

HSUK NATIONAL NETWORK DEVELOPMENT

These diagrams set out the vision of an enhanced national railway network, based around the High Speed UK core network of dedicated high speed lines.

NND1 : EXISTING UK RAIL NETWORK

This identifies the incomplete connectivity offered by the existing intercity rail network. Main lines radiate from London (East Coast, Midland, West Coast, Great Western) with CrossCountry and TransPennine providing interregional connections. These interregional routes comprise multiple city pairs, greatly increasing their viability, whereas the London-centric system comprises single city pairs. Connectivity is assessed against the benchmark requirement of direct services operating at minimum hourly frequency. Many of these services between regional centres comprise short and often ageing multiple units offering cramped passenger accommodation, not of 'intercity' quality.

NND2 : HS2 PROPOSALS SUPERIMPOSED ONTO EXISTING UK RAIL NETWORK

The HS2 proposals are illustrated in 'extended Y' format, extending either side of the Pennines beyond the currently projected terminating points of Leeds and Manchester to all primary regional centres. The resulting system is of limited connectivity, focussed upon London with few viable interregional links; it is also segregated from the existing intercity railway, with high speed stations disconnected from regional 'hubs', and intermediate centres left bypassed. This restricted connectivity will compromise economic (and environmental) performance, with most benefits accruing in London where connectivity is concentrated. It will also create a 2-tier system, compromising the basic integrity of the national rail network, and preventing efficient development of rail links within the Northern Powerhouse.

NND3/4/5 : HIGH SPEED UK SUPERIMPOSED ONTO EXISTING UK RAIL NETWORK

High Speed UK's blend of new build and upgraded routes, and its radically different 'spine and spur' configuration gives comprehensive connectivity between all primary regional centres of the Midlands, the North and Scotland. It is a far more efficient and symmetric system than the HS2 'Y', covering all primary main line corridors with 54 city pairs linked (as against 12 for HS2), yet requiring fewer route kilometres to be constructed and fewer trains to be operated.

NND6 : HIGH SPEED UK FULLY INTEGRATED WITH EXISTING UK RAIL NETWORK

Full integration between high speed and classic networks is essential to optimise connectivity of the national network, and hence achieve optimum economic and environmental benefits. This diagram illustrates the full spread of HSUK services, extending to outlying regions and secondary centres that will inevitably be bypassed by new high speed lines. This will not merely replicate but enhance the functionality and connectivity of the existing intercity network.

NND7 : HIGH SPEED UK ACCESSING HEATHROW VIA COMPASS POINT NETWORK

There is a powerful political imperative for high speed rail links to Heathrow, and this has exerted a massive influence on the development of HS2. It has dictated both the expensive and controversial Chiltern route, and the 'Y' configuration which leaves HS2 unable to perform effectively as a national intercity rail system; yet it is clear that HS2 will do little to enhance Heathrow's links to the UK regions. A far superior strategy is to create a regional 'Compass Point' network focussed upon Heathrow (largely utilising existing infrastructure) and connecting with both the classic and high speed systems. This diagram illustrates the comprehensive regional connectivity to Heathrow that is achievable with High Speed UK, and complementary development of Heathrow's local rail network.

NND8/9 : HIGH SPEED UK PROPOSED INTERCITY SERVICE PATTERN, CORE NETWORK & FREQUENCIES

These diagrams set out a proposed service pattern for High Speed UK's core routes, and show service frequency between 16 fully interconnected cities. This fully replicates and greatly enhances the functionality of the existing intercity network, and is backed up by a comprehensive 'demonstrator timetable'.

NND10 : HIGH SPEED UK PROPOSED HEATHROW SERVICE PATTERN

This diagram illustrates how 5 train diagrams can cover all primary centres of the Midlands, North and Scotland, plus South Wales and the West Country, and effectively eliminate any requirement for domestic flights to Heathrow. This is only achievable with HSUK's basic routing efficiency, with several cities placed on a single line of route.

NND11 : HIGH SPEED UK PROPOSED EUROPEAN SERVICE PATTERN

In the 1990's, the inefficiencies of the existing radial main line network prevented the Regional Eurostars from providing viable services to the UK provinces. The same problems exist with HS2, offering no prospect of frequent direct European services to regional UK destinations. High Speed UK's more efficient configuration allows all UK regional centres to be efficiently served with just 3 train diagrams (including a 'Great Western' link).

NND12 & NND13 : KEY DIAGRAMS ILLUSTRATING EXISTING NETWORK ENHANCEMENTS

The improvement of intercity rail services under the UK high speed rail initiative demands parallel enhancements to existing local networks. Complementary regional development strategies must be established to ensure efficient network function and distribution to local networks. These diagrams, and linked regional diagrams, highlight the key projects that must be undertaken to realise the vision of an enhanced national rail network.

NND14 : PARALLEL DEVELOPMENT OF 'EUROGAUGE UK' RAILFREIGHT NETWORK

High Speed UK's routing, closely aligned with and frequently connected to existing rail corridors, presents the opportunity to create a parallel national network of lines on which freight becomes the prime user. This system, following 'decriticalised' routes generally clear of major tunnels and stations, has the potential for 'gauge enhancement' ie creating the larger clearances necessary to permit the operation of larger 'Eurogauge' Continental wagons and 'piggyback' operation of articulated trailers on rail wagons. This harmonises with other HSUK proposals, for TransPennine lorry shuttle operations and coast-to-coast freight links via the restored Woodhead corridor.

UK RAIL NETWORK: EFFECTIVENESS OF INTERCITY LINKS & CONNECTIONS TO HEATHROW AIRPORT

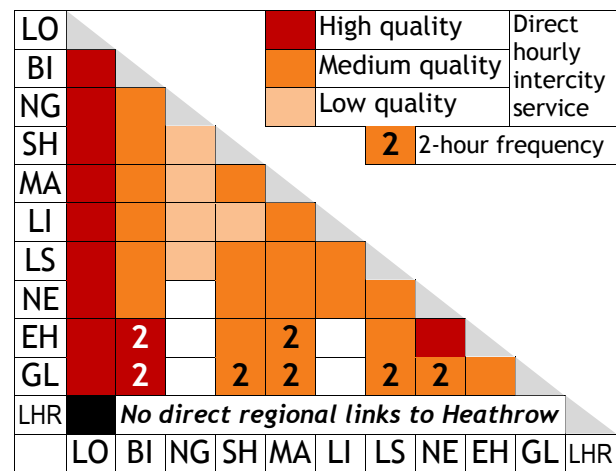
DIAGRAM **NND 1**

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KEY

- Primary/interchange hub/secondary centre/airport
- East Coast Main Line
- Midland Main Line
- West Coast Main Line
- Great Western Main Line
- CrossCountry Main Line
- TransPennine Main Line
- Principal Scottish network

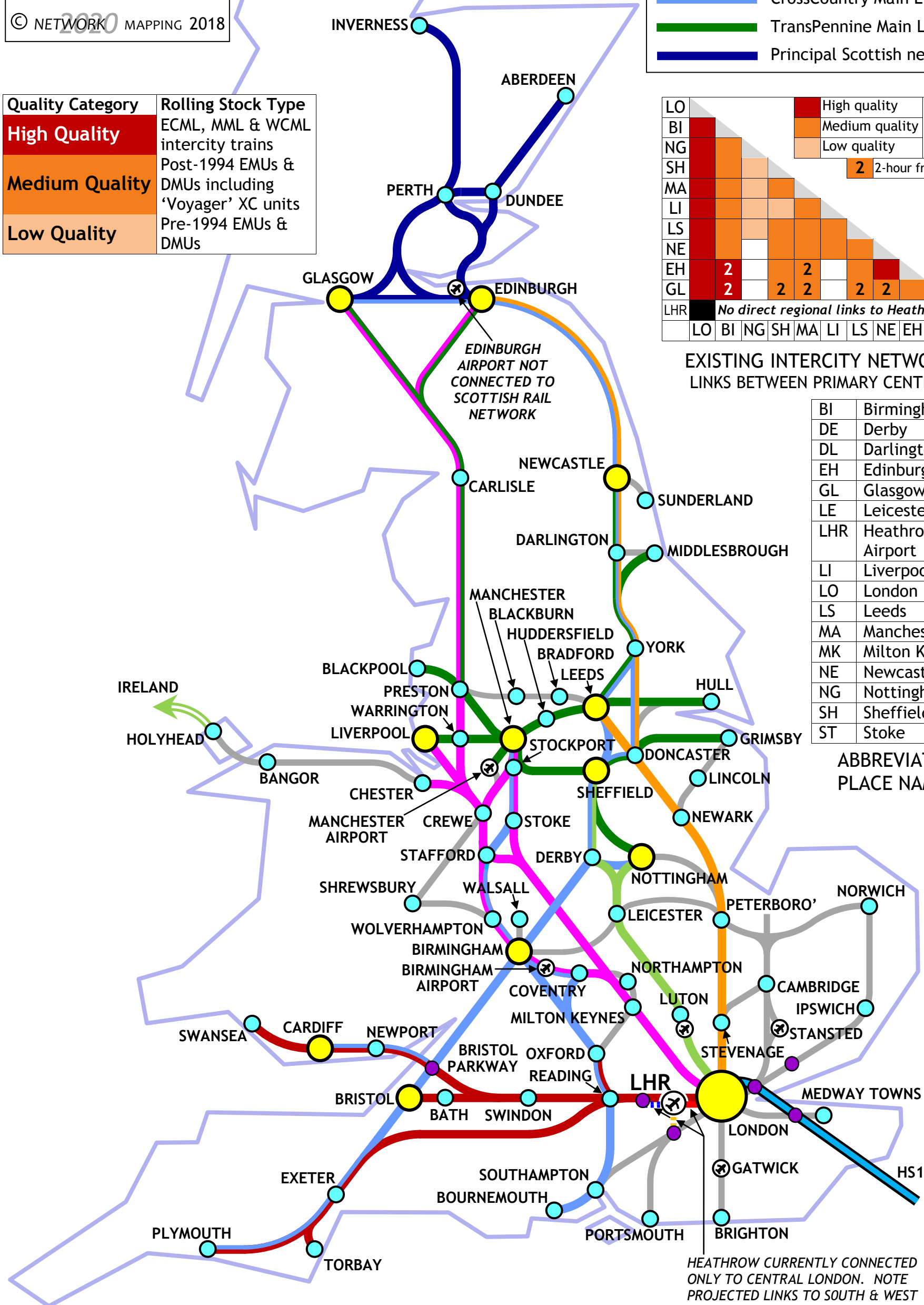
Quality Category	Rolling Stock Type
High Quality	ECML, MML & WCML intercity trains
Medium Quality	Post-1994 EMUs & DMUs including 'Voyager' XC units
Low Quality	Pre-1994 EMUs & DMUs



EXISTING INTERCITY NETWORK
LINKS BETWEEN PRIMARY CENTRES

BI	Birmingham
DE	Derby
DL	Darlington
EH	Edinburgh
GL	Glasgow
LE	Leicester
LHR	Heathrow Airport
LI	Liverpool
LO	London
LS	Leeds
MA	Manchester
MK	Milton Keynes
NE	Newcastle
NG	Nottingham
SH	Sheffield
ST	Stoke

ABBREVIATED
PLACE NAMES



HEATHROW CURRENTLY CONNECTED ONLY TO CENTRAL LONDON. NOTE PROJECTED LINKS TO SOUTH & WEST

**HIGH SPEED 2 / NPR
COMPLETED SYSTEM -
'Y' EXTENDING BOTH
SIDES OF PENNINES &
TRANSPENNINE LINK**

DIAGRAM **NND 2**
© NETWORK MAPPING 2018

FULL NETWORK COMPARISONS	HSUK	HS2+ NPR
Route length of new HSL (km)	911	956+ 196
Length of restored or upgraded route	307	38+ 66
Primary city pairs connected	54	12+8
Main line corridors enhanced	6	3+1
Integration with secondary centres	Y	N
Direct access to Heathrow?	Y	N

KEY

- Principal intercity route
- New high speed line
- Projected extension of HS2 'Y' to link all primary cities
- Primary/interchange hub/secondary centre
- Regional centres not directly connected to high speed 'network'
- Airport connected to high speed network via local interchange

LO	BI	NG	SH	MA	LI	LS	NE	EH	GL	LHR

**NPR:
MANCHESTER-
LEEDS TRANS-
PENNINE LINK**

**HIGH SPEED 2:
DEDICATED HIGH SPEED LINE
IN 'Y' CONFIGURATION
PROJECTED NORTHWARDS TO
LINK ALL PRIMARY REGIONAL
CENTRES OF MIDLANDS,
NORTH & SCOTLAND TO
LONDON AND BIRMINGHAM**

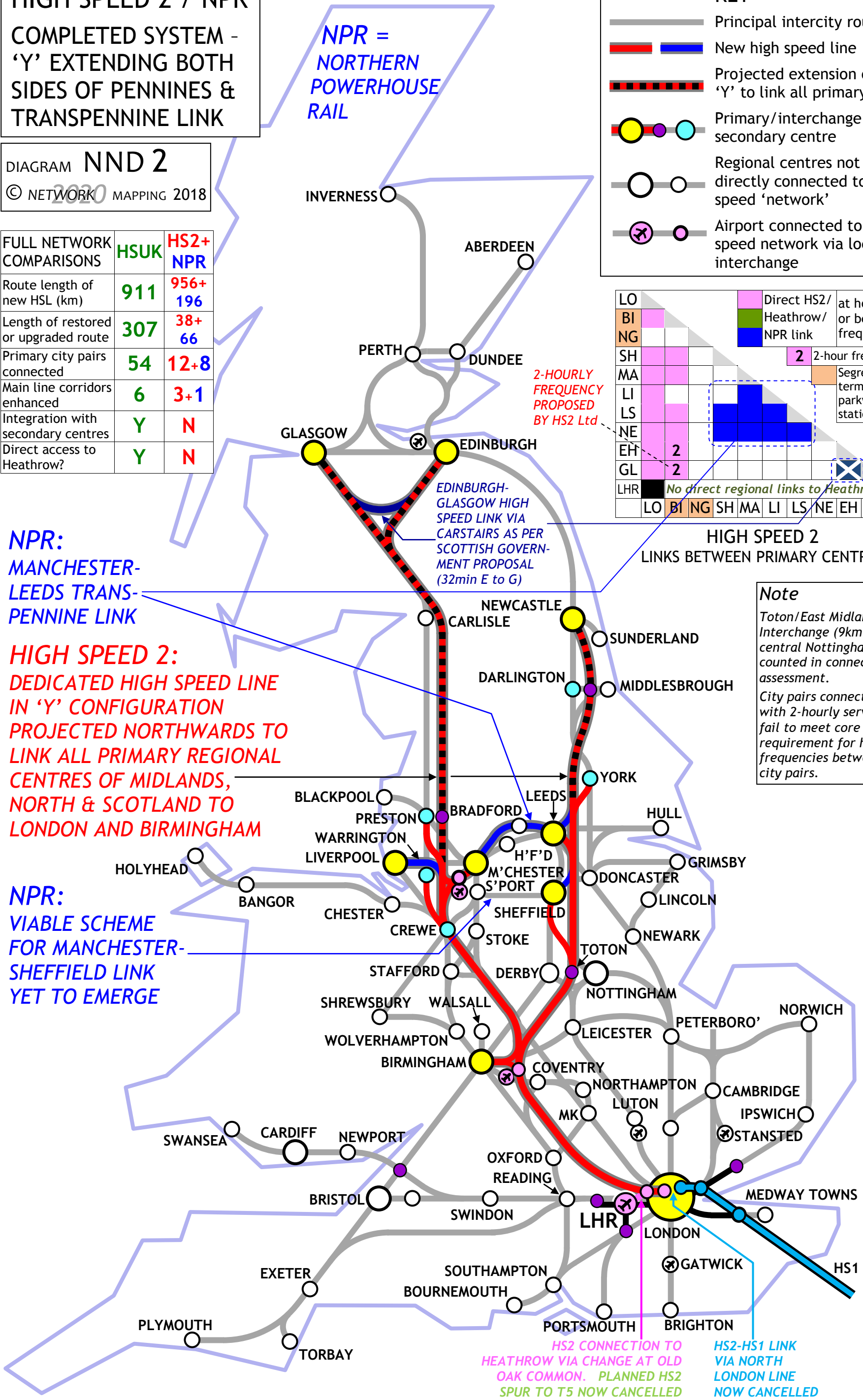
**NPR:
VIAIBLE SCHEME
FOR MANCHESTER-
SHEFFIELD LINK
YET TO EMERGE**

**2-HOURLY
FREQUENCY
PROPOSED
BY HS2 Ltd**

**EDINBURGH-
GLASGOW HIGH
SPEED LINK VIA
CARSTAIRS AS PER
SCOTTISH GOVERN-
MENT PROPOSAL
(32min E to G)**

**HIGH SPEED 2
LINKS BETWEEN PRIMARY CENTRES**

Note
Toton/East Midlands Interchange (9km from central Nottingham) not counted in connectivity assessment.
City pairs connected with 2-hourly services fail to meet core requirement for hourly frequencies between all city pairs.



**HS2 CONNECTION TO
HEATHROW VIA CHANGE AT OLD
OAK COMMON. PLANNED HS2
SPUR TO T5 NOW CANCELLED**

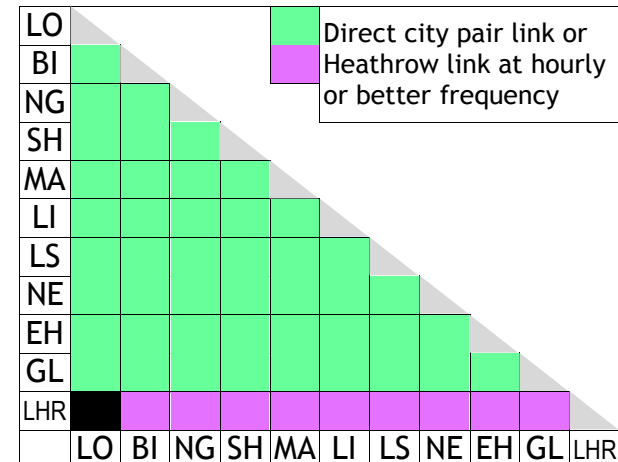
**HS2-HS1 LINK
VIA NORTH
LONDON LINE
NOW CANCELLED**

**HIGH SPEED UK:
FULLY INTEGRATED
HIGH SPEED LINE C/W
UPGRADES TO ACCESS
ALL PRIMARY & MOST
SECONDARY CITIES**

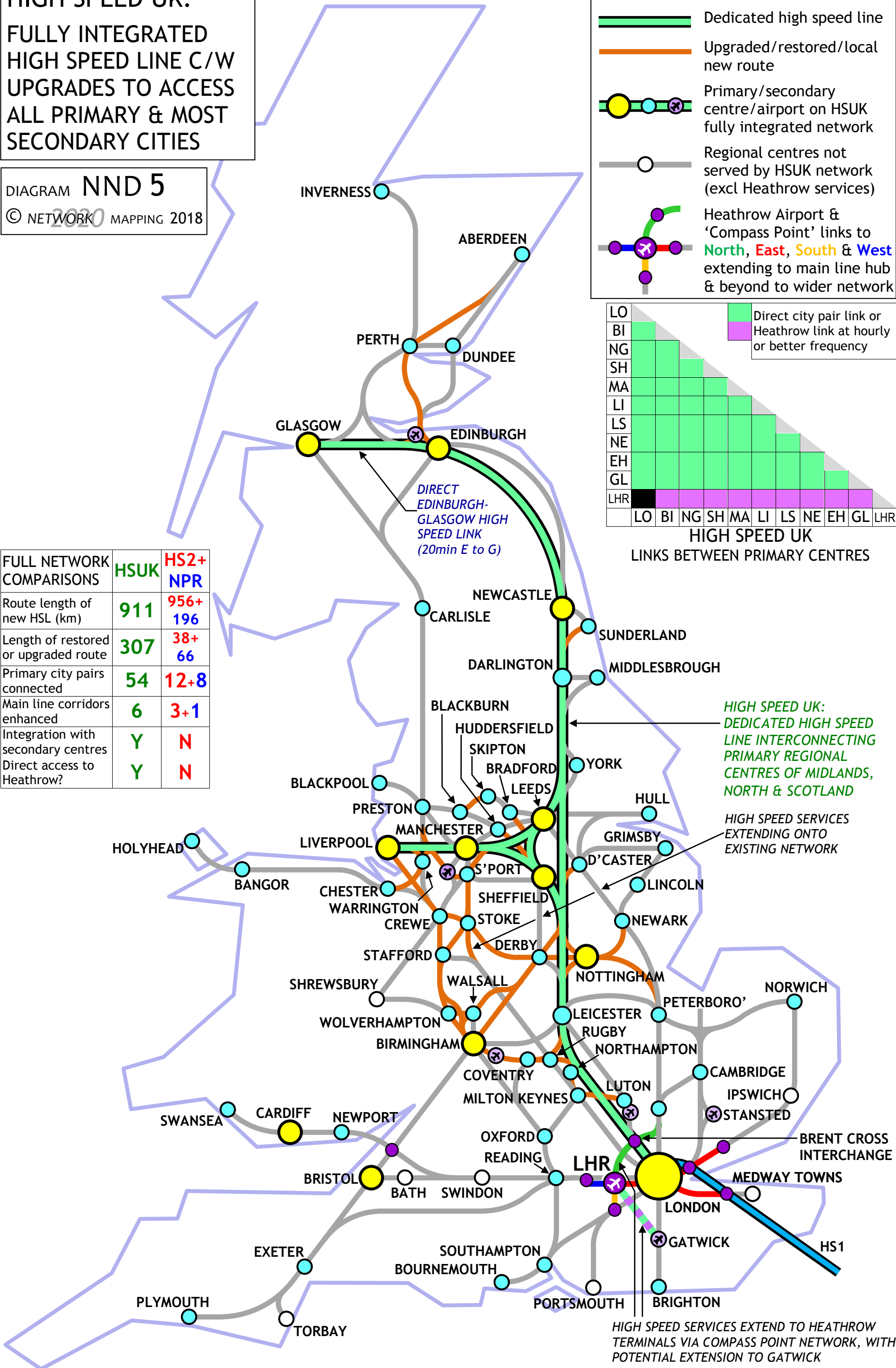
DIAGRAM **NND 5**
© NETWORK 2020 MAPPING 2018

KEY

- Dedicated high speed line
- Upgraded/restored/local new route
- Primary/secondary centre/airport on HSUK fully integrated network
- Regional centres not served by HSUK network (excl Heathrow services)
- Heathrow Airport & 'Compass Point' links to North, East, South & West extending to main line hub & beyond to wider network



FULL NETWORK COMPARISONS	HSUK	HS2+ NPR
Route length of new HSL (km)	911	956+ 196
Length of restored or upgraded route	307	38+ 66
Primary city pairs connected	54	12+8
Main line corridors enhanced	6	3+1
Integration with secondary centres	Y	N
Direct access to Heathrow?	Y	N



HIGH SPEED SERVICES EXTEND TO HEATHROW TERMINALS VIA COMPASS POINT NETWORK, WITH POTENTIAL EXTENSION TO GATWICK

HIGH SPEED UK: PRIMARY HIGH SPEED INTERCITY ROUTES EXTENDING ONTO CLASSIC NETWORK

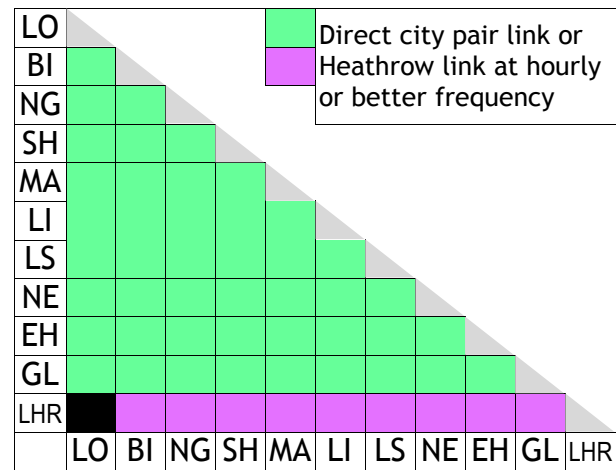
DIAGRAM **NND 6**

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KEY

- Dedicated high speed line
- High speed routes extending to classic lines
- Principal intercity route
- Primary/secondary centre/airport on High Speed UK integrated network
- Regional centres not served by HSUK network (excl Heathrow services)
- Heathrow Airport & 'Compass Point' links to North, East, South & West extending to main line hub & beyond to wider network

SCOTTISH NETWORK ILLUSTRATED IN ENHANCED 'INVERTED TEE' FORMAT, WITH RESTORED GLENFARG & STRATHMORE ROUTE, EXTENDING DIRECT HEATHROW CONNECTIVITY TO ABERDEEN



FULL NETWORK COMPARISONS	HSUK	HS2+ NPR
Route length of new HSL (km)	911	956+ 196
Length of restored or upgraded route	307	38+ 66
Primary city pairs connected	54	12+8
Main line corridors enhanced	6	3+1
Integration with secondary centres	Y	N
Direct access to Heathrow?	Y	N

HIGH SPEED UK
LINKS BETWEEN PRIMARY CENTRES

HIGH SPEED UK: DEDICATED HIGH SPEED LINE INTERCONNECTING PRIMARY REGIONAL CENTRES OF MIDLANDS, NORTH & SCOTLAND

HIGH SPEED SERVICES EXTENDING ONTO EXISTING NETWORK

TRANSPENNINE ROUTE FROM EAST ANGLIA TO EAST MIDLANDS, SOUTH YORKSHIRE & NORTH-WEST

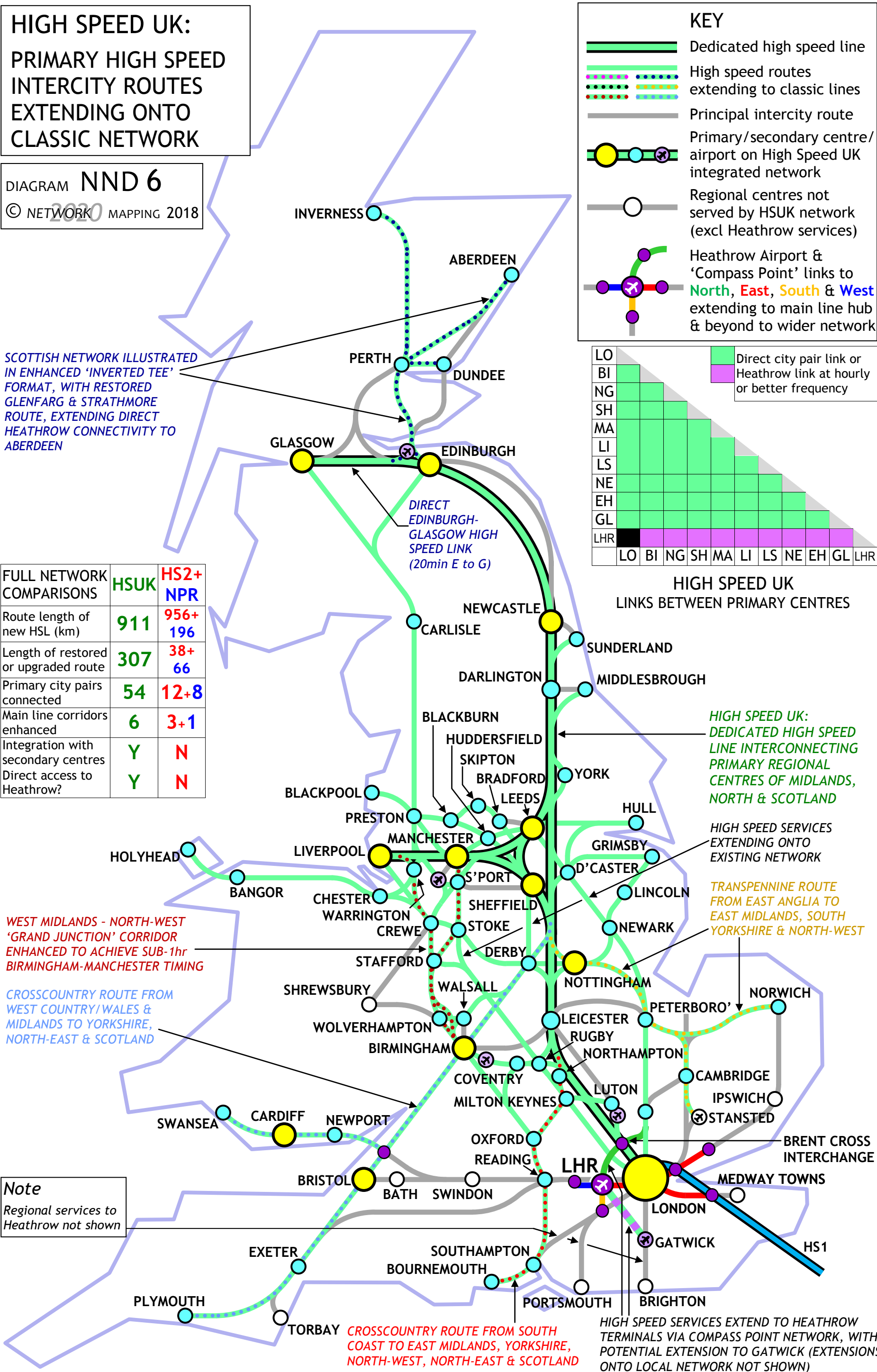
WEST MIDLANDS - NORTH-WEST 'GRAND JUNCTION' CORRIDOR ENHANCED TO ACHIEVE SUB-1hr BIRMINGHAM-MANCHESTER TIMING

CROSSCOUNTRY ROUTE FROM WEST COUNTRY/WALES & MIDLANDS TO YORKSHIRE, NORTH-EAST & SCOTLAND

Note
Regional services to Heathrow not shown

CROSSCOUNTRY ROUTE FROM SOUTH COAST TO EAST MIDLANDS, YORKSHIRE, NORTH-WEST, NORTH-EAST & SCOTLAND

HIGH SPEED SERVICES EXTEND TO HEATHROW TERMINALS VIA COMPASS POINT NETWORK, WITH POTENTIAL EXTENSION TO GATWICK (EXTENSIONS ONTO LOCAL NETWORK NOT SHOWN)



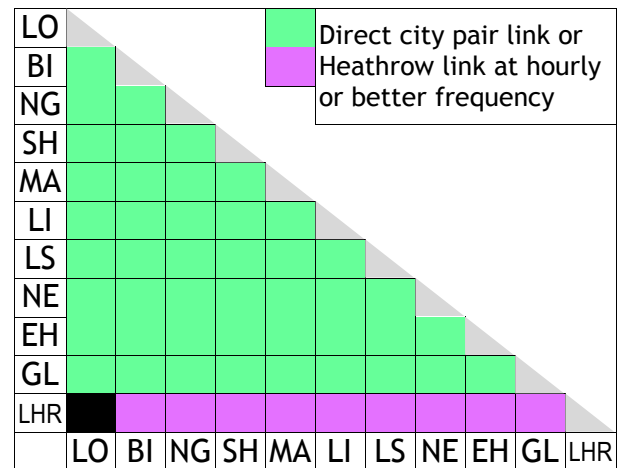
HIGH SPEED UK: DIRECT REGIONAL & 'COMPASS POINT' CONNECTIONS TO HEATHROW AIRPORT

DIAGRAM **NND 7**
© NETWORK MAPPING 2019

KEY

- Primary/interchange hub/secondary centre directly connected to Heathrow
- Regional centre 1 change of trains from Heathrow
- Dedicated high speed link to Heathrow - from north
- Dedicated intercity link to Heathrow - from west
- Heathrow Airport & 'Compass Point' links to North, East, South & West High Speed UK & Great Western network

SCOTTISH NETWORK ILLUSTRATED IN ENHANCED 'INVERTED TEE' FORMAT, WITH RESTORED GLENFARG & STRATHMORE ROUTE, EXTENDING DIRECT HEATHROW CONNECTIVITY TO ABERDEEN

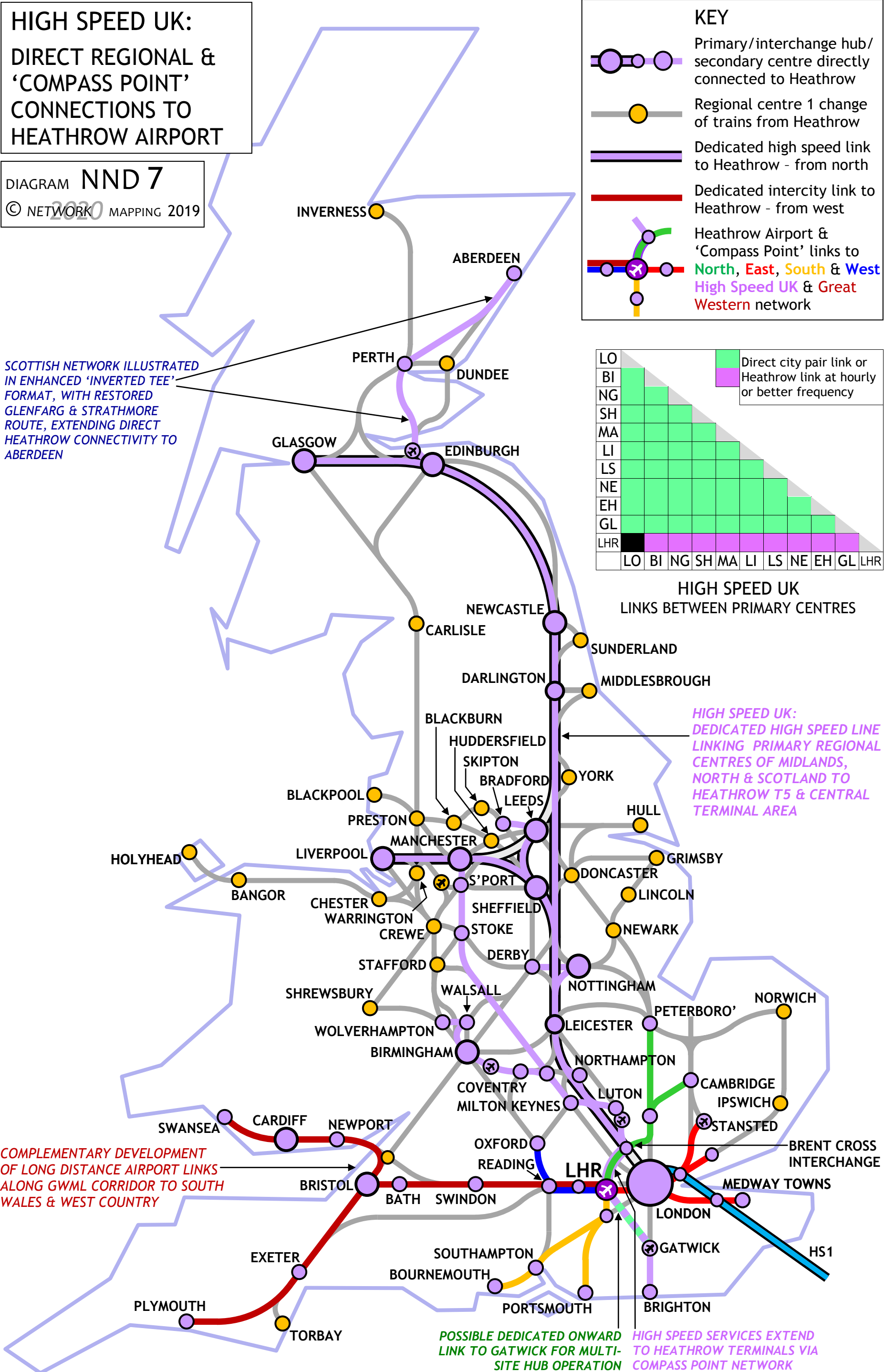


HIGH SPEED UK
LINKS BETWEEN PRIMARY CENTRES

HIGH SPEED UK:
DEDICATED HIGH SPEED LINE LINKING PRIMARY REGIONAL CENTRES OF MIDLANDS, NORTH & SCOTLAND TO HEATHROW T5 & CENTRAL TERMINAL AREA

COMPLEMENTARY DEVELOPMENT OF LONG DISTANCE AIRPORT LINKS ALONG GWML CORRIDOR TO SOUTH WALES & WEST COUNTRY

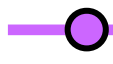
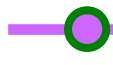





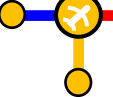
POSSIBLE DEDICATED ONWARD LINK TO GATWICK FOR MULTI-SITE HUB OPERATION
HIGH SPEED SERVICES EXTEND TO HEATHROW TERMINALS VIA COMPASS POINT NETWORK

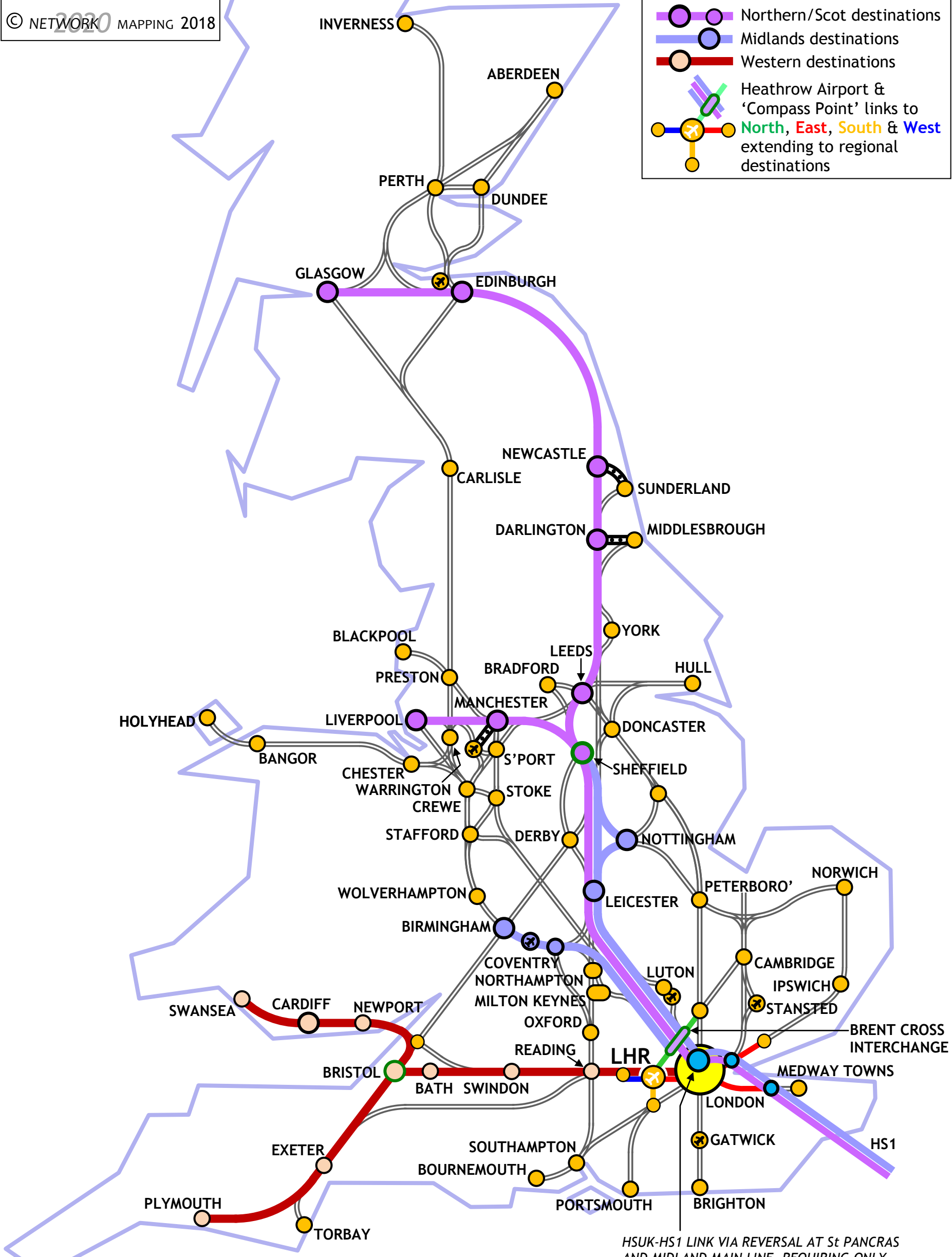


HIGH SPEED UK: PROPOSED SERVICE PATTERN FOR DIRECT CONTINENTAL SERVICES VIA HS1

DIAGRAM **NND 11**
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KEY

-  Primary regional centre directly linked to Europe
-  Train splitting point
-  Secondary centre linked via single change of trains
-  Local metro connection
- Direct Euro service to:
 -  Northern/Scot destinations
 -  Midlands destinations
 -  Western destinations
-  Heathrow Airport & 'Compass Point' links to North, East, South & West extending to regional destinations



HIGH SPEED UK: INTERVENTIONS TO EXISTING NETWORK TO HARMONISE WITH HIGH SPEED UK

DIAGRAM **NND 13**

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NATIONAL HIGH SPEED LINE DEVELOPMENT

A HIGH SPEED NORTH - NORTHERN COMPONENT OF HIGH SPEED UK. DEDICATED HIGH SPEED LINE INTERCONNECTING PRIMARY REGIONAL CENTRES OF MIDLANDS, NORTH & SCOTLAND

SCOTTISH ENHANCEMENTS

B STRATHMORE ROUTE RESTORED
C GLENFARG ROUTE RESTORED
D EDINBURGH AIRPORT 'WEST TO NORTH' INTERCITY LINK

NORTH WEST ENHANCEMENTS

I WOODHEAD CORRIDOR RESTORATION AS INTEGRATED MULTIUSER RAILWAY
J NEW CROSS-MANCHESTER TUNNEL
K NEW STOCKPORT - AIRPORT - ALTRINCHAM - HSUK LINK
L UPGRADE OF NORTH STAFFS ROUTES STONE - STOKE - CHEADLE HULME
M WCML REORIENTATION VIA STOKE & DERBY-STOKE UPGRADE

WEST MIDLANDS ENHANCEMENTS

S COVENTRY-BIRMINGHAM 4-TRACKING
T NEW SOHO - TAME BRIDGE LINK & GRAND JUNCTION UPGRADE
U WALSALL - LICHFIELD RESTORATION
V BIRMINGHAM - DERBY 4-TRACKING

NATIONAL HIGH SPEED LINE DEVELOPMENT

W HIGH SPEED WEST: WESTERN COMPONENT OF HIGH SPEED UK. TARGETED ENHANCEMENTS OF KEY SECTIONS OF GREAT WESTERN & CROSSCOUNTRY MAIN LINES

ACCESS TO NATIONAL HUB AIRPORT AT HEATHROW

Z COMPASS POINT ENHANCEMENT OF HEATHROW EXPRESS SYSTEM TO LINK TO HIGH SPEED UK &
Q ALSO TO GATWICK. PLANNED LINKS TO OTHER PRIMARY MAIN LINES ASSUMED TO BE IN PLACE.

KEY

- Dedicated high speed line
- Principal intercity route
- Major proposed enhancements
- Green shading indicates works req^d for core HSUK network.
- White & blue shading indicates works req^d for wider network.
- Major station/local network reconfigurations
- Existing 2-station situation resolved into single I/C station

YORKSHIRE & N.E. ENHANCEMENTS

- E** TEES VALLEY METRO
- F** BRADFORD CROSSRAIL LINK, SPEN VALLEY RESTORATION & SKIPTON-COLNE RESTORATION
- G** LEEDS EAST 4-TRACKING & STOURTON - NEVILLE HILL LINK
- H** SHEFFIELD HIGH SPEED TERMINAL AT RESTORED VICTORIA STATION

EAST MIDLANDS ENHANCEMENTS

- N** NEW DIRECT NOTTINGHAM-HSUK LINK
- O** DERBY - EREWASH VALLEY LINK ALONG RESTORED GREAT NORTHERN ROUTE & DERBY TEARDROP LOOP RESTORED FOR THROUGH NOTTINGHAM-BIRMINGHAM OPERATION
- P** GRANTHAM-NOTTINGHAM ROUTE UPGRADED TO 200kph OPERATION & BOTTESFORD-NEWARK LINK RESTORED
- R** FREIGHT ROUTES THROUGH LEICESTER DIVERTED VIA CORBY, C/W NEW CHORDS AT GLENDON & MANTON JNS

M1 CORRIDOR ENHANCEMENTS

- X** MAIN LINE LINKS TO HIGH SPEED UK CREATE LINKS BETWEEN MML & WCML CORRIDORS
- Y** EAST-WEST RAIL RESTORATION AS PER CURRENT PLANS

