HS – Horsham – Gatwick Airport – East Croydon – Victoria (LL) – Pancras Cross – Chesterfield – Sheffield Midland – Rotherham – South Yorkshire LL – Doncaster – Goole – Gilberdyke – Hull Paragon
- 2tphH Portsmouth & Southsea – Hayling Island – Chichester – Arundel HS – Horsham – Gatwick Airport – East Croydon – Victoria (LL) – Pancras Cross – Nottingham – Derby
- 2tphH Newcastle – Hexham – Hawick – Lauder – Edinburgh Waverley HS – Haymarket HS – Edinburgh Airport – Glasgow Bellgrove – Glasgow St. Enoch

HS Metro:

- 2tphH Brighton – Gatwick Airport – East Croydon – Victoria (LL) – Pancras Cross – West Hampstead – Luton & Dunstable Parkway – Milton Keynes Parkway – Northampton Castle – Leicester – Nottingham – Sheffield HS – Huddersfield – Leeds HS – York HS
- 2tphH Brighton – Gatwick Airport – East Croydon – Victoria (LL) – Pancras Cross – West Hampstead – Luton & Dunstable Parkway – Milton Keynes Parkway – Northampton Castle – Leicester – Nottingham – Sheffield HS – Manchester HS – Mancheater Victoria (LL) – Bolton – Preston
- 2tphH Chichester – Worthing – Shoreham-by-Sea – Hove – Gatwick Airport – East Croydon – Victoria (LL) – Pancras Cross – West Hampstead – Luton & Dunstable Parkway – Milton Keynes Parkway – Northampton Castle – Leicester – Melton Mowbray (reverse) – Nottingham – Derby

- 2tphH St. Pancras West – West Hampstead – Luton & Dunstable Parkway – Milton Keynes Parkway – Northampton Castle – Leicester – Loughborough – Derby – Chesterfield – Sheffield Midland – Rotherham – Wakefield Westgate – Leeds City – Micklefield – York
- 2tphH St. Pancras West – West Hampstead – Luton & Dunstable Parkway – Milton Keynes Parkway – Northampton Castle – Leicester – East Midlands Parkway – Derby – Matlock – Bakewell – Miller's Dale (from/to Buxton) – Chinley – Stockport – Manchester Piccadilly (alternatively: – Derby – Chesterfield – Sheffield Midland (revers) – Chinley – if the Peak route has not yet been reopened.)
- 2tphH St. Pancras West – West Hampstead – Luton & Dunstable Parkway – Milton Keynes Parkway – Northampton Castle – Rugby HS – Coventry HS – Birmingham International – Birmingham New St. – Wolverhampton (splits/joins) – :
  – Stafford – Crewe – Runcorn – Liverpool South Parkway – Liverpool Lime St.
  – Telford – Wellington – Shrewsbury – Wrexham – Chester
- 2tphH St. Pancras West – West Hampstead – Luton & Dunstable Parkway – Milton Keynes Parkway – Northampton Castle – Rugby HS – Coventry HS – Birmingham International – Birmingham New St. – University – Bromsgrove – Droitwich Spa – Worcester Shrub Hill (NB this was formerly a RM service)
- 2tphH Bournemouth West – Bournemouth Central – Brockenhurst – Southampton – Southampton Airport Parkway – Winchester – Basingstoke – Reading (reverse) – Oxford – Banbury – Rugby (GC) – Leicester – Nottingham –South Yorkshire HS –
  York HS (splits / joins) – :
  – Darlington – Durham Relly Mill – Consett – Newcastle
  – Northallerton – Yarm – Eaglescliffe – Thornaby – Middlesborough
  (NB this is in addition to the RM Bournemouth West – York service)
- 2tphH Paddington – Old Oak Common – LHR Interchange – Slough – Maidenhead – Bourne End (to/from Marlow) – High Wycombe – Princes Risborough – Calvert – Rugby (GC) – Leicester – Melton Mowbray (reverse) – Nottingham – Derby
- 2tphH Whitehaven Bransty – Workington – Maryport – Carlisle Citadel – Riddings – Newcastleton – Hawick – Lauder – Edinburgh Waverley HS – Haymarket HS – Edinburgh Airport – Glasgow Bellgrove – Glasgow St. Enoch
- 2tphH Newcastle – Hexham – Haydon Bridge – Bardon Mill – Haltwhistle – Brampton – Wetheral – Carlisle Citadel (reverse) – Dalston – Wigton – Aspatria – Maryport – Flimby – Workington – Harrington – Parton – Whitehaven Bransty

MML and other Regional Metro:

- 2tphR St. Pancras – West Hampstead – St. Albans – Luton Airport Parkway – Luton – Bedford – Wellingborough – Kettering – Market Harborough – Leicester – Loughborough – Attenborough – Beeston - Nottingham
- 2tphR St. Pancras – West Hampstead– St. Albans – Luton Airport Parkway – Luton – Bedford – Wellingborough – Kettering – Market Harborough – Leicester – East Midlands Parkway – Attenborough – Beeston - Nottingham
- 2tphR St. Pancras – West Hampstead– St. Albans – Luton Airport Parkway – Luton – Bedford – Wellingborough – Kettering – Corby – Oakham – Melton Mowbray – Nottingham – Langley Mill – Alfreton & Mansfield Parkway – Chesterfield – Sheffield Midland – Rotherham – Pontefract – York (note that this uses HS3 on the approach to Nottingham)
- 2tphR (Thameslink) Brighton –> Bedford – Olney – Northampton

- 2tphR Worcester Shrub Hill – Droitwich Spa – Bromsgrove – University – Birmingham New St. – Coleshill Parkway – Nuneaton – Hinckley – Leicester – Melton Mowbray – Oakham – Stamford – Peterborough – March – Ely – Bury St. Edmunds – Ipswich – Harwich International – Harwich Town
- 2tphR Bournemouth West – Bournemouth Central – Brockenhurst – Southampton – Southampton Airport Parkway – Winchester – Basingstoke – Reading – Oxford – Banbury – Leamington Spa – Kenilworth – Coventry – Birmingham Int'l – Birmingham New St. (reverse) – Tamworth – Burton-on-Trent – Derby – Chesterfield – Sheffield – Rotherham – Wakefield Westgate – Leeds City – Micklefield – York
- 2tphR Plymouth – Ivybridge – Totnes – Newton Abbot – Teignmouth – Dawlish – Exeter St. David's – Cullompton – Tiverton Junction – Taunton – Bridgwater – Highbridge – Weston Super Mare – Bristol Temple Meads – Bristol Parkway – Gloucester (reverse) – Cheltenham Spa – Ashchurch – Worcester Shrub Hill – Droitwich Spa – Bromsgrove – University – Birmingham New St. – Tamworth – Burton on Trent – Derby – Chesterfield – Sheffield – Rotherham – Wakefield Westgate – Leeds City – Micklefield – York
- 2tphR Norwich – Wymondham – Thetford – Ely (reverse) –
  2tphR Stansted Airport – Cambridge – Ely (joins / splits) –
  – March – Peterborough – Stamford – Oakham – Melton Mowbray – Nottingham – Langley Mill – Alfreton and Mansfield Parkway – Chesterfield – Sheffield (reverse) – Chinley – Stockport – Manchester Piccadilly – Manchester Oxford Road – Salford Crescent – Bolton – Horwich Parkway – Chorley – Leyland – Preston – Lancaster – Morecambe
- 2tphR York – Thirsk – Northallerton – Darlington – Durham – Chester le St+reet – Newcastle – Morpeth – Alnmouth – Berwick-upon-Tweed – Dunbar – Drem – Edinburgh Waverley
- 2tphRS (Tees Valley Metro) Bishop Auckland – Shildon – Newton Aycliffe – Heighington – North Road – Darlington – Dinsdale – Tees-Side Airport – Allen's West – Eaglescliffe – Thornaby – Middlesborough – British Steel (Redcar) – Redcar Central – Redcar East – Marske – Saltburn

HS7 North of Birmingham:

- 2tphH Plymouth – Exeter St. David's – Taunton – Bristol Temple Meads HS – Bristol Parkway HS – Cheltenham Spa – Worcester Shrub Hill – Birmingham Interchange – Derby – Sheffield HS – Huddersfield – Leeds HS – York HS (splits / joins) – :
  – Darlington – Durham (Relly Mill) – Consett – Newcastle
  – Northallerton – Yarm – Eaglescliffe – thornaby – Middlesborough
- 2tphH Swansea – Port Talbot – Cardiff (Rhoose) Airport – Cardiff HS – Bristol Parkway HS – Cheltenham Spa – Worcester Shrub Hill – Birmingham Interchange – Derby – Nottingham – Peterborough – Norwich
- 2tphH Birmingham HS – Derby – Sheffield HS – Huddersfield – Leeds HS – York
- 2tphH Birmingham HS – Derby – Chesterfield – Sheffield Midland – South Yorkshire HL – Leeds City (splits / joins) – :
  – Shipley – Bradford City – Halifax
  – Shipley – Keighley – Skipton
- 2tphH Birmingham HS – Derby – Nottingham – Newark Castle – Lincoln Central – Market Rasen – Grimsby Town – Cleethorpes
- 2tphH Birmingham HS – Derby – Nottingham – Newark Castle – Lincoln Central – Sleaford – Boston – Wainfleet – Skegness

HS8:

- 2tphH Norwich – Ely (reverse) – Peterborough – Nottingham – Sheffield HS – Manchester HS – Manchester Victoria LL – Bolton – Preston
- 2tphH Hull Paragon – Brigg – Gainsborough Central – Retford (LL) – Worksop – Sheffield HS – Manchester HS – Victoria LL – Liverpool Lime St. (NB this was formerly a RM service)
- 2tphH Cleethorpes – Grimsby Town – Brigg – Gainsborough Central – Retford (LL) – Worksop – Sheffield HS – Manchester HS – Victoria LL – Bolton – Preston
  (NB this was formerly a RM service)
- 2tphH Skegness – Wainfleet – Boston – Sleaford – Lincoln – Gainsborough Lea Rd. – Retford (LL) – Worksop – Sheffield HS – Manchester HS – Victoria LL – Liverpool Lime St.
  (NB this was formerly a RM service)

HS9:

- 2tphH Liverpool Lime Street – Manchester Victoria (LL) – Manchester HS – Huddersfield – Leeds HS – York HS (splits / joins) – :
  – Darlington – Durham (Relly Mill) – Consett – Newcastle
  – Northallerton – Yarm – Eaglescliffe – Thornaby – Middlesborough
- 2tphH Liverpool Lime Street – Manchester Victoria (LL) – Manchester HS – Huddersfield – Leeds HS – Micklefield – York – Thirsk – Northallerton – Yarm – Eaglescliffe – Stockton – Hartlepool – Seaham – Sunderland - Newcastle
- 2tphH Preston – Bolton – Manchester Victoria (LL) – Manchester HS – Huddersfield – Leeds HS – Micklefield – Selby – Hull
- 2tphH Preston – Bolton – Manchester Victoria (LL) – Manchester HS – Huddersfield – Leeds HS – Micklefield – York – Malton – Seamer – Scarborough

HS6:

- 2tphH St. Pancras (East) – Stratford HS North – Stansted Airport – Cambridge – Ely – Peterborough – Doncaster – York (splits / Joins) – :
  – Darlington – Durham – Newcastle – Morpeth – Alnmouth – Berwick – Dunbar – Drem – Edinburgh Waverley
  – Thirsk – Northallerton – Yarm – Eaglescliffe – Stockton – Hartlepool – Seaham – Sunderland - Newcastle
- 2tphH St. Pancras (East) – Stratford HS North – Stansted Airport – Cambridge – Ely – Peterborough – Grantham – Newark Northgate – Retford HL – Doncaster – Wakefield Westgate – Leeds City

[HS2 Scottish Extension:

- 2tphH Eastbourne – Bexhill – St. Leonards Warrior Square – Hastings – Ore – Winchelsea – Rye Appledore – Ashford – Ebbsfleet – Stratford HS South – Euston Cross – Old Oak Common – Preston – Carlisle – Hawick – Edinburgh Waverley HS – Haymarket – Edinburgh Airport – Bellgrove – Glasgow St. Enoch
- 2tphH Birmingham HS – Crewe – Preston – Carlisle – Hawick – Edinburgh Waverley HS – Haymarket – Edinburgh Airport – Bellgrove – Glasgow St. Enoch

- 2tphH Liverpool Lime St. – Preston – Carlisle – Hawick – Edinburgh Waverley HS – Haymarket – Edinburgh Airport – Bellgrove – Glasgow St. Enoch

This is included for completeness. The Waverley service from (Whitehaven –) Carlisle – Hawick – Glasgow has been included with the HS3 services, as this is intended independently of the HS2 extension, and it shares the Lauder service with Newcastle - Glasgow.]

Representative Hourly Non-Cross-Platform Interchange Pattern at Bedford:

00R St. Pancras – York via Melton Mowbray
R (Thameslink) Brighton – Bedford

07R St. Pancras – Nottingham (calling at East Midlands Parkway)
(Thameslink) Horsham – Northampton

15R St. Pancras – Birmingham New St. – Worcester
R (Thameslink) Brighton – Corby

23R St. Pancras – Nottingham (calling at Loughborough)
(Thameslink) Horsham – Northampton

– repeating at 30, 37, 45 and 53 minutes past.

Representative Hourly Non-Cross-Platform Interchange Pattern at Milton Keynes Parkway (the EWR services make cross-platform connections between themselves):

00H Brighton – York (not cross-platform)
R Plymouth – Norwich
RS Buckingham – Bedford

05H St Pancras – Wolverhampton – Liverpool / Chester
(connects into the following EWR services)

07H St. Pancras – Derby – Sheffield – York (not cross-platform)
RS Oxford – Cambridge
RS Milton Keynes – Bedford

12H Chichester – Derby
(connects into the following EWR services)

15H Brighton – Preston (not cross-platform)
R Plymouth – Cleethorpes
RS Buckingham – Bedford

20H St. Pancras – Birmingham New St. – Worcester Shrub Hill
(connects into the following EWR services)

23H St. Pancras – Derby – Matlock (or Sheffield) – Manchester (not cross-platform)
R Weymouth – York
RS Milton Keynes – Bedford

– repeating at 30, 35, 37, 42, 45, 50 and 53 minutes past.

Representative Hourly Interchange Pattern at Northampton (the HS3/MML connections are not cross-platform, but the intra-WCML ones are; see the WCML Service Plans article for full details of these):

00H Brighton – York (not cross-platform)
R Euston – Crewe via Stoke
R Euston – Rugby

05H St. Pancras – Wolverhampton – Liverpool / Chester (not cross-platform)
R (Thameslink) Brighton – Northampton

07H St. Pancras – Derby – Sheffield – York (not cross-platform)
R Euston – Birmingham New St.

12H Chichester – Derby

15H Brighton – Preston (not cross-platform)
R Euston – Crewe via Stafford
R Euston – Rugby

20R St. Pancras – Birmingham New St. – Worcester
R (Thameslink) Brighton – Northampton

23H St. Pancras – Derby – Matlock (or Sheffield) – Manchester (not cross-platform)
R Euston – Barrow in Furness

– repeating at 30, 35, 37, 42, 45, 50 and 53 minutes past.

Representative Hourly Cross-Platform Interchange Pattern at Leicester:

00H Brighton – York
(no connection)

05R St. Pancras – East Midlands Parkway – Nottingham
H St. Pancras – Loughborough – Derby – Sheffield –York

12H Chichester – Derby via Melton Mowbray
(no connection)

15H Brighton – Preston
R Harwich Town – Worcester Shrub Hill

20H Bournemouth West – Newcastle / Middlesborough
(no connection)

23H St. Pancras – East Midlands Parkway – Derby – Matlock/Sheffield – Manchester
R St. Pancras – Loughborough – Nottingham

25H Paddington – Derby via Melton Mowbray
(no connection)

– repeating at 30, 35, 42, 45, 50, 53 and 55 minutes past. Note that the connecting pairs involving a RM Nottingham service depart in the order stated, thus the RM St. Pancras – Nottingham service, calling at East Midlands Parkway (but not Loughborough) departs before the HS-C St. Pancras – York service,

calling at Loughborough (but not EM Parkway). Likewise the HS-C St. Pancras – Manchester service, calling at East Midlands Parkway (but not Loughborough) departs before the RM St. Pancras – Nottingham service, calling at Loughborough (but not EM Parkway. This ensures that Loughborough and East Midlands Parkway stations each have 4tph, alternatively to Derby and points north, or to Nottingham, but no HS-C or RM train serves both. (There is a stopping service between Leicester and Derby, which does.)

Representative Hourly (non-cross-platform) Interchange Pattern at Derby:

00H HS7 Plymouth – Newcastle / Middlesborough
H Derby – Portsmouth and Southsea (provides fast connection to Nottingham)
R Bournemouth West – York

05H HS7 Birmingham – York
H Derby – Paddington (HS Metro; provides fast connection to Nottingham and Melton Mowbray)
H St. Pancras – Matlock (or Sheffield) – Manchester

10H HS7 Birmingham – Cleethorpes
(no connection)

15H HS4/HS7 Swansea – Norwich
H Derby – Chichester (HS Metro; provides connection to Nottingham and Melton Mowbray for:)
R Plymouth – York

20H HS7 Birmingham – Halifax / Skipton
H St. Pancras – Sheffield – York

25H HS7 Birmingham – Skegness
(no connection)

– repeating at 30, 35, 40, 45, 50 and 55 minutes past.

Representative Hourly Cross-Platform Interchange Pattern at Nottingham:

00H HS8 Norwich – Preston
H Chichester – Derby (HS Metro)

07H Brighton – York
H HS7 Birmingham – Skegness
R St. Pancras – Melton Mowbray – York
R Norwich / Stansted Airport – Morecambe

15H HS8/HS7 Norwich – Swansea (*)
H Paddington – Derby (*)

23H HS3/HS8 Brighton – Preston
H Portsmouth and Southsea – Derby
H HS7 Birmingham – Cleethorpes

– repeating at 30, 37. 45 and 53 minutes past. (* The Norwich – Swansea and Paddington - Derby services connect into the following service to Preston – obviously they offer nothing to each other.)

Representative Hourly Cross-Platform Interchange Pattern at Sheffield HS/Midland (refer to the HS Transpennine Routes and Service Plans article for full details of the Regional Metro services). The HS services have cross-platform interchange, and the RM services have longer stops, to allow for the platform change. The pattern is:

00H Brighton –York (HS Metro)
H HS8 Norwich – Preston
R Skegness – Liverpool
H Skipton / Halifax – Birmingham HS
H Manchester Piccadilly – St. Pancras (HS Metro, **if** travelling via the Hope Valley and Sheffield, rather than the High Peak. If so, reverses at Sheffield Midland and does not make a cross-platform connection.)

07H HS7 Plymouth – Newcastle / Middlesborough
H Tunbridge Wells – Preston (UHS)
R Cleethorpes – Blackpool
H Hull – Portsmouth and Southsea (UHS)

15H HS3/HS8 Brighton – Preston
H HS7 Birmingham HS – York
R Norwich / Stansted Airport – Morecambe
H York – St. Pancras (HS Metro)

23H HS3/HS8 Tunbridge Wells - Liverpool
(no cross-platform connection)
R Hull – Southport
H Barnsley / South Yorkshire LL – Portsmouth and Southsea (UHS)

– repeating at 30, 37, 45 and 53 minutes past. Note that, in each case, the first two services use Sheffield HS, making cross-platform connections (except, obviously, at 23/53 minutes past, which has only a single service), and the second pair of services use Sheffield Midland, making cross-platform connections between a southbound HS service and a westbound RM transpennine service. It is a quirk of the layout around Sheffield that northbound HS services via the HS platforms and southbound HS services via the Midland platforms both travel through Sheffield in the same NE – SW direction. (The southbound services travel via the classic route through Chesterfield, joining HS3 at Huthwaite Junction – UHS services, or Leicester – HS Metro.)

Representative Hourly Cross-Platform Interchange and Terminating Pattern at York

00H Eastbourne – Glasgow
H Liverpool – Newcastle / Middlesborough
H Brighton – York (HS Metro)

07H Tunbridge Wells – York (UHS, Leeds fast)
H HS7 Plymouth – Newcastle / Middlesborough
H St.Pancras (West) – York (via Derby – not cross platform)

15H Newhaven – Newcastle / Middlesborough
H HS7 Birmingham HS – York

23H St. Pancras (East) – Edinburgh
H Bournemouth West – Newcastle / Middlesborough
R St. Pancras (West) – York (via Melton Mowbray – not cross-platform)

– repeating at 30, 40, 45 and 55 minutes past. The services terminating at 07 and 23 minutes past are obviously intended for (non-cross-platform) connection into those 7 / 8 minutes later.

Representative Hourly Cross-Platform Interchange Pattern at Darlington:

00H Eastbourne – Glasgow
RS Bishop Auckland – Middlesborough – Saltburn

03H Liverpool – Newcastle (/ Middlesborough)
(no connection)

07H Plymouth – Newcastle (/ Middlesborough)
RS Bishop Auckland – Middlesborough – Saltburn

15H Newhaven – Newcastle (/ Middlesborough)
RS Bishop Auckland – Middlesborough – Saltburn

23H Bournemouth West – Newcastle (/ Middlesborough)
H St. Pancras (East) – Edinburgh (not cross-platform – uses ECML platforms)
RS Bishop Auckland – Middlesborough – Saltburn

– repeating at 30, 33, 37, 45 and 53 minutes past. Note that the Liverpool – Newcastle service has to be delayed slightly because there is only one HS platform face – the other face is for the contra-flow Tees Valley Metro service (see appendix D).

Representative Hourly Cross-Platform Interchange Pattern at Newcastle:

00H Liverpool – Newcastle (/ Middlesborough)
(no connection)

07H Plymouth – Newcastle (/ Middlesborough)
R York – Edinburgh

15H Newhaven – Newcastle (/ Middlesborough)
(no connection)

23H Bournemouth West – Newcastle (/ Middlesborough)
H St. Pancras (East) – Edinburgh

– repeating at 30, 37, 45 and 53 minutes past.

Representative Hourly Cross-Platform Interchange Pattern at Hexham:

00H Eastbourne – Glasgow
H Newcastle – Carlisle – Whitehaven
R Newcastle – Hexham (all stations)

07H Newcastle – Glasgow
(no connection)

– repeating at 30 and 37 minutes past.

Representative Hourly Cross-Platform Interchange Pattern at Hawick:

00H Eastbourne – Glasgow

07H Hawick – Inverness (departs first)
H Newcastle – Glasgow (calls Lauder)
R Hawick – Dundee via Ladybank

23H (Whitehaven –) Carlisle – Glasgow (calls Lauder)
R Hawick – Perth via Ladybank

– repeating at 30, 37 and 53 minutes past. With the addition of the service from (Whitehaven –) Carlisle – Glasgow, the Newcastle – Glasgow service has been retimes to provide with it a regular 15 minute service for Lauder.

[First thoughts for the HS2 Scottish Extension, with an extra 2tph to Glasgow from each of Eastbourne, Birmingham and Liverpool, is to have an even departure pattern from Hawick:

00H Eastbourne – Glasgow

05H [HS2] Birmingham – Glasgow

10H Hawick – Inverness (departs first)
H Newcastle – Glasgow (calls Lauder)
R Hawick – Dundee via Ladybank

15H [HS2] Eastbourne – Glasgow

20H [HS2] Liverpool – Glasgow

25H [HS2] (Whitehaven –) Carlisle – Glasgow (calls Lauder)
R Hawick – Perth via Ladybank

– repeating at 30, 35, 40, 45, 50 and 55 minutes past.

An alternative, perhaps preferable, approach would be to ensure a regular arrival pattern at Edinburgh. This would require the Lauder services' departures from Hawick to be moved forward by ~7 minutes, for the following departure to overtake at Lauder. This really doesn't need to be decided now.]

Adding the new services introduced in service plan 6 to those of plan 5 imposes the following loadings on HS3. Note that we now, between London and Wales Junction, distinguish between main lines (the inner pair of the 4 tracks) and relief lines (the outer tracks). Also the main lines are the two tracks directly linking Wales Junction and Garforth East Junction via South Yorkshire. Generally speaking, the main lines carry the UHS services, and the relief lines the HS-Metro and HS-C services, though this is not an absolute distinction, since UHS services travel to Manchester and Liverpool / Preston via Sheffield, and to Derby via Nottingham. North of Romanby Junction there are only 2 tracks anyway, so the main/relief distinction expires.

Main Lines:

- Pancras Cross – Stanford Junction 18tph
- Stanford Junction – Nuthall South Junction 16tph
- Nuthall South Junction – Wales Junction 14tph
- Wales Junction – Denaby Main Junction 10tph
- Denaby Main Junction – Ryhill Junction 12tph
- Ryhill Junction – Crofton Junction 2tph
- Crofton Junction – Gelderd Road South Junction 4tph
- Gelderd Road South Junction – Gelderd Rd. North Junction 2tph
- Ryhill Junction – Swillington Common Junction 10tph
- Swillington Common Jn. – Manston Junction 4tph
- Swillington Common Jn. – Garforth East Junction 6tph
- Garforth East Junction – Ulleskelf Junction 14tph
- Ulleskelf Junction – Holgate Junction 20tph
- Holgate Junction – York HS station 14tph
- York HS station – Poppleton Junction 18tph
- Poppleton Junction – Romanby Junction 22tph
- Romanby Junction – Derwent Hill Junction 10tph
- Derwent Hill Junction – Stocksfield Junction 2tph
- Derwent Hill Junction – Paradise Junction 8tph
- Newcastle – Paradise Junction 12tph
- Paradise Junction – Blaydon East Junction 4tph
- Blaydon East Junction – Stocksfield Junction 4tph
- Stocksfield – Tynegreen Junction 6tph
- Tynegreen Junction – Riccarton North Junction 4tph
- Riccarton North Junction – Hawick 6tph
- Hawick – Ravenwood Junction 12tph
- Ravenwood Junction – Newcraighall HS 8tph
- Newcraighall HS – Edinburgh HS 8 tph

Relief Lines:

- Pancras Cross – West Hampstead Junction 6tph
- St. Pancras West – West Hampstead Junction 14tph
- West Hampstead Junction – Watford Gap Junction 14tph
- Watford Gap Junction – Onley Junction (HS2-CV) 4tph
- Watford Gap Junction – Cotesbach Junction 10tph
- Rugby HS Junctn (HS2-CV) – Cotesbach Junction 4tph
- Cotesbach Junction – Regent St. Junction 14tph
- Regent St. Junction – Swain St. Junction 14tph
- Swain St. Junction – Stanford Junction 6tph
- Stanford Junction – Edwalton Junction 8tph
- Asfordby Junction (HS8) – Edwalton Junction 10tph
- Edwalton Junction – Manvers St. Junction 18tph
- Manvers St. Junction – Nottingham HS station 206tph
- Manvers St. Junction – Nottingham (classic) station 2tph
- Nottingham HS station – Strelley Junction 20tph
- Strelley Junction – Awsworth Junction 12tph
- Strelley Junction – Nuthall South Junction 8tph
- Nuthall South Junction – Nuthall North Junction 8tph
- Awsworth Junction – Nuthall North Junction 6tph
- Nuthall North Junction – Huthwaite Junction 14tph
- Huthwaite Junction – Stonebroom Junction 4tph
- Stonebroon Junction – Old Denaby Junction 4tph
- Old Denaby Junction – South Yorkshire LL 2tph
- Old Denaby Junction – Denaby Main Junction 2tph
- Huthwaite Junction – Wales Junction 10tph
- Wales Junction – Waleswood Junction 14tph
- Waleswood Junction – Woodburn HS Junction 20tph
- Woodburn HS Junction – Ladybower Junction 20tph
- Ladybower Junction – Guide Bridge HS Junction 14tph
- Ladybower Junction – Paddock Junction 6tph
- Paddock Junction – Gelderd Rd. North Junction 14tph
- Gelderd Rd. North Junction – Garforth West Junction 16tph
- Garforth West Junction – Garforth East Junction 10tph
- Garforth West Junction – Micklefield Junction 6tph

Estimated Journey Times

The only distance change due to the 4-tracking is the saving of 3km via the direct, tunnel route between Pancras Cross and Scratchwood Junction. This affects only the UHS services. There are also timing changes at Langborough, Stanford, Nuthall South and Wales junctions, due to these now being route but no longer (in normal service) track junctions. These affect, mostly, only HS Metro and HS-C services.

It is assumed that, at Mk2, the Coventry Variant of HS2 (HS2-CV) will have been implemented. In the present context, that means that the HS-C service to Birmingham and beyond now travels from Northampton on HS3 to Langborough Junction (now just – in normal service – a route junction, so no deceleration required to traverse a track junction) and then for a further 3km to the new Watford Gap Junction, where it **does** diverge from HS3 onto HS2-CV, which it follows to Rugby HS and on to Coventry HS. It joins the classic London – Birmingham route at Warwick Rd. Junction, immediately after Coventry HS station (underneath the existing Coventry station).

Some new services introduced at Mk2 traverse routes not covered at Mk1A, most importantly HS7 between Strelley Junction and Derby, as used by the new UHS service from Portsmouth and Southsea to Nottingham and Derby, The new UHS servicc from Portsmouth and Southsea to Hull travels to Sheffield Midland via Chesterfield, then along the classic route via Doncaster and Goole. The new HS Metro service from Chichester to Nottingham and Derby travels via Melton Mowbray. These services are assigned to HS3, and dealt with here.

(The new HS Metro services from Hull and Skegness, likewise Cleethorpes and Preston, all via Gainsborough, are assigned to HS8, and dealt with there, while the services from Bournemouth West to Newcastle / Middlesborough and Paddington to Nottingham and Derby via Melton Mowbray are assigned to HS4, and dealt with there.)

The following new distance values apply:

- Pancras Cross/St. Pancras West – West Hampstead 6.3km (*)
- West Hampstead – West Hampstead Junction 0.4km (360kph)
- Northampton Castle – Watford Gap Junction 21km (360kph *)
- Watford Gap Junction – Rugby HS 12km (300kph)
- Rugby HS – Coventry HS 18km (300kph *)
- Melton Mowbray – Asfordby Junction 3.7km (225kph)
- Asfordby Junction – Edwalton Junction 19.6km (300kph)
- Edwalton Junction – Nottingham HS 6.8km (300kph *)
- Nottingham – Derby 26km (360kph *)
- South Yorkshire LL – Doncaster 9.6km (160kph)
- Doncaster – Goole 27.3km (200kph)
- Goole – Gilberdyke 10.8km (200kph)
- Gilberdyke – Hull Paragon 27.3km (200kph)

(*) The time to travel from Pancras Cross / St. Pancras West to West Hampstead (6.3km start to pass) is 271 seconds, Northampton Castle to Watford Gap Junction (21km start to pass) is 389 seconds, from Rugby HS to Coventry HS (18km start to stop) is 438 seconds, from Edwalton Junction to Nottingham (6.8km pass to stop) in 168 seconds and from Nottingham to Derby (26km start to stop) is 527 seconds.

1. UHS Services London – South Yorkshire (LL) / Barnsley / York / Halifax / Skipton (3/2/3/4/4 stops)

Section	Distance (km)	Cumulative Distance (km)	Section Time (minutes)	Cumulative Journey Time (minutes)	Elapsed Time from London, inc. Station Wait Times
Pancras Cross - Huthwaite Jn.	211.0	211.0	38.2	38.2	
Huthwaite Jn.- Stonebroom Jn.	5.0	216.0	1.3	39.5	
Stonebroom Jn. - Chesterfield	10.0	226.0	3.9	43.4	43.4
Chesterfield - Sheffield Midland	19.8	245.8	8.4	51.8	54.8
Sheffield Midland - Barnsley	25.8	271.6	11.7	63.5	71.5
Sheffield Midland - Rotherham	9.7	255.5	5.6	57.4	63.4
Rotherham - South Yorkshire LL	11.0	266.5	6.1	63.5	72.5
South Yorkshire LL - Doncaster	9.6	276.1	5.6	69.1	81.1
Doncaster - Goole	27.3	303.4	10.7	79.8	94.8
Goole - Gilberdyke	10.8	314.2	5.7	85.5	103.5
Gilberdyke - Hull Paragon	27.3	341.5	10.7	96.1	117.1
Pancras Cross - South Yorkshire HL	253.0	253.0	46.6	46.6	46.6
South Yorkshire HL - Ryhill Jn,	19.0	272.0	6.1	52.7	
Ryhill Jn. - Wakefield Westgate	8.0	280.0	3.2	55.9	58.9
Wakefield Westgate - Leeds New Lane	15.0	295.0	7.6	63.5	69.5
Leeds New Lane - Garforth East Junction	10.8	305.8	4.5	68.0	
Garforth East Junction - Ulleskelf Junction	15.0	320.8	3.1	71.2	
Ulleskelf Jn. - York HS	14.0	334.8	4.8	75.9	84.9
South Yorkshire HL - Swillington Common Junction	36.0	289.0	9.0	55.6	
Swillington Common Junction - Manston Junction	1.9	290.9	0.5	56.1	
Manston Jn. - Leeds City	8.0	298.9	3.3	59.5	62.5
Leeds City - Shipley	17.3	316.2	8.5	67.9	73.9
Shipley - Bradford City	4.9	321.1	3.8	71.7	80.7
Bradford City - Halifax	12.8	333.9	6.8	78.5	90.5
Leeds City - Shipley	17.3	316.2	8.5	67.9	75.9
Shipley - Keighley	10.0	326.2	5.7	73.6	84.6
Keighley - Skipton	16.4	342.6	8.1	81.8	95.8

Current fastest time (minutes) from London (with HS2 Ltd.'s estimates) [and the above values] to:

- Chesterfield 105 [43]
- Sheffield 120 (69/79*) [55]
- Barnsley 155 (1 change) [72]
- Rotherham 136 (1 change) [63]
- South Yorkshire LL [73]
- Doncaster [81]
- Goole [95]
- Gilberdyke [104]
- Hull Paragon [117]
- South Yorkshire HL [47]
- Wakefield 115 [59]
- Leeds 131 (83) [70/63]
- York 110 [85]
- Shipley 152 (1 change) [74]
- Bradford 168 (2 changes) [81]
- Halifax 171 [91]
- Keighley 166 (1 change) [85]
- Skipton 184 (1 change) [96]

(*) 69 minutes is HS2 Ltd.'s estimate from London to the old South Yorkshire (Sheffield Meadowhall), and 79 minutes to Sheffield Midland. These values, and that for Leeds, show very clearly the time penalty imposed by the ridiculous routing via Birmingham. Note that the above service to Sheffield is not the fastest – see section 2, following. Likewise the service to York – via Leeds – is very much not the fastest – see sections 2 and 3.

The services to South Yorkshire LL and Barnsley split / join at Sheffield Midland. The Barnsley portion is given a 5 minute station wait at Sheffield, departing 2 minutes after / arriving 2 minutes before the South Yorkshire portion. Likewise the services to Halifax and Skipton split / join at Leeds City, the Skipton portion having a 5 minute wait there.

1P. UHS Services London – South Yorkshire (LL) / Barnsley / York / Halifax / Skipton (3/2/3/4/4 stops; with passing times)

Section	Distance (km)	Cumulative Distance (km)	Section Time (minutes)	Cumulative Journey Time (minutes)	Elapsed Time from London, inc. Station Wait Times
Pancras Cross - *Scratchwood Junction (pass)*	14.0	14.0	5.1	*5.1*	*5.1*
Scratchwood Junction (pass) - Slip End (North) Junction (pass)	29.9	43.9	5.0	*10.1*	*10.1*
Slip End (North) Junction (pass) - Luton & Dunstable Pkwy (pass)	4.1	48.0	0.7	*10.8*	*10.8*

Luton & Dunstable Pkwy (pass) - Milton Keynes Pkwy (pass)	18.0	66.0	3.0	*13.8*	*13.8*
Milton Keynes Parkway (pass) - Newport Pagnell (N.) Jn. (pass)	6.8	72.8	1.1	*14.9*	*14.9*
Newport Pagnell (N.) Jn. (pass) - Collingtree (West) Jn. (pass)	22.1	94.9	3.7	*18.6*	*18.6*
Collingtree (West) Jn. (pass) - Langborough Junction (pass)	15.1	110.0	2.5	*21.1*	*21.1*
Langborough Junction (pass) - Aylestone (North) Junction (pass)	35.9	145.9	6.0	*27.1*	*27.1*
Aylestone (North) Junction (pass) - Leicester Avoiding Line (pass)	4.1	150.0	0.7	*27.8*	*27.8*
Leicester Avoiding Line (pass) - Thurmaston (North) Jn. (pass)	6.8	156.8	1.1	*28.9*	*28.9*
Thurmaston (North) Jn. (pass) - Stanford Junction (pass)	13.2	170.0	2.2	*31.1*	*31.1*
Stanford Junction (pass) - Nuthall South Junction (pass)	23.0	193.0	3.8	*34.9*	*34.9*
Nuthall South Junction (pass) - Nuthall North Junction (pass)	4.5	197.5	0.8	*35.7*	*35.7*
Nuthall North Junction (pass) - Huthwaite Junction (pass)	13.5	211.0	2.5	*38.2*	*38.2*
Huthwaite Junction (pass) - Stonebroom Junction (pass)	5.0	216.0	1.3	*39.5*	*39.5*
Stonebroom Jn. (pass) - Chesterfield	10.0	226.0	3.9	43.4	43.4
Chesterfield - Sheffield Midland	19.8	245.8	8.4	51.8	54.8
Sheffield Midland - Barnsley	25.8	271.6	11.7	63.5	71.5
Sheffield Midland - Rotherham	9.7	255.5	5.6	57.4	63.4
Rotherham - South Yorkshire LL	11.0	266.5	6.1	63.5	72.5
South Yorkshire LL - Doncaster	9.6	276.1	5.6	69.1	81.1
Doncaster - Goole	27.3	303.4	10.7	79.8	94.8
Goole - Gilberdyke	10.8	314.2	5.7	85.5	103.5
Gilberdyke - Hull Paragon	27.3	341.5	10.7	96.1	117.1
Nuthall North Junction (pass) - Huthwaite Junction (pass)	13.5	211.0	2.3	*37.9*	*37.9*
Huthwaite Junction (pass) - Wales Junction (pass)	25.0	236.0	4.2	*42.1*	*42.1*
Wales Junction (pass) - Ravenfield (North) Jn. (pass)	12.9	248.9	2.4	*44.5*	*44.5*
Ravenfield (North) Jn. (pass) - South Yorkshire HL	4.1	253.0	2.1	46.6	46.6
South Yorkshire HL - *Hickleton (North) Junction (pass)*	6.8	259.8	3.5	50.2	53.2
Hickleton (North) Junction (pass) - Ryhill Junction)pass)	12.2	272.0	2.6	52.7	55.7

Ryhill Junction)pass) - Crofton Junction (pass)	1.0	273.0	0.3	*53.0*	56.0
Crofton Junction (pass) - Wakefield Westgate	7.0	280.0	2.9	55.9	58.9
Wakefield Westgate - *Gelderd Rd. North Junction (pass)*	11.0	291.0	5.4	*61.3*	*67.3*
Gelderd Rd. North Junction (pass) - Leeds New Lane	4.0	295.0	2.2	63.5	69.5
Leeds New Lane - *Garforth West Junction (pass)*	10.0	305.0	4.3	*67.8*	*76.8*
Garforth West Junction (pass) - Garforth East Junction (pass)	0.8	305.8	0.2	*68.0*	*77.0*
Garforth East Junction (pass) - Ulleskelf Junction (pass)	15.0	320.8	3.1	*71.2*	*80.2*
Ulleskelf Junction (pass) - York HS	14.0	334.8	4.8	76.0	85.0
South Yorkshire HL - *Hickleton (North) Junction (pass)*	6.8	259.8	3.9	*50.5*	*53.5*
Hickleton (North) Jn. (pass) - Ryhill Junction (pass)	12.2	272.0	2.0	*52.6*	*55.6*
Ryhill Junction (pass) - Swillington Common Jn. (pass)	17.0	289.0	3.1	*55.6*	*58.6*
Swillington Common Jn. (pass) - Manston Junction (pass)	1.9	290.9	0.5	*56.1*	*59.1*
Manston Junction (pass) - Leeds City	8.0	298.9	3.3	59.5	62.5
Leeds City - Shipley	17.3	316.2	8.5	67.9	73.9
Shipley - Bradford City	4.9	321.1	3.8	71.7	80.7
Bradford City - Halifax	12.8	333.9	6.8	78.5	90.5
Leeds City - Shipley	17.3	316.2	8.5	67.9	75.9
Shipley - Keighley	10.0	326.2	5.7	73.6	84.6
Keighley - Skipton	16.4	342.6	8.1	81.8	95.8

2. UHS Services London – Derby/Liverpool /Preston/York/Middlesborough/ Newcastle (1/3/4/1/6/5 stops):

Section	Distance (km)	Cumulative Distance (km)	Section Time (minutes)	Cumulative Journey Time (minutes)	Elapsed Time from London, inc. Station Wait Times
Pancras Cross - Nottingham	192.0	192.0	37.1	37.1	37.1
Nottingham - Derby	26.0	218.0	8.8	45.8	48.8
Pancras Cross - Wales Junction	236.0	236.0	42.3	42.3	
Wales Junction - Waleswood Junction	0.8	236.8	0.2	42.5	
Waleswood Jn. - Sheffield HS	10.6	247.3	3.9	46.4	46.4
Sheffield HS - Manchester HS	55.0	302.3	14.7	61.1	64.1
Manchester HS - M/C Victoria LL	0.5	302.8	1.2	62.3	68.3
M/C Victoria LL - Liverpool Lime St.	49.0	351.8	12.6	74.9	83.9
M/C Victoria LL - Bolton	17.0	319.8	7.1	69.4	78.4
Bolton - Gibb Farm Junction	8.0	327.8	3.9	73.3	
Gibb Farm Junction - Preston	24.0	351.8	6.0	79.3	91.3
Pancras Cross - South Yorkshire HL	253.0	253.0	46.6	46.6	46.6
South Yorkshire HL - Ulleskelf Junction	53.0	306.0	11.8	58.5	
Ulleskelf Junction - York HS	14.0	320.0	4.8	63.2	66.2
York HS - Northallerton	48.2	368.2	15.6	78.9	86.9
Northallerton - Yarm	18.9	387.1	7.8	86.7	97.7
Yarm - Eaglescliffe	4.1	391.2	3.5	90.2	104.2
Eaglescliffe - Thornaby	4.8	396.0	3.8	93.9	110.9
Thornaby - Middlesborough	5.2	401.2	3.9	97.8	117.8
York - Romanby Jn.	46.0	366.0	14.0	77.2	
Romanby Junction - Darlington	24.0	390.0	6.1	83.3	89.3

Darlington - Durham Relly Mill	33.0	423.0	10.3	93.6	102.6
Durham Relly Mill - Consett	20.0	443.0	7.7	101.3	113.3
Consett - Newcastle	20.0	463.0	7.7	109.0	124.0

Current fastest time (minutes) from London (with HS2 Ltd.'s estimates) [and the above values] to:

- Nottingham 100 (51/68*) [37]
- Derby 85 (51/72*) [49]
- Sheffield 120 [46]
- Manchester 127 (68) [64]
- Liverpool 128 (96) [84]
- Bolton 164 (1 change) [78]
- Preston 128 [91]
- York 110 [66]
- Northallerton 144 [87]
- Yarm 174 (1 change) [98]
- Eaglescliffe 163 [104]
- Thornaby 169 (1 change) [111]
- Middlesborough 176 (1 change) [118]
- Darlington 139 [89]
- Durham 173 [103]
- Newcastle 169 [124]

The above time to York is still not the fastest – see section 3, following.

The services to Newcastle and Middlesborough split / join at York. The Middlesborough portion is given a 5 minute station wait at York, departing 2 minutes after / arriving 2 minutes before the Newcastle portion.

Pancras Cross – Sheffield HS non-stop takes 47 minutes at an average speed of 200.6mph. Pancras Cross – Manchester HS with 1 stop takes 64 minutes at an average speed of 178.5mph. This actually takes 4 minutes less than HS2's time from Euston Cross to Manchester, although that journey is 6km shorter, but of course that journey has 2 intermediate stops rather than just 1, and the extra stop, Manchester Interchange, is only 5 miles from Manchester HS, which means in effect that the deceleration for the final station begins 5 miles further out, and the final 5 miles are taken at an average speed of only 60mph, and the overall journey at an average speed of 167mph.

The above time Pancras Cross – Liverpool is 12 minutes longer than HS2 by my plans, new HS infrastructure all the way, but 15 minutes shorter than my value for the HS-C service to Liverpool, along the classic route between Crewe and Liverpool (using current timetable times between Crewe and Liverpool) and 12 minutes shorter than HS2 Ltd.'s time to Liverpool (they've clearly assumed some acceleration on the WCML).

2P. UHS Services London – Derby/Liverpool /Preston/York/Middlesborough/ Newcastle (1/3/4/1/6/5 stops; with passing times):

Section	Distance (km)	Cumulative Distance (km)	Section Time (minutes)	Cumulative Journey Time (minutes)	Elapsed Time from London, inc. Station Wait Times
Pancras Cross - *Scratchwood Junction (pass)*	14.0	14.0	5.1	*5.1*	*5.1*
Scratchwood Junction (pass) - Slip End (North) Junction (pass)	29.9	43.9	5.0	*10.1*	*10.1*
Slip End (North) Junction (pass) - Luton & Dunstable Pkwy (pass)	4.1	48.0	0.7	*10.8*	*10.8*
Luton & Dunstable Pkwy (pass) - Milton Keynes Partkway (pass)	18.0	66.0	3.0	*13.8*	*13.8*
Milton Keynes Parkway (pass) - Newport Pagnell (N.) Jn. (pass)	6.8	72.8	1.1	*14.9*	*14.9*
Newport Pagnell (N.) Jn. (pass) - Collingtree (West) Jn. (pass)	22.1	94.9	3.7	*18.6*	*18.6*
Collingtree (West) Jn. (pass) - Langborough Junction (pass)	15.1	110.0	2.5	*21.1*	*21.1*
Langborough Junction (pass) - Aylestone (North) Junstion (pass)	35.9	145.9	6.0	*27.1*	*27.1*
Aylestone (North) Junction (pass) - Leicester Avoiding Line (pass)	4.1	150.0	0.7	*27.8*	*27.8*
Leicester Avoiding Line (pass) - Thurmaston (North) Jn. (pass)	6.8	156.8	1.1	*28.9*	*28.9*
Thurlestone (North) Jn. (pass) - Stanford Junction (pass)	13.2	170.0	2.4	*31.3*	*31.3*
Stanford Junction (pass) - Edwalton Junction (pass)	15.2	185.2	3.0	*34.3*	*34.3*
Edwalton Junction (pass) - Nottingham	6.8	192.0	2.7	37.1	37.1
Nottingham - *Strelley Junction (pass)*	7.0	199.0	3.6	*40.7*	*43.7*
Strelley Junction (pass) - Awsworth Junction (pass)	3.5	202.5	0.8	*41.5*	*44.5*
Awsworth Junction (pass) - Derby	15.5	218.0	4.4	45.8	48.8
Thurlestone (North) Jn. (pass) - Stanford Junction (pass)	13.2	170.0	2.2	*31.1*	*31.1*
Stanford Junction (pass) - Nuthall South Junction (pass)	23.0	193.0	3.8	*34.9*	*34.9*
Nuthall South Junction (pass) - Nuthall North Junction (pass)	4.5	197.5	0.8	*35.7*	*35.7*
Nuthall North Junction (pass) - Huthwaite Junction (pass)	13.5	211.0	2.3	*37.9*	*37.9*

Huthwaite Junction (pass) - Wales Junction (pass)	25.0	236.0	4.4	*42.3*	*42.3*
Wales Junction (pass) - Waleswood Junction (pass)	0.8	236.8	0.2	*42.5*	*42.5*
Waleswood Junction (pass) - Woodburn HS Juncione (pass)	9.0	245.8	2.5	*45.1*	*45.1*
Woodburn HS Junction (pass) - Sheffield HS	1.6	247.3	1.3	46.4	46.4
Sheffield HS - *Ladybower Junction (pass)*	17.0	264.3	5.7	*52.1*	*55.1*
Ladybower Junction (pass) - Guide Bridge HS Jn. (pass)	30.0	294.3	6.0	*58.1*	*61.1*
Guide Bridge HS Jn (pass) - Manchester HS	8.0	302.3	3.0	*61.1*	64.1
Manchester HS - Manchester Victoria LL	0.5	302.8	1.2	62.3	68.3
Manchester Victoria LL - *Broughton Junction (pass)*	3.0	305.8	2.4	*64.7*	*73.7*
Broughton Junction (pass) - Kenyon West Junction (pass)	17.0	322.8	3.8	*68.4*	*77.4*
Kenyon West Junction (pass) - Liverpool Lime St.	29.0	351.8	6.5	74.9	83.9
Broughton Junction (pass) - Bolton	14.0	319.8	4.7	69.4	78.4
Bolton - *Gibb Farm Junction (pass)*	8.0	327.8	3.9	*73.3*	*85.3*
Gibb Farm Junction (pass) - Preston	24.0	351.8	6.0	79.3	91.3
Huthwaite Junction (pass) - Wales Junction (pass)	25.0	236.0	4.2	*42.1*	*42.1*
Wales Junction (pass) - Ravenfield (North) Jn. (pass)	12.9	248.9	2.4	*44.5*	*44.5*
Ravenfield (North) Jn. (pass) - South Yorkshire HL	4.1	253.0	2.1	46.6	46.6
South Yorkshire HL - *Hickleton (North) Junction (pass)*	6.8	259.8	3.5	*50.2*	*53.2*
Hickleton (North) Junction (pass) - Ryhill Junction (pass)	12.2	272.0	2.4	*52.6*	*55.6*
Ryhill Junction (pass) - Swillington Common Jn. (pass)	17.0	289.0	2.8	*55.4*	*58.4*
Swillington Common Jn. (pass) - Garforth East Jn. (pass)	2.0	291.0	0.3	*55.7*	*58.7*
Garforth East Junction (pass) - Ulleskelf Junction (pass)	15.0	306.0	2.7	*58.5*	*61.5*
Ulleskelf Junction (pass) - York HS	14.0	320.0	4.8	63.2	66.2

York HS - Northallerton	48.2	368.2	15.6	78.9	86.9
Northallerton - Yarm	18.9	387.1	7.8	86.7	97.7
Yarm - Eaglescliffe	4.1	391.2	3.5	90.2	104.2
Eaglescliffe - Thornaby	4.8	396.0	3.8	93.9	110.9
Thornaby - Middlesborough	5.2	401.2	3.9	97.8	117.8
York HS - *Romanby Junction (pass)*	46.0	366.0	14.0	*77.2*	*83.2*
Romanby Junction (pass) - Darlington	24.0	390.0	6.1	83.3	89.3
Darlington - Durham Relly Mill	33.0	423.0	10.3	93.6	102.6
Durham Relly Mill - Consett	20.0	443.0	7.7	101.3	113.3
Consett - *Derwent Hill Junction (pass)*	2.0	445.0	1.9	*103.2*	*118.2*
Derwent Hill Junction (pass) - Paradise Junction (pass)	15.0	460.0	4.0	*107.2*	*122.2*
Paradise Junction (pass) - Newcastle	3.0	463.0	1.8	109.0	124.0

3. UHS Services London / Newcastle – Edinburgh (6/3 stops):

Section	Distance (km)	Cumulative Distance (km)	Section Time (minutes)	Cumulative Journey Time (minutes)	Elapsed Time from London, inc. Station Wait Times
Pancras Cross - Ulleskelf Jn.	306.0	306.0	54.0	54.0	
Ulleskelf Jn. - York HS	14.0	320.0	4.8	58.8	58.8
York HS - Romanby Jn.	46.0	366.0	14.0	72.8	
Romanby Jn. - Darlington	24.0	390.0	6.1	78.8	81.8
Darlington - Durham Relly Mill	33.0	423.0	10.3	89.2	95.2
Durham Relly Mill - Consett	20.0	443.0	7.7	96.9	105.9
Consett - Derwent Hill Junction	2.0	445.0	1.9	98.8	
Derwent Hill Junction - Hexham	21.0	466.0	7.4	106.2	118.2
Hexham - Riccarton North Jn.	60.0	526.0	14.4	120.6	
Riccarton North Jn. - Hawick	20.0	546.0	5.4	126.0	141.0
Hawick - Edinburgh	82.0	628.0	18.1	144.1	162.1
Newcastle - Hexham	32.0	32.0	12.1	12.1	12.1
Hexham - Riccarton North Jn,	60.0	92.0	14.4	26.5	
Riccarton North Jn. - Hawick	20.0	112.0	5.4	31.9	34.9
Hawick - Lauder	37.0	149.0	10.6	42.5	48.5
Lauder - Edinburgh	45.0	194.0	11.9	54.4	63.4

Current fastest time (minutes) from London [and the above values] to:

- York 110 [59]
- Darlington 139 [82]
- Durham 173 [95]
- Hexham 235 (1 change) [118]
- Hawick [141]
- Edinburgh 260 [162]

And from Newcastle:

- Hexham 31 [12]
- Hawick [35]
- Lauder [49]
- Edinburgh 85 (via ECML, of course). [63]

3P. UHS Services London / Newcastle – Edinburgh (6/3 stops; with passing times):

Section	Distance (km)	Cumulative Distance (km)	Section Time (minutes)	Cumulative Journey Time (minutes)	Elapsed Time from London, inc. Station Wait Times
Pancras Cross - *Scratchwood Junction (pass)*	14.0	14.0	5.1	*5.1*	*5.1*
Scratchwood Junction (pass) - Slip End (North) Jn. (pass)	29.9	43.9	5.0	*10.1*	*10.1*
Slip End (North) Jn. (pass) - Luton & Dunstable Pkwy (pass)	4.1	48.0	0.7	*10.8*	*10.8*
Luton & Dunstable Pkwy (pass) - Milton Keynes Partkway (pass)	18.0	66.0	3.0	*13.8*	*13.8*
Milton Keynes Parkway (pass) - Newport Pagnell (N.) Jn. (pass)	6.8	72.8	1.1	*14.9*	*14.9*
Newport Pagnell (N.) Jn. (pass) - Collingtree (West) Jn. (pass)	22.1	94.9	3.7	*18.6*	*18.6*
Collingtree (West) Jn. (pass) - Langborough Junction (pass)	15.1	110.0	2.5	*21.1*	*21.1*
Langborough Junction (pass) - Aylestone (North) Junstion (pass)	35.9	145.9	6.0	*27.1*	*27.1*
Aylestone (North) Junction (pass) - Leicester Avoiding Line (pass)	4.1	150.0	0.7	*27.8*	*27.8*
Leicester Avoiding Line (pass) - Thurmaston (North) Jn. (pass)	6.8	156.8	1.1	*28.9*	*28.9*
Thurlestone (North) Jn. (pass) - Stanford Junction (pass)	13.2	170.0	2.2	*31.1*	*31.1*

Stanford Junction (pass) - Nuthall South Junction (pass)	23.0	193.0	3.8	*34.9*	*34.9*
Nuthall South Junction (pass) - Nuthall North Junction (pass)	4.5	197.5	0.8	*35.7*	*35.7*
Nuthall North Junction (pass) - Huthwaite Junction (pass)	13.5	211.0	2.3	*37.9*	*37.9*
Huthwaite Junction (pass) - Wales Junction (pass)	25.0	236.0	4.2	*42.1*	*42.1*
Wales Junction (pass) - Ravenfield (North) Jn. (pass)	12.9	248.9	2.2	*44.3*	*44.3*
Ravenfield (North) Jn. (pass) - South Yorkshire HL (pass)	4.1	253.0	0.7	*44.9*	*44.9*
South Yorkshire HL (pass) - Hickleton (North) Jn. (pass)	6.8	259.8	1.1	*46.1*	*46.1*
Hickleton (North) Jn. (pass) - Ryhill Junction (pass)	12.2	272.0	2.0	*48.1*	*48.1*
Ryhill Junction (pass) - Swillington Common Jn. (pass)	17.0	289.0	2.8	*50.9*	*50.9*
Swillington Common Jn. (pass) - Garforth East Jn. (pass)	2.0	291.0	0.3	*51.3*	*51.3*
Garforth East Junction (pass) - Ulleskelf Junction (pass)	15.0	306.0	2.7	*54.0*	*54.0*
Ulleskelf Junction (pass) - York HS	14.0	320.0	4.8	58.8	58.8
York HS - *Romanby Junction (pass)*	46.0	366.0	14.0	*72.8*	*75.8*
Romanby Junction (pass) - Darlington	24.0	390.0	6.1	78.8	81.8
Darlington - Durham Relly Mill	33.0	423.0	10.3	89.2	95.2
Durham Relly Mill - Consett	20.0	443.0	7.7	96.9	105.9
Consett - *Derwent Hill Junction (pass)*	2.0	445.0	1.9	*98.8*	*110.8*
Derwent Hill Junction (pass) - Stocksfield Junction (pass)	9.0	454.0	2.9	*101.7*	*113.7*
Stocksfield Junction (pass) - Hexham	12.0	466.0	4.5	106.2	118.2
Hexham - *Riccarton North Junction (pass)*	60.0	526.0	14.4	*120.6*	*135.6*
Riccarton North Junction (pass) - Hawick	20.0	546.0	5.4	126.0	141.0
Hawick - *Ravenswood Jn. (pass)*	21.0	567.0	6.3	*132.3*	*150.3*
Ravenswood Jn. (pass) - Birkenside (North) Jn. (pass)	11.9	578.9	2.0	*134.3*	*152.3*
Birkenside (North) Jn. (pass) - Lauder (pass)	4.1	583.0	0.7	*135.0*	*153.0*

Lauder (pass) - Wiselawmill (North) Jn. (pass)	6.8	589.8	1.1	*136.1*	*154.1*
Wiselawmill (North) Jn. (pass) - Newcraighall HS (pass)	31.0	620.8	5.2	*141.3*	*159.3*
Newcraighall HS (pass) - Edinburgh	7.2	628.0	2.8	144.1	162.1
Newcastle - *Paradise Junction (pass)*	3.0	3.0	2.4	*2.4*	*2.4*
Paradise Junction (pass) - Bladon Junction East (pass)	4.0	7.0	1.3	*3.6*	*3.6*
Bladon Junction East (pass) - Stocksfield Junction (pass)	13.0	20.0	3.9	*7.5*	*7.5*
Stocksfield Junction (pass) - Hexham	12.0	32.0	4.5	12.1	12.1
Hexham - *Riccarton North Junction (pass)*	60.0	92.0	14.4	*26.5*	*29.5*
Riccarton North Junction (pass) - Hawick	20.0	112.0	5.4	31.9	34.9
Hawick - *Ravenswood Jn. (pass)*	21.0	133.0	6.3	*38.1*	*44.1*
Ravenswood Jn. (pass) - Birkenside (North) Jn. (pass)	11.9	144.9	2.2	*40.3*	*46.3*
Birkenside (North) Jn. (pass) - Lauder	4.1	149.0	2.1	42.5	48.5
Lauder - *Wiselawmill (North) Jn. (pass)*	6.8	155.8	3.5	46.0	*55.0*
Wiselawmill (North) Jn. (pass) - Newcraighall HS (pass)	31.0	186.8	5.6	51.6	*60.6*
Newcraighall HS (pass) - Edinburgh	7.2	194.0	2.8	54.4	63.4

4. UHS Elapsed Times Summary:

Section	Pancr. Cross - Derby	Pancr. Cross - Liverp'l / Preston	Pancr. Cross - South Yorks	Pancr. Cross - York	Pancr. Cross - Mid'bro'	Pancr. Cross - N'castle	Pancr. Cross - West Yorks.	Pancr. Cross - Ed'b'gh	N'castle - Ed'b'gh
Pancras Cross - Nottingham	37.1								
Nottingham - Derby	48.8								
Pancras Cross - Sheffield HS		46.4							
Sheffield HS - Manchester HS		64.1							
Manchester HS - Victoria LL		68.3							
Victoria LL - Liverpool Lime St.		83.9							
Victoria LL - Bolton		78.4							
Bolton - Preston		91.3							
Pancras Cross - Chesterfield			43.4						
Chesterfield - Sheffield Midland			54.8						
Sheffield Midland - Barnsley			71.5						
Sheffield Midland - Rotherham			63.4						
Rotherham - South Yorkshire LL			72.5						
South Yorkshire LL - Doncaster			81.1						

Doncaster - Goole			94.8						
Goole - Gilberdyke			103.5						
Gilberdyke - Hull Paragon			117.1						
Pancras Cross - South Yorkshire				46.6	46.6	46.6	46.6		
South Yorkshire - Wakefield Westgate				58.9					
Wakefield Westgate - Leeds New Lane				69.5					
South Yorkshire / Leeds - York HS				84.9	66.2	66.2			
York HS - Northallerton					86.9				
Northallerton - Yarm					97.7				
Yarm - Eaglescliffe					104.2				
Eaglescliffe - Thornaby					110.9				
Thornaby - Middlesborough					117.8				
York HS - Darlington						89.3			
Darlington - Durham Relly Mill						102.6			
Durham Relly Mill - Consett						113.3			
Consett - Newcastle						124.0			
South Yorkshire - Leeds City							62.5		

Leeds City - Shipley							73.9		
Shipley - Bradford City							80.7		
Bradford City - Halifax							90.5		
Shipley - Keighley							84.6		
Keighley - Skipton							95.8		
Pancras Cross - York								58.8	
York - Darlington								81.8	
Darlington - Durham Relly Mill								95.2	
Durham Relly Mill - Consett								105.9	
Consett - Hexham								118.2	
Hexham - Hawick								141.0	
Hawick - Edinburgh								162.1	
Newcastle - Hexham									12.1
Hexham - Hawick									34.9
Hawick - Lauder									48.5
Lauder - Edinburgh									63.4

5. HS Metro Services London – York / Preston (9/10 stops):

Section	Distance (km)	Cumulative Distance (km)	Section Time (minutes)	Cumulative Journey Time (minutes)	Elapsed Time from London, inc. Station Wait Times
Pancras Cross - West Hampstead	6.3	6.3	4.5	4.5	4.5
West Hampstead - Luton & Dunstable Pkwy	44.7	51.0	11.9	16.4	19.4
Luton & Dunstable Pkwy - Milton Keynes Parkway	18.0	69.0	7.3	23.7	29.7
Milton Keynes Parkway - Northampton Castle	33.0	102.0	9.9	33.7	42.7
Northampton Castle - Leicester	58.0	160.0	14.1	47.8	59.8
Leicester - Nottingham	42.0	202.0	11.4	59.2	74.2
Nottingham - Derby	26.0	228.0	8.8	68.0	88.0
Leicester - Melton Mowbray (reverse)	24.1	184.1	9.7	57.5	72.5
Melton Mowbray - Edwalton Junction	23.3	207.4	7.1	64.5	
Edwalton Junction - Nottingham	6.8	214.2	2.8	67.3	87.3
Nottingham - Derby	26.0	240.2	8.8	76.1	99.1
Nottingham - Nuthall South Junction.	7.4	209.4	3.7	62.9	
Nuthall South Junction - Wales Junction	43.0	252.4	7.8	70.7	
Wales Junction - Waleswood Junction	0.8	253.2	0.2	70.9	
Waleswood Junction - Sheffield HS	10.6	263.7	3.9	74.8	94.8
Sheffield HS - Huddersfield	51.0	314.7	14.1	85.0	111.9
Huddersfield - Leeds New Lane	24.0	338.7	8.5	93.5	123.4
Leeds New Lane - Garforth East Jn.	10.8	349.5	4.5	98.1	
Garforth East Junction - Ulleskelf Junction	15.0	364.5	3.1	101.2	
Ulleskelf Jn. - York HS	14.0	378.5	4.8	105.9	138.8
Sheffield HS - Manchester HS	55.0	308.2	14.7	85.6	112.5
Manchester HS - Victoria LL	0.5	308.7	1.2	86.8	116.7

Victoria LL - Bolton	17.0	325.7	7.1	93.9	126.8
Bolton - Gibb Farm Junction	8.0	333.7	3.9	97.8	
Gibb Farm Junction - Preston	24.0	349.7	6.1	103.8	139.7

The thing to note here is that Langborough and Stanford junctions are now no longer track junctions (in normal service – the connections with the main lines are still in place, for operational flexibility, but not for normal use, except that the UHS service from Portsmouth and Southsea to Derby **does** switch between main and relief lines at Stanford Junction). Accordingly, HS Metro services now take these junctions at full line speed.

Note that there are now two types of (HS Metro – there's also a UHS) service to Derby. The first service to Derby in the above table involves one change – a (cross-platform) connection at Nottingham into an HS7 service, either Skegness or Cleethorpes to Birmingham. The HS3 service accordingly is given a 5 minute wait at Nottingham, since the HS7 service has the main line through Strelley and Awsworth junctions, whereas the HS3 service has to slow to diverge at Strelley. The second service is via Melton Mowbray, and travels through to Derby. It is significantly slower to Derby than that with the change at Nottingham (and **very** much slower than the UHS service), reflecting the longer distance. Its principal aim is to give Melton Mowbray the deserved benefit of an HS-Metro service (see below).

Current fastest time (minutes) from London (with HS2 Ltd.'s estimates) [and the above values] to:

- West Hampstead (no MML service) [5]
- Luton [& Dunstable Pkwy] 21 [19]
- Milton Keynes [Parkway] 30 [30]
- Northampton 51 [43]
- Leicester 62 [60]
- Melton Mowbray 119 (with 1 change) [73]
- Nottingham 100 (51/68*) [74 – 87 via MM]
- Derby 85 (51/71*) [88 – 99 via MM]
- Sheffield 120 [95]
- Huddersfield 162 (with 1 change) [112]
- Leeds 131 [123]
- York 110 [139]
- Manchester HS 127 [113]
- Bolton 164 (with 1 change) [127]
- Preston 128 [140]

(*) 51 minutes is HS2 Ltd.'s estimate from London to Toton (with 1 stop), 68 minutes to Nottingham Midland and 71 to Derby Midland. HS3's value of 68 minutes to Nottingham is with 3 stops, and 80 minutes to Derby is with 4 stops and 1 change. (The non-stop London – Nottingham service by HS3 takes 37 minutes, and reaches Derby in 49 minutes – see table 2.)

The West Hampstead stop has added c.7 minutes to the times. I consider this a price worth paying for the extra connectionality, and also for the reduction in passenger loadings at Pancras Cross / St. Pancras West (c/f Old Oak Common and Stratford HS South for HS1/HS2 and HS4/HS11/HS12).

Okay, so even a HS Metro train can't, travelling via Huddersfield and with 8 intermediate stops, beat a non-stop service to York, straight up the ECML. But see the corresponding UHS services to York. Remarkably, it still beats the fastest service to Leeds, by a comfortable margin (but, again, see the UHS service to Leeds and on to York).

Moreover, even travelling via the East Midlands, with 7 intermediate stops, the HS Metro service still beats the current best time to Manchester (comfortably) and, with 9 intermediate stops, is just 12 minutes slower to Preston.

5P. HS Metro Services London – York / Preston (9/10 stops with passing times):

Section	Distance (km)	Cumulative Distance (km)	Section Time (minutes)	Cumulative Journey Time (minutes)	Elapsed Time from London, inc. Station Wait Times
Pancras Cross - West Hampstead	6.3	6.3	4.5	4.5	4.5
West Hampstead - *West Hampstead Jn. (pass)*	0.4	6.7	0.9	*5.4*	*8.4*
West Hampstead Jn. (pass) - Scratchwood Junction (pass)	10.3	17.0	3.6	*9.0*	*12.0*
Scratchwood Junctionn (pass) - Slip End (North) Jn. (pass)	29.9	46.9	5.3	*14.3*	*17.3*
Slip End (North) Jn. (pass) - Luton & Dunstable Parkway	4.1	51.0	2.1	16.4	19.4
Luton & Dunstable Parkway - Milton Keynes Partkway	18.0	69.0	7.3	23.7	29.7
Milton Keynes Parkway - *Newport Pagnell (N.) Jn. (pass) -*	6.8	75.8	3.5	*27.3*	*36.3*
Newport Pagnell (N.) Jn. (pass) - Collingtree (West) Jn. (pass)	22.1	97.9	4.3	*31.5*	*40.5*
Collingtree (West) Jn. (pass) - Northampton Castle	4.1	102.0	2.1	33.7	42.7
Northampton Castle - *Langborough Junction (pass)*	18.0	120.0	5.8	*39.4*	*51.4*
Langborough Junction (pass) - Aylestone (North) Jn. (pass)	35.9	155.9	6.2	*45.6*	*57.6*
Aylestone (North) Jn. (pass) - Leicester	4.1	160.0	2.1	47.8	59.8
Leicester - *Thurmaston (North) Jn. (pass)*	6.8	166.8	3.5	*51.3*	*66.3*
Thurmaston (North) Jn. (pass) - Stanford Junction (pass)	13.2	180.0	2.6	*53.9*	*68.9*

Stanford Junction (pass) - Edwalton Junction (pass)	15.0	195.0	2.5	*56.4*	*71.4*
Edwalton Junction (pass) - Nottingham	7.0	202.0	2.8	59.2	74.2
Nottingham - *Strelley Junction (pass)*	7.0	209.0	3.6	*62.8*	*82.8*
Strelley Junction (pass) - Awsworth Junction (pass)	3.5	212.5	0.8	*63.6*	*83.6*
Awsworth Junction (pass) - Derby	15.5	228.0	4.4	68.0	88.0
Leicester - *Systen South Junction (pass)*	7.6	167.6	3.8	*51.6*	*66.6*
Systen South Junction (pass) - Melton Mowbray	16.5	184.1	5.9	57.5	72.5
Metlon Mowbray - *Asfordby Junction (pass)*	3.7	187.8	2.6	*60.1*	*80.1*
Asfordby Junction (passs) - Edwalton Junction (pass)	19.6	207.4	4.5	*64.5*	*84.5*
Edwalton Junction (pass) - Nottingham	6.8	214.2	2.8	67.3	87.3
Nottingham - *Strelley Junction (pass)*	7.0	221.2	3.6	*70.9*	*93.9*
Strelley Junction (pass) - Awsworth Junction (pass)	3.5	224.7	0.8	*71.7*	*94.7*
Awsworth Junction (pass) - Derby	15.5	240.2	4.4	76.1	99.1
Nottingham - *Strelley Junction (pass)*	7.0	209.0	3.6	*62.8*	*82.8*
Strelley Junction (pass) - Nuthall South Junction (pass)	0.4	209.4	0.1	*62.9*	*82.9*
Nuthall South Junction (pass) - Nuthall North Junction (pass)	4.5	213.9	1.0	*64.0*	*84.0*
Nuthall North Junction (pass) - Huthwaite Junction (pass)	13.5	227.4	2.3	*66.3*	*86.3*
Huthwaite Junction (pass) - Wales Junction (pass)	25.0	252.4	4.4	*70.7*	*90.7*
Wales Junction (pass) - Waleswood Junction (pass)	0.8	253.1	0.2	*70.9*	*90.9*
Waleswood Junction (pass) - Woodburn HS Junction (pass)	9.0	262.1	2.5	*73.4*	*93.4*
Woodburn HS Junction (pass) - Sheffield HS	1.6	263.7	1.3	74.7	94.7
Sheffield HS - *Ladybower Junction (pass)*	17.0	280.7	5.8	*80.5*	*103.5*
Ladybower Junction (pass) - Huddersfield	34.0	314.7	8.3	88.8	111.8

Huddersfield - Leeds New Lane	24.0	338.7	8.5	97.3	123.3
Leeds New Lane - *Garforth West Junction (pass)*	10.0	348.7	4.3	*101.7*	*130.7*
Garforth West Junction (pass) - Garforth East Junction (pass)	0.8	349.5	0.2	*101.9*	*130.9*
Garforth East Junction (pass) - Ulleskelf Junction (pass)	15.0	364.5	3.1	*105.0*	*134.0*
Ulleskelf Junction (pass) - York HS	14.0	378.5	4.8	109.8	138.8
Sheffield HS - *Ladybower Junction (pass)*	17.0	280.7	5.7	*80.4*	*103.4*
Ladtbower Junction (pass) - Guide Bridge HS Jn. (pass)	30.0	293.7	6.0	*86.4*	*109.4*
Guide Bridge HS Jn. (pass) - Manchester HS	8.0	288.7	3.0	89.4	112.4
Manchester HS - Manchester Victoria LL	0.5	289.2	1.2	90.6	116.6
Manchester Victoria LL - *Broughton Junction (pass)*	3.0	292.2	2.4	*93.0*	*122.0*
Broughton Junction (pass) - Bolton	14.0	306.2	4.7	97.7	126.7
Bolton - *Gibb Farm Junction (pass)*	8.0	314.2	3.9	*101.6*	*133.6*
Gibb Farm Jinction (pass) - Preston	24.0	338.2	6.1	107.6	139.6

6. HS-C St. Pancras West –York / Manchester / Liverpool / Chester / Worcester (13/11/13/14/11 stops):

Section	Distance (km)	Cumulative Distance (km)	Section Time (minutes)	Cumulative Journey Time (minutes)	Elapsed Time from London, inc. Station Wait Times
St. Pancras - West Hampstead	6.3	6.3	4.5	4.5	4.5
West Hampstead - Luton & Dunstable Pkwy	44.7	51.0	11.9	16.4	19.4
Luton & Dunstable Pkwy - Milton Keynes Parkway	18.0	69.0	7.3	23.7	29.7
Milton Keynes Parkway - Northampton Castle	33.0	102.0	9.9	33.7	42.7
Northampton Castle - Leicester	58.0	160.0	14.1	47.8	59.8
Leicester - Loughborough	20.1	180.1	8.5	56.3	71.3
Loughborough - Derby	26.2	206.3	10.3	66.6	84.6
Leicester - East Midlands Parkway	30.9	190.9	11.7	59.5	74.5
East Midlands Parkway - Derby	15.4	206.3	7.1	66.6	84.6
Derby - Chesterfield	38.8	245.1	14.1	80.7	101.7
Chesterfield - Sheffield	19.8	264.9	8.4	89.1	113.1
Sheffield - Rotherham	9.7	274.6	5.6	94.7	121.7
Rotherham - Wakefield Westgate	36.8	311.4	15.8	110.5	140.5
Wakefield Westgate - Leeds City	16.2	327.6	8.1	118.6	151.6
Leeds City - Micklefield	15.7	343.3	7.2	125.7	161.7
Micklefield - York	25.5	368.8	9.6	135.3	174.3
Sheffield - Chinley	32.0	296.9	14.0	103.1	132.1
Chinley - Stockport	18.2	315.1	8.8	111.9	143.9
Stockport - Manchester Piccadilly	9.4	324.5	5.3	117.2	152.2
Northampton Castle - Watford Gap Junction	21.0	123.0	6.5	40.1	
Watford Gap Junction - Rugby HS	12.0	135.0	3.9	44.1	56.1
Rugby HS - Coventry HS	18.0	153.0	7.3	51.4	66.4
Coventry HS - Birmingham International	17.2	170.2	7.6	59.0	77.0

Birmingham International - Birmingham New St.	13.3	183.5	6.5	65.5	86.5
Birmingham New St. - Wolverhampton	20.7	204.2	9.7	75.2	99.2
Wolverhampton - Stafford	26.0	230.2	10.3	85.5	112.5
Stafford - Crewe	39.4	269.6	13.3	98.8	128.8
Crewe - Runcord	36.2	305.8	12.4	111.2	144.2
Runcord - Liverpool South Parkway	12.0	317.8	6.1	117.3	153.3
Liverpool South Parkway - Liverpool Lime St.	9.2	327.0	5.2	122.5	161.5
Wolverhampton - Telford	25.2	229.4	9.5	84.7	111.7
Telford - Wellington	6.2	235.6	4.4	89.1	119.1
Wellington - Shrewsbury	16.5	252.1	7.2	96.3	129.3
Shrewsbury - Gobowen	29.0	281.1	10.5	106.8	142.8
Gobowen - Wrexham	19.6	300.7	8.3	115.2	154.2
Wrexham - Chester	19.4	320.1	8.3	123.5	165.5
Birmingham New St. (reverse) - University	4.2	187.7	3.5	69.0	95.0
University - Barnt Green	11.1	198.8	5.4	74.4	
Barnt Green - Bromsgrove	5.7	204.5	2.7	77.1	106.1
Bromsgrove - Droitwich Spa	10.3	214.8	5.6	82.7	114.7
Droitwich Spa - Worcester Shrub Hill	9.0	223.8	5.2	87.8	122.8

Current fastest time (minutes) from London [and the above values] to:

- West Hampstead (no MML service) [5]
- Luton [& Dunstable Parkway] 21 [19]
- Milton Keynes [Parkway] 30 [30]
- Northampton 51 [43]
- Leicester 62 [60]
- Loughborough 73 [71]
- East Midlands Parkway 81 [75]
- Derby 85 [85]
- Chesterfield 105 [102]
- Sheffield 120 [113]
- Rotherham 136 (1 change) [122]
- Wakefield Westgate 114 [141]
- Leeds 131 [152]

- Micklefield 140 (1 change) [162]
- York 110 [174]
- Chinley 177 (1 change) [132]
- Stockport 115 [144]
- Manchester Piccadilly 123 [152]
- Rugby 48 [56]
- Coventry 59 [66]
- Birmingham International 70 [77]
- Birmingham New St. 82 [87]
- Wolverhampton 107 [99]
- Stafford 77 [113]
- Crewe 90 [129]
- Runcorn 113 [144]
- Liverpool South Parkway 140 [153]
- Liverpool Lime St. 132 [162]
- Telford 124 [112]
- Wellington 161 [119]
- Shrewsbury 148 [129]
- Gobowen 163 (1 change) [143]
- Wrexham 144 (1 change) [154]
- Chester 121 [166]
- University [95]
- Bromsgrove [106]
- Droitwich Spa [115]
- Worcester Shrub Jill [123]

Wakefield, Leeds and York (current) times are, of course, via the ECML, likewise Stockport and Manchester via the WCML, which isn't really comparing like with like.

The Manchester times are given via Sheffield (reverse) and the Hope Valley (though via the High Peak would be much preferable).

Note that only one of either Loughborough or East Midland Parkway is served by a given train – the York trains serve Loughborough and the Manchester trains serve East Midlands Parkway.

The HS-C times to Rugby, Coventry and the Birmingham stations are essentially the same as the current best, but that to Northampton very much better (naturally).

Likewise the HS-C times as far as Leicester are very much better than current times. The times beyond Leicester (until Wakefield!) remain much better than current times, but not quite as good as those up as far as Leicester.

6P. HS-C St. Pancras West –York / Manchester / Liverpool / Chester / Worcester (13/11/13/14/11 stops; with passing times):

Section	Distance (km)	Cumulative Distance (km)	Section Time (minutes)	Cumulative Journey Time (minutes)	Elapsed Time from London, inc. Station Wait Times
St. Pancras - West Hampstead	6.3	6.3	4.5	4.5	4.5
West Hampstead - *West Hampstead Jn. (pass)*	0.4	6.7	0.9	*5.4*	*8.4*
West Hampstead Jn. (pass) - Scratchwood Junction (pass)	10.3	17.0	3.6	*9.0*	*12.0*
Scratchwood Junction (pass) - Slip End (North) Jn. (pass)	29.9	46.9	5.3	*14.3*	*17.3*
Slip End (North) Jn. (pass) - Luton & Dunstable Parkway	4.1	51.0	2.1	16.4	19.4
Luton & Dunstable Parkway - Milton Keynes Parkway	18.0	69.0	7.3	23.7	29.7
Milton Keynes Parkway - *Newport Pagnell (N.) Jn. (pass)*	6.8	75.8	3.5	*27.3*	*36.3*
Newport Pagnell (N.) Jn. (pass) - Collingtree West Jn. (pass)	22.1	97.9	4.3	*31.5*	*40.5*
Collingtree West Jn. (pass) - Northampton Castle	4.1	102.0	2.1	33.7	42.7
Northampton Castle - *Langborough Junction (pass)*	18.0	120.0	5.8	*39.4*	*51.4*
Langborough Junction (pass) - Aylestone (North) Jn. (pass)	35.9	155.9	6.2	*45.6*	*57.6*
Aylestone (North) Jn. (pass) - Leicester	4.1	160.0	2.1	47.8	59.8
Leicester - *Syston South Junction (pass)*	7.6	167.6	3.8	*51.6*	*66.6*
Syston South Junction (pass) - Loughborough	12.5	180.1	4.7	56.3	71.3
Loughborough - *East Midlands Parkway (pass)*	10.8	190.9	4.8	*61.0*	*79.0*
East Midlands Parkway (pass) - Derby	15.4	206.3	5.5	66.6	84.6
Syston South Junction (pass) - Loughborough (pass)	12.5	180.1	3.8	*55.3*	*70.3*
Loughborough (pass) - East Midlands Parkway	10.8	190.9	4.2	59.5	74.5
East Midlands Parkway - Derby	15.4	206.3	7.1	66.6	84.6

Derby - *Clay Cross Junction (pass)*	32.2	238.5	11.2	*77.8*	*98.8*
Clay Cross Junction (pass) - Chesterfield	6.6	245.1	2.9	80.7	101.7
Chesterfield - *Dore Station Junction (pass)*	13.6	258.7	5.6	*86.3*	*110.3*
Dore Station Junction (pass) - Sheffield	6.2	264.9	2.8	89.1	113.1
Sheffield - Rotherham	9.7	274.6	5.6	94.7	121.7
Rotherham - Wakefield Westgate	36.8	311.4	15.8	110.5	140.5
Wakefield Westgate - Leeds City	16.2	327.6	8.1	118.6	151.6
Leeds City - Micklefield	15.7	343.3	7.2	125.7	161.7
Micklefield - *Ulleskelf Junction (pass)*	11.1	354.4	4.7	*130.4*	*169.4*
Ulleskelf Junction (pass) - York	14.3	368.7	4.9	135.3	174.3
Sheffield - *Dore Station Junction (pass)*	6.2	271.1	3.6	*92.7*	*121.7*
Dore Station Junction (pass) - Chinley	25.8	290.7	10.4	103.1	132.1
Chinley - Stockport	18.2	308.9	8.8	111.9	143.9
Stockport - Manchester Piccadilly	9.4	318.3	5.3	117.2	152.2
Northampton Castle - *Watford Gap Junction (pass)*	21.0	123.0	6.5	*40.1*	*52.1*
Watford Gap Junction (pass) - Rugby HS	12.0	135.0	3.9	44.1	56.1
Rugby HS - Coventry HS	18.0	153.0	7.3	51.4	66.4
Coventry HS - Birmingham International	17.2	170.2	7.6	59.0	77.0
Birmingham International - Birmingham New St.	13.3	183.5	6.5	65.5	86.5
Birmingham New St. - Wolverhampton	20.7	204.2	9.7	75.2	99.2
Wolverhampton - Stafford	26.0	230.2	10.3	85.5	112.5
Stafford - Crewe	39.4	269.6	13.3	98.8	128.8
Crewe - Runcord	36.2	305.8	12.4	111.2	144.2
Runcord - Liverpool South Parkway	12.0	317.8	6.1	117.3	153.3
Liverpool South Parkway - Liverpool Lime St.	9.2	327.0	5.2	122.5	161.5
Wolverhampton - Telford	25.2	229.4	9.5	84.7	111.7
Telford - Wellington	6.2	235.6	4.4	89.1	119.1

Wellington - Shrewsbury	16.5	252.1	7.2	96.3	129.3
Shrewsbury - Gobowen	29.0	281.1	10.5	106.8	142.8
Gobowen - Wrexham	19.6	300.7	8.3	115.2	154.2
Wrexham - Chester	19.4	320.1	8.3	123.5	165.5
Birmingham New St. (reverse) - University	4.2	187.7	3.5	69.0	95.0
University - *Kings Norton (pass)*	4.6	192.3	3.0	*72.0*	*101.0*
Kings Norton (pass) - Barnt Green (pass)	6.5	198.8	2.4	*74.4*	*103.4*
Barnt Green (pass) - Bromsgrove	5.7	204.5	2.7	77.1	106.1
Bromsgrove - *Stoke Works Junction (pass)*	3.5	208.0	2.6	*79.7*	*111.7*
Stoke Works Junction (pass) - Droitwich Spa	6.8	214.8	3.0	82.7	114.7
Droitwich Spa - Worcester Shrub Hill	9.0	223.8	5.2	87.8	122.8

7. HS Metro and HS-C Elapsed Times Summary:

Section	HS Metro Pancras Cross - York	HS Metro Pancras Cross - Preston	HS-C St. Pancras - Wolverhampton - Liverpool / Cheater	HS-C St. Pancras - York	HS-C St. Pancras - Manchester
Pancras Cross St. Pancras West - West Hampstead	4.5	4.5	4.5	4.5	4.5
West Hampstead - Luton & Dunstable Parkway	19.4	19.4	19.4	19.4	19.4
Luton & Dunstable Parkway - Milton Keynes Parlway	29.7	29.7	29.7	29.7	29.7
Milton Keynes Parkway - Northampton Castle	42.7	42.7	42.7	42.7	42.7
Northampton Castle - Leicester	59.8	59.8	59.8	59.8	59.8
Leicester - Nottingham	74.2	74.2	|	|	|
Nottingham - Derby	88.0	88.0	|	|	|
Nottingham - Sheffield HS	94.8	94.8	|	|	|
Sheffield HS - Huddersfield	111.9	|	|	|	|
Huddersfield - Leeds New Lane	123.4	| |	| |	| |	| |
Leeds New Lane - York	138.8	|	|	|	|
Sheffield HS - Manchester HS		112.5	|	|	|
Manchester HS - Victoria LL		116.7	|	|	|
Victoria LL - Bolton		126.8	|	|	|
Bolton - Preston		139.7	|	|	|
Northampton Castle - Rugby HS			56.1	| |	| |
Rugby HS - Coventry HS			66.4	|	|
Coventry HS - Birmingham International			77.0	| |	| |
Birmingham International - Birmingham New St.			86.5	| |	| |
Birmingham New St. - Wolverhampton			99.2	| |	| |
Wolverhampton - Stafford			112.5	|	|
Stafford - Crewe			128.8	|	|
Crewe - Runcorn			144.2	|	|
Runcorn - Liv. S, Parkway			146.8	|	|
Liv. S. Pkwy - Liv. Lime St.			161.5	|	|

Wolverhampton - Telford			111.7	|	|
Telford - Wellington			119.1	|	|
Wellington - Shrewsbury			129.3	|	|
Shrewsbury - Gobowen			142.8	|	|
Gobowen - Wrexham			154.2	|	|
Wrexham - Chester			165.5	|	|
Birmingham New St. - University			95.0	| |	| |
University - Bromsgrove			106.1	|	|
Bromsgrove - Droitwich Spa			114.7	|	|
Droitwich Spa - Worcester Shrub Hill			122.8	| |	| |
Leicester - Loughborough				71.3	|
Loughborough - Derby				84.6	|
Leicester - East Midlands Parkway				| |	74.5
East Midlands Parkway - Derby				| |	84.6
Derby - Chesterfield				101.7	101.7
Chesterfield - Sheffield				113.1	113.1
Sheffield - Rotherham				140.5	|
Rotherham - Wakefield Westgate				145.1	| |
Wakefield Westgate - Leeds City				151.6	| |
Leeds City - Micklefield				161.7	|
Micklefield - York				174.3	|
Sheffield - Chinley					132.1
Chinley - Stockport					143.9
Stockport - Manchester Piccadilly					152.2

Appendix A – Pancras Cross and the Inter-Regional Connections

General

By routing the HS-C services of HS3 into St. Pancras West (the MML platforms), and of HS6 into St. Pancras East (the 'Javelin' platforms), and all the UHS and HS Metro services of both routes through Pancras Cross and on to HS5, superlative cross-London inter-regional HS services are enabled, between Scotland, the North East, Yorkshire and the East Midlands (HS3), likewise West Anglia and Lincolnshire (HS6/HS10), and Sussex, West Kent and Hampshire. Given the service loadings of the London end of HS3 and of HS6/HS10, balancing exactly those of HS5, a single tunnel in each direction and 6 platform faces, (passive provision for 8,) would suffice. That a single Pancras Cross station, with a single pair of approach tunnels, would serve two HS inter-regional routes should seriously enhance its business case.

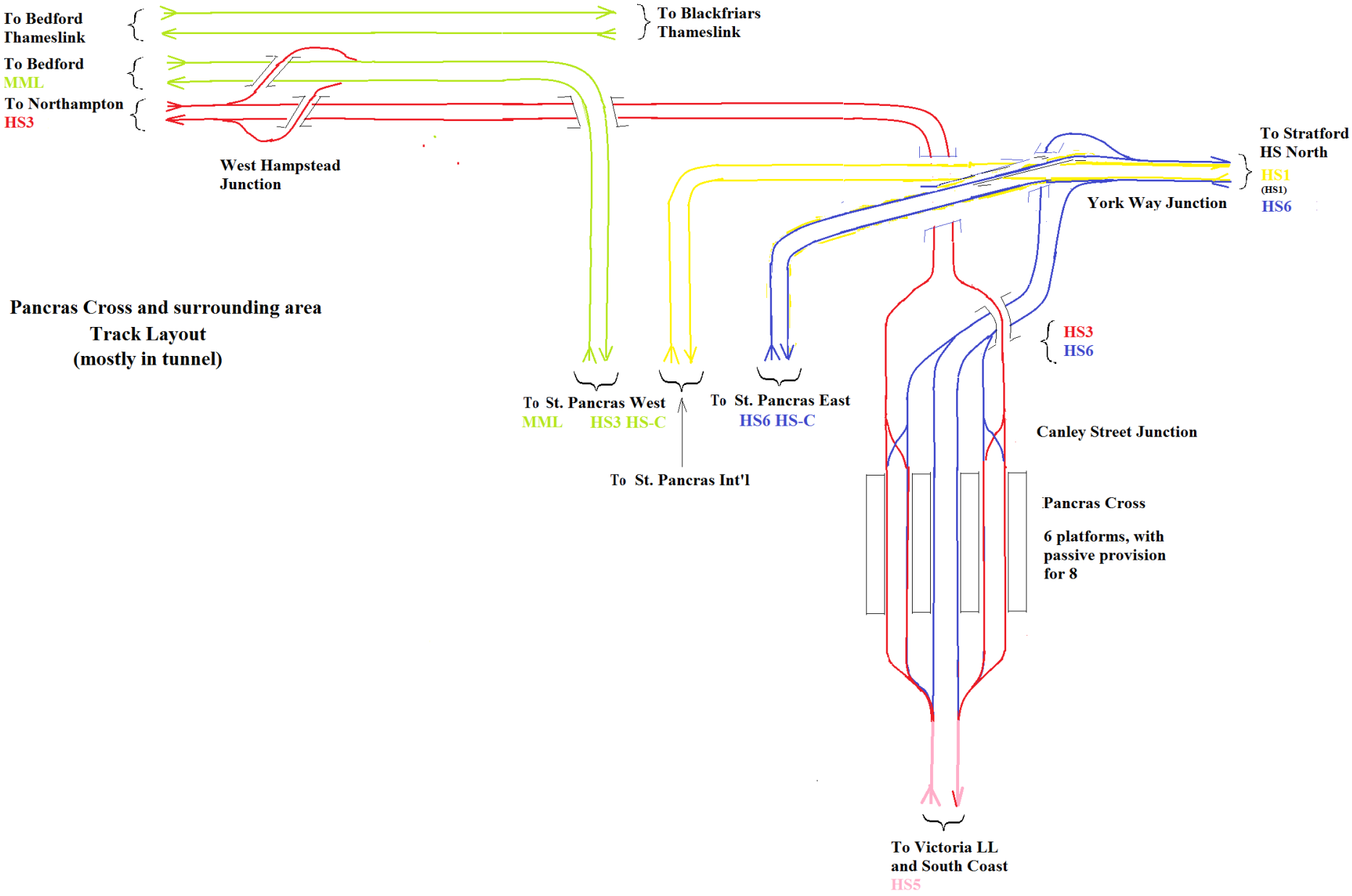
The track diagram of Pancras Cross and its surroundings is on the next two pages. The layout is not especially complicated, but there are a few points to note. The second version, for HS3 Mk2 with 4-tracking, is extra futuristic and speculative.

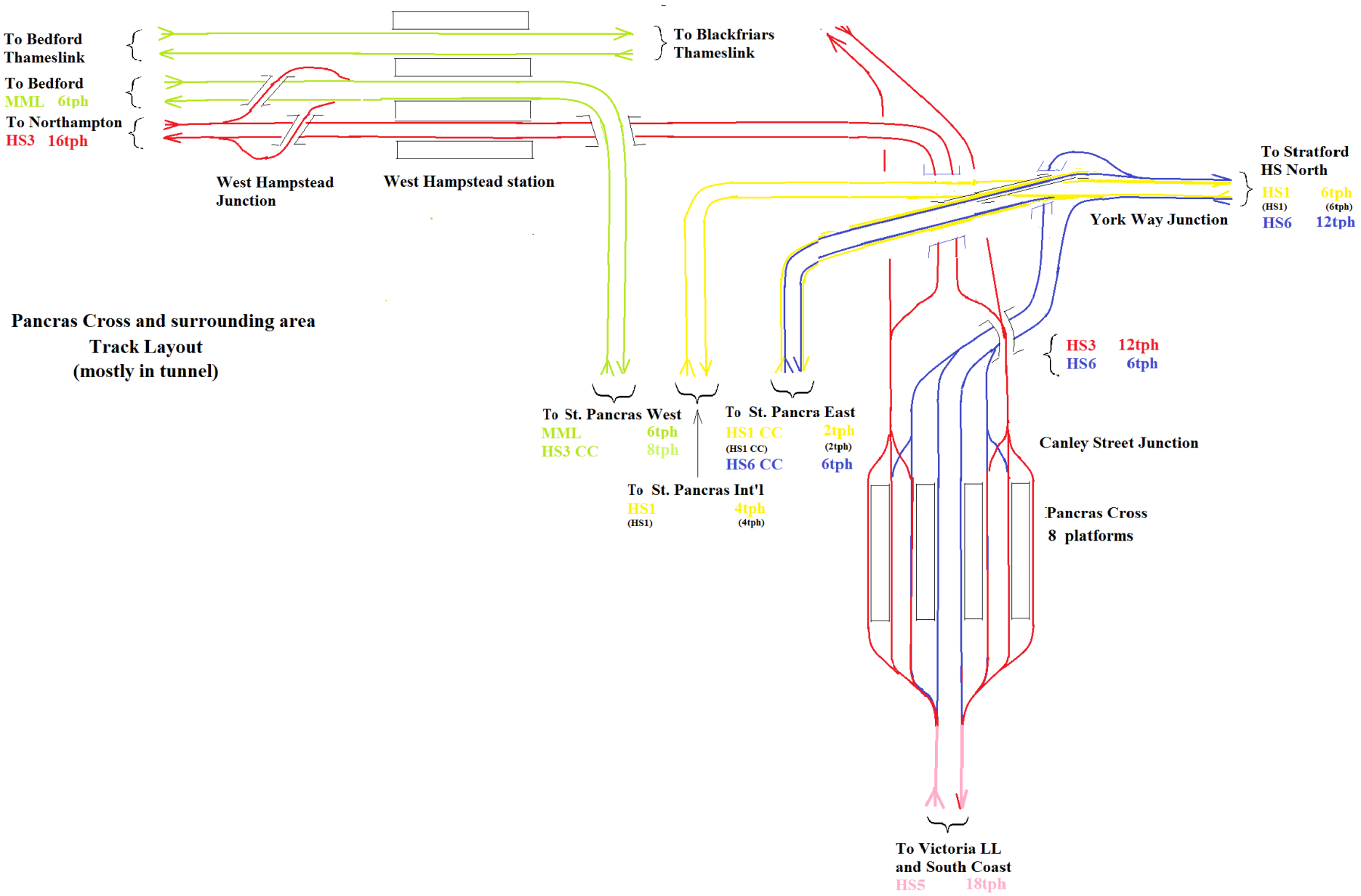
The middle two platform faces at Pancras Cross would ordinarily be used by HS6 trains and the two outer pairs by HS3. The scissors crossovers are provided for operational flexibility, but should not normally be used. I would like to see **passive** provision for 8 platforms, as is indicated in the diagram.

HS6's HS Metro services from Pancras Cross, and its HS-C services from St. Pancras East, all join HS1's route from St. Pancras International, at York Way Junction. They then all share the same tracks as far as Stratford HS North station (formerly Stratford International, which it never was). The track diagram for Stratford HS North is deliberately simplified, omitting the extra through tracks and the connection to Temple Mills. The station exists already, and has a single platformed track in each direction (a rather inadequate provision; it may well prove necessary to add extra platform faces on the outside). This is served by all HS6/HS10 services. HS1's international services pass through the centre, as they always have. (The inter-regional services from HS2 join HS1 later, at Woodgrange Road Junction.) HS6 diverges from HS1 at Hitchcock Lane Junction, immediately east of the station, without rejoining the main lines of HS1.

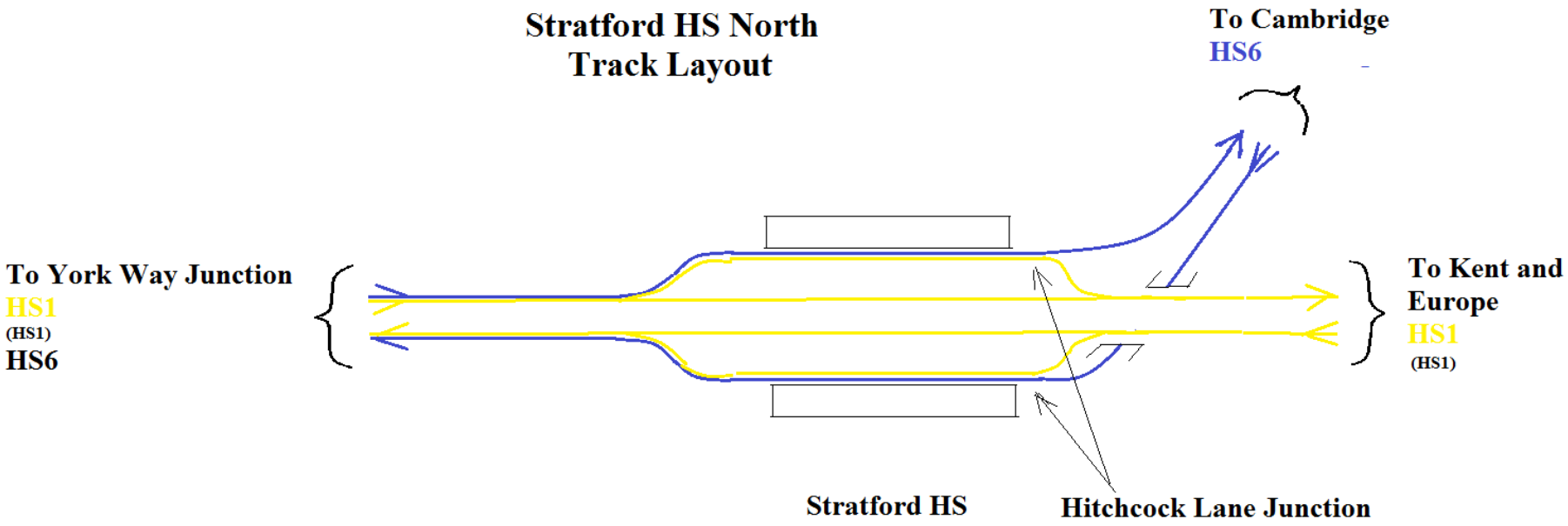
Since (most of) the above was written, the Mk2 version of HS3's route has been developed. The first track diagram of Pancras Cross still accurately depicts HS3 Mk2 in its initial state, before 4-tracking. The second track diagram shows the enhanced provision after 4-tracking (including the extra platform faces at Pancras Cross, for which passive provision was made earlier). It is assumed that by then (c.2060, perhaps), automatic train control will enable 24tph and more in each direction over the 2-track section south of Pancras Cross (all the way to East Croydon, in fact).

Note the addition of West Hampstead station at Mk2. This now includes platforms for the HS3 tracks (just one in each direction). The MML platforms were always there, of course, but were not used by the St. Pancras services at Mk1A.


To Bedford
Thameslink
To Blackfriars
Thameslink
To Bedford
MML
To Northampton
HS3
West Hampstead
Junction
To Stratford
HS North
HS1
(HS1)
HS6
York Way Junction
Pancras Cross and surrounding area
Track Layout
(mostly in tunnel)
HS3
HS6
To St. Pancras West
MML HS3 HS-C
To St. Pancras East
HS6 HS-C
Canley Street Junction
To St. Pancras Int'l
Pancras Cross
6 platforms, with
passive provision
for 8
To Victoria LL
and South Coast
HS5



Pancras Cross and surrounding area
Track Layout
(mostly in tunnel)


Stratford HS North
Track Layout
To Cambridge
HS6
To York Way Junction
HS1
(HS1)
HS6
To Kent and
Europe
HS1
(HS1)
Stratford HS
Hitchcock Lane Junction

Appendix B – Leicester Station Arrangements

Fitting the HS platforms into London Road station is distinctly tricky. There's no single suitably large space available. But there's a large car park on the western side, and goods lines on the eastern side.

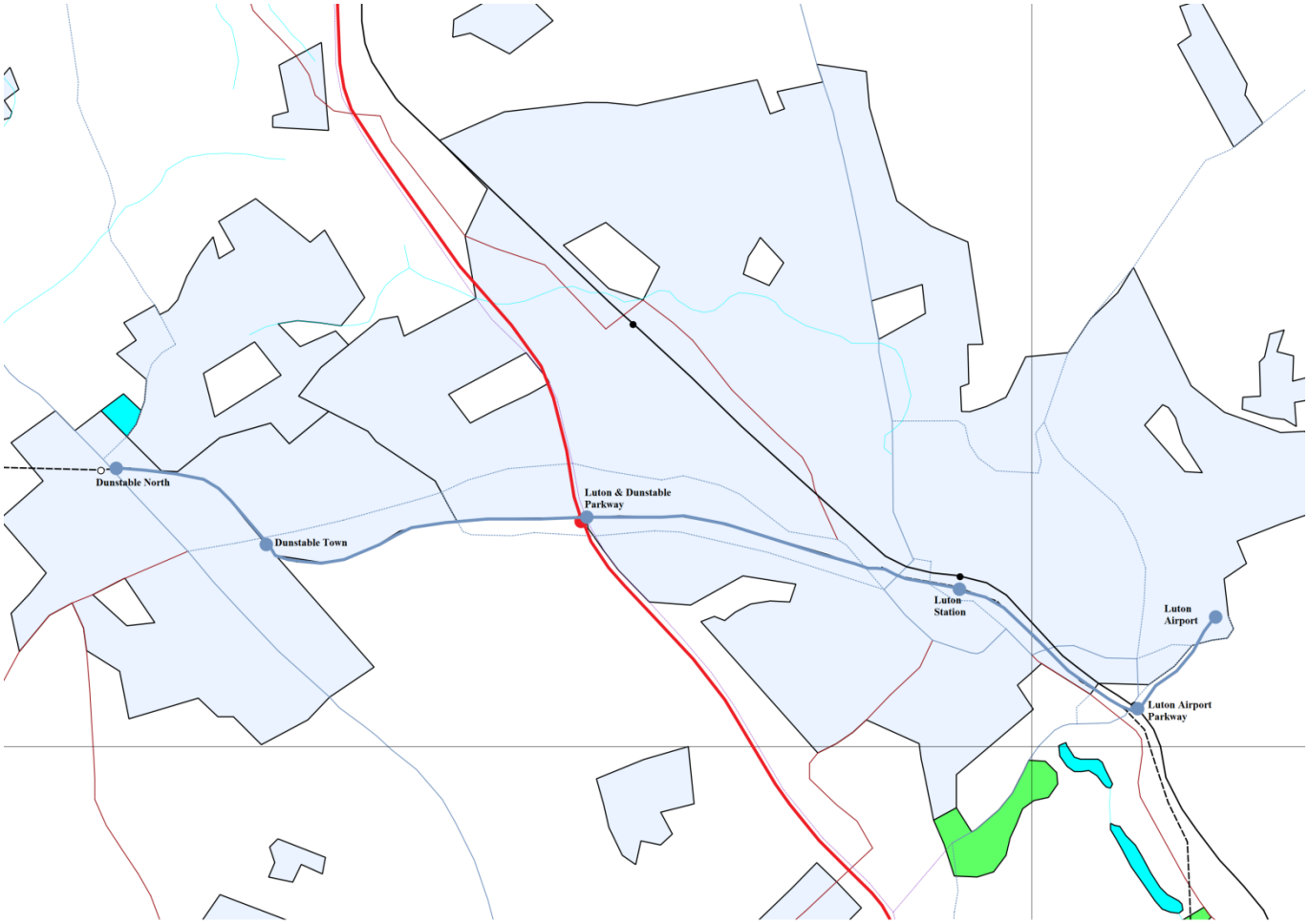
HS3 approaches London Road station in tunnel from SK578032, on the Great Central alignment. Since the main lines carry non-stopping traffic, they could advantageously avoid the station altogether. So we need a separate (short) branch for Leicester station. This would diverge from the main line slightly to the south of the above map reference (at SK577030 – Watkin Road Junction), and travel in the above tunnel to just before London Road station, at SK592034, emerging from tunnel **between** the classic tracks. The HS tracks take over the existing two island platforms, enlarged as required to GC gauge and made variable platforms, so they can be served by both GC-gauge and classic trains. (See appendix B of my 'Network' article for an explanation of variable platforms.) The classic tracks make a junction with the HS tracks, at SK593038 (Regent St. Junction) so they can access the existing platforms, but also continue straight ahead, each to access a new, single-faced platform on the outside of the alignment (these are for stopping services on the classic route). There **is** sufficient room for these. The HS tracks make a junction with the classic tracks just north of the station, at SK596044 (Swain St. Junction) so Regional Metro and classic-compatible services can get back on the classic lines. The southbound classic track crosses the HS tracks on a flyover, to allow them to gain the east side of the alignment. Ordinarily, HS3 services would use the innermost pair of tracks, and RM services the outer faces of the two island platforms (and also the outermost tracks), but scissors crossovers between HS and classic tracks at each end of the island platforms allow for complete operational flexibility.

HS3 main line proceeds a little further along the Great Central alignment beyond Watkin Road junction, then enters a 2.3 mile tunnel at SK579033, emerging on the eastern side of the Midland alignment at SK599049 (Humberstone Road Junction), where it is rejoined by the Leicester station branch.

The freight lines need to avoid all this. Accordingly, they enter a 2 mile tunnel at SK603057, (where the line to Belgrave Road used to pass underneath the Midland,) well to the north of Humberstone Road Junction, and emerge again at SK590032, well to the south of the emergence of the HS3 Leicester station branch, and on the west side of the passenger lines, which have been slewed to the east. Thus, between Leicester and Wigston North Junction, freight and passenger lines have switched places, which is exactly what is required to avoid conflicting movements where the Midland Main Line is crossed by the strategic freight route from Felixstowe to Nuneaton and the West Midlands. (Ideally, this work should have been carried out during the MML electrification.)

Appendix C – Luton & Dunstable Parkway

(The previous contents of appendix C, further thoughts on Nottingham station and surrounding infrastructure, are now the preferred option, and appear in the main text.)



Luton & Dunstable Light Rail

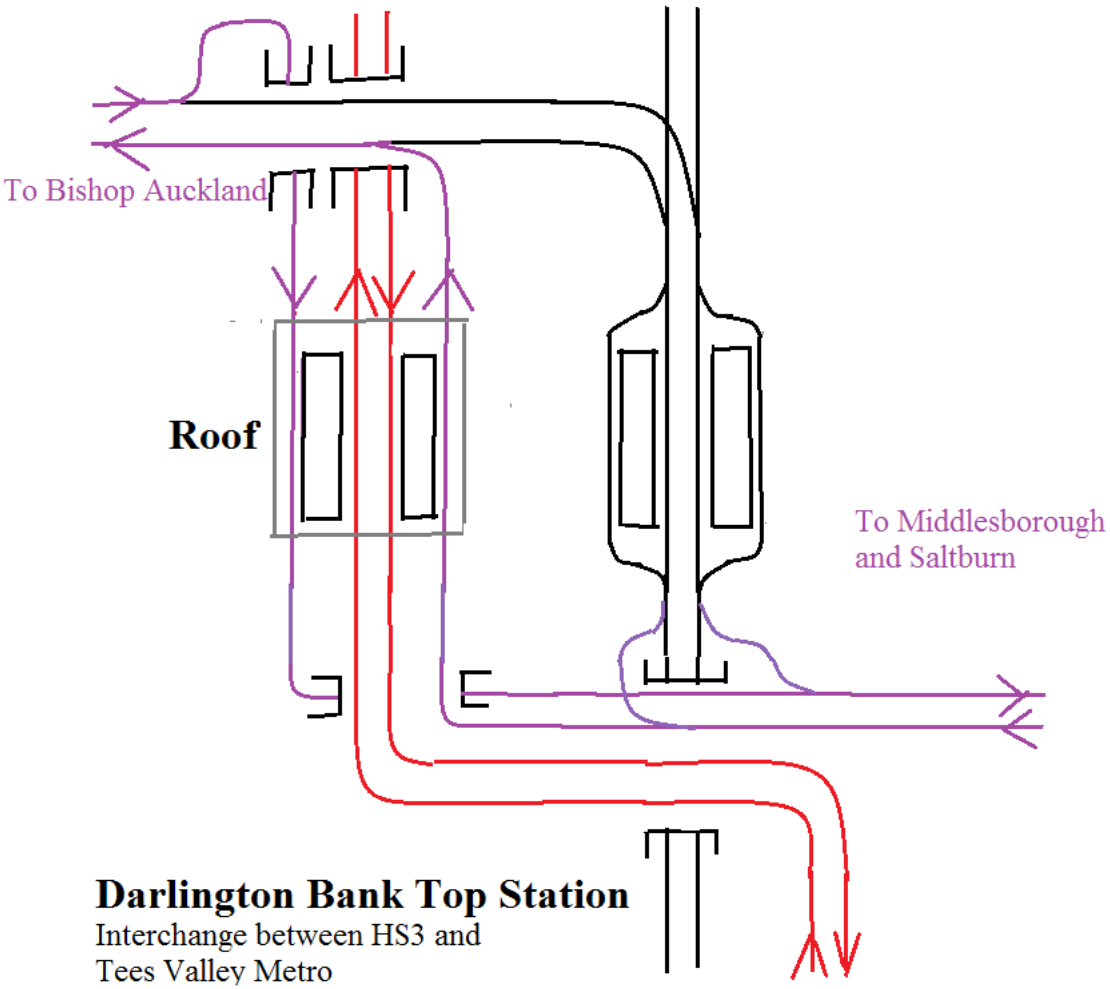
A light rail system along the route of the relevant section of the former Welwyn – Luton – Leighton Buzzard line would provide excellent connections between Luton & Dunstable Parkway station and Dunstable, Luton and the airport. Part of this route (between just short of Dunstable North and just short of Luton Airport Parkway station) is currently occupied by the Luton Dunstable Busway. This seems aimed purely at local traffic, in that it does not provide connections between the Parkway station and the airport. Instead this connection is provided by a dedicated bus transfer service, which is evidently highly unpopular. So much so that Luton Council is currently (April 2016) planning to replace it by a 1.3-mile light rail link to the nearest station – Luton Airport Parkway. (So serious are they, in fact, that the Council, which owns the airport, proposes to fund the development itself.) The proposal even has the light-rail platforms above the heavy-rail ones – they've got almost everything right! All that's missing is to take over the current busway as well, which will future-proof the system by providing for connections to and from HS3. (Many of the services will still, doubtless, run as a shuttle between Parkway and airport, since the main route to the airport is likely to remain always MML and Thameslink.)

Appendix D – Darlington Station Arrangements

The inside of the station is completely rebuilt. The buildings on the central platform are all demolished, and two new through lines provided through the centre (extending the former south-facing bays. New facilities are provided on the two new island platforms. To the south of the station, HS3 and the Tees Valley metro line from Redcar and Middlesborough share the same bridge over the ECML, and share the roofed platforms, arranged in contraflow. The diagram below should make this clear. The entire point of this arrangement is to provide interchange facilities giving a HS connection between Middlesborough and London, with just the one, cross-platform change at Darlington. (The custom colour for the Tees Valley Metro is purrple – R/G/B 143/100/183.)

These changes mean that the original station entrance, in Victoria Road / Park Lane, comes back into use, together with the magnificent station buildings, and the grotty current approach between the tracks is very properly abolished.

New platforms are provided for the ECML. There is no guaranteed interchange between HS3 and ECML services (that's at Newcastle).



Appendix E – Sheffield HS Station

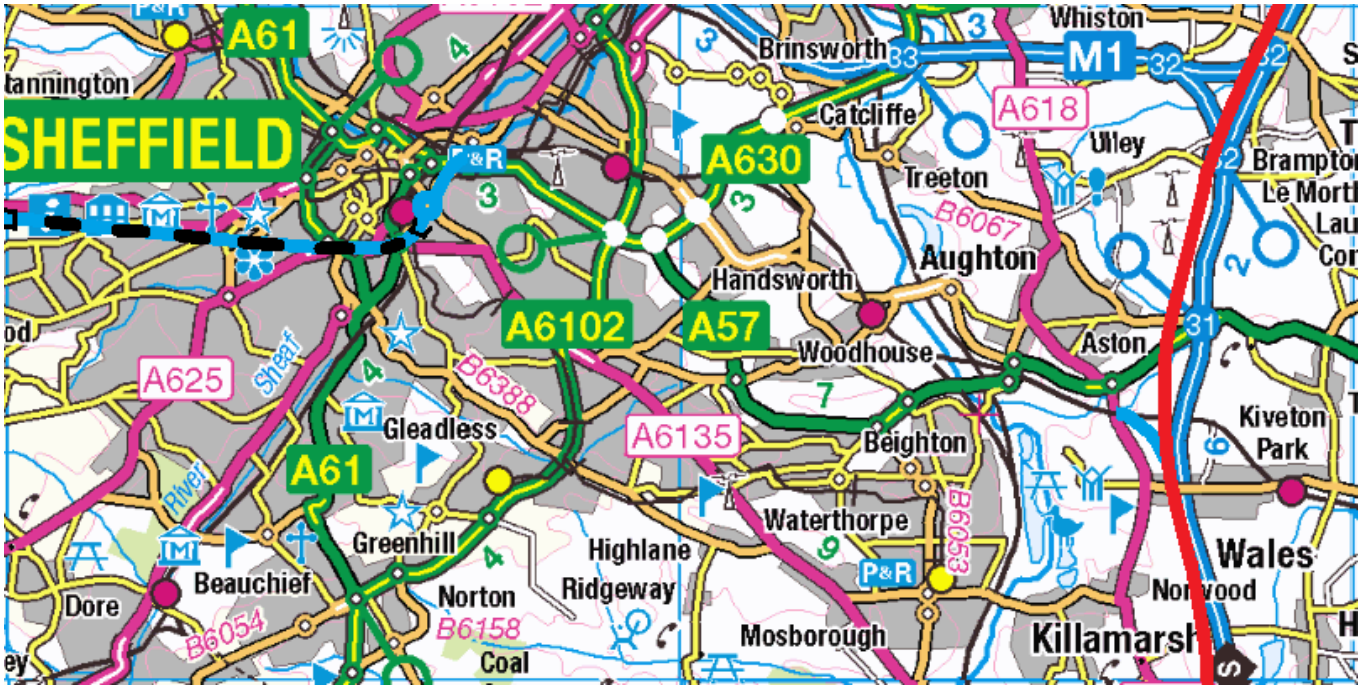
This is not, strictly, HS3, but rather HS8, Southern Transpennine. But certain transpennine services do use part of HS3, so it is certainly relevant.

First ideas were to locate the station at Pond Street, in the area occupied by the bus station. However, close examination of the area by satellite maps shows that this is no longer practicable (without quite a lot of demolition). Many buildings have gone up in this area in recent years, arbitrarily, to no obvious overall plan, so there is no longer any clear way through. Accordingly a different approach is now favoured, which provides rather more of an engineering challenge.

The station will be behind and above the existing Midland station, at the bottom of Park Hill. There is plenty of space for it. I have plotted three possible locations for a standard size HS station, allowing 300m by 50m – the usual two island platforms, and long enough to accommodate a 12-car Velaro (25m cars) –

- adjacent to the existing supertram (requires most excavation of Park Hill, with substantial retaining walls
- taking over the supertram alignment, with less excavation
- extending over the eastern island platform (platforms 6 and 8, + bay 7) of Midland station – more structural work but fairly little excavation

– all at the level of the supertram alignment, so the footbridge crossing the tracks at Midland station could extend straight ahead as a subway under the HS platforms. All but the first of the above options require relocation of the supertram alignment, but that's not much of a problem.



Wales – Rivelin Valley Contains Ordnance Survey data © Crown copyright and database right 2013

The approach from HS3 is from Wales/Waleswood Junctions along the classic tracks of the Retford line, upgraded to 225kph/140mph and merged into HS8. At Woodburn HS Junction (SK370878) HS8 diverges from the classic route, and runs in tunnel or adjacent to (at a higher level than) the existing cutting, above the existing tracks (with which the Retford line connects).

South of the HS station, the route enters a 3 mile tunnel at SK359866, curving to the right and then heading in almost a straight line to Manchester (emerging from tunnel in the Rivelin Valley, at SK300872). There shouldn't be any problem with the tunnel's entrance, to pass underneath the A6135 (Granville Road), but it then has to go significantly deeper, to pass beneath the Midland line, also beneath the former diveunder where the line from London passed underneath the Hope Valley lines, to reach the north side of the station (and the then through, northbound lines). This has been out of use (and indeed filled in) for the past 50 years, but we may well wish at some time to reinstate it so care should be taken not to damage it.

Appendix F – Interchange at Newcastle

I've defined an hourly cross-platform interchange pattern for Newcastle; the interchange pattern could certainly be implemented, but not, going north, cross-platform, as Newcastle Central station is at present laid out.

There are currently 4 terminal platforms, 9-12, (or, rather 12-9, going eastwards,) at the west end of the station, and a single terminal platform, 1, at the east end. Platform 2 is the through platform for trains going north to Scotland. Platform 1 is on the opposite side to 2 of a semi-island. Platforms 3 and 4 are on each side of an island platform, used by southbound ECML and Cross-Country services. Platforms 5 / 6 and 7 / 8, although through, are used for terminating services (and are shorter than 2, 3 and 4).

What I really want is a new through platform, created by joining 9 to 1 (call it 1). This would then be the platform for northbound ECML services, and platform 2 the arrival platform for the HS3/HS7 services terminating at Newcastle. These would then pass through to the east of the station for servicing, and return to platform 3 for departure, with connections on platform 4 from southbound ECML services. Then we have the desired cross-platform interchange.

That's what I would like, but I don't know if it's possible, except at vast expense. I am not familiar with Newcastle station, and have been unable to find the necessary information on the web to clarify the situation. Such pictures as I have located seem cautiously optimistic.

Appendix G – The Coventry Variant of HS2

The Coventry Variant of HS2 (HS2-CV) is described in appendix B of the HS2 Route and Service Plans article. Effectively it is an additional section of HS2 diverging from the existing route at Brackley and rejoining it at Berkswell, passing through Rugby and Coventry, allowing those cities also to be served.

As for as HS3 is concerned, two interconnections between HS2-CV and HS3 are planned:

1. From Crick Junction, now a junction with HS2-CV rather that with the classic route, joining the main line of HS2-CV at Onley Junction, on the southern side of Rugby.
2. A branch of HS2-CV continues along the ex-GC alignment north of Rugby, joining HS3 at Cotesbach Junction, where HS3 takes over that alignment.

The CC service from St. Pancras to Birmingham and Wolverhampton, thence to Liverpool and Chester, travels on HS2-CV as far as Warwick Road Junction, just west of Coventry, where it joins the classic route. The RM service from St. Pancras to Birmingham and on to Worcester, itself becomes CC and travels on HS3 between West Hampstead and Crick Junctions, instead of via Bedford, likewise joining the classic route at Warwick Road Junction. This increases the loading of HS3 between West Hampstead and Crick junctions to 18tph, and decreases the loading between West Hampstead Junction and Bedford by 2tph.

An extra 4tph join HS3 from HS2-CV at Cotesbach Junction. The loading thence to Watkin Road Junction is likewise raised to 18tph. The details of these services are not yet fixed.

Appendix H – Route Changes at Mk1A

There are three fundamental changes of plan at Mk1A:

1. HS2 Ltd.'s plans for a considerably improved alignment in South Yorkshire have been adopted, with refinements as necessary, in particular the new connection to the classic route into Leeds City, from the east (diverging from HS3 at the new Swillington Common Junction).
2. Abandoning GC gauge, so that all new infrastructure is built to standard UK gauge. As a consequence of this, certain appropriate sections of classic route are merged into HS routes, with upgrading as necessary for higher speeds (140, 125 or 100mph).
3. Re-routing the section between Scratchwood Junction and Houghton Regis to give an improved alignment, with passive provision for four tracks.

The individual changes are:

- New link Huthwaite Junction – Stonebroom Junction on the Erewash Valley route.
- Incorporation of classic route into HS3, upgraded as practicable to 100mph line speed, from Stonebroom Junction via Chesterfield, Sheffield Midland and Rotherham to South Yorkshire LL station. South Yorkshire is a 2-level station, the HL on HS3's main line and the LL on the classic Sheffield – Doncaster route. The LL station has a bay platform on the north side, where the South Yorkshire portion of the service from Pancras Cross terminates; the other portion terminates in Barnsley. There is a connection from Old Denaby Junction, on the classic route, to Denaby Main Junction, on HS3, immediately south of South Yorkshire HL station. This allows the HS7 service from Birmingham HS to Leeds and Halifax/Skipton (see below) to travel via Sheffield and re-join HS3 at South Yorkshire.
- A new link from Ryhill Junction on HS3 to Crofton Junction on the classic route from Doncaster to Leeds, allows the HS Pancras Cross – York via Leeds service to call at Wakefield Westgate. It then follows the classic route, upgraded to line speed 100mph, to Gelderd Road South Junction, where it diverges to join HS9 at Gelderd Road North Junction, then serving Leeds New Lane station.
- A new connection diverges from HS3 at Swillington Common Junction, and joins the classic route to Leeds City at Manston Junction. Services from Pancras Cross and Birmingham take this route, splitting / joining at Leeds City into / from Halifax and Skipton portions. The Halifax portion travels via Shipley (they both do, but using different platforms there,) and the new cross-city link at Bradford, serving the new, central, Bradford City station.
- HS3 merges with the fast tracks of the ECML at Poppleton Junction (immediately after the ECML become 4-track just north of York), and shares that (upgraded to 140mph line speed) until Romanby Junction, where it diverges and assumes its former alignment on to Darlington and points north.
- All the HS Newcastle services (from London, Plymouth, Liverpool and Bournemouth West) now include a Middlesborough portion, splitting / joining at York.
- The section of classic route between Northallerton and Yarm is likewise upgraded to line speed 140mph. Beyond Yarm, the line speed is irrelevant sine Yarm and the remaining three stations are too close together to allow any reasonable line speed to be reached.
- The classic Newcastle and Carlisle route between Paradise Junction and Tynegreen Junction is incorporated into HS3, and upgraded to line speed 125mph.

Appendix I – Distance Table for MML and Associated Routes

Distance Table for MML and Associated Routes		
St. Pancras West to:	miles:chains	km
West Hampstead	3:73	6.3
Leicester	99:07	159.4
Syston South Junction	103:63	167.0
Melton Mowbray	114:04	183.5
Loughborough	111:46	179.5
East Midlands Parkway	118:20	190.3
Derby	127:68	205.7
Clay Cross Junction	147:69	237.9
Chesterfield	151:79	244.5
Dore Station Junction	160:33	258.1
Sheffield Midland	164:19	264.3
Sheffield Midland to:	miles:chains	km
Barnsley	16:04	25.8
Rotherham Central	6:00	9.7
Wakefield Westgate via Swinton and Moorthorpe	28:72	46.5
Leeds City	38:77	62.7
Micklefield	48:58	78.4
Ulleskelf (station and junction)	55:57	89.6
York	64:46	103.9
Mexborough via Rotherham and Swinton	11:64	19.0
Doncaster	18:69	30.3
Goole	35:64	57.6
Gilberdyke	42:41	68.4
Hull Parqgon	59:37	95.7
Dore Station Junction	3:66	6.2
Chinley	19:70	32.0
Hazel Grove	28:31	45.7
Stockport	31:16	50.2
Manchester Piccadilly	37:05	59.6
Leeds City to:	miles:chains	km
Shipley	10:61	17.3
Bradford Forster Square (site of)	13:38	21.7
Bradford F. Sq. - Interchange = Bradford City	0.5km	22.2
Bradford City - Halifax	[7:79]	35.0
Keighley	16:75	27.3
Skipton	27:11	43.7
York to:	miles:chains	km
Northallerton	29:76	48.2
Yarm	42:01	67.6
Eaglescliffe	44:46	71.7

Thornaby	47.16	76.5
Middlesborough	50.63	81.7
Northampton Castle to:	miles:chains	km
Rugby WCML	18:78	30.5
Coventry	30:37	49.0
Birmingham International	41:13	66.2
Birmingham New St.	49:31	79.5
Birmingham New St. to:	miles:chains	km
Wolverhampton	12:70	20.7
Stafford	29:04	46.7
Crewe	53:41	86.1
Runcorn	76:01	122.3
Liverpool South Parkway	83:38	134.3
Liverpool Lime St.	89:13	143.5
Telford	28:43	45.9
Wellington	32:30	52.1
Shrewsbury	42:49	68.6
Gobowen	60:53	97.6
Wrexham	72:69	117.2
Chester	84:71	136.6
University	2:49	4.2
Kings Norton	5:40	8.8
Barnt Green	9:43	15.3
Bromsgrove	13:06	21.0
Stoke Works Junction	15:19	24.5
Droitwich Spa	19:34	31.3
Worcester Shrub Hill	25:02	40.3

The source of the above data is ‘Track Atlas of Mainland Britain’ (TRACKmaps 2009). The values are given in miles and chains (80 chains = 1 mile).

The distances from St. Pancras via Derby are simply read off, until Clay Cross Junction is reached, when they switch to via the Erewash Valley. The Hope Valley distances involve two changes of datum, either side of Dore station, another before Hazel Grove and yet another before Stockport – four changes in less than 28 miles. The section between Northallerton and Thornaby likewise involves three changes of datum in less than 18 miles.

But the section between Holmes Junction (just before Rotherham) and (just past) South Kirby Junction (10 miles south of Wakefield) involves no less than **six** changes of datum in less than 13 miles. This must surely represent some record in malignant obscurity. Indeed, the section between Holmes Junction and Gilberdyke involves 8 changes of datum, but over the rather longer distance of 37 miles.

The area around Wolverhampton is also perfectly horrible (in this context!! – I actually like it as a place).

All in all, a monstrous process, making it very well worth preserving the results, so that I don’t ever have to do it again.

Appendix Q – Journey Times for Line Speed 225kph, 140mph

The article 'Line Capacity vs. Speed for High Speed Railways' points out (in the section 'Consequences of the Results') that a good case can be made for a line speed of 225kph, 140mph, because this offers a good compromise between speed and line capacity (theoretical capacity 49tph at 225kph with basic Train Separation Distance as compared with 29tph at 360kph with extended TSD). Even more important is the fact that this is just within the current (as at 2014) Turnout Limit Speed of 230kph, 144mph. This is the maximum speed at which trains can diverge from the main line of a HS railway, using the fastest available pointwork. What this means is that diverging trains can leave the main line at full line speed; there is no need to decelerate on the main line before diverging. This means that the Extended Train Separation Distance standard, which allows diverging trains to decelerate on the main line, without affecting a following straight-ahead train, which continues at full line speed, is no longer necessary, which allows major simplification in the operation of HS railways.

This new appendix Q is being added to every Route and Service Plans article, to show what the effect would be for the journey times of the various services. No recommendation is actually being made for this change, but it is important that the supporting information be available to allow a reasoned decision to be made.

1. UHS Services London – South Yorkshire (LL) / Barnsley / York / Halifax / Skipton (3/2/3/4/4 stops)

Section	Distance (km)	Cumulative Distance (km)	Section Time (minutes)	Cumulative Journey Time (minutes)	Elapsed Time from London, inc. Station Wait Times
Pancras Cross - Stonebroom Jn.	216.0	216.0	59.3	59.3	
Stonebroom Jn. - Chesterfield	10.0	226.0	3.9	63.3	63.3
Chesterfield - Sheffield Midland	19.8	245.8	8.4	71.7	74.7
Sheffield Midland - Barnsley	25.8	271.6	11.7	83.3	91.3
Sheffield Midland - Rotherham	9.7	255.5	5.6	77.3	83.3
Rotherham - South Yorkshire LL	11.0	266.5	6.1	83.4	92.4
South Yorkshire LL - Doncaster	9.6	276.1	5.6	89.0	101.0
Doncaster - Goole	27.3	303.4	10.7	99.6	114.6
Goole - Gilberdyke	10.8	314.2	5.7	105.3	123.3
Gilberdyke - Hull Paragon	27.3	341.5	10.7	116.0	137.0
Pancras Cross - South Yorkshire HL	253.0	253.0	70.2	70.2	70.2
South Yorkshire HL - Wakefield Westgate	27.0	280.0	10.0	80.2	83.2
Wakefield Westgate - Leeds New Lane	15.0	295.0	7.6	87.8	93.8

Leeds New Lane - York HS	39.8	334.8	13.4	101.2	110.2
South Yorkshire HL - Swillington Common Junction	37.9	290.9	11.9	82.1	
Manston Jn. - Leeds City	8.0	298.9	3.3	82.1	88.4
Leeds City - Shipley	17.3	316.2	8.5	90.6	99.9
Shipley - Bradford City	4.9	321.1	3.8	94.4	106.7
Bradford City - Halifax	12.8	333.9	6.8	101.2	116.5
Leeds City - Shipley	17.3	316.2	8.5	90.6	101.9
Shipley - Keighley	10.0	326.2	5.7	96.3	110.6
Keighley - Skipton	16.4	342.6	8.1	104.4	121.7

Current fastest time (minutes) from London (with HS2 Ltd.'s estimates) [and the 360kph values] {and the above 225kph values} to:

- Chesterfield 105 [43] {63}
- Sheffield 120 (69/79*) [55] {75}
- Barnsley 155 (1 change) [72] {91}
- Rotherham 136 (1 change) [63] {83}
- South Yorkshire LL (via Sheffield) [73] {92}
- Doncaster [81] {101}
- Goole [95] {115}
- Gilberdyke [104] {123}
- Hull Paragon [117] {137}
- South Yorkshire HL (direct) [47] {70}
- Wakefield 115 [59] {83}
- Leeds 131 (83) [70/63] {94}
- York 110 [85] {110}
- Shipley 152 (1 change) [74] {100}
- Bradford 168 (2 changes) [81] {107}
- Halifax 171 [91] {117}
- Keighley 166 (1 change) [85] {111}
- Skipton 184 (1 change) [96] {122}

(*) 69 minutes is HS2 Ltd.'s estimate from London to the old South Yorkshire (Sheffield Meadowhall), and 79 minutes to Sheffield Midland. These values, and that for Leeds, show very clearly the time penalty imposed by the ridiculous routing via Birmingham. Note that the above service to Sheffield is not the fastest – see section 2, following. Likewise the service to York – via Leeds – is very much not the fastest – see sections 2 and 3.

The services to South Yorkshire LL and Barnsley split / join at Sheffield Midland. The Barnsley portion is given a 5 minute station wait at Sheffield, departing 2 minutes after / arriving 2 minutes before the South Yorkshire portion. Likewise the services to Halifax and Skipton split / join at Leeds City, the Skipton portion having a 5 minute wait there.

2. UHS Services London – Derby/Liverpool /Preston/York/Middlesborough/ Newcastle (1/3/4/1/6/5 stops):

Section	Distance (km)	Cumulative Distance (km)	Section Time (minutes)	Cumulative Journey Time (minutes)	Elapsed Time from London, inc. Station Wait Times
Pancras Cross - Nottingham	192.0	192.0	54.0	54.0	54.0
Nottingham - Derby	26.0	218.0	9.7	63.7	66.7
Pancras Cross - Sheffield HS	247.4	247.4	68.8	68.8	68.8
Sheffield HS - Manchester HS	55.0	302.4	17.4	86.2	89.2
Manchester HS - M/C Victoria LL	0.5	302.9	1.2	87.4	93.4
M/C Victoria LL - Liverpool Lime St.	49.0	351.9	15.8	103.3	112.3
M/C Victoria LL - Bolton	17.0	319.9	7.3	94.7	103.7
Bolton - Preston	32.0	351.9	11.3	106.0	118.0
Pancras Cross - South Yorkshire HL	253.0	253.0	70.2	70.2	70.2
South Yorkshire HL - York HS	67.0	320.0	20.6	90.9	93.9
York HS - Northallerton	48.2	368.2	15.6	106.5	114.5
Northallerton - Yarm	18.9	387.1	7.8	114.3	125.3
Yarm - Eaglescliffe	4.1	391.2	3.5	117.8	131.8
Eaglescliffe - Thornaby	4.8	396.0	3.8	121.6	138.6
Thornaby - Middlesborough	5.2	401.2	3.9	125.5	145.5
York HS - Darlington	70.0	390.0	21.4	112.3	118.3
Darlington - Durham Relly Mill	33.0	423.0	11.6	123.9	132.9
Durham Relly Mill - Consett	20.0	443.0	8.1	132.0	144.0
Consett - Newcastle	20.0	463.0	8.1	140.1	155.1

Current fastest time (minutes) from London (with HS2 Ltd.'s estimates) [and the 360kph values] {and the above 225kph values } to:

- Nottingham 100 (51/68*) [37] {54}
- Derby 85 (51/72*) [49] {67}
- Sheffield 120 [46] {69}
- Manchester 127 (68) [64] {89}
- Liverpool 128 (96) [84] {112}
- Bolton 164 (1 change) [78] {104}
- Preston 128 [91] {118}
- York 110 [66] {94}
- Northallerton 144 [87] {115}
- Yarm 174 (1 change) [98] {125}
- Eaglescliffe 163 [104] {132}
- Thornaby 169 (1 change) [111] {139}
- Middlesborough 176 (1 change) [118] {146}
- Darlington 139 [89] {119}
- Durham 173 [103] {133}
- Newcastle 169 [124] {155}

The services to Newcastle and Middlesborough split / join at York. The Middlesborough portion is given a 5 minute station wait at York, departing 2 minutes after / arriving 2 minutes before the Newcastle portion.

3. UHS Services London / Newcastle – Edinburgh (6/3 stops):

Section	Distance (km)	Cumulative Distance (km)	Section Time (minutes)	Cumulative Journey Time (minutes)	Elapsed Time from London, inc. Station Wait Times
Pancras Cross - York HS	320.0	320.0	88.1	88.1	88.1
York HS - Darlington	70.0	390.0	21.4	109.6	112.6
Darlington - Durham Relly Mill	33.0	423.0	11.6	121.1	127.1
Durham Relly Mill - Consett	20.0	443.0	8.1	129.2	138.2
Consett - Hexham	23.0	466.0	9.4	138.6	150.6
Hexham - Hawick	80.0	546.0	24.1	162.7	177.7
Hawick - Edinburgh	82.0	628.0	24.6	162.7	205.4
Newcastle - Hexham	32.0	32.0	12.1	12.1	12.1
Hexham - Hawick	80.0	112.0	24.1	36.2	39.2
Hawick - Lauder	37.0	149.0	12.6	48.8	54.8
Lauder - Edinburgh	45.0	194.0	14.8	63.6	72.6

Current fastest time (minutes) from London [and the 360kph values] {and the above 225kph values } to:

- York 110 [59] {88}
- Darlington 139 [82] {113}
- Durham 173 [95] {127}
- Hexham 235 (1 change) [118] {151}
- Hawick [141] {178}
- Edinburgh 260 [162] {205}

And from Newcastle:

- Hexham 31 [12] {12}
- Hawick [35] {39}
- Lauder [49] {55}
- Edinburgh 85 (via ECML, of course). [63] {73}

5. HS Metro Services London – York / Preston (9/10 stops):

Section	Distance (km)	Cumulative Distance (km)	Section Time (minutes)	Cumulative Journey Time (minutes)	Elapsed Time from London, inc. Station Wait Times
Pancras Cross - West Hampstead	6.3	6.3	4.5	4.5	4.5
West Hampstead - Luton & Dunstable Pkwy	44.7	51.0	14.7	19.2	22.2
Luton & Dunstable Pkwy - Milton Keynes Parkway	18.0	69.0	7.6	26.8	32.8
Milton Keynes Parkway - Northampton Castle	33.0	102.0	11.6	38.4	47.4
Northampton Castle - Leicester	58.0	160.0	18.2	56.6	68.6
Leicester - Nottingham	42.0	202.0	14.0	70.6	85.6
Nottingham - Derby	26.0	228.0	9.7	80.3	100.3
Leicester - Melton Mowbray (reverse)	24.1	184.1	9.7	66.3	81.3
Melton Mowbray - Nottingham	30.1	214.2	10.8	77.1	97.1
Nottingham - Derby	26.0	240.2	9.7	86.8	109.8
Nottingham - Sheffield HS	61.7	263.7	19.2	89.8	107.8
Sheffield HS - Huddersfield	51.0	314.7	16.4	106.2	127.2
Huddersfield - Leeds New Lane	24.0	338.7	9.2	115.4	139.4

Leeds New Lane - York HS	39.8	378.5	13.4	128.8	155.8
Sheffield HS - Manchester HS	55.0	318.7	17.4	107.3	128.3
Manchester HS - Victoria LL	0.5	319.2	1.2	108.5	132.5
Victoria LL - Bolton	17.0	336.2	7.3	115.8	142.8
Bolton - Preston	32.0	368.2	11.3	127.1	157.1

Current fastest time (minutes) from London (with HS2 Ltd.'s estimates) [and the 360kph values] {and the above 225kph values} to:

- West Hampstead (no MML service) [5] {5}
- Luton [& Dunstable Pkwy] 21 [19] {22}
- Milton Keynes [Parkway] 30 [30] {33}
- Northampton 51 [43] {47}
- Leicester 62 [60] {69}
- Melton Mowbray 119 (with 1 change) [73] {81}
- Nottingham 100 (51/68*) [74 – 87 via MM] {86 – 97 MM}
- Derby 85 (51/71*) [88 – 99 via MM] {100 – 110 M}
- Sheffield 120 [95] {108}
- Huddersfield 162 (with 1 change) [112] {127}
- Leeds 131 [123] {139}
- York 110 [139] {156}
- Manchester HS 127 [113] {128}
- Bolton 164 (with 1 change) [127] {143}
- Preston 128 [140] {157}

For table 8, HS-C services from St. Pancras West to many places (refer to p.147 et seq.), the 225kph version takes 9 minutes longer to Leicester; thereafter add 9 minutes to every other destination to York and Manchester, and 12 minutes, say to everything via Birmingham.