

Section II

Network capability

Introduction

The capability of the network determines the speed and type of trains that can operate. Capability is defined as a function of the assets as well as operating instructions used to ensure safety. It is described by the following measures, which are detailed in the maps and tables below:

- **linespeed:** the maximum speed that at which it is safe for trains to travel;
- **loading gauge:** the maximum dimensions of vehicles and load that routes can carry, as determined by the clearances to structures and passing trains;
- **axle load:** the maximum axle load that the route can carry, as determined by the strength of underline bridges;
- **electrification:** the extent of the network for electrically hauled trains;
- **capacity utilisation:** the extent to which capacity is utilised by the existing usage of the network; and
- **route classification:** the extent to which capacity is utilised by the existing usage of the network.

The Regulator's target for network capability measures is for no functionality reduction, against 1 April 2001, subject to contractual and safety procedures such as network change.

Our maintenance and renewal activities are expected to maintain the capability of the network. Enhancements may result in increased capability. Also, there are circumstances where we can legitimately make permanent reductions in capability, but only by complying with contractual and safety procedures.

Linespeeds



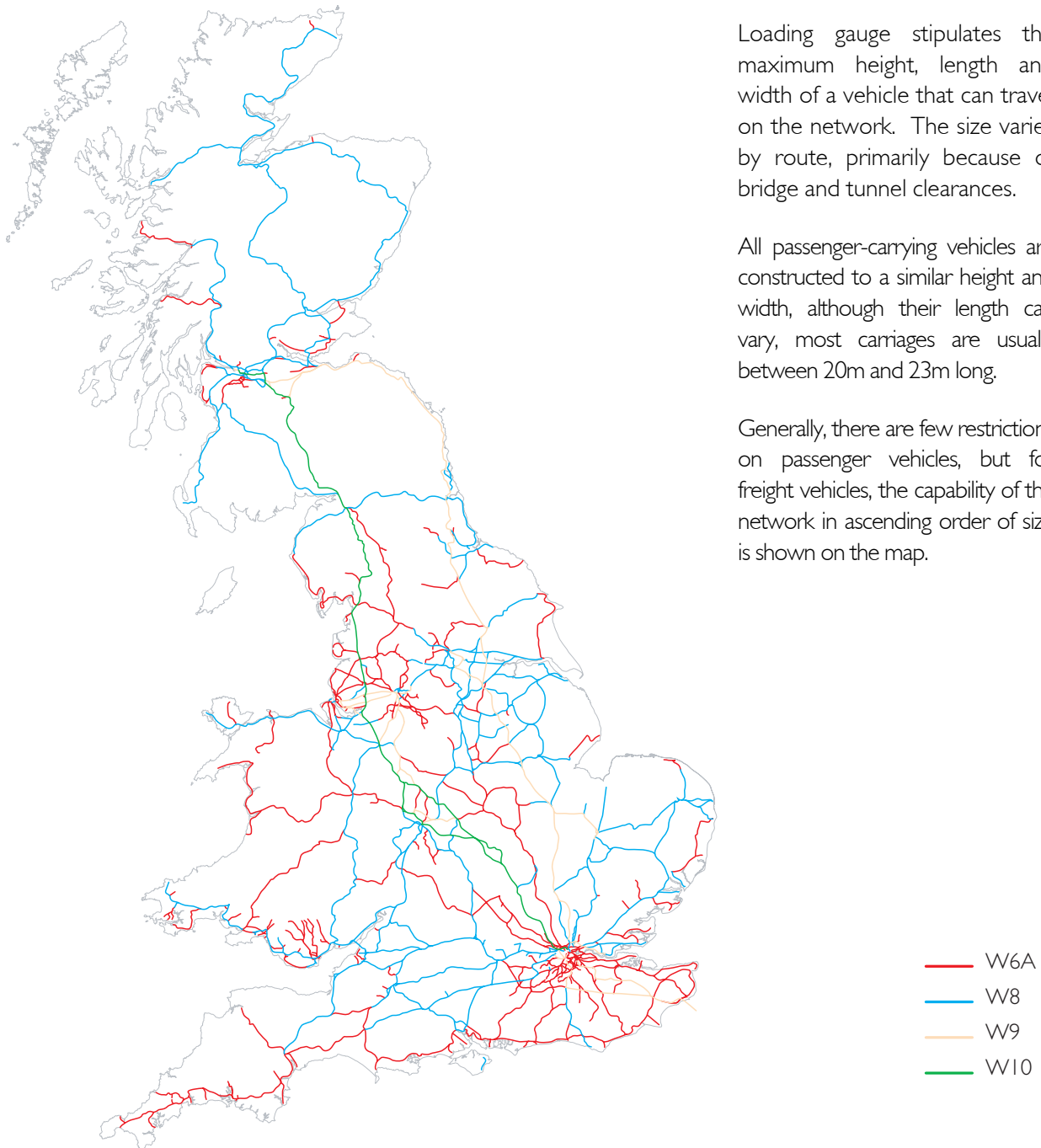
The current linespeeds shown on the map and the types of trains currently in operation, together with their timetable and stopping patterns, produce actual journey times for rail services.

Figure 11.1 Line speeds (km of track in each speed band)

Line speed	1 April 2004	2005	2008
km of track up to 35mph	1,932	1,911	1,911
km of track 40–75mph	16,381	16,381	16,381
km of track 80–105mph	8,401	8,401	8,423
km of track 110–125mph	4,947	4,947	4,947
Total	31,661	31,640	31,662

Changes are due to Probus Bumgullow redoubling (route 12), and transfer of Oldham Loop to Metrolink (route 20). Whilst WCRM is improving linespeeds, the improvements are within the same band. The 2008 increase is due to Trent Valley quadrupling.

Loading gauge



Loading gauge stipulates the maximum height, length and width of a vehicle that can travel on the network. The size varies by route, primarily because of bridge and tunnel clearances.

All passenger-carrying vehicles are constructed to a similar height and width, although their length can vary, most carriages are usually between 20m and 23m long.

Generally, there are few restrictions on passenger vehicles, but for freight vehicles, the capability of the network in ascending order of size is shown on the map.

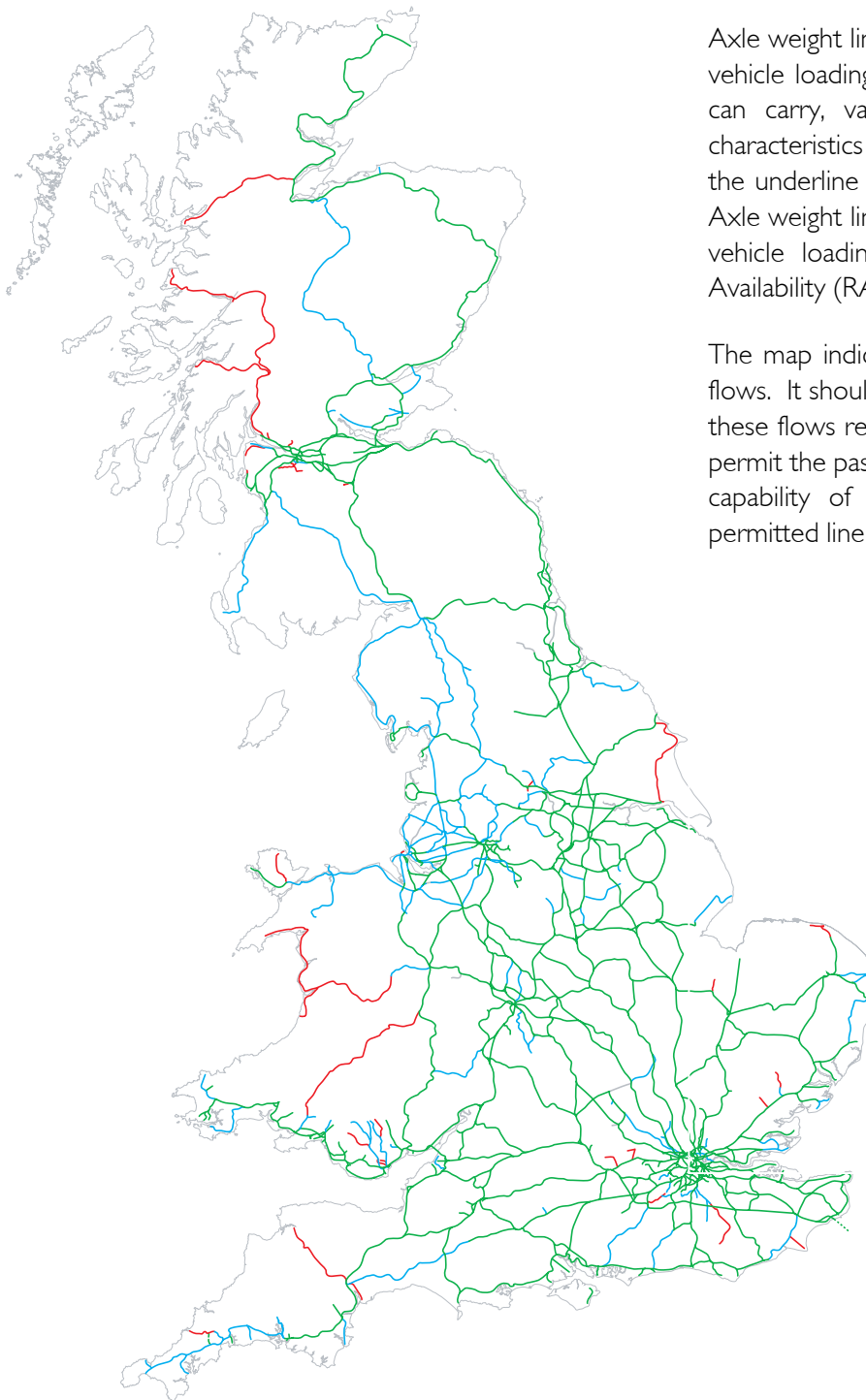
Figure 11.2 Loading gauge (km of route by loading gauge)

Loading gauge	1 April 2004	2005	2008
km of route W6A ¹	16,140	16,121	16,121
km of route W7	10,928	10,928	10,928
km of route W8	8,739	8,739	8,739
km of route W9	3,108	3,251	3,251
km of route W10 or above	776	978	978

¹ This is the standard gauge for freight vehicles

Changes are due to the transfer of Oldham Loop (route 20) the Felixstowe – Nuneaton (Routes 6 and 7) and WCRM (Route 20) WCRM is also improving gauge within the category "W10 or above"

Axle weights



Axle weight limits and equivalent distributed vehicle loadings which the current network can carry, vary according to engineering characteristics of each route, particularly of the underline bridge and viaduct structures. Axle weight limits and equivalent distributed vehicle loadings are classified into Route Availability (RA) values between 1 and 10.

The map indicates current permitted traffic flows. It should be noted that in some cases these flows require operating restrictions to permit the passage of traffic heavier than the capability of structures at the maximum permitted line speed for the route.

The capability of track on a route to carry traffic is dependent on its construction and the maintenance and renewal regime in place. There are some routes where an increase in traffic can be accommodated only with a prior increase in maintenance and renewal activity.

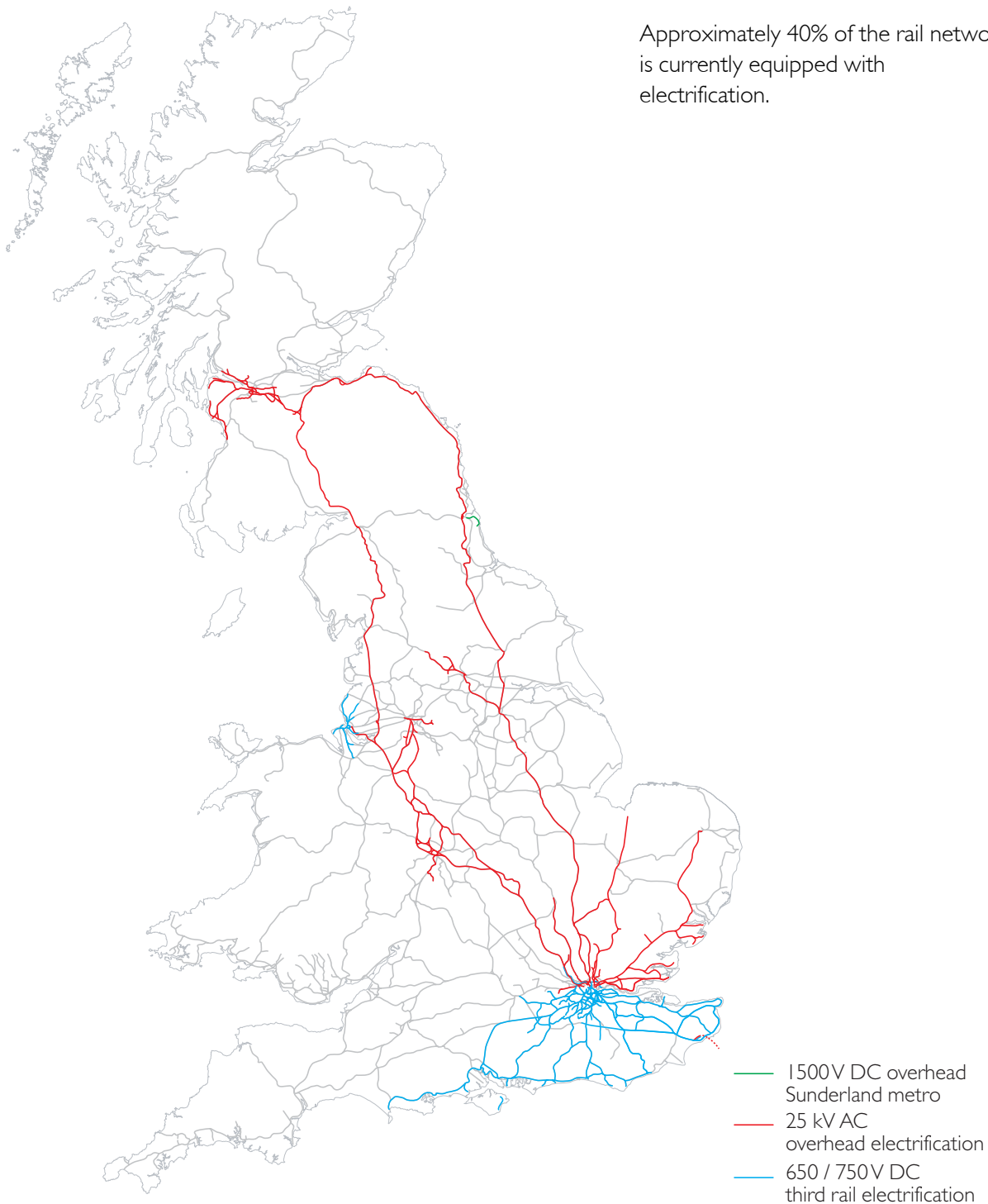
- Up to RA 6
- RA 7-9
- RA 10
- Unclassified/ routes currently not in use

Figure 11.3 Permitted axle weights (km of track by axle weight band)			
Axle weights	1 April 2004	2005	2008
km of track up to 20.3 tonnes (RA1-6)	2,480	2,480	2,480
km of track 20.4–24.1 tonnes (RA 7-9)	24,241	24,220	24,220
km of track 24.2–25.4 tonnes (RA10)	4,941	4,941	4,963
Total	31,661	31,640	31,662

The 2005 change is due to the transfer of Oldham Loop to Metrolink (route 20), and Probus Burngallow (route 12), The 2008 increase is due to Trent Valley quadrupling.

Electrification

Approximately 40% of the rail network is currently equipped with electrification.



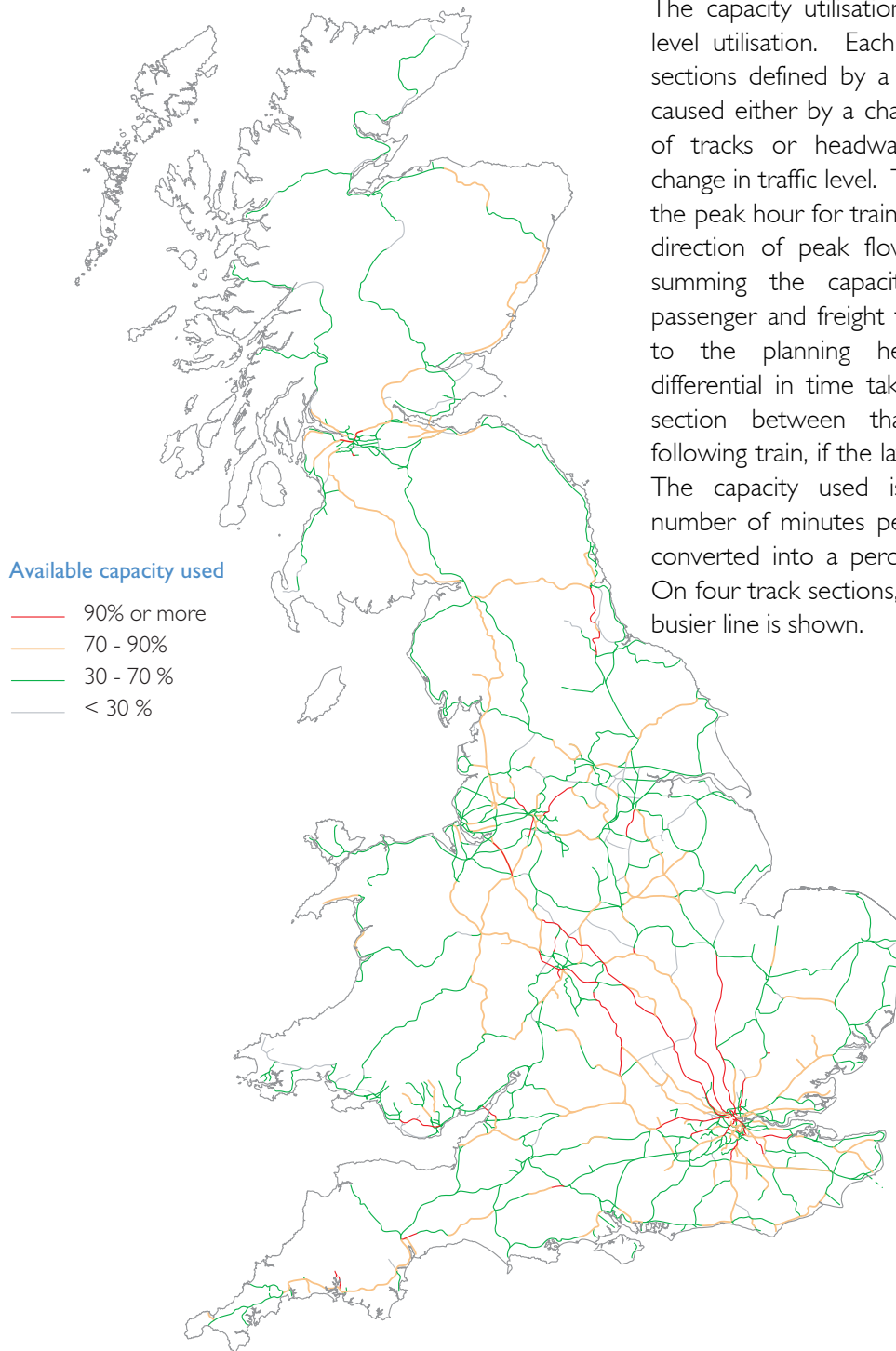
- 1500V DC overhead
Sunderland metro
- 25 kV AC
overhead electrification
- 650 / 750V DC
third rail electrification

Figure 11.4 Electrification (km of electrified track)

Electrification	1 April 2004	2005	2008
km of 25kV AC overhead line	8,783	8,783	8,805
km of 650/750V DC third rail	4,337	4,337	4,337
km of 1500V DC overhead line	36	36	36

The 2008 increase is due to Trent Valley quadrupling.

Capacity utilisation



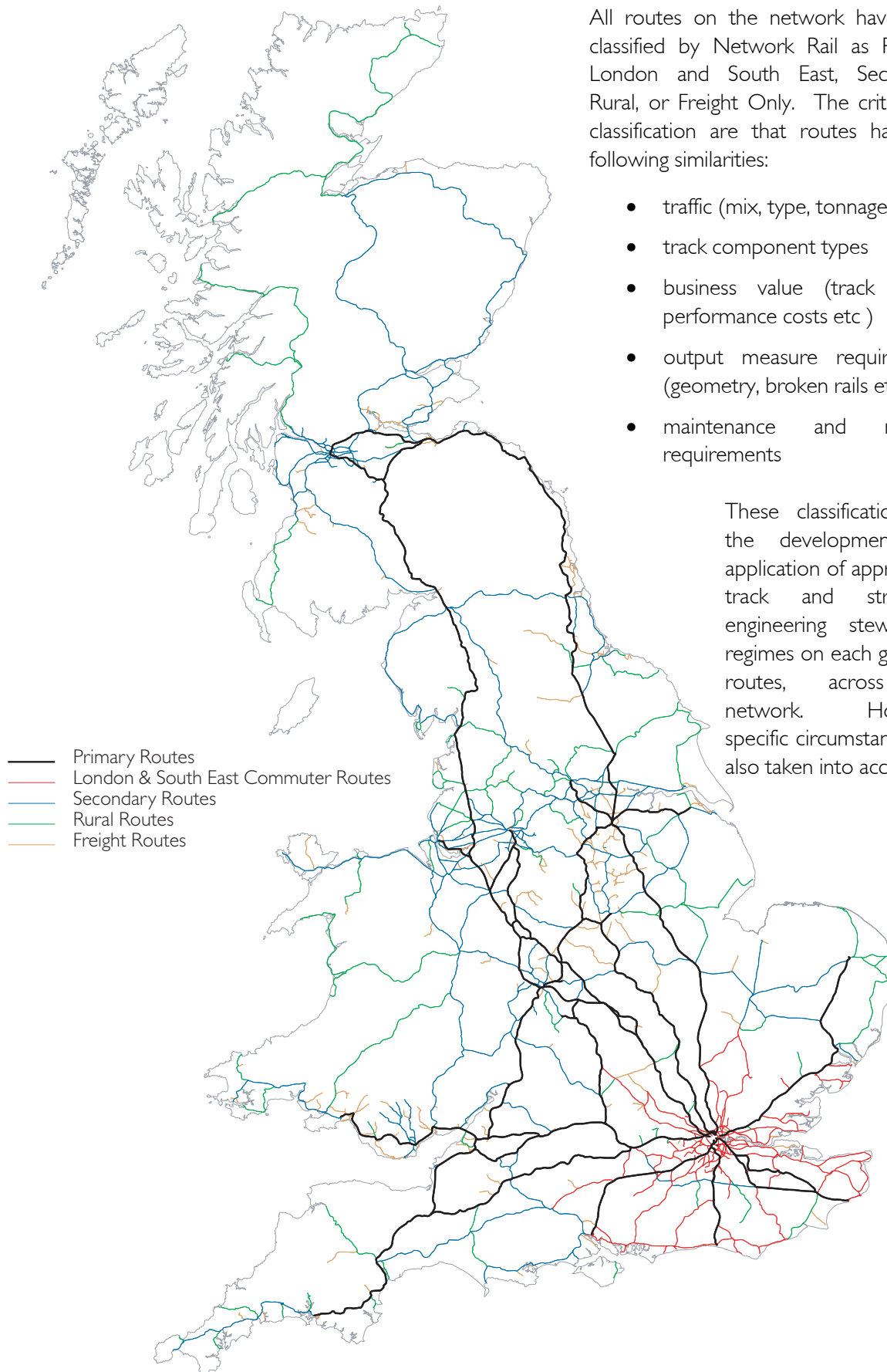
Base Maps © Maps In Minutes 1997

The map is only a guide to the relative utilisation of different parts of the network, since actual utilisation depends on the exact ordering of trains and the length of the sections chosen. This high-level analysis therefore helps to point us toward areas that need to be explored further.

The capacity bottlenecks, along with possible solutions, are presented in the Route Plans document.

The capacity utilisation map shows peak level utilisation. Each route is split into sections defined by a change of capacity caused either by a change in the number of tracks or headway, or a significant change in traffic level. The capacity used in the peak hour for train movements, in the direction of peak flow, is calculated by summing the capacity used by each passenger and freight train. This is equal to the planning headway, plus the differential in time taken to traverse the section between that train and the following train, if the latter is a faster train. The capacity used is expressed as a number of minutes per hour, and this is converted into a percentage of an hour. On four track sections, the capacity of the busier line is shown.

Classification of routes



All routes on the network have been classified by Network Rail as Primary, London and South East, Secondary, Rural, or Freight Only. The criteria for classification are that routes have the following similarities:

- traffic (mix, type, tonnage)
- track component types
- business value (track access, performance costs etc)
- output measure requirements (geometry, broken rails etc)
- maintenance and renewal requirements

These classifications aid the development and application of appropriate track and structures engineering stewardship regimes on each group of routes, across the network. However, specific circumstances are also taken into account.