

HS2

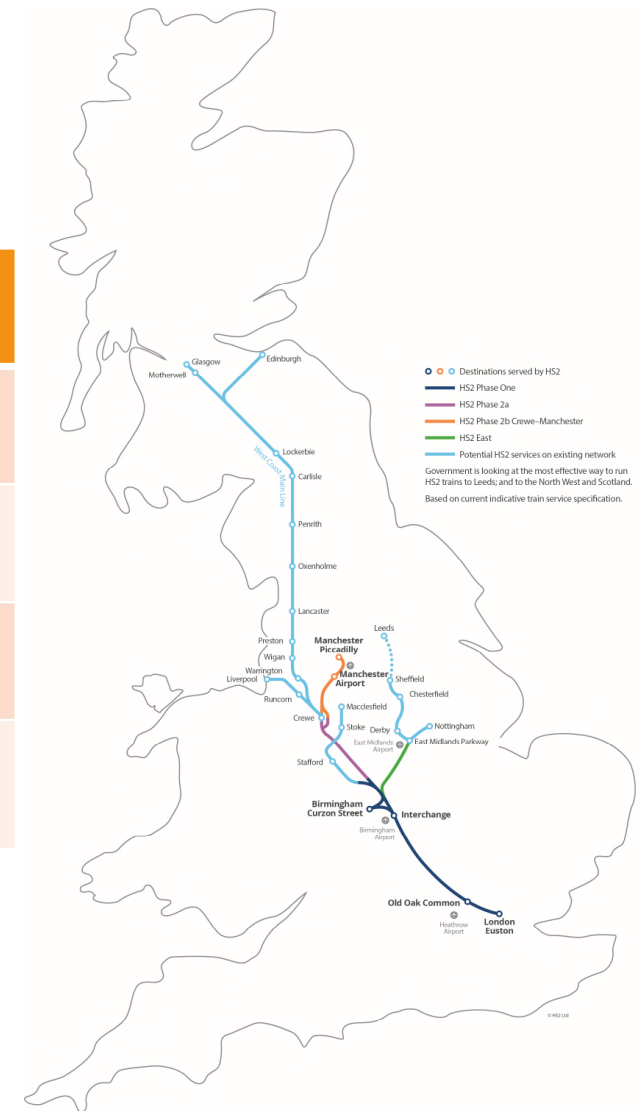
Crewe to Manchester Route Overview for House of Commons Select Committee

**Tim Smart - Managing Director, HS2 Phase 2
Expert Engineering Witness for the Promoter**

HS2

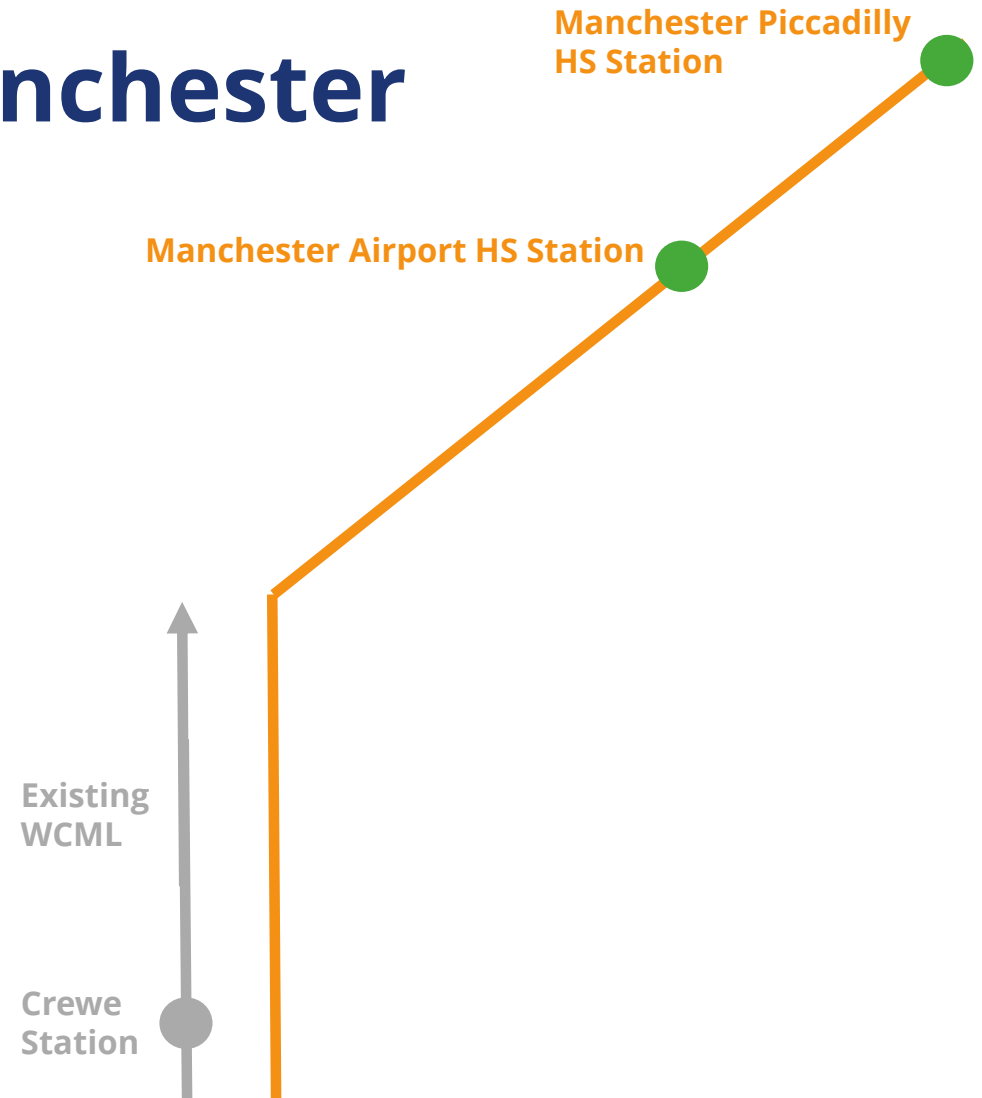
Phase	Geography	Status	Target Opening
1	London – West Midlands	Royal Assent 2017 - Main Construction	2029-2033
2a	West Midlands – Crewe	Royal Assent 2021 - Early Works Construction	2029-2033
2b	Crewe – Manchester	HoC Select Committee	2036-2041
HS2 East	West Midlands – East Midlands	Future Scheme	2040s

The link connecting HS2 to the West Coast Main Line south of Wigan (Golborne Link) is to be removed from this Bill.



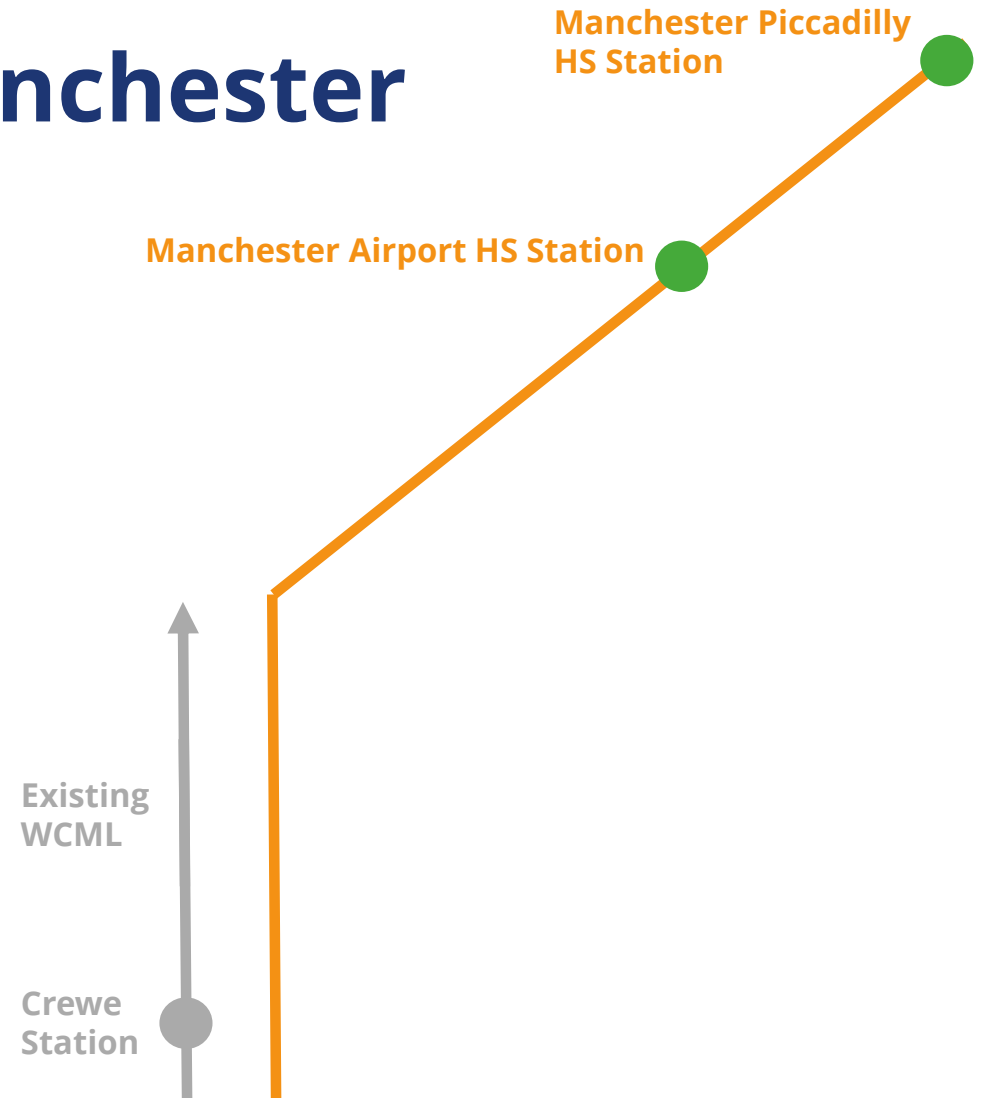
Phase 2b Crewe to Manchester

- 38 miles of new line and 2 high speed stations



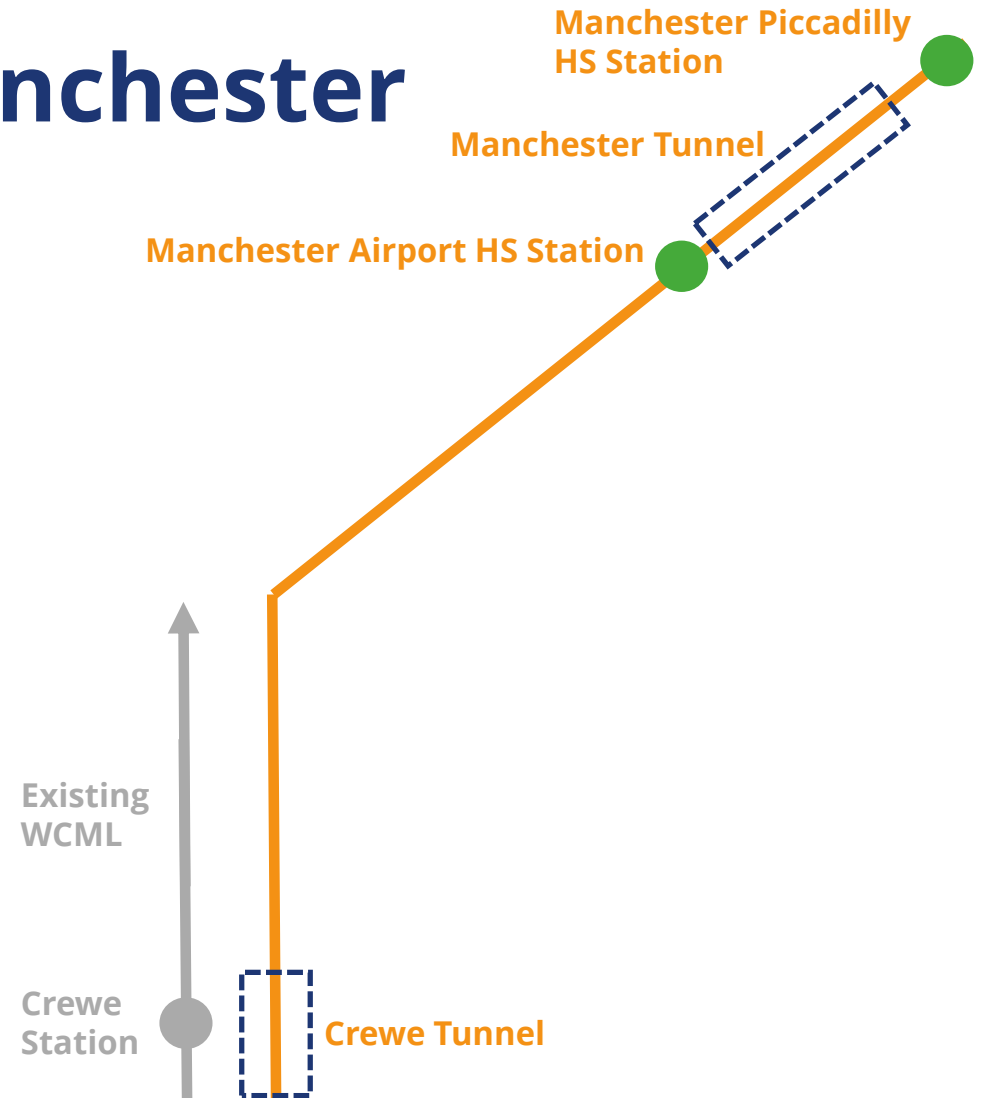
Phase 2b Crewe to Manchester

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- 14 train paths per hour



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- 2 tunnels & 18 viaducts



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- 14 train paths per hour
- 2 tunnels & 18 viaducts
- 3 junctions and the 'Crewe Northern Connection' for future schemes/NPR provision



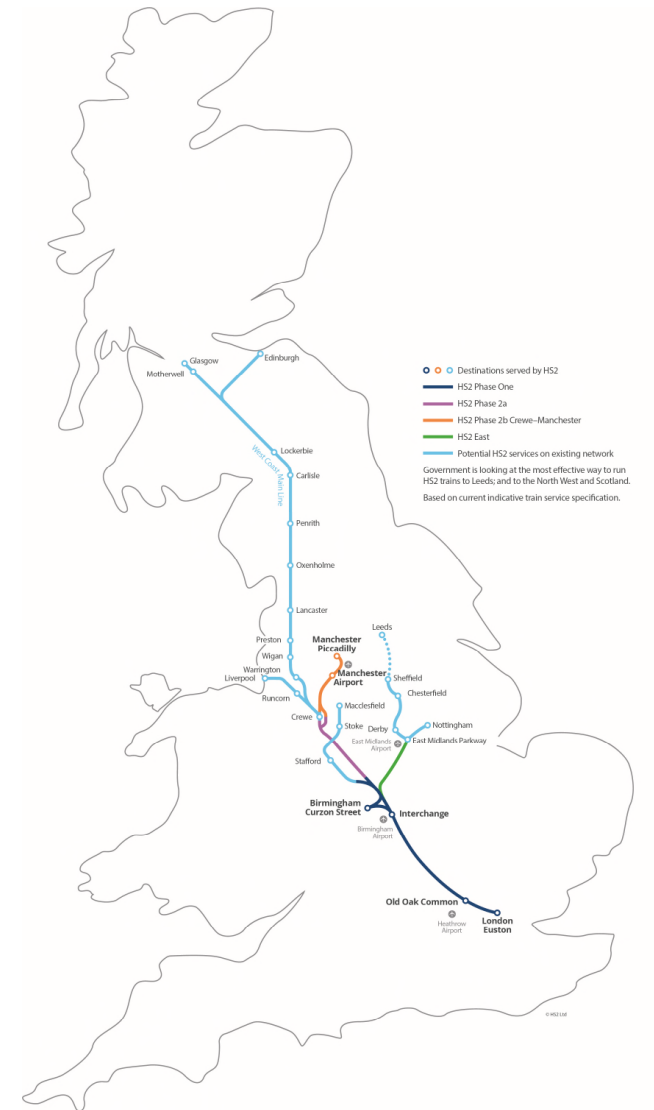
Phase 2b Crewe to Manchester

- 38 miles of new line and 2 high speed stations
- 14 train paths per hour
- 2 tunnels & 18 viaducts
- 3 junctions and the 'Crewe Northern Connection' for future schemes/NPR provision
- Crewe North Rolling Stock Depot
- 2 Satellite Maintenance Bases (Crewe and Ashley)



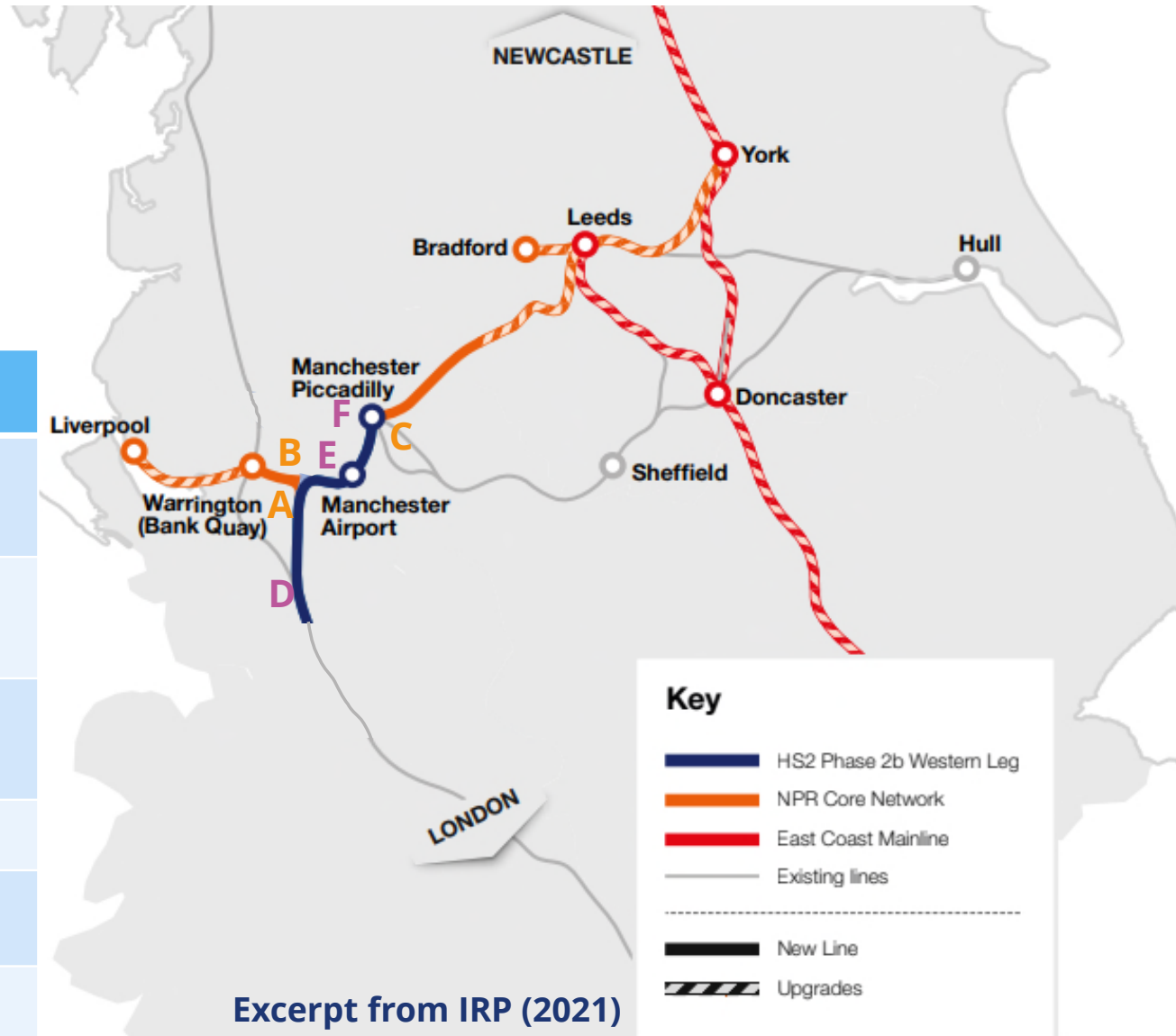
Off route works

- Platform extension/remodelling at Preston and Carlisle (Off-route)
- Rolling Stock Depot at Annandale (Dumfries and Galloway)



HS2 - Northern Powerhouse Rail connections

	Component	Delivered in this bill
A	London – Liverpool Connection	Yes - Passive Provision
B	Liverpool – Manchester Connection	Yes - Passive Provision
C	Manchester – Leeds Connection	Yes - Passive Provision
D	Crewe Northern Connection	Yes
E	2 NPR platforms at Manchester Airport HS station	Yes
F	2 NPR platforms at Manchester Piccadilly HS station	Yes

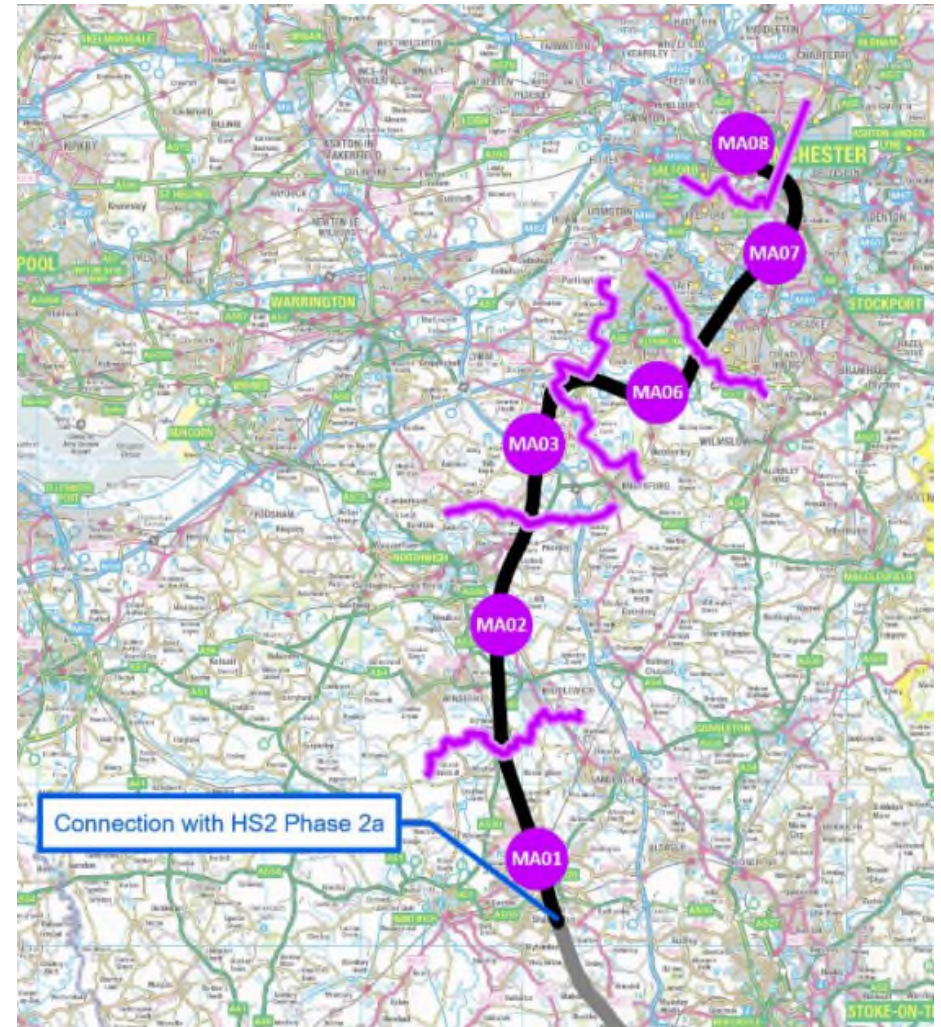


Community Areas

The hybrid Bill environmental statement split the route into 8 community areas. AP1 has removed the link to the WCML (Golborne link) (MA04, MA05).

The remaining community areas are:

- MA01, Hough to Walley's Green
- MA02, Wimboldsley to Lostock Gralam
- MA03, Pickmere to Agden & Hulseheath
- MA06, Hulseheath to Manchester Airport
- MA07, Davenport Green to Ardwick
- MA08, Manchester Piccadilly Station



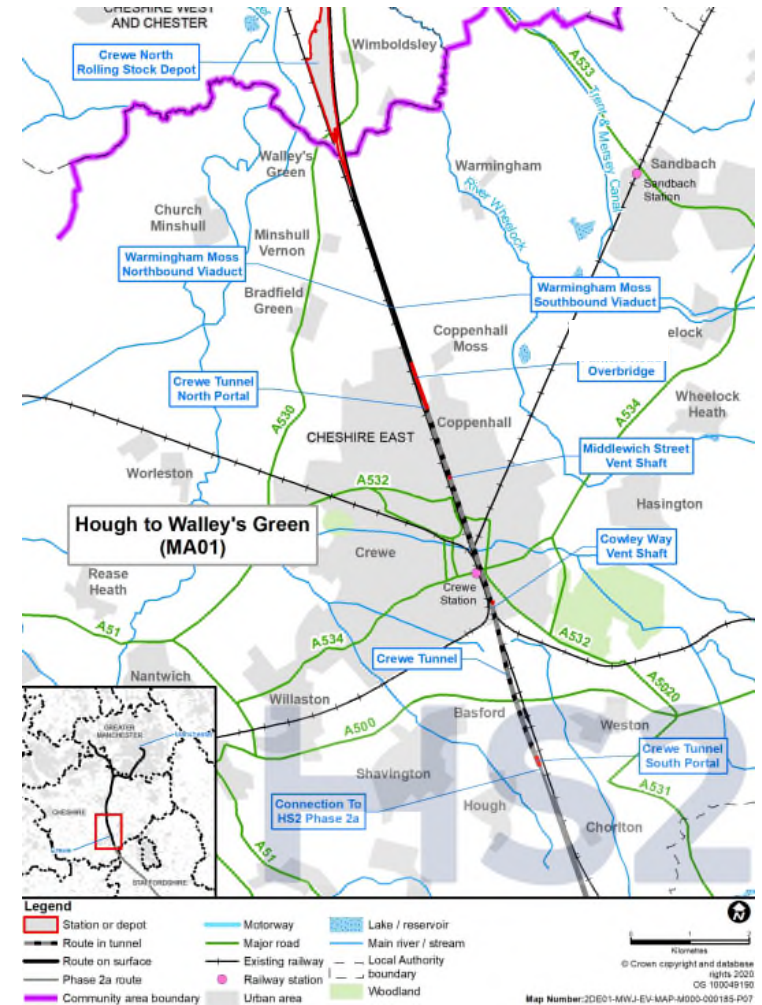
Hough to Walley's Green (MA01)

Main design elements:

- Connection to HS2 Phase 2a
- Crewe Tunnel (6.8km) max depth of 40m
- Two tunnel vent shafts (Cowley Way and Middlewich Street)
- Crewe Northern Connection (NPR provision)

Main AP1 changes:

- Crewe Tunnel extension and alignment change



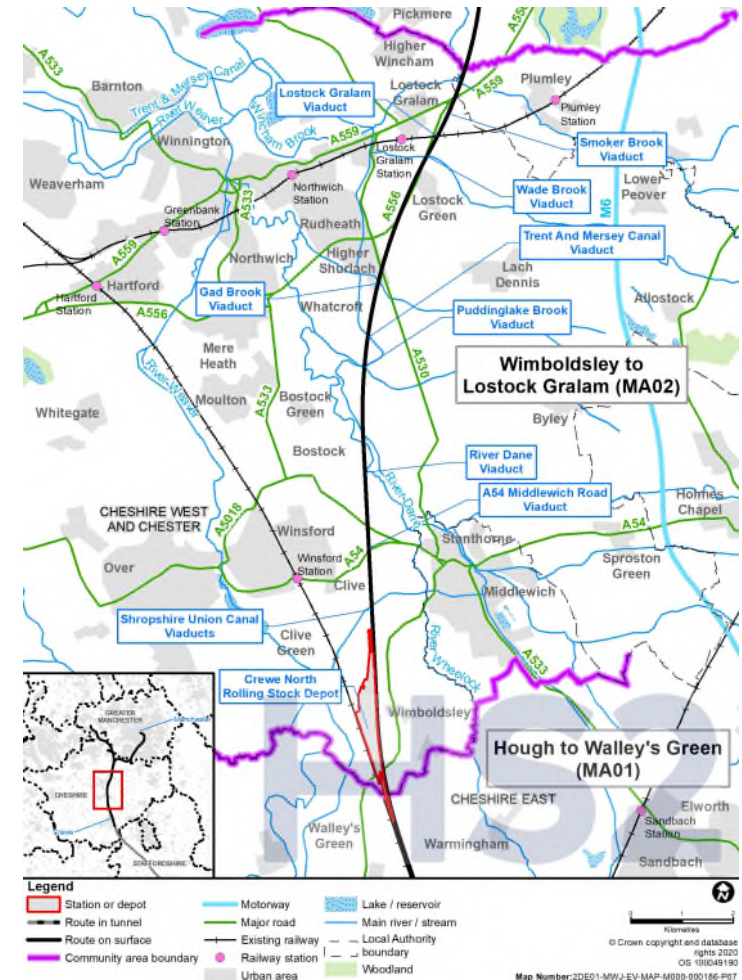
Wimboldsley to Lostock Gralam (MA02)

Main design elements:

- Northern section of the Crewe Northern Connection to the WCML (NPR provision)
- Crewe North Rolling Stock Depot and Infrastructure Maintenance Base – Rail (IMB-R)
- A54 Middlewich Road realignment and A533 Northwich Road diversion
- Realignment of A556 Shurlach Road

Main AP1 changes:

- Additional highways works (A54/M6 J18, A54/B5308 in Holmes Chapel, A54/A530 Croxton Lane in Middlewich)



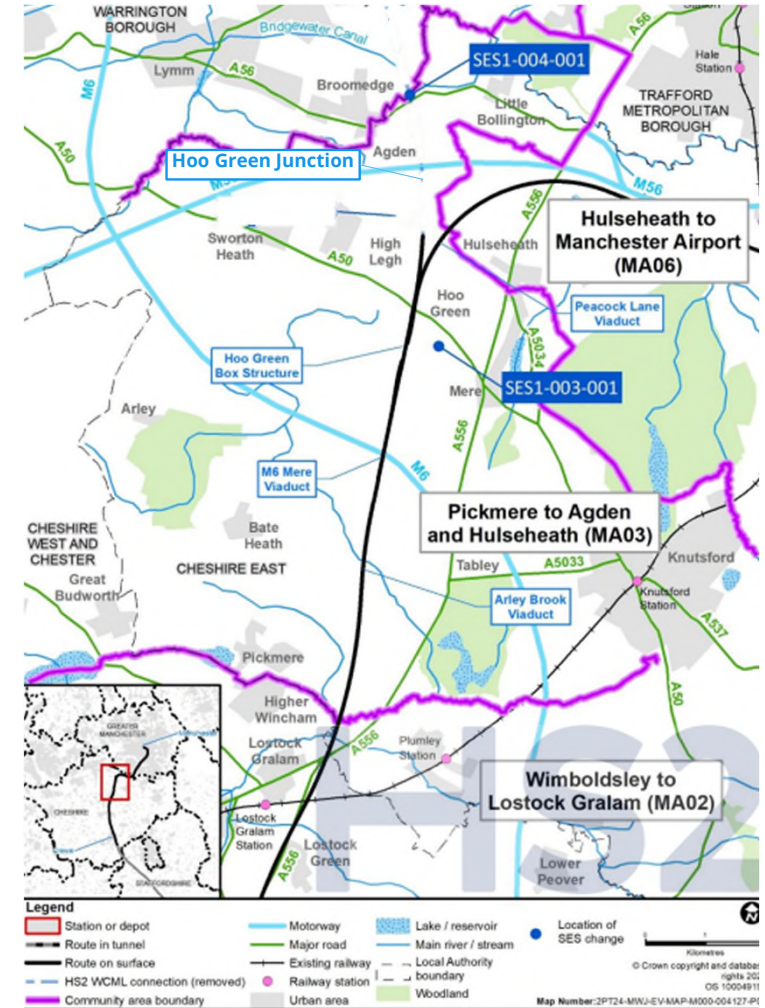
Pickmere to Agden & Hulseheath (MA03)

Main design elements:

- Hoo Green grade separated junction for future connection to WCML and Liverpool (NPR)
- Peacock Lane National Grid Supply Point
- Peacock Lane Auto Transformer Feeder Station

Main AP1 changes:

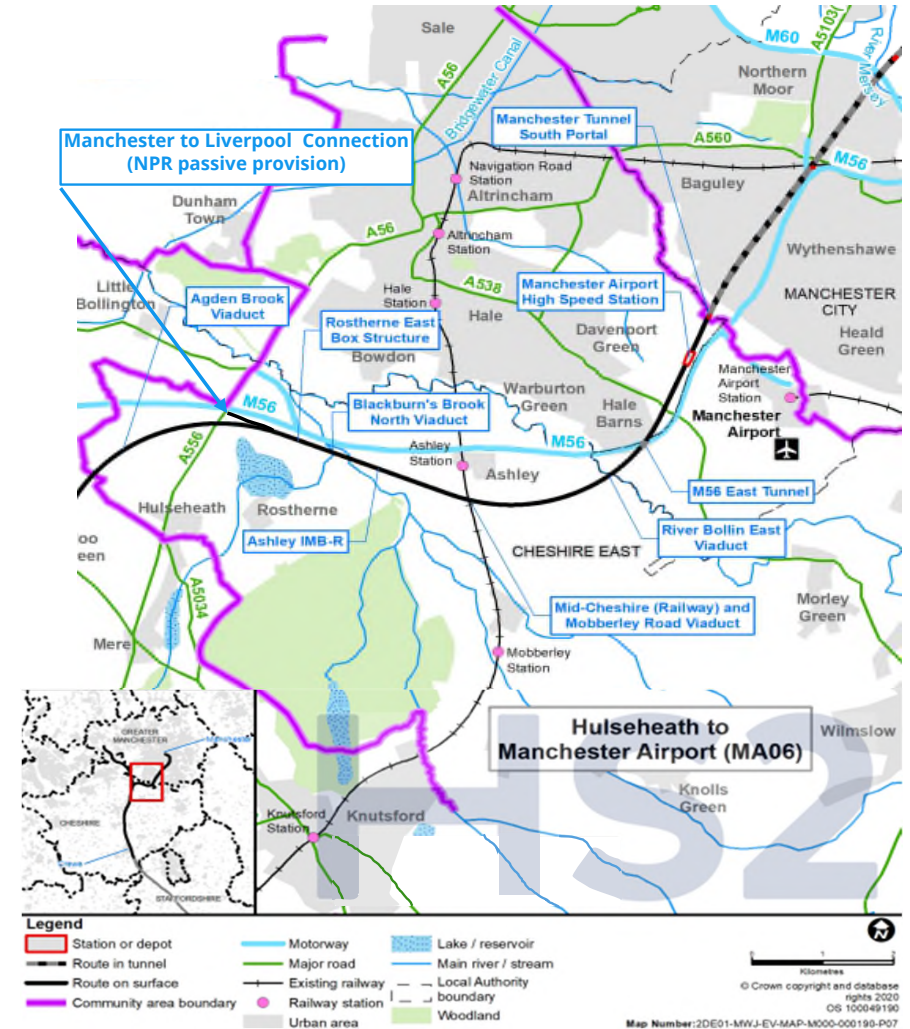
- Peacock Lane highway realignment



Hulseheath to Manchester Airport (MA06)

Main design elements:

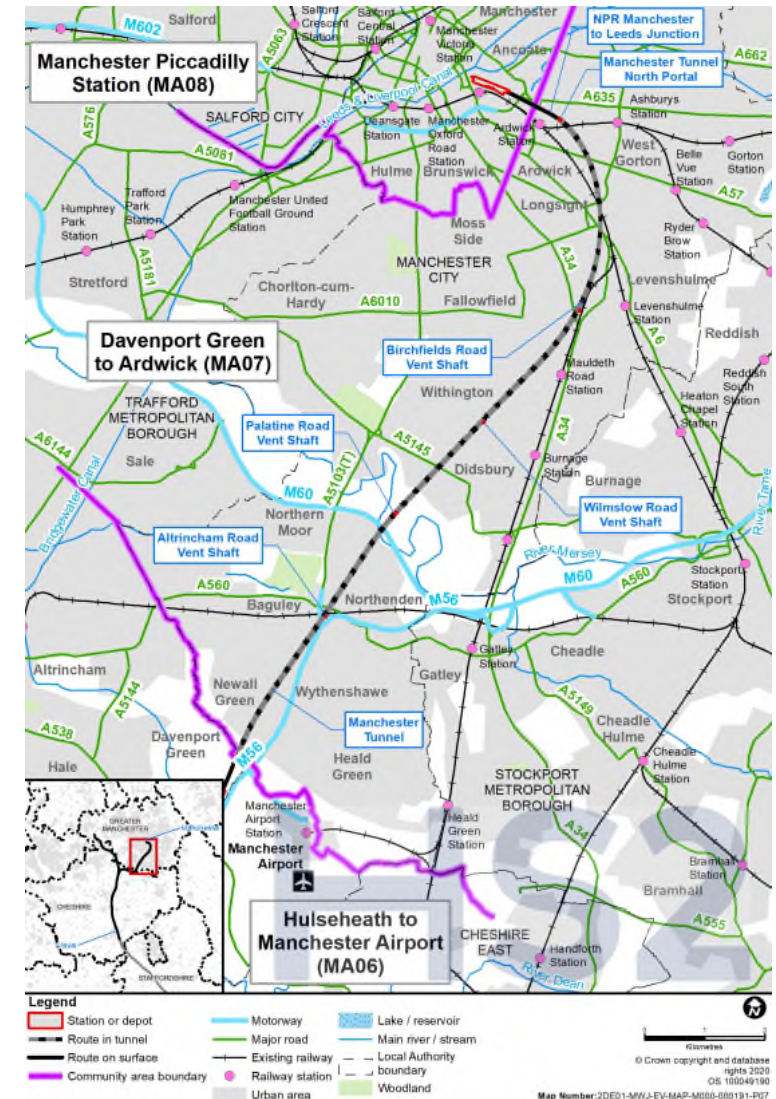
- Manchester Airport High Speed Station
- Metrolink provision at Manchester Airport HS Station
- Manchester to Liverpool Junction (NPR provision)
- Ashley Railhead (temporary – for construction only)
- Ashley IMB-R
- M56 Junction 6 modifications



Davenport Green to Ardwick Area (MA07)

Main design elements:

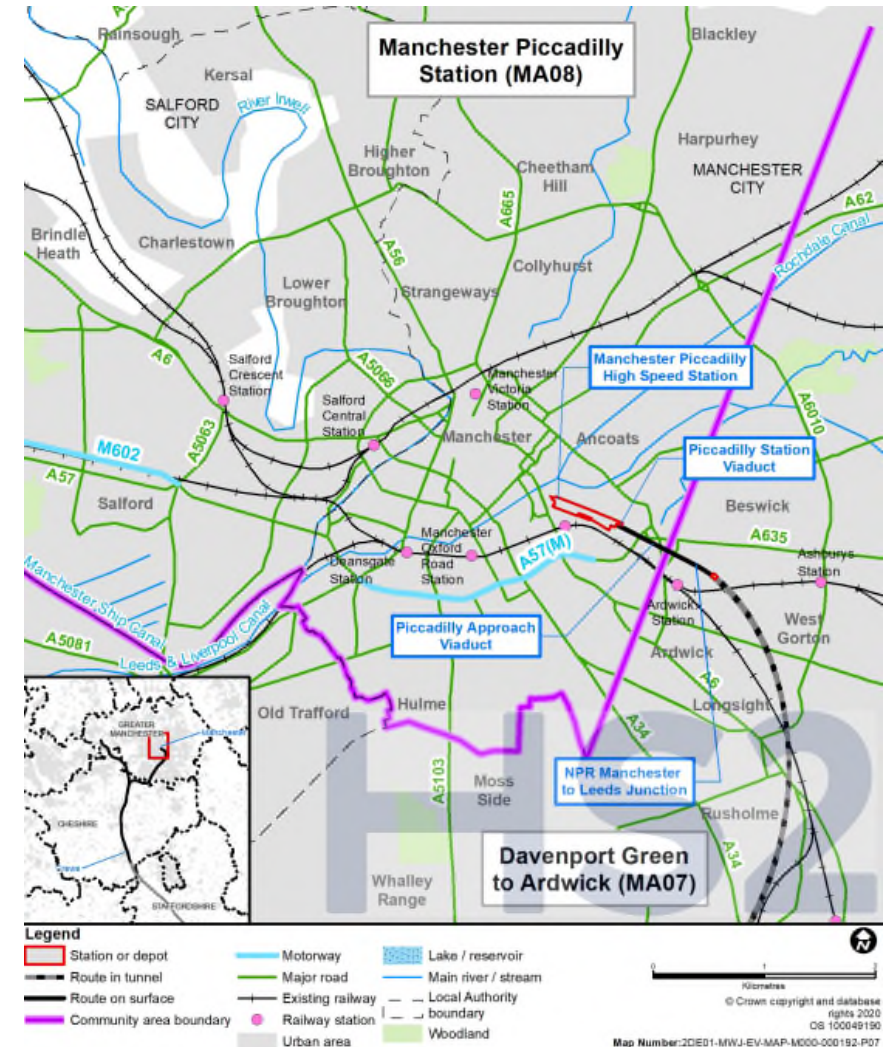
- Manchester Tunnel (12.8km)
- Manchester Tunnel South Portal
- Manchester Tunnel North Portal
- 4 tunnel vent shafts (Altrincham Road, Palatine Road, Wilmslow Road, Birchfields Road)
- Leeds junction (NPR provision)



Manchester Piccadilly Station (MA08)

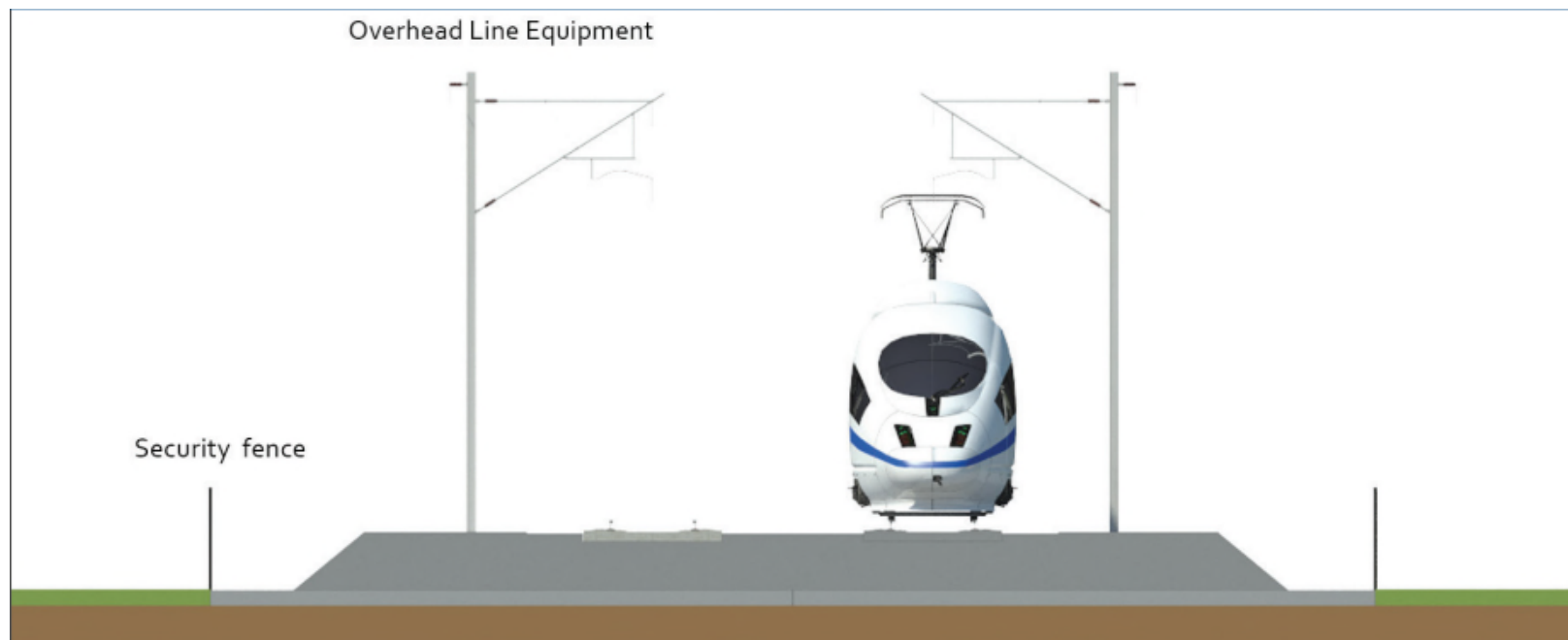
Main design elements:

- Manchester Piccadilly High Speed Station (approx. 6 ha)
- Manchester approach viaduct and station viaduct
- HS2 services between London/Birmingham and Manchester
- 6 platforms (inc. 2 for NPR provision)
- Future NPR services possible from Liverpool, Leeds and the North East
- 2,029 parking spaces

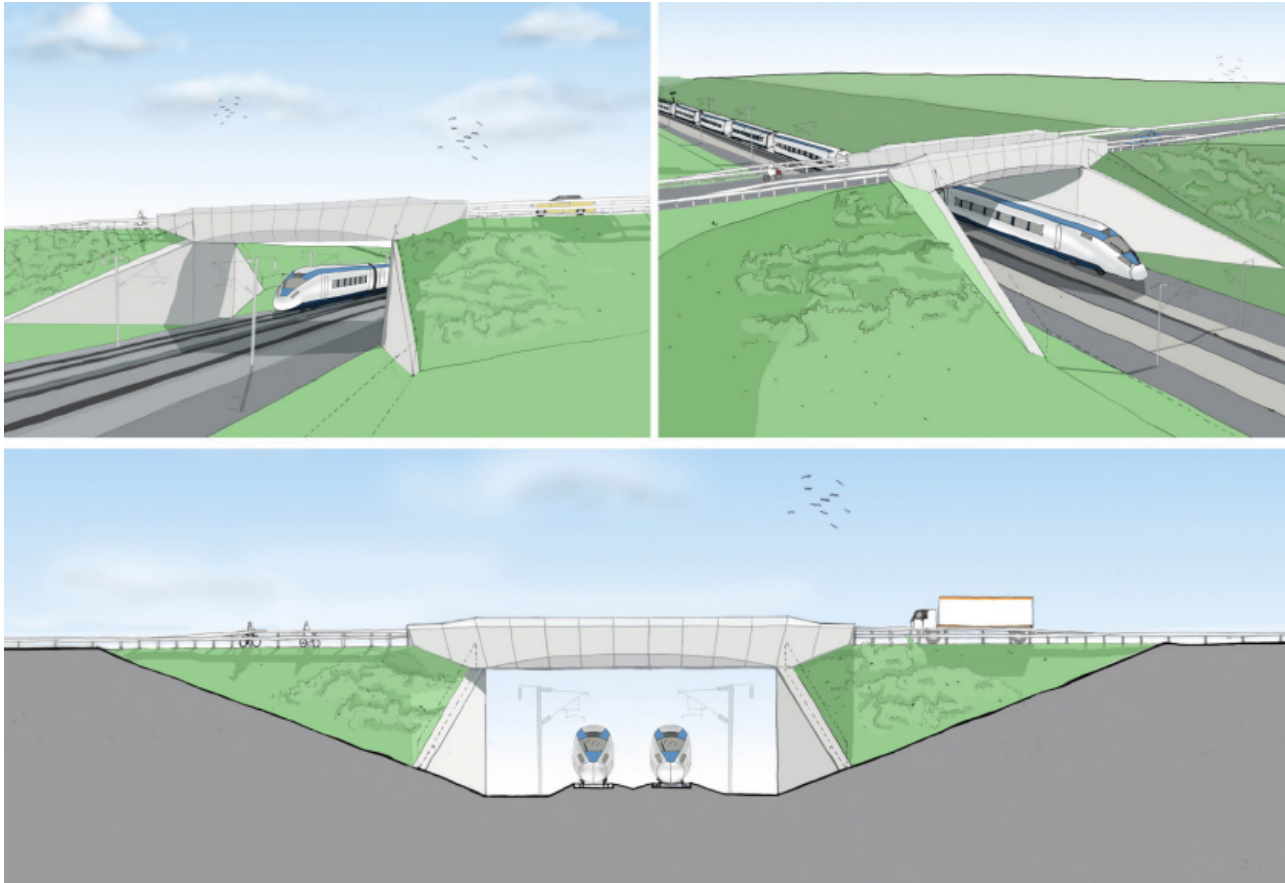


Rail Corridor

The HS2 route will typically accommodate two railway tracks (one northbound and one southbound) with an overall width of about 19 metres (excluding security fences). Overhead masts and frames will typically be 8m–9m high and spaced at 45m–55m intervals along the route.



Single span overbridge

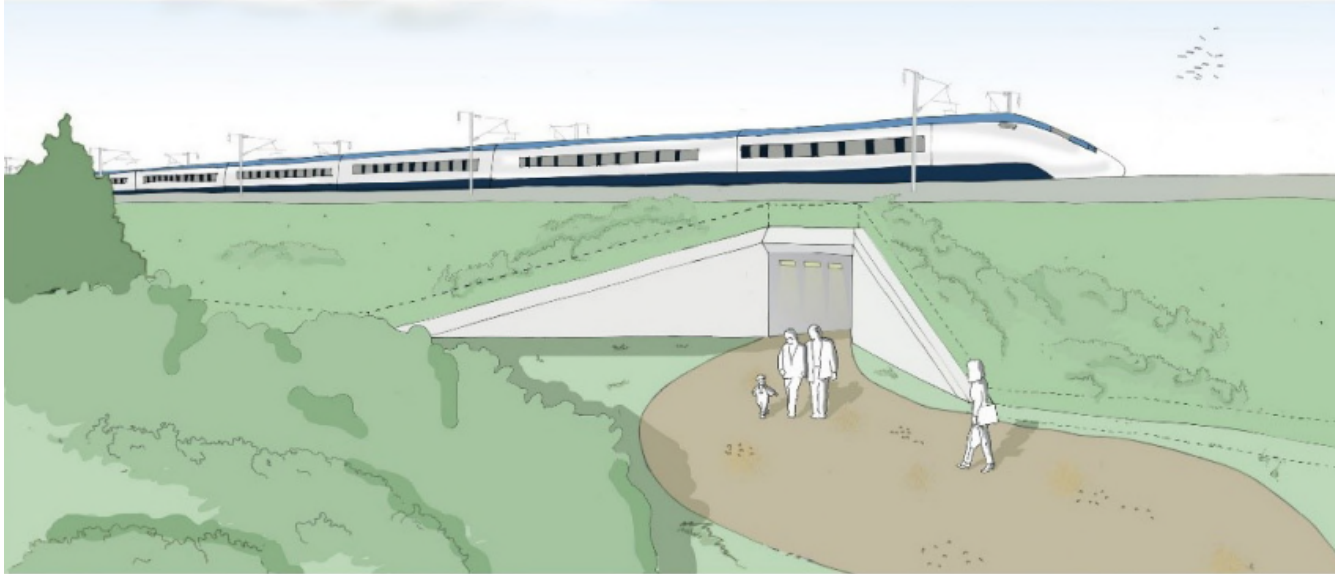


Overbridges are used to carry the following features over the railway:

- Public rights of way
- Roads
- Existing railways

Heights are determined by the route alignment, surrounding ground levels and the feature being crossed.

Single span underbridge



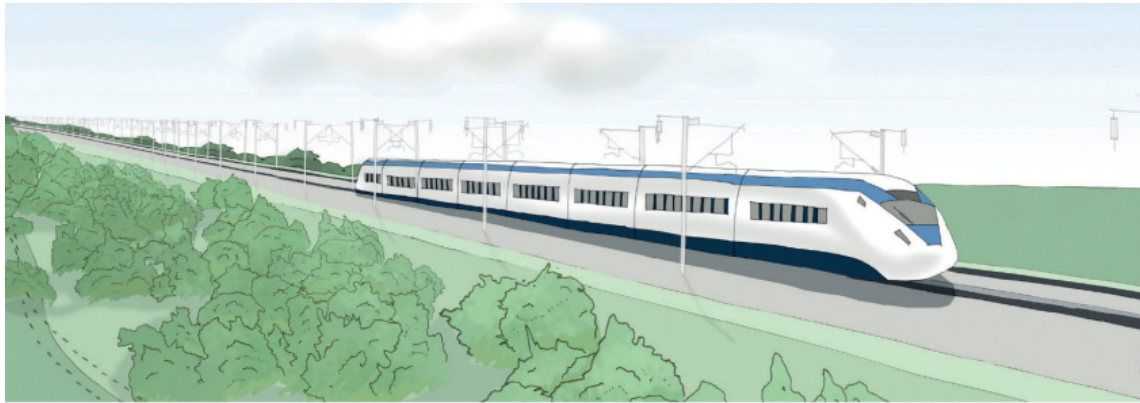
An underbridge is where the bridge sits underneath the HS2 railway corridor.

Illustrated left is an example of an HS2 pedestrian underbridge, where the HS2 route crosses a public right of way.

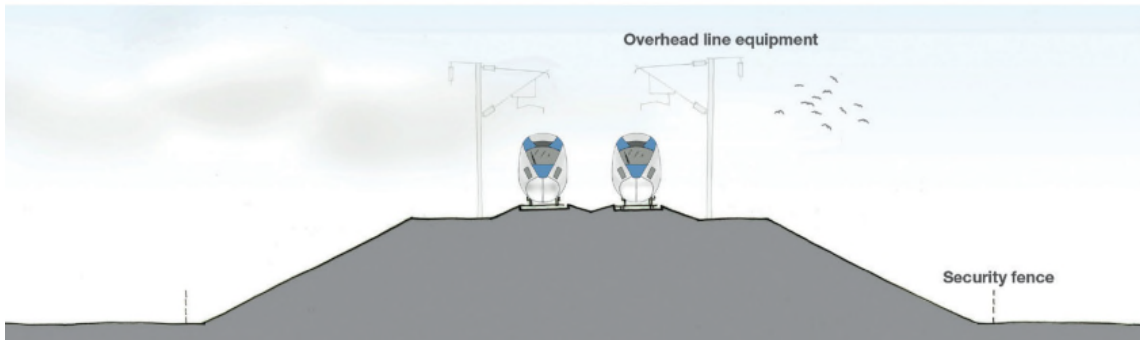


Embankments

Embankments are where the railway level is constructed above the existing ground level using compacted soils or rock material.



HS2 uses suitable material excavated from cuttings to construct embankments. This reduces the need to import material and serves to reduce traffic movements on the public highway.



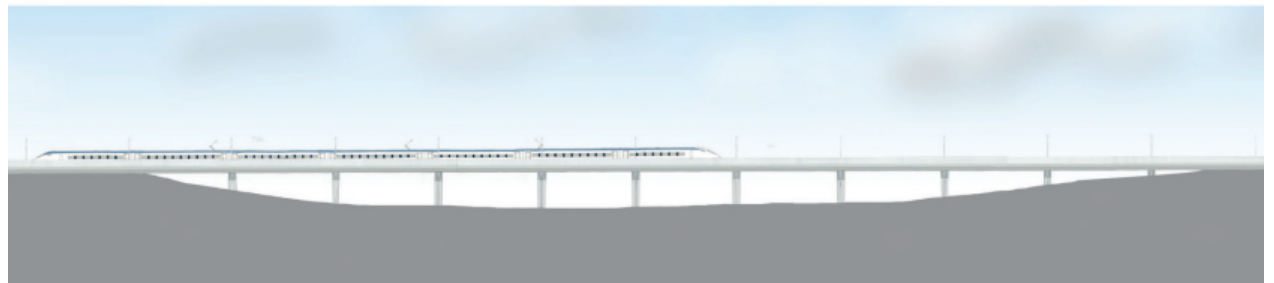
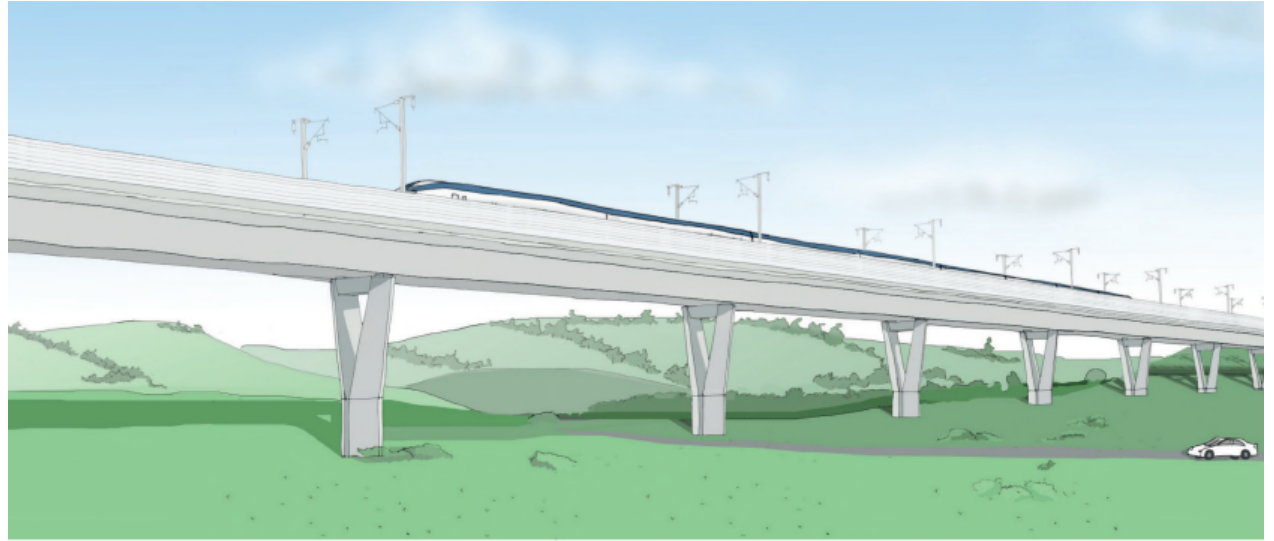
An example of an embankment is shown to the left. Also shown is an illustrative example of natural screening of the railway using shrubs and bushes.

Some locations will also have earthworks that mitigate noise or to help integrate the railway corridor into the natural landscape. This is achieved by having raised earth 'bunds' or mounds on one or both sides of the route.

Viaduct

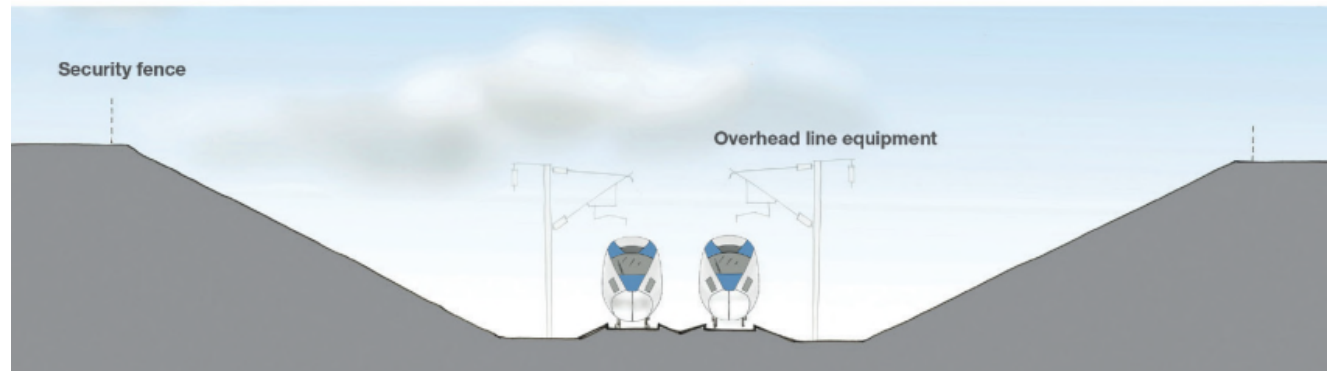
Viaducts are used where embankments are not practicable as well as for crossing existing land features such as:

- Public rights of way
- Roads
- Rivers
- Canals
- Floodplains
- Existing railways



Cuttings

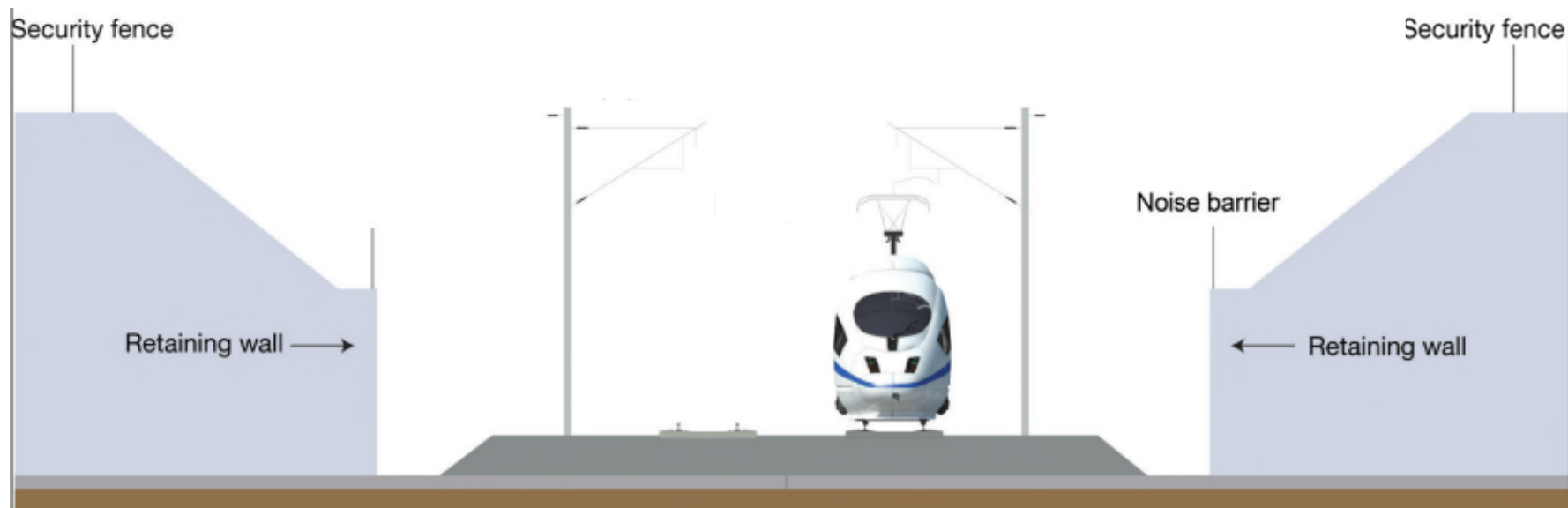
Cuttings are sections of the route where land has been excavated for the railway to pass through below ground level. An example of a cutting is shown to the right.



Retaining Walls

In some locations, retaining walls are proposed on one or both sides of a cutting to reduce the amount of land required for the railway corridor, as shown indicatively below.

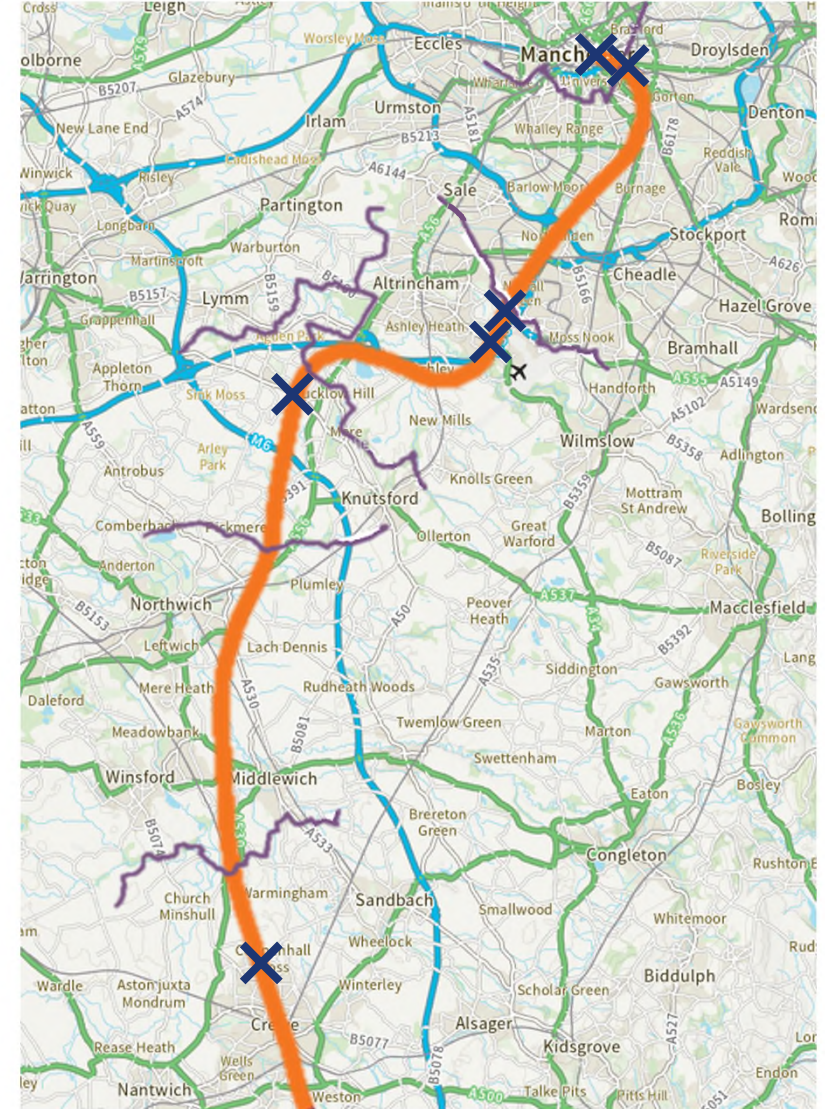
Retaining walls are built to prevent the earth at the side encroaching on the tracks, where otherwise the angle of the cutting slope would be too steep to be left naturally or space either side of the railway is limited.



Main Construction Compounds

- Coppenhall Moss – MA01
- South-West of Hoo Green – MA03
- East of Hale Barns and East of Davenport Green – MA06
- East of Ardwick Station – MA07
- Adjacent to Manchester Piccadilly station – MA08

The location of satellite construction compounds is shown on the plans in the Environmental Statement.



Haul Roads

- Internal site haul roads will be used to reduce the need to transport materials on the public highway network.
- In order to manage the transportation of construction materials efficiently on the public highway network, transfer nodes will be used as points where bulk materials enter or leave construction sites.

Construction Sidings

Temporary sidings will be required to handle construction materials.

The sidings will be connected to the existing railway network to allow excavated materials to be exported via the rail network.

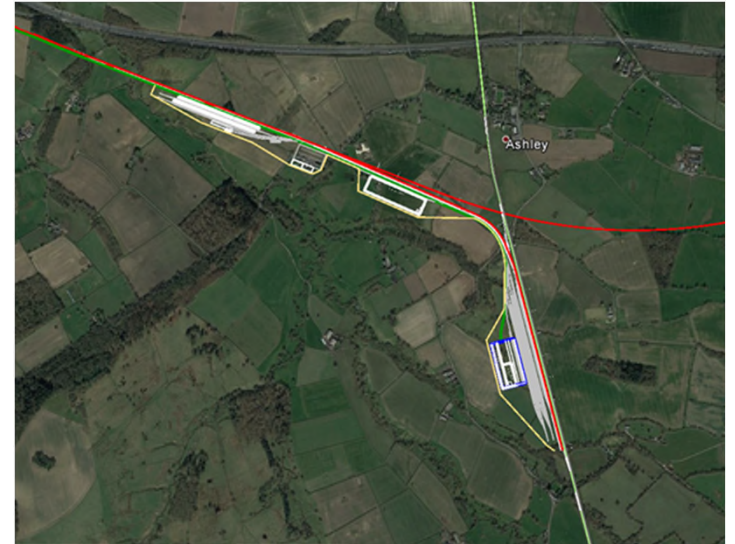
Construction sidings will be located in **Crewe** in the Wimboldsley to Lostock Gralam area (MA02) and **Ardwick** in the Davenport Green to Ardwick area (MA07).

Railhead

A construction 'railhead' will be located at **Ashley** in the Hulseheath to Manchester Airport area (MA06). Following completion of construction, the railhead will be decommissioned, and the site restored.

A Railhead is a site at a strategic location along the HS2 route with a connection to the existing rail network, used as the delivery/base location for bulk rail-borne materials such as ballast, slab, rails and sleepers required for the construction of the railway tracks, signals, and electrification systems for the proposed scheme.

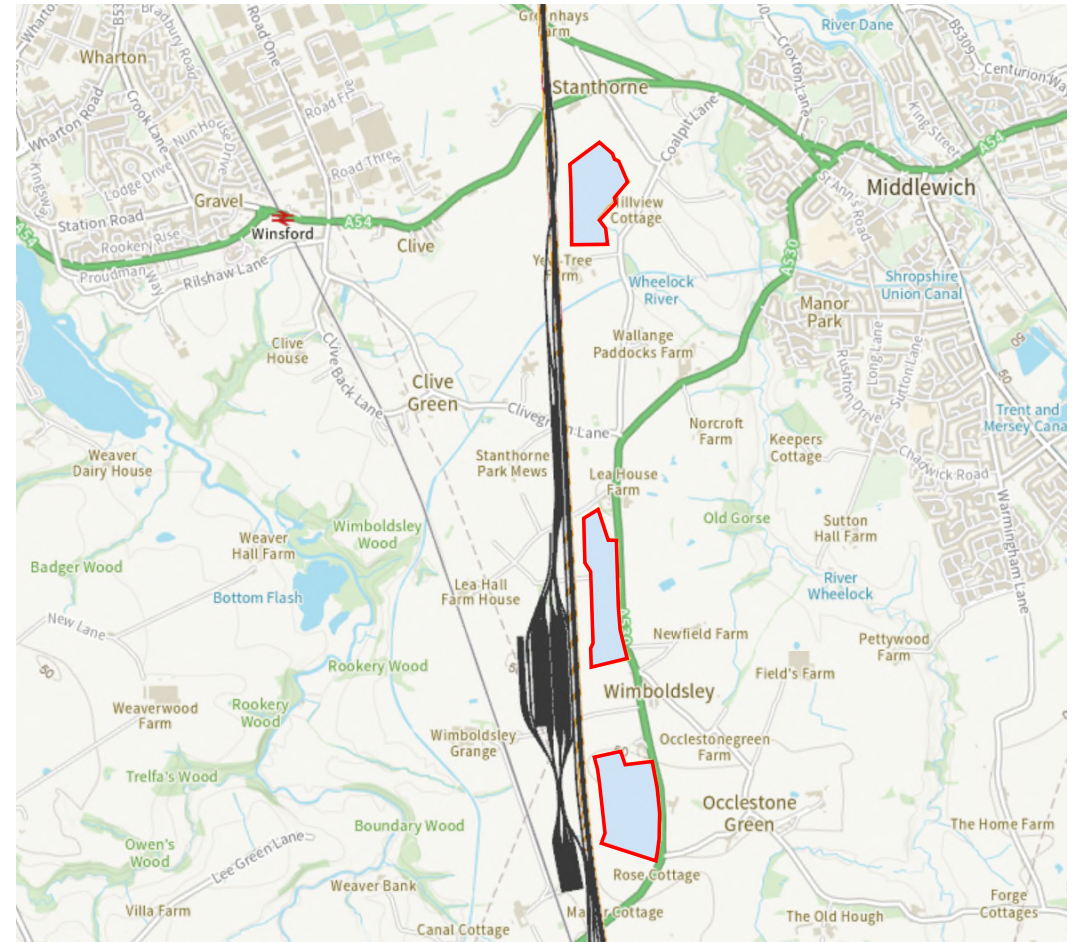
Facilities at the railhead will include offices, welfare facilities, storage areas, workshops, a rail marshalling yard, a pre-assembly area and car parking areas.



Borrow Pits

A shortfall of material suitable for embankments is predicted in the Wimboldsley to Lostock Gralam area (MA02).

In order to meet this shortfall whilst minimising the need to import the required material from existing quarries, powers to work three 'borrow pits' have been included for the proposed scheme. This enables excavated material to be transported via site haul road and reduces the impact of the scheme on the public highway network.



Utility Works

Utility works are required for:

- New utility services for the construction of HS2
- New utility services for the operation of HS2
- Diversions to remove clashes with HS2 infrastructure
- Diversions to enable ongoing utility maintenance
- Protection works
- Decommissioning of redundant supplies
- Works as a result of realigning existing transport infrastructure



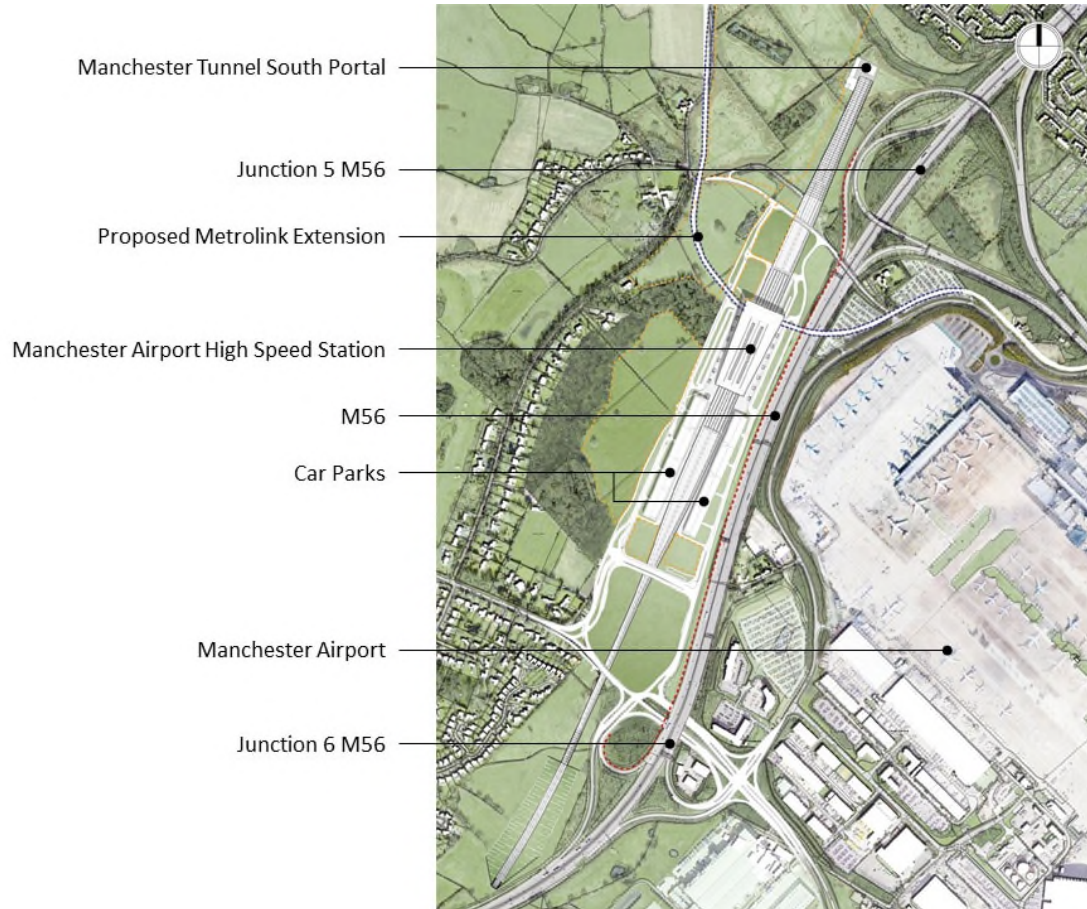
Power supply



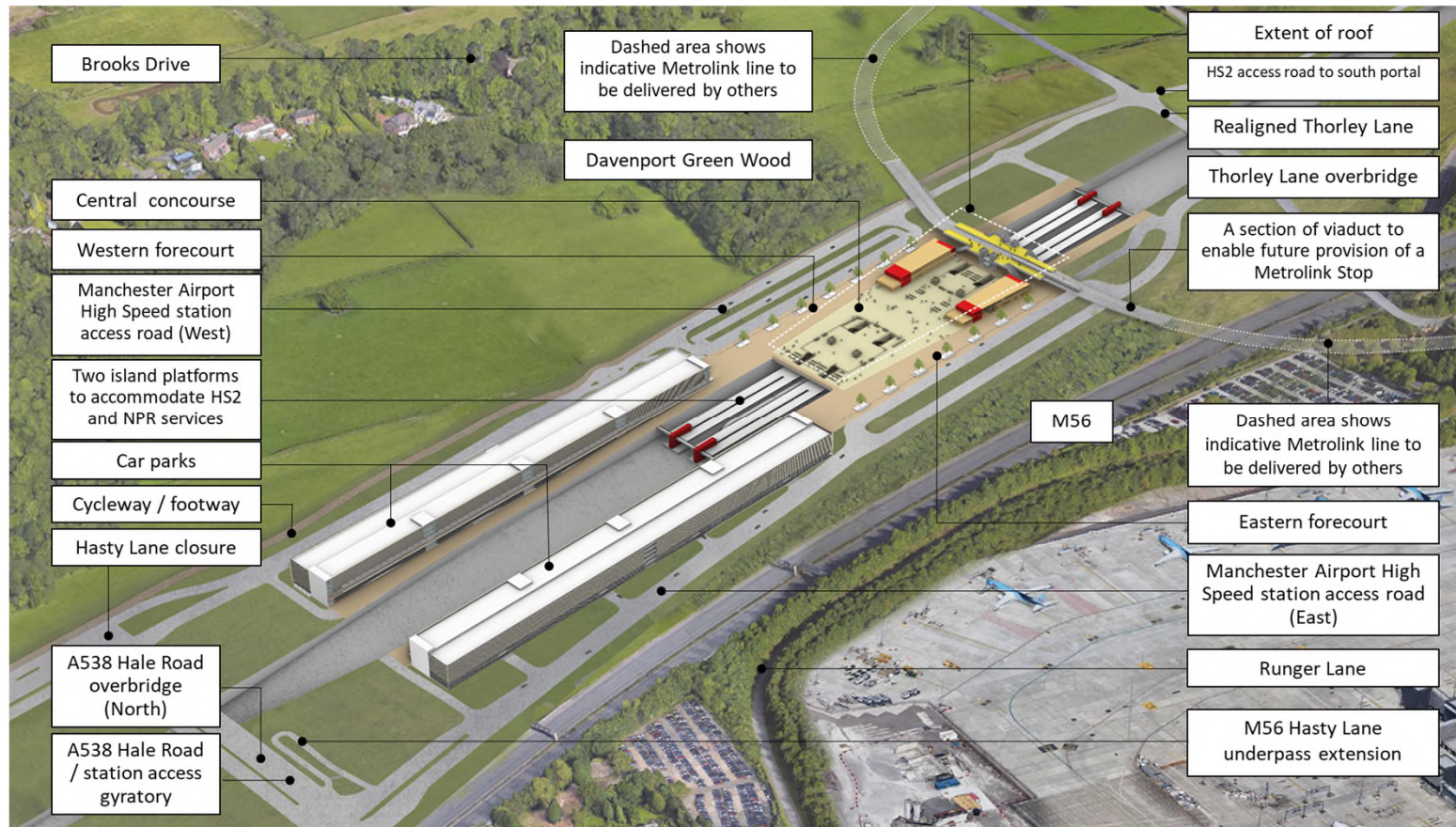
- Electrical power for the Proposed Scheme will be provided from a National Grid supply point to auto-transformer feeder station at Peacock Lane.
- The auto-transformer feeder station will occupy an area of approximately 2.75ha and will require road access for maintenance purposes.
- Auto-transformer sites will be required at regular intervals along the route of the Proposed Scheme. Each site will require an area of approximately 0.3ha and road access for maintenance purposes.

Manchester Airport High Speed Station

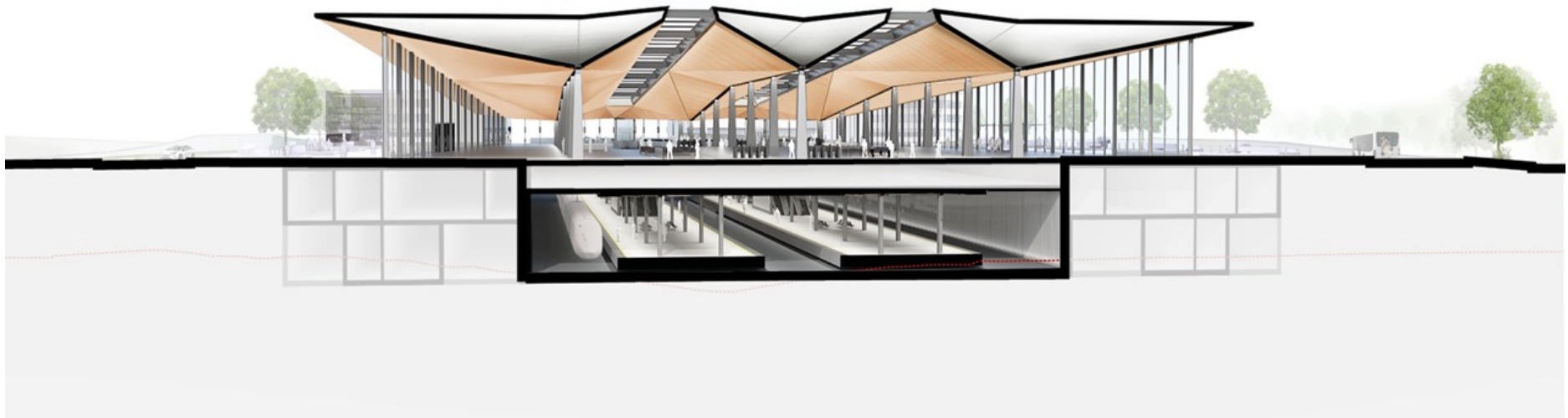
- 4 Platforms (2 for future NPR services)
- HS2 services between London/Birmingham and Manchester
- Provision made for future NPR services
- Approx. 1km from the Airport Terminal
- Provision for future Metrolink services and local bus services
- 3,818 parking spaces



Manchester Airport High Speed Station - Visualisation

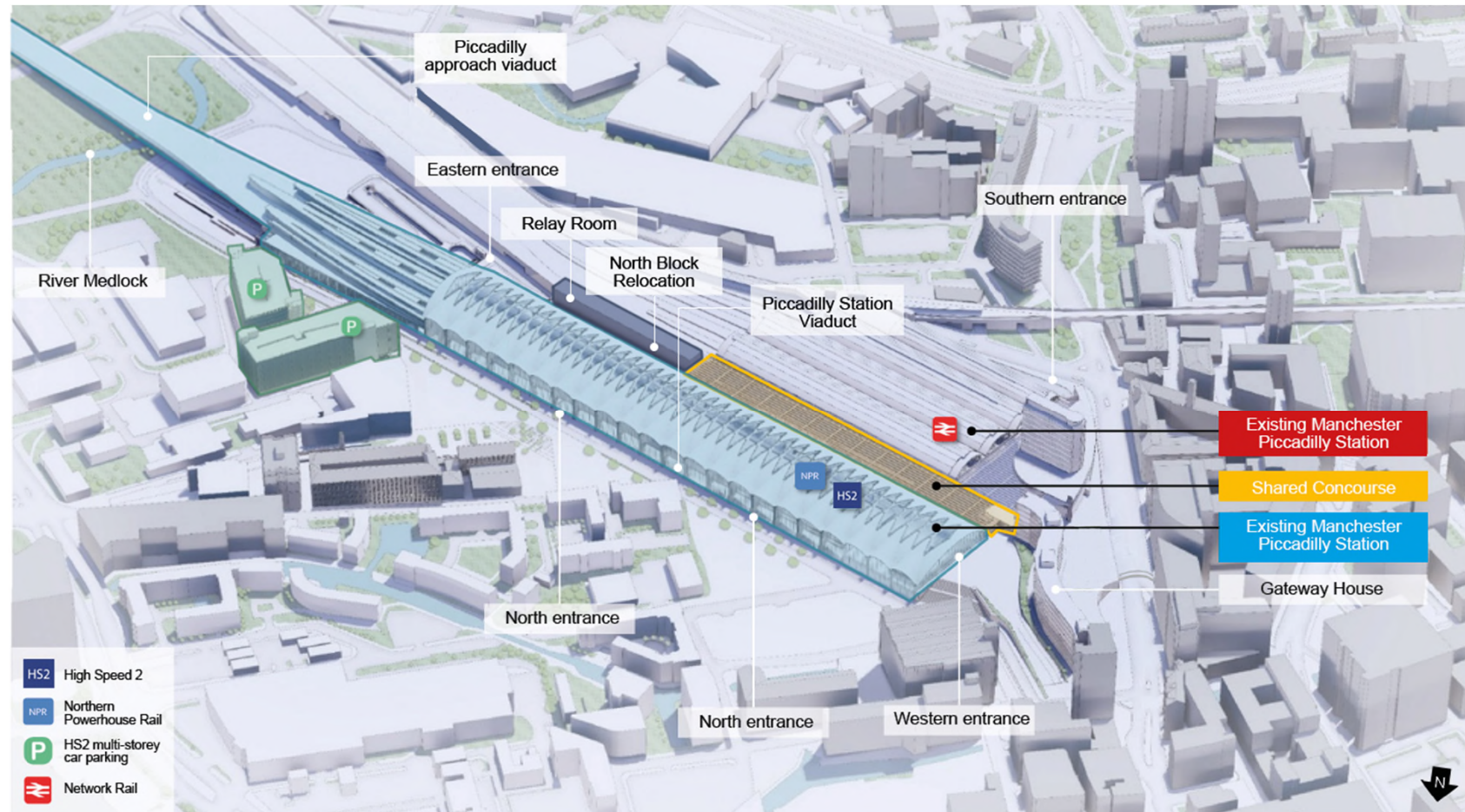


Station Cross Section

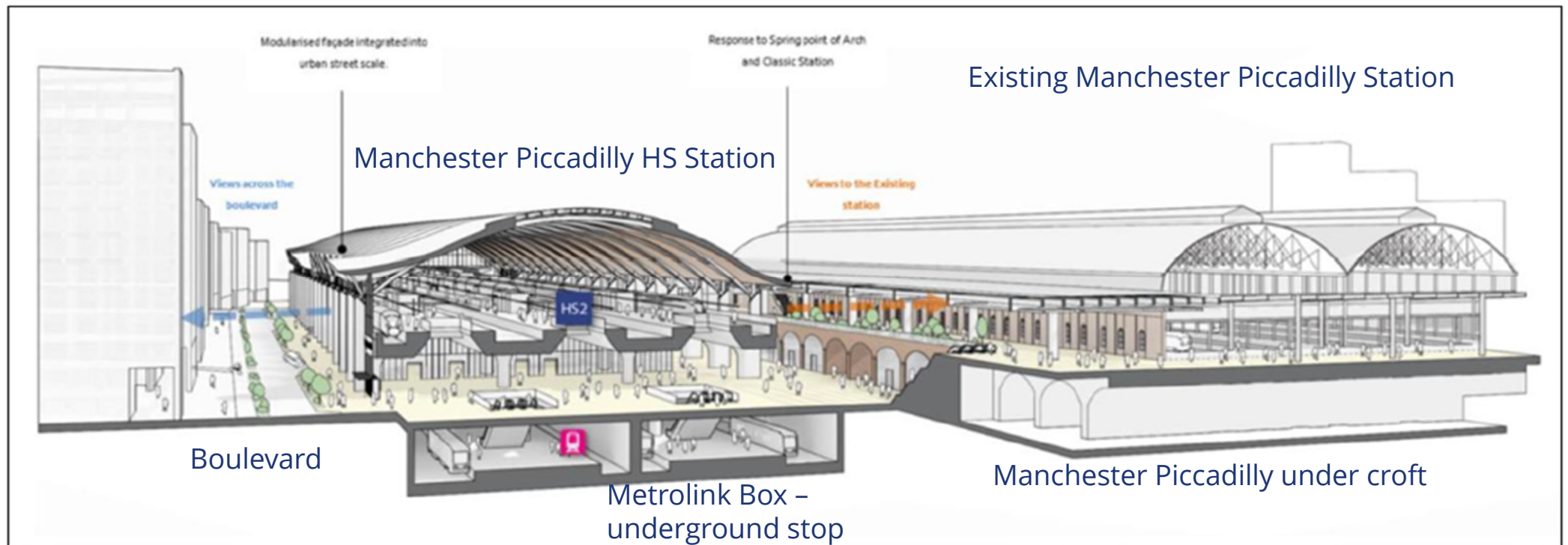


Illustrative conceptual cross-section design of HS2 Manchester Airport Station.

Manchester Piccadilly Station



Manchester Piccadilly Area Illustrative Cross-section



Western Entrance



High Speed Station – Mezzanine View



Northern Entrance and New Sheffield Street

