



Department
for Transport

High Speed Two: From Crewe to Manchester, West Midlands to Leeds and beyond

Phase 2b Route Decision

Moving Britain Ahead

July 2017



High Speed Two: From Crewe to Manchester, West Midlands to Leeds and beyond Phase 2b Route Decision

Presented to Parliament
by the Secretary of State for Transport
by Command of Her Majesty

July 2017

CORRECTION SLIP

Title: High Speed Two: From Crewe to Manchester, West Midlands to Leeds and beyond Phase 2b Route Decision

Session: 2017/Current

Cm 9479

ISBN: Print ISBN 9781474145978 Web ISBN 9781474145985

Correction:

A drafting error in paragraph 2.7.46 means that the 81 percent figure is incorrect, this figure related to the percentage decrease in the total number of demolitions (not the number of properties eligible for compensation), it had also been calculated from a previous version of HS2 Ltd's advice. The correct figure for the reduction in properties eligible for statutory compensation and non-statutory property schemes is **41** percent. This does not include figures for the Need to Sell scheme which has no geographic boundary and is judged on a case by case basis. Therefore the text of the document has been changed to include the wording '**distance bound** non-statutory property schemes'.

Text currently reads:

Overall the M18 / Eastern route leads to a reduction in the number of properties that would fall into safeguarding, and results in 90 fewer demolitions than the 2013 consulted route. The M18 / Eastern route has an 81 percent reduction in the total number of properties that would be eligible for statutory compensation and non-statutory property schemes compared to the Meadowhall alignment.

Text should read:

Overall the M18 / Eastern route leads to a reduction in the number of properties that would fall into safeguarding, and results in 90 fewer demolitions than the 2013 consulted route. The M18 / Eastern route has a 41 percent reduction in the total number of properties that would be eligible for statutory compensation and distance bound non-statutory property schemes compared to the Meadowhall alignment.

Month of correction: December 2017



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This publication is available at www.gov.uk/government/publications

Print ISBN 9781474145978

Web ISBN 9781474145985

ID P002882633

07/17

Printed on paper containing 75% recycled fibre content minimum

Printed in the UK by the Williams Lea Group on behalf of the Controller of Her Majesty's Stationery Office

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Foreword



Today marks an important step forward for High Speed Two (HS2). We have reached the award of stage 1 of the main civil engineering contracts for the route from London to the West Midlands (Phase One). We have deposited the next hybrid Bill in Parliament seeking powers to build the route from the West Midlands to Crewe (Phase 2a). And we have confirmed the remainder of the route, from Crewe to Manchester and from the West Midlands to Leeds (Phase 2b).

Britain pioneered the railway in the 19th century. It is a testament to the vision of the Victorian innovators who went before us that we still use the network they established today. But we cannot rest on their legacy when our railways are ageing and, as passengers will know, face overcrowding and capacity problems.

Poor connectivity between the cities and regions of the Midlands and the North is restraining economic growth. We need high quality transport to allow businesses to grow, work together and access a wide range of customers, suppliers and skilled labour markets.

HS2 will become the new backbone of our national rail network. It will increase capacity on our congested railways and improve connections between our biggest cities and regions. It will support our Industrial Strategy, generating jobs, skills and economic growth to help us build an economy that works for all.

Even if you never travel on HS2, you stand to feel its benefits. By providing new routes for intercity services, HS2 will free-up space on our existing railways for new commuter, regional and freight services, while also taking lorries off our roads. It will provide new options for services to towns which currently do not have a direct connection to London, and it will create thousands of local jobs and apprenticeships. The contracts awarded today are expected to support 16,000 jobs across the country, and generate 7,000 contract opportunities in the supply chain, for which two thirds will go to small and medium enterprises.

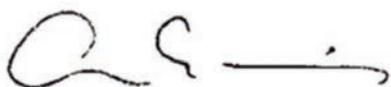
In November last year, the Government confirmed the majority of the Phase 2b route from Crewe to Manchester in the West, and from Birmingham to Leeds in the East, with junctions to the existing network. A consultation was also launched on seven route refinements to seek the views of the communities and interested parties. The response to the public consultation has seen almost 7,000 people taking the time to give us their views and I am grateful to everyone who took the time to respond. Every response has been reviewed and the views expressed taken into consideration as we further develop our plans for the railway.

Phase Two will extend the High Speed network from Birmingham to Manchester and Leeds (a total of 209 miles), with connections allowing HS2 trains to continue to other cities including Newcastle, Edinburgh and Glasgow. It will significantly reduce journey times to the North and Scotland, and dramatically improve connectivity between the Midlands and the North, supporting growth and regeneration, and bringing new opportunities to millions of people, providing better access to jobs and markets as well as increase freight capacity in some locations on the existing rail network.

This Command Paper sets out the Government's response to the consultation and my decisions on the seven refinements proposed for the Phase 2b Crewe to Manchester and West Midlands to Leeds route. This, together with confirmation of the majority of the route announced last November, provides the route to be prepared for a hybrid Bill for the whole of Phase 2b. There is one further change on which we are now consulting, namely an alternative site for the Eastern Leg Rolling Stock Depot.

I recognise that building major infrastructure will always be disruptive and disturbing for those living nearby and I am very mindful of the concerns of communities. My Department and HS2 Ltd will continue to work closely with those affected communities and their local authorities up and down the line of route and I expect people to be treated with fairness, compassion and respect. In addition to the property schemes currently operating for Phases One and 2a, I am pleased to today confirm a range of property schemes for Phase 2b that will go over and above what is required by law and give assistance to those who will be adversely affected by the railway.

This Government is investing in world class infrastructure to ensure that the United Kingdom can compete on the global stage. HS2 is an ambitious and exciting project and we are seizing the opportunity it offers to transform our country for generations to come.

A handwritten signature in black ink, appearing to read 'Chris Grayling', with a horizontal line extending to the right.

The Rt Hon Chris Grayling MP
Secretary of State for Transport

The case for HS2

The key objectives of HS2 are to:

- Provide sufficient capacity to meet long term rail demand and to improve resilience and reliability across the network
- Improve connectivity by delivering better journey times and making travel easier
- Boost economic growth across the UK

As part of the Phase 2a Outline Business Case (OBC) and updated Phase 2b Strategic Outline Business Case (SOBC), HS2 Ltd has carried out an economic appraisal of the expected costs, benefits and revenues for HS2. The benefit-cost ratio (BCR) for the HS2 network as a whole, including wider economic impacts, is calculated to be 2.3. This provides £92bn in total benefits to the UK as a whole.

For Phase 2b the November 2016 SOBC set out the most recent analysis of alternatives. Alternatives will be assessed again at Phase 2b's OBC stage. We have found no alternatives to Phase 2a or Phase 2b that could deliver the same level of benefit for the country, stand the test of time and provide the same level of capacity, connectivity and service that Phase Two does in pursuit of our strategic objectives.

Looking to the future, the Government sees ongoing growth in the importance of city centre employment and knowledge-based industries, where employees have a relatively high propensity for commuting and business travel by rail. This reinforces the Government's view that HS2 is the right transport intervention to boost productivity and the economy in general, and support the Northern Powerhouse in particular.

Phase 2b unlocks the full benefits of HS2. It doubles the number of places served compared to Phase One. It allows significant increases in capacity, and transformational reductions in journey times between the Midlands and the North, as well as to London. Some of the biggest journey time reductions are on the Eastern Leg between Leeds, York, Newcastle, Sheffield, the East Midlands and Birmingham.

Executive summary

1. In November 2016, the Government published the *High Speed Two: From Crewe to Manchester, the West Midlands to Leeds and beyond*¹ Command Paper confirming the majority of the Phase 2b route.
2. At the same time, the Government also launched a consultation to seek the views of the public and gather information to allow the Secretary of State to make an informed decision on seven proposed changes to the Phase 2b route. The main consultation ran for 16 weeks from the announcement on 15 November 2016. The Government's proposals and questions were set out in the *High Speed Two Phase 2b Crewe to Manchester, West Midlands to Leeds Route Refinement Consultation 2016*² document. This was a national consultation and was open to all.
3. The Secretary of State is grateful to those organisations and members of the public who responded to the consultation. Some 6,920 responses were received on the proposed refinements to the Phase 2b route. An independent analysis of responses to the consultation was undertaken by Dialogue by Design and is available at www.dialoguebydesign.co.uk. HS2 Ltd's recommendations and analysis is available at: www.gov.uk/hs2
4. Today the Secretary of State has confirmed the remaining section of the Government's preference for the full Phase 2b after considering responses to the 2016 consultation. The Government remains committed to completing the HS2 Y network (which includes Phase One, Phase 2a and 2b). It plans to deposit the hybrid Bill for Phase 2b in Parliament in 2019 so that it can open in 2033.
5. This Government response document outlines:
 - A brief history of the issues surrounding each proposed change
 - The main themes raised in the responses to the consultation
 - HS2 Ltd's advice to the Government following review of the consultation responses and further design development work
 - The Secretary of State's decision

Further consultations

6. The Government is now consulting³ further on:
 - **A new location for the Eastern Leg Rolling Stock Depot** – a new proposal to relocate the Eastern Leg Rolling Stock Depot (ELRSD) to a site east of Leeds in the Aire Valley adjacent to the M1 on a brownfield site
 - **The Crewe Hub consultation** – to seek views to inform ongoing development of options to support a Crewe Hub and the business cases that would be required to take this forward
 - **The scope and methodology for the Phase 2b Environmental Impact Assessment (EIA) and Equalities Impact Assessment (EqIA)** – to seek views on how these critical parts of the hybrid Bill preparation will be carried out

¹ <https://www.gov.uk/government/publications/hs2-phase-2b-decision-document>

² <https://www.gov.uk/government/consultations/hs2-crewe-to-manchester-west-midlands-to-leeds-route-refinement-consultation-2016>

³ <https://www.gov.uk/hs2>

Timeline

HS2 Phase 2b requires a number of steps to be completed before any construction of the route can begin. The major milestones for the project are:

- Today – 2018: Design development and Environmental Impact Assessment (EIA)
- 2018: Expected consultation on working draft EIA, EqIA and potential Route Refinements
- 2019: Phase 2b hybrid Bill deposit
- 2022: Royal Assent
- 2023: Construction begins
- 2033: Operations begin

Summary of decisions

In November 2016, Government confirmed the majority of the HS2 Phase Two route (Phase 2b) and completed its response to the 2013 Consultation. In seven specific areas, a new consultation on proposed changes was launched.

The Secretary of State has today reached decisions on the proposed changes which were consulted on in November 2016. These decisions draw on the evidence prepared ahead of the consultation, on consultation responses on other input from stakeholders, and on further analysis undertaken in light of these responses.

The Secretary of State's decision is to confirm six of the seven changes included in the November 2016 consultation:

- Relocating the Western Leg Rolling Stock Depot (RSD) – moving the RSD from a site near Golborne to a site north of Crewe between the A530 Nantwich Road and the West Coast Main Line (WCML) near Wimboldsley
- Changing the alignment over a 26km length of route in the Middlewich-Northwich area of Cheshire, raising the route as it passes through the Cheshire salt caverns to avoid brining and gas storage infrastructure
- Changing the alignment of the route on the approach to Manchester Piccadilly station to improve the operational efficiency of the station and avoid direct residential impacts and a primary school
- Changing the route near East Midlands Airport, so the route follows the eastern side of the A42 more closely, avoids a tunnel under the airport, does not cross the A42, and reduces the impacts on some communities
- Locating the route through Long Eaton on a high level viaduct through the town immediately adjacent to the existing low-level rail corridor
- The re-alignment of the route between Derbyshire and West Yorkshire. The route in South Yorkshire will be the route consulted in 2016 which in part follows the M1 and M18, serves Sheffield City Centre via a spur from the HS2 line and includes provision for a northern junction allowing trains to run between Sheffield and Leeds city centres using HS2

The Secretary of State has decided not to proceed with the proposed change of route at Measham, which would have seen the alignment move to the east of Measham, away from the A42. Instead, the Secretary of State is confirming a modified version of the 2013 Preferred Route to the west of Measham. In Measham itself, the route is moved approximately 80m further east from the 2013 Preferred Route and viaduct extended from 145m to 600m to mitigate commercial property impacts.

1 Introduction

1.1 Background

- 1.1.1 High Speed Two (HS2) is the new high speed railway proposed by the Government to connect major cities in Britain. It will be built in phases. Phase One will see a new high speed line constructed from Euston to north of Birmingham, where it will re-join the existing West Coast Main Line (WCML). New high speed trains will serve Birmingham City centre and an interchange station designed to serve the wider West Midlands. At Old Oak Common in West London, a new interchange will be built connecting HS2 with Crossrail and the Great Western Main Line. Phase One will be built and operational by 2026.
- 1.1.2 In the November 2015 Command Paper: High Speed Two: East and West, the Next Steps to Crewe and Beyond, the Government announced its intention to accelerate the delivery of the section of Phase Two between the West Midlands and Crewe (Phase 2a). At the northern end it will connect with the WCML to the south of Crewe to allow HS2 services to join the WCML and call at Crewe Station. Phase 2a is expected to be built and operational by 2027 (subject to parliamentary approval of the Phase 2a hybrid Bill).
- 1.1.3 In November 2016, the Government published *High Speed Two: From Crewe to Manchester, the West Midlands to Leeds and beyond*. This confirmed the majority of the Government's preferred route for Phase 2b of HS2, completing the full Y network.
- 1.1.4 Following the previous public consultation on Phase Two (referred to as the 2013 Consultation), HS2 Ltd had further developed the scheme and recommended a number of refinements to the route in order to respond to concerns raised at consultation, as well as other factors. In most cases these refinements were relatively minor and did not result in impacts on new communities, or substantially different impacts on communities than the route proposed in the 2013 Consultation. The responses to the 2013 Consultation can be found at: <https://www.gov.uk/government/consultations/hs2-phase-two-proposed-line-of-route-from-west-midlands-to-manchester-and-leeds>.
- 1.1.5 However, in seven areas where the proposed refinements were substantial, the Secretary of State launched a further consultation in November 2016 to seek the views of communities and other interested parties. Having considered the responses to that consultation, the Secretary of State is now in a position to confirm the full Phase 2b route by taking decisions on the seven areas where proposed route refinements were put forward. The individual decisions are detailed in the Route Decision section.
- 1.1.6 In November 2016, the Government also launched a consultation on property compensation schemes, *High Speed Two Phase 2b Crewe to Manchester, West Midlands to Leeds Property Consultation 2016*. The Government's decisions following this consultation are addressed in a separate document⁴

⁴ <https://www.gov.uk/government/consultations/hs2-crewe-to-manchester-west-midlands-to-leeds-property-consultation-2016>

1.2 Developing the Phase 2b section of the Y network

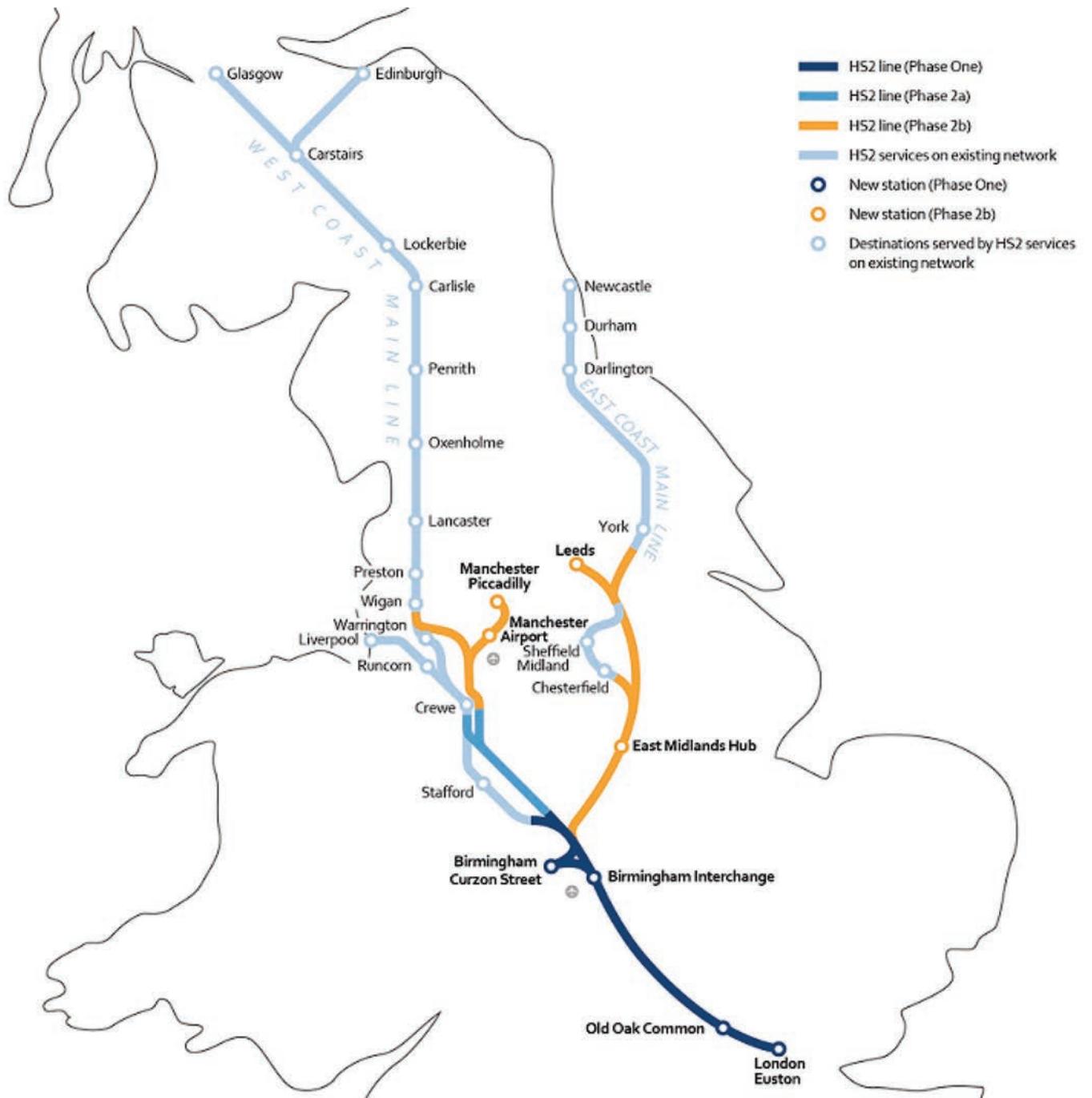
- 1.2.1 The concept of the Y shaped network was endorsed following a consultation in 2011⁵, which also sought views on the route of Phase One between London and Birmingham. The Government then instructed HS2 Ltd to begin development of route options for the Y Network with the following key requirements:
- To serve Manchester, Leeds, South Yorkshire and East Midlands
 - To improve journey times to other destinations
 - To include connections to the classic network
 - To consider connectivity to major airports

1.3 Making a route decision

- 1.3.1 Following the November 2016 consultation, HS2 Ltd has continued to develop its proposals for Phase 2b to take account of:
- Responses to the consultation
 - Feedback gathered from communities and stakeholders gathered during the 2016 consultation Information Events
 - Ongoing engagement with communities and other interested parties such as local authorities, environmental bodies, Network Rail, Highways England, Midlands Connect and Transport for the North (TfN)
 - Lessons learnt from the development of Phase One and Phase 2a
 - Updated engineering and design
 - Previous evidence gathered and analysis work including that undertaken to inform reports by Sir David Higgins
- 1.3.2 The announcement today, together with the route decision announced in November 2016, completes the Government's preferred route for the whole of Phase 2b. The one exception is the Eastern Leg Rolling Stock Depot, where the Government is consulting on an alternative site outside Leeds.

⁵ <https://www.gov.uk/government/consultations/high-speed-rail-investing-in-britains-future-consultation>

Figure 1: the HS2 Y network



1.4 What we consulted on in November 2016

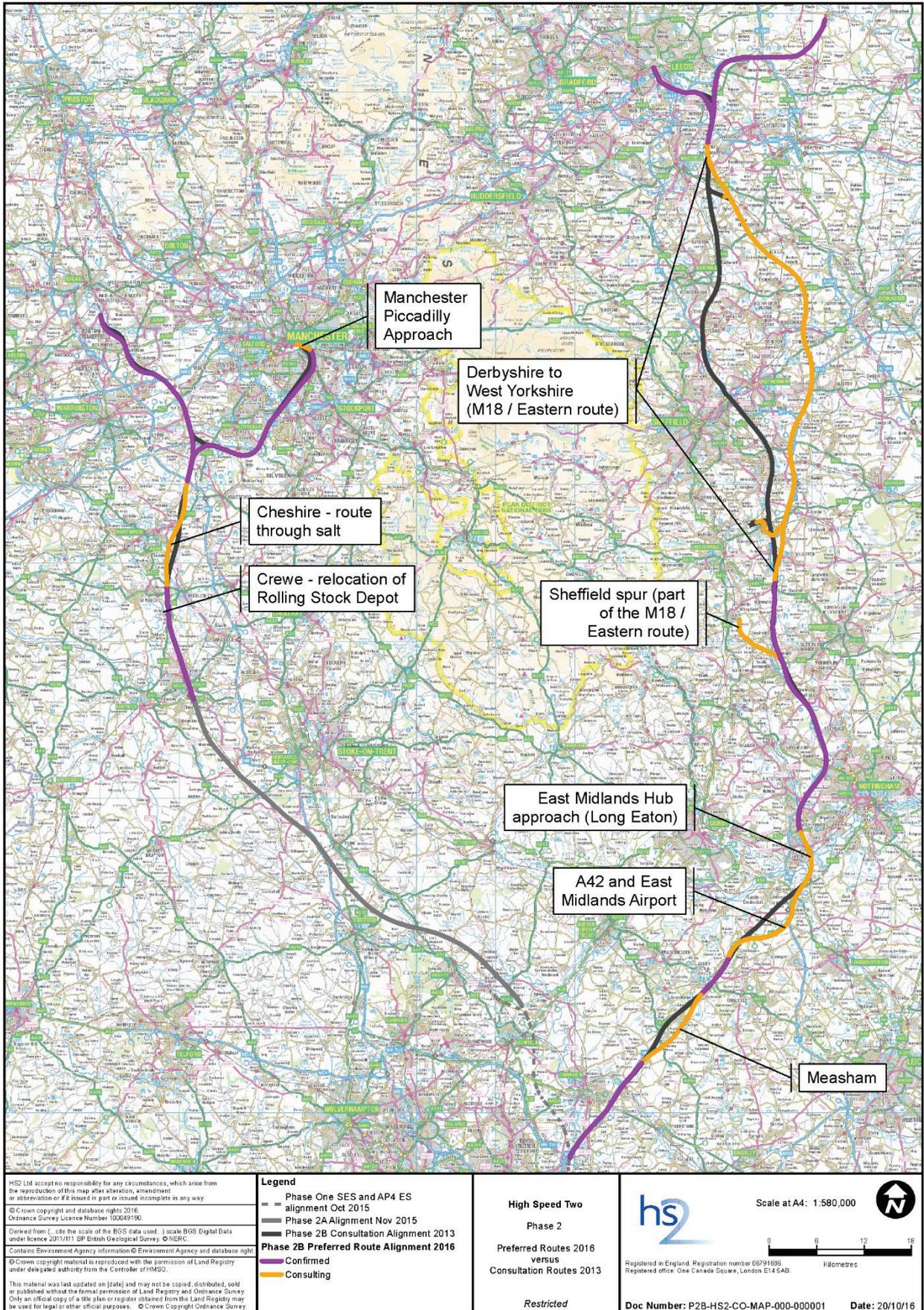
1.4.1 The Phase 2b route refinement Consultation sought comments on seven proposed refinements (see Figure 2 below) and asked the following questions.

- **Route between Middlewich and Pickmere** – Do you support the proposal to change the alignment and raise the route through the Cheshire salt plains? Please indicate whether or not you support the proposal together with your reasons.
- **Manchester Piccadilly approach** – Do you support the proposal to change the alignment of the approach to Manchester Piccadilly station? Please indicate whether or not you support the proposal together with your reasons.
- **Route around Measham, Leicestershire** – Do you support the proposal to re-align the route to the east of Measham? Please indicate whether or not you support the proposal together with your reasons.
- **Route along A42 around East Midlands Airport** – Do you support the proposal to realign the route in the area around East Midlands Airport? Please indicate whether or not you support the proposal together with your reasons.
- **East Midlands Hub approach around Long Eaton** – Do you support one of the two options being considered by the Secretary of State for the alignment through Long Eaton? Please indicate which option together with your reasons.
- **Derbyshire to West Yorkshire (M18 / Eastern route)** – Do you support the proposal to amend the route to serve South and West Yorkshire? Please indicate whether or not you support the proposal together with your reasons.

1.4.2 We also asked two additional questions in conjunction with the M18 refinement. These related to the creation of a northern junction. The question asked were:

- Do you support the potential development of a northern junction to enable high speed services stopping at Sheffield to continue further north? Please indicate whether or not you support the proposal and your reasons.
- Do you support the proposed location of the northern junction in the vicinity of Clayton? Please indicate whether or not you support the proposal and your reasons.

Figure 2: Map showing location of the proposed refinements on the Phase 2b route



1.5 Approach to consultation

- 1.5.1 The consultation was organised and managed by HS2 Ltd on behalf of the Department for Transport (DfT). An independent company, Dialogue by Design (DbyD) was commissioned by HS2 Ltd to manage the consultation, analyse the responses and produce a report. The DbyD report is available at: <http://www.dialoguebydesign.co.uk/>
- 1.5.2 The consultation was publicised on the www.gov.uk website as well as via letters and leaflets sent to all properties within 1km of the Phase 2b route. Information on the consultation was also sent to local authorities, Parish Councils, statutory and technical respondents and other stakeholders along the route.
- 1.5.3 Copies of the consultation documents were made available at council offices, libraries and Citizens Advice Bureaux along the route. In addition, adverts were placed in local papers and online to further publicise the consultation and a series of supporting information and engagement events. A Written Ministerial Statement was laid in Parliament announcing the start of the consultation and a press release was issued by DfT.
- 1.5.4 A total of 36 information and engagement events were held at venues along the whole Phase 2b line of route with over 20,000 people attended these events. These events commenced on 5 January in Crewe and ran for 16 weeks.

1.6 Methodology and response process used by DbyD

- 1.6.1 DbyD received the consultation responses via multiple response channels (web form, email and Freepost) and processed them using the following four stages:
1. Receipt and digitisation of all responses: to a consistent digital format, with supervision and quality checking of the transcription process to ensure accuracy.
 2. The development of an analytical framework: to enable a team of analysts to categorise all responses according to the issues they raise.
 3. The application of the analytical framework: a systematic process of applying the analytical framework to all responses, with quality checking to ensure accuracy.
 4. Reporting: the translation of the analysed data into a report which presents a summary of the issues raised in the consultation.
- 1.6.2 The summary report produced by DbyD does not make recommendations or seek to draw conclusions from responses; attempt to respond to comments made by respondents; or seek to verify or pass judgement on the accuracy of comments made by respondents. Its purpose is to organise, analyse and report on the responses received and provide results in a format that is as accessible as possible for the general public, stakeholders and for decision makers in Government.

The Phase 2b Route Decision

This section sets out the Government's response to the 2016 consultation and its decisions on the HS2 Phase 2b route in each of the 7 areas where a change was proposed. Taken with the 2016 Command Paper (which set out the Government's decisions on the rest of Phase 2b) this provides the full preferred route for the scheme. The one exception is the Eastern Leg Rolling Stock Depot, where the Government is consulting on an alternative site outside Leeds.

2 Response to the Route Refinement Consultation

2.1 Relocating the Western Leg Rolling Stock Depot

What the Government proposed in 2013

- 2.1.1 The route consulted on in July 2013 included a rolling stock depot (RSD) located north of Golborne, to the south of the HS2 junction with the West Coast Main Line (WCML). This was proposed as it was an appropriate location to service trains terminating at Preston, Liverpool and Manchester. Locating a depot in this area with existing industrial and redundant railway land could also have encouraged job growth.

Summary of issues from the 2013 Consultation

- 2.1.2 Issues raised during the 2013 Consultation included the potential impact of the RSD on the local community and environment. This included impacts on the setting of the Grade II* listed Lightshaw Hall, Byrom Hall and Abram Flashes Site of Special Scientific Interest (SSSI).

Alternative options that were considered

- 2.1.3 As a result of further consideration and in response to the 2013 Consultation feedback, HS2 Ltd continued work in order to improve the connectivity to the HS2 mainline and WCML and, therefore, reduce the impacts on local community, environment and Grade II* listed buildings and the SSSI.
- 2.1.4 For a site to be potentially suitable for the RSD, it needs to meet the following requirements:
- A large, flat site
 - Accessible to workforce and local transport network
 - Located as close as feasible to where HS2 services will terminate or begin to minimise empty train movements
 - Connected to the existing network
- 2.1.5 A range of locations across the western section of the route were identified which met these requirements and were, therefore, potentially suitable locations for a RSD. In assessing these locations, HS2 Ltd considered the balance between a range of factors including environmental impact, cost, and engineering complexity.
- 2.1.6 Following an initial level of design development, a number of options at Lowton, Leigh, Ashley and Whatcroft were assessed and discounted as unsuitable. Consideration was also given to an alternative site at Golborne, however, after further assessment, this option was discounted as it was unlikely to significantly improve on the sustainability impacts of the site proposed during the 2013 Consultation.
- 2.1.7 A series of options to locate the RSD along the HS2 route in the vicinity of Knutsford were assessed as potentially suitable, and therefore considered in more detail. These

options were assessed as likely to have greater landscape and visual impacts and would present difficulties in connecting to the existing rail network.

- 2.1.8 Consideration was also given to a site north of Crewe as proposed in the 2016 consultation.

What the Secretary of State proposed in 2016

- 2.1.9 In the 2016 consultation, the Secretary of State proposed to relocate the RSD from Golborne to a site north of Crewe. The site is a large area of flat land between the A530 Nantwich Road and WCML near Wimboldsley which, following the construction of HS2, would sit between the HS2 route and the WCML. A depot in this location was assessed as being likely to have fewer landscape and visual impacts than the site at Golborne proposed in the 2013 Consultation.

- 2.1.10 The site has good connections to the existing network and would be able to facilitate access for empty rolling stock movements to the depot for HS2 trains serving destinations such as Liverpool, Manchester and Preston. Direct road access to the depot is possible from the A530.

- 2.1.11 Locating the RSD near Crewe means that the northern chord of the Manchester Junction at Golborne, which would previously have been necessary to enable trains to travel between the RSD and Manchester, is no longer required. A similar connection, albeit designed for trains travelling at faster speeds, remains an option as part of Transport for the North's (TfN) proposals for serving Liverpool from Manchester Piccadilly via HS2.

Consultation question:

“Do you support the proposal to locate the Western Leg Rolling Stock Depot on the site north of Crewe? Please indicate whether or not you support the proposal together with your reasons.”

What you said in response to the 2016 consultation

- 2.1.12 A total of 87 respondents say that they support relocating the rolling stock depot to a site north of Crewe with 15 respondents supporting it with caveats. In contrast, 295 respondents opposed the new location. A further 249 respondents stated that they have no comments or opinion on the matter and other respondents commented without expressing clear support or opposition. More information on this can be found on the DbyD report⁶.

- 2.1.13 Several respondents expressed the view that although the new site would have new impacts, they were less significant than those associated with the site at Golborne.

- 2.1.14 There was support for the move on a number of grounds, including from respondents in both Golborne and Crewe. These included the potential to reduce the impact on the environment and local heritage, stating that the Grade II* listed buildings (Lightshaw Hall and Byrom Hall) would no longer be affected in Golborne, as well as potential economic benefits to the area in Crewe.

⁶ <https://www.gov.uk/government/consultations/hs2-crewe-to-manchester-west-midlands-to-leeds-route-refinement-consultation-2016>

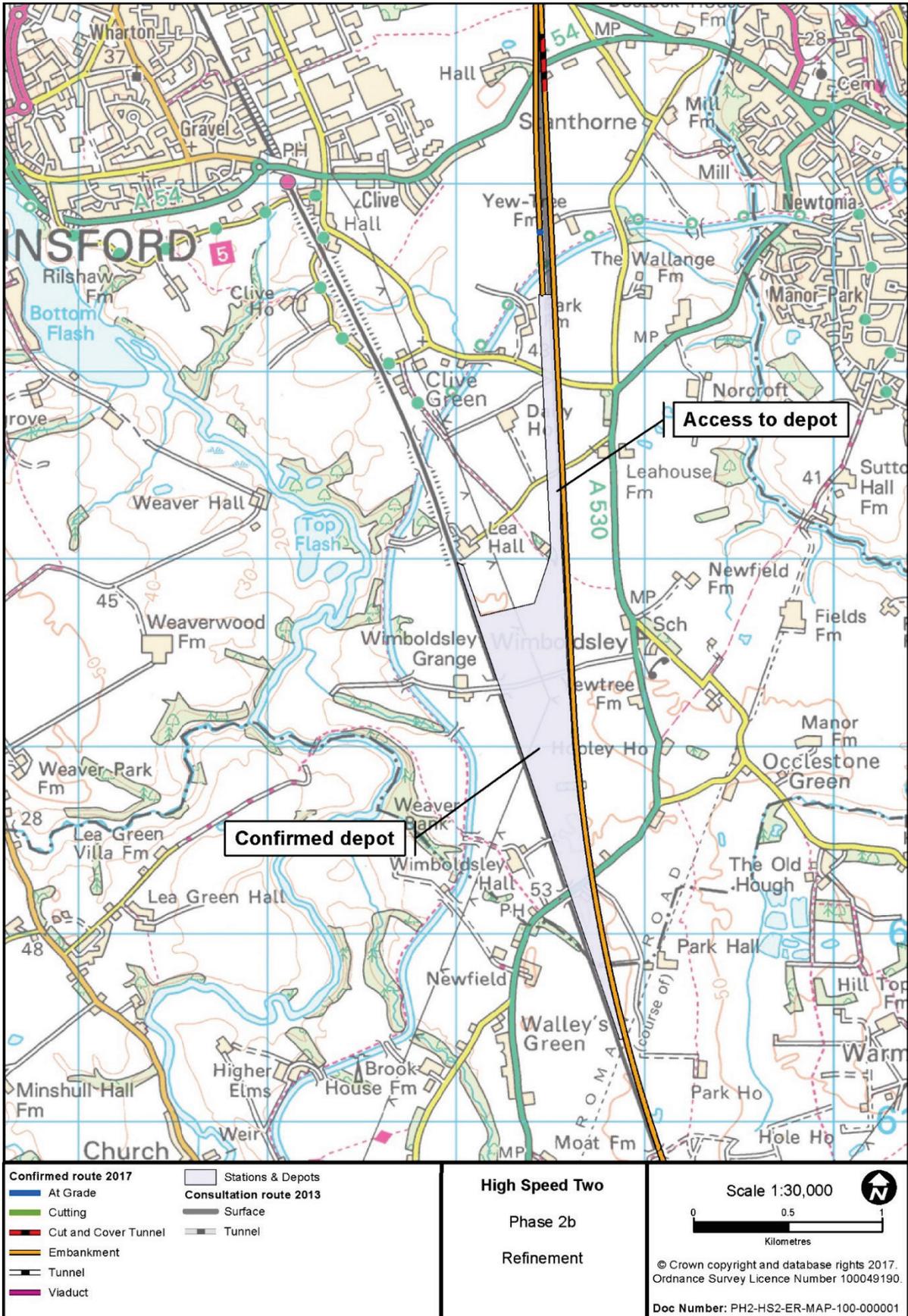
- 2.1.15 Concerns expressed about the proposed location of the depot included the potential impacts to local communities, for example, Stanthorne and Wimboldsley Parish Forum raised concerns about the threat to the tranquillity in the area as well as the impacts on the local residents during the construction and operation. There were concerns raised over the potential impact around the depot, particularly the working hours of the depot and associated noise and visual impacts, proximity to nearby schools, residences and businesses.
- 2.1.16 Other concerns raised included the impact of the construction phase on the existing transport network as well as the removal of the northern chord restricting rail connections between Manchester and other cities in the North. There were also questions whether the railway could be safely constructed in the Crewe area given the underlying ground conditions and history of salt mining and gas storage.

Government response

- 2.1.17 Having carefully considered all the points made by respondents during the consultation, the Secretary of State has decided to confirm the proposal set out in the 2016 consultation to locate the Western Leg RSD at the site north of Crewe (see figure 3 below).
- 2.1.18 The Secretary of State believes that the site north of Crewe remains the most suitable option for the Western Leg RSD as it:
- Fits the physical requirements for the RSD
 - Provides a connection to the existing network and is suited strategically for empty rolling stock HS2 trains serving destinations such as Liverpool, Manchester and Preston
 - Reduces the impact on Golborne residents whilst delivering a lower level of impacts in the area north of Crewe
 - Removes direct impacts on Grade II Listed buildings and proximity to SSSIs, as well as reducing impacts on the Leeds and Liverpool Canal
- 2.1.19 The Secretary of State acknowledges the points made in response to consultation about the impact on particular communities. Overall, however, he considers that the environmental impact is lower than would have been the case for the Golborne RSD location. Moving the RSD from Golborne also means that significantly less infrastructure is required at the junction to Manchester, as a northern chord is not needed for HS2. This means less land needs to be taken and there will be reduced noise and visual impacts in this area. Removal of this connection also significantly reduces the estimated cost of the route.
- 2.1.20 In reaching this conclusion, the Secretary of State has again considered alternative sites for the location of the RSD, including whether appropriate brownfield sites are available. However, no brownfield sites were available that met the requirements for an RSD on the current line of route.
- 2.1.21 An alternative option for relocating the RSD south of Crewe at Basford Sidings was also considered, following suggestions made by consultees, but it is further away for empty rolling stock movements from Manchester, Liverpool and Preston and would impact existing railway operations and planned development.

- 2.1.22 Finally, HS2 Ltd considered an option to move the RSD into a tunnel on this site. However, an underground depot site would be more costly and unsuitable for HS2's depot needs.
- 2.1.23 The Government is aware that there are some impacts and concerns with the proposed RSD location, although a number of these are also associated with the WCML alignment. These include an impact on the Grade II* Listed Lea Hall and associated Grade II Listed Gate Piers, and on the setting of the Grade II Listed Park Farm. There would also be minor impacts on the setting of the Grade II* Listed Twelve Acres Farmhouse. More broadly, there are environmental impacts affecting in particular residents of Wimboldsley and users of the Trent and Mersey Canal. The Secretary of State has instructed HS2 Ltd to continue work with local communities and stakeholders during further design development to work to mitigate these impacts, in particular to mitigate the noise, visual and lighting impacts of the depot itself and the impacts of construction. HS2 Ltd will also engage with the Canal and River Trust and seek to design the viaduct taking their concerns into account.
- 2.1.24 Following the removal of the northern connection at the Manchester junction, DfT and HS2 Ltd will continue to work with TfN to consider how the HS2 line could help support east-west connectivity as part of the Northern Powerhouse Rail (NPR) programme, in particular Manchester to Liverpool connections. This could mean that additional infrastructure in this area is considered as part of NPR.

Figure 3: Confirmed location of Western Leg Rolling Stock depot



2.2 Route between Middlewich and Pickmere

What the Government proposed in 2013

- 2.2.1 The route consulted on in July 2013 passed between Middlewich and Winsford on to a long viaduct over the River Dane floodplain and crossed the Trent and Mersey Canal. On its way north east, the route ran mainly on embankment, passing approximately 3km to the east of Northwich, before crossing the Altrincham to Chester railway line, the A556 and the A559.

Summary of issues from the 2013 Consultation

- 2.2.2 Issues raised during the 2013 Consultation through this area included safety risks as the route passes over areas with underlying geological risk. It was highlighted that the proposed route could have significant impacts on the infrastructure of the existing controlled brining and gas storage operations in the area. Some concerns were raised that crossing the sub-surface brine extraction and gas storage caverns could have an impact on long-term viability for the operation of these assets. Concerns were raised more generally about possible ground movement and subsidence.
- 2.2.3 Concerns were raised with the close proximity of the proposed route to Lostock Green, Lostock Gralam and Pickmere Telescope. Impacts on the Trent and Mersey Canal Conservation Area, the River Dane, Peover Eye, Leonards and Smokers Wood and Winnington Wood ancient woodlands were also highlighted.

Alternative options that were considered

- 2.2.4 As a result of further consideration and in response to the 2013 Consultation, a number of routes through this area were considered, with the aim of avoiding the greatest concentration of risk due to underlying geology and underground gas storage caverns. The alternatives included moving the route to the east and west of the 2013 Consultation Route. Options further east towards Manchester via Mobberley were assessed more likely to have greater environmental impacts and higher costs than the routes via Knutsford. Options via Knutsford which pass to the east of Middlewich (towards Sandbach and Holmes Chapel) were not progressed due to sustainability impacts, including demolition of around 50 properties.
- 2.2.5 Throughout this area, options for putting the route into cuttings or tunnels were not progressed due to the risks associated with gas brining and salt storage caverns along with the hydrogeology. Three options were taken forward for more design development:
- The first involved raising the route consulted on in 2013 onto a series of embankments and viaducts. This alignment avoids the main settlements but passes close to a number of smaller communities
 - The second option involved moving the route to the west of Lostock Green and raises the route by around 1 metre to address issues associated with the salt brining and drainage
 - The third option follows an alignment similar to that consulted on in 2013/14, but moves the route further east of Lostock Gralam while also raising the alignment by up to 8 metres to address the issues associated with the salt brining and drainage

- 2.2.6 The options developed took into consideration impacts on communities, the environment and other engineering challenges that might be involved.

What the Secretary of State proposed in 2016

- 2.2.7 In the 2016 consultation, the Secretary of State proposed the second option to avoid brining and gas storage infrastructure and raise the route to at least one metre above ground level to minimise the risk of subsidence and to allow for management of drainage. The route was also moved westwards to avoid the risk of passing over an area associated with active brine extraction and gas storage. To the north of the River Dane valley and for approximately 12km, the route has been raised up onto a series of embankments, interspersed with viaducts over floodplains, including over Peover Eye.

Consultation question:

“Do you support the proposal to change the alignment and raise the route through the Cheshire salt plains? Please indicate whether or not you support the proposal together with your reasons.”

What you said in response to the 2016 consultation

- 2.2.8 For the proposed route alignment between Middlewich and Pickmere, 368 respondents said they opposed the proposed route, 43 supported the proposal and a further 15 supported it with caveats. A further 225 respondents stated that they have no opinion on the matter, and other respondents commented on this route without expressing clear support or opposition. More information on this can be found on the DbyD report⁷.
- 2.2.9 Concerns were expressed over HS2 Ltd’s understanding of ground conditions and the ability to safely construct a high speed railway in this area. There were general concerns about the proximity of the route to salt mines and gas storage facilities and potential flood risk in the area. Concerns were raised that HS2 Ltd needed to do further ground investigation work to understand more fully ground conditions and the ability to safely construct a high speed railway in the area.
- 2.2.10 There were also concerns raised about the impact of the proposal on local roads, especially during the construction phase of the project. Some respondents expressed concerns about the possibility of road closures, increased traffic and congestion. Many respondents expressed concern about the visual impacts in the area. Respondents also raised concerns that the elevated nature of the route could exacerbate existing flooding or disrupt surface run-off flows in the area and that the height of the alignment would make it a prominent feature in an otherwise low-lying landscape. There were also concerns raised about the impact on the Royal Cheshire County Show and its operation.
- 2.2.11 Further concerns raised by respondents questioned the ground survey work done to date and whether it was adequate in measuring the safety of the current ground conditions and in monitoring the level of movement over time.
- 2.2.12 Other issues include the canal crossings at Shropshire Union Canal and the Trent and Mersey Canal and their impacts on the environment.

⁷ <https://www.gov.uk/government/consultations/hs2-crewe-to-manchester-west-midlands-to-leeds-route-refinement-consultation-2016>

2.2.13 There was support for the proposal from several respondents who cited that the revised route would have less interaction with salt brine areas and also represent better value for money.

Government response

2.2.14 Having carefully considered the points made by respondents to the consultation and further advice from HS2 Ltd, the Secretary of State has decided to confirm the proposal set out in November 2016 to change the horizontal alignment of the route between Middlewich and Pickmere and raise the route to be above ground level. As a result of this, compared to the 2013 proposal, the route north of Lostock Gralam will move eastwards by up to 400m taking the line further east of Pickmere (see Figure 4 below).

2.2.15 The Secretary of State considers that the 2016 preferred Route between Middlewich and Pickmere is the best option as it:

- Carries the least overall risk regarding the construction, operation and long-term maintenance of the railway
- Avoids direct interference with existing brining and gas storage infrastructure and would minimise the risk of subsidence from ground movements in the brine caverns
- Is raised to allow for better drainage and ground stability mitigation options

2.2.16 Between Lichfield and the Manchester junction, it is strategically important for the route to pass via Crewe given Crewe's role as a key interchange on the current rail network. Alternative routes to the east between Crewe and Manchester were considered. They would have similar risks and issues to the 2016 route, crossing known brine runs and introducing impacts on Grade II* Listed Buildings, but they would not provide for a suitable link to the WCML to provide onward service to the north of England and Scotland.

2.2.17 Within the strategic corridor between Crewe and the location of the Manchester junction, every route option presents risks and issues and the Government takes seriously the issues raised by respondents to consultations in relation to both the 2013 route and the 2016 route. However, the Government considers that the risks and issues associated with the 2016 route are, on balance, less severe than those associated with the 2013 route. In particular, underground gas storage caverns are considered a greater risk than other risks in this area. Avoidance of those gas storage caverns is a key reason for the 2016 route proposals.

2.2.18 Other alternatives which were assessed but not chosen within the strategic corridor included extending the proposed HS2 tunnel below Crewe and returning to surface near the M6 crossing. Although this option would have environmental advantages over the 2016 route, the long and extremely deep tunnelling option would be significantly more expensive to construct and would not be without constructability risks.

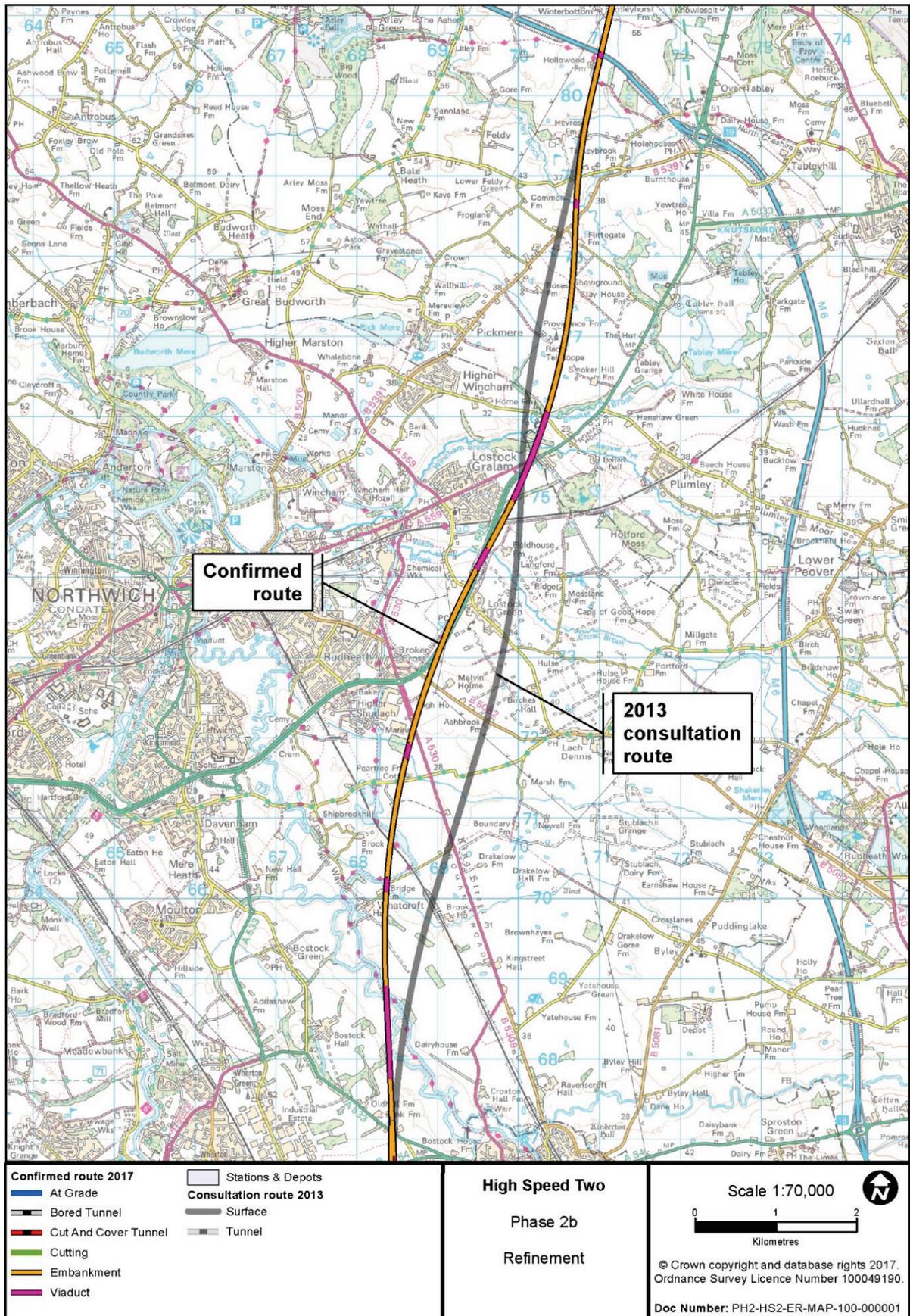
2.2.19 A raised route in this area is considered less likely to result in drainage path changes and thus reduce risk. HS2 Ltd will seek to mitigate some of the drainage concerns during the development of the hybrid Bill.

2.2.20 HS2 Ltd has been working with specialist consultants to undertake work on this part of the route to understand the ground conditions and geotechnical risks on this part of the route. The Government recognises that this is a sensitive and complex section of the route and that there is more work to be done before hybrid Bill deposit to further assess

the geological risks and provide suitable mitigations. HS2 Ltd plan to carry out early geotechnical investigation work in the Mid Cheshire area to gather more advanced survey information.

- 2.2.21 The Government recognises that the 2016 preferred route adopts a longer route through the salt areas (approximately a 1km increase over the 2013 Consultation Route) and a slightly longer crossing of the Winsford Rock Salt Mine. However, the associated risks are preferable to those associated with the 2013 route when considered in totality. They will be managed through further design and assessment work and continued engagement with stakeholders, such as Compass Minerals.
- 2.2.22 The Government also recognises that there are concerns regarding impacts on the site of the Royal Cheshire County Show, the Trent and Mersey Canal and potential visual and noise impacts at Lostock Green and Lostock Gralam. HS2 Ltd will work with these and other stakeholders and communities as it further develops the scheme to mitigate the impact of HS2 in this area.

Figure 4: The confirmed re-alignment through Cheshire salt



2.3 Manchester Piccadilly approach

What the Government proposed in 2013

- 2.3.1 The route consulted on in 2013 included a tunnel portal in West Gorton. The route then continued in a cutting through the West Gorton Development Site and Ardwick alongside the existing railway line rising to pass over the Inner Relief Road (Mancunian Way). This approached the new station immediately to the north of the existing Piccadilly Station.

Summary of issues from the 2013 Consultation

- 2.3.2 Issues raised during the 2013 Consultation included the direct impact of the proposed tunnel portal on West Gorton and the demolition of 22 residential properties and the proximity of the tunnel portal to a school. A number of complexities were also identified associated with constructing the tunnel portal in the Corn Brook floodplain and the close proximity of the existing railway viaducts.
- 2.3.3 Greater Manchester Combined Authority was also concerned that the proposed station approach did not provide adequate integration with the existing station nor with the wider cityscape, as well as being concerned about the timing of construction and the early delivery of a HS2 station at Piccadilly.

Alternative options that were considered

- 2.3.4 In response to the identified engineering complexities with the 2013 proposal and concerns raised during consultation, a number of alternative route alignments have been considered for the approach to Manchester Piccadilly.
- 2.3.5 The alternatives identified would increase the length and alignment of the Manchester tunnel and change the location of the tunnel portal. This would increase costs, but have the advantage of reducing the impact on the community at West Gorton (removing the need for demolition of residential properties in this area), move the tunnel portal out of the floodplain and avoid the need for construction adjacent to the existing WCML and associated viaducts.
- 2.3.6 The alternatives also provide a straighter track alignment into Manchester Piccadilly which improves the operational capacity of the railway and reduces the impact on the existing structures at Piccadilly station.

What the Secretary of State proposed in 2016

- 2.3.7 In the 2016 consultation, the Secretary of State proposed to re-align the approach to Manchester Piccadilly Station, moving the route eastwards by up to 370m to take the tunnel portal and section of the route which runs on the surface away from the community of West Gorton. This change would lengthen the tunnel leading to the approach to the station by approximately 880m so that the northern entrance/exit to the tunnel would be located in the Ardwick rail depot. This change also allowed the approach into Manchester Piccadilly station to be straightened in order to maximise operational capacity and reduce impact on the structure of the existing station.

Consultation question:

‘Do you support the proposal to change the alignment of the approach to Manchester Piccadilly station? Please indicate whether or not you support the proposal together with your reasons.’

- 2.3.8 A total of 51 respondents support the new alignment, with a further 13 voicing support with caveats. In contrast, 179 respondents voice their opposition to the proposals. A total of 288 respondents stated that they had no comments or opinion on the matter and other respondents commented without expressing clear support or opposition. More information on this can be found on the DbyD report⁸.

What you said in response to the 2016 consultation

- 2.3.9 Respondents raised a number of concerns with the proposed realignment of the route on the approach to Manchester Piccadilly. There were concerns about the impact on the local communities and the perceived benefits of the alignment into Manchester Piccadilly. There were concerns raised about the effect of the proposal at Ardwick Depot. These include the impact on the TransPennine Express franchise and possible loss of jobs in the local area.
- 2.3.10 There were concerns expressed about the noise and vibration associated with the proposal. While some respondents argue that the change will disrupt their local communities, others expressed the view that the proposed realignment will have reduced flood risk and visual impact.
- 2.3.11 A range of concerns were expressed about the impact on the environment and the surrounding communities. These include impacts on listed buildings, environmental sites, SSSIs, local businesses and infrastructure. There were significant concerns amongst those living above the proposed tunnel route about the potential impact on their properties from both a structural and valuation perspective as well as concerns raised about the location of ventilation shafts. Concerns were also raised about the impact on potential development areas in Manchester.
- 2.3.12 Greater Manchester Combined Authority expressed concern that further work was needed to optimise the station and approach alignment to ensure HS2 proposals were integrated with the existing station and cityscape and how this would impact on the regeneration area.
- 2.3.13 Some respondents supported the proposed realignment, which moves the route away from the community at West Gorton. Network Rail supports the proposed change as the new tunnel portal location and amended approach to Manchester Piccadilly reduces the construction impact to WCML services.

Government response

- 2.3.14 Having carefully considered the points made by respondents to the consultation, the Secretary of State has decided to confirm the proposal to re-align the route on the approach to Manchester Piccadilly station. This means the route will move eastwards by up to 370m on the approach to Manchester Piccadilly station, moving away from

⁸ <https://www.gov.uk/government/consultations/hs2-crewe-to-manchester-west-midlands-to-leeds-route-refinement-consultation-2016>

West Gorton (see figure 5 below). The ventilation shaft locations remain indicative and further work will be progressed to look at the locations in more detail.

- 2.3.15 The preferred alignment into Manchester Piccadilly remains the most suitable option because:
- It reduces the flood risk and engineering complexity by moving the tunnel portal out of the Corn Brook floodplain and away from existing railway viaducts
 - It allows the approach to Manchester Piccadilly Station to be straightened, maximising operational capacity and reducing the impact on the structure of the existing station
 - It avoids community impacts at West Gorton, including a cluster of residential demolitions, a major development site and a local primary school
- 2.3.16 The Government notes that the site of a tunnel portal will inevitably have an impact on the surrounding area and where possible considers it preferable to construct a portal within existing rail land, rather than in a residential area. Technical work by HS2 Ltd indicates that the existing rail depot on the site of the proposed northern tunnel portal can be reconfigured to continue operations.
- 2.3.17 HS2 Ltd is working with Manchester City Council and the Greater Manchester Combined Authority to consider how the route alignment can minimise impacts on proposed development land, including sites identified in the Piccadilly Strategic Regeneration Framework and the impact of the northern tunnel portal on the existing Ardwick rail depot.
- 2.3.18 As proposals develop, there will be further consideration of how provision can be made for Northern Powerhouse Rail (NPR) within the design of HS2, which may include further changes in this area. HS2 Ltd will continue to discuss with affected parties precise locations for the vent shafts in a way that minimises potential impacts.

Figure 5: Confirmed re-alignment of the approach to Manchester Piccadilly Station



2.4 Route around Measham, Leicestershire

What the Government proposed in 2013

- 2.4.1 The route that was consulted on in July 2013 passed north of Birchmoor and followed the corridor of the M42/A42 on its south-eastern side. The route crossed the River Mease Special Area of Conservation (SAC) and Site of Special Scientific Interest (SSSI) and passed through the north western side of the town of Measham before continuing to follow the A42 towards Tonge.

Summary of issues from the 2013 Consultation

- 2.4.2 Issues raised during the 2013 Consultation included concerns about the impacts on both local businesses (including Plastic Omnium Automotive Limited, a key supplier for Jaguar Land Rover) and a local housing development site (Measham Wharf), as well as concerns about the impacts on the broader area. Highways England were concerned about the proposed realignment of the A42 that would be required. An additional feature in this area is the River Mease SAC, which is subject to a European-level environmental designation.

Alternative options that were considered

- 2.4.3 As a result of the feedback from the 2013 consultation, HS2 Ltd reconsidered the line of route in this area. A number of options were considered which sought to reduce the impact on local communities, businesses and housing development sites.
- 2.4.4 Options which involved tunnelling were not progressed due to the significant cost implications and sustainability impacts.
- 2.4.5 Two options which lowered the alignment so that the line is in a cutting as it passes Austrey were considered which broadly followed the same corridor along the eastern side of the M42/A42:
- The first of these still impacted on a number of businesses and Measham Wharf major development site
 - The second reduced impacts on some of the businesses, maintaining their access, however it still impacted on others and would increase the impacts on the Measham Wharf major development site and move the route slightly closer to the communities in Measham

What the Secretary of State proposed in 2016

- 2.4.6 In the 2016 consultation, the Secretary of State proposed the re-alignment of the route to the east of Measham away from the A42 corridor to avoid some of the significant impacts on the town, businesses and Measham Wharf major development site.
- 2.4.7 This option avoids direct impacts on the manufacturing businesses and the development site. However, the crossing point over the River Mease, an area protected by a number of environmental designations, would need to be moved. The crossing of the River Mease on a viaduct would also pass through a brickworks quarry and be

adjacent to an historic landfill site. This alignment would also increase impacts to Appleby Parva, Appleby Magna and the eastern side of Measham.

Consultation question:

-

What you said in response to the 2016 consultation

- 2.4.8 A total of 50 respondents supported the proposed route at Measham, with a further 13 expressing caveated support. In contrast, 588 respondents opposed the refined route. A further 247 respondents stated that they had no comment or opinion on the matter, and other respondents commented without expressing clear support or opposition. A few respondents disagree with both the 2013 route and the currently proposed route. More information on this can be found on the DbyD report⁹.
- 2.4.9 Concerns were expressed by a number of respondents about the impact on employment locally, recognising the route would remove the impact on a key local employer but could impact more jobs at other smaller businesses affected by the 2016 route.
- 2.4.10 Concerns were raised over the visual, noise, dust and pollution impacts to the communities of Measham, Appleby Parva and Appleby Magna. There were also concerns raised about the potential impact on the River Mease SAC and SSSI with Natural England identifying concerns about the proximity of the route to two landfill sites which could result in contamination of the River Mease. There were concerns about the height of the route along this area, particularly the high embankments and viaducts which are close to villages. This led to concerns about the potential noise and visual impact to these local communities.
- 2.4.11 While some respondents raised concerns about disruption to some roads and potential impacts on other transport services in the area, others were in favour of the proposal, expressing the view that the revised route will have lower noise and traffic impacts. However, concerns were raised about the local land condition with subsidence prevalent in some areas; the realignment and crossing of the A444 to the south of Appleby Parva; and the risk of flooding as a result of the impact on the sewage works.
- 2.4.12 There were concerns raised around the potential “islanding” of Austrey, Appleby Parva, Appleby Magna and Measham, between the A42 and the HS2 line.
- 2.4.13 Respondents who supported the 2016 preferred route expressed as their main reasons that reduces impacts around Measham, including in relation to the manufacturing sites, Measham Wharf development, and the extent of re-alignment of the A42.
- 2.4.14 Several respondents suggested the route deviated from the principle of following existing transport corridors and questioned why this principle was not being followed in this area. Some respondents noted that the proposed route would avoid impact on the proposed Measham Wharf housing development site but pointed to effects on a housing site near completion on the eastern side of Measham. North West Leicestershire Council’s response indicated that should the Measham Wharf site be

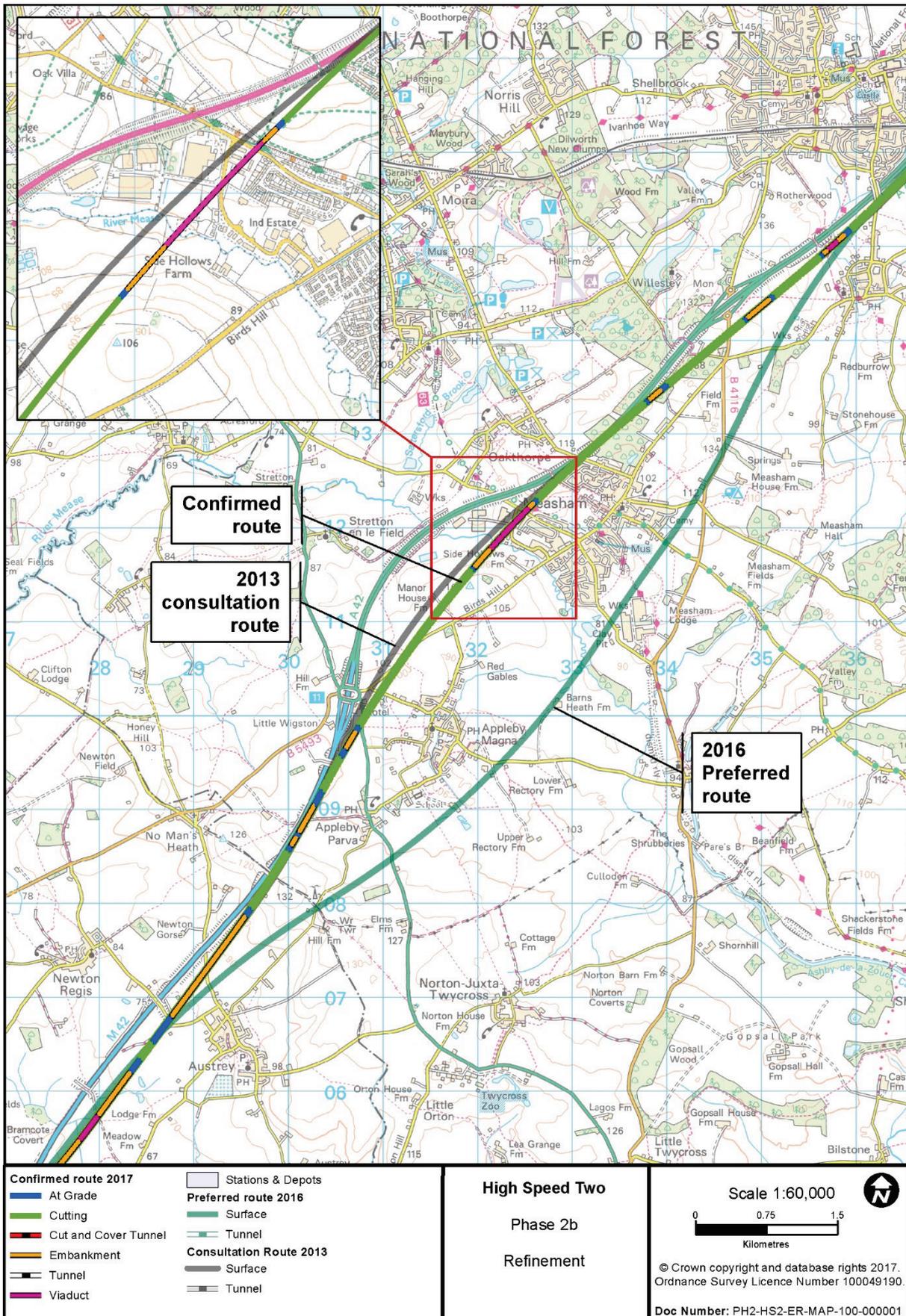
⁹ <https://www.gov.uk/government/consultations/hs2-crewe-to-manchester-west-midlands-to-leeds-route-refinement-consultation-2016>

impacted they were confident of alternative sites being available to enable them to meet their strategic housing allocation target for the area.

Government response

- 2.4.15 Having carefully considered all the points made by respondents, the Secretary of State has decided to not adopt the change proposed in November 2016. The Secretary of State has decided instead to confirm a modified version of the 2013 route, which would be moved approximately 80m to the east of the 2013 route and more closely follows the A42, a section of which would need to be realigned near Measham (see figure 6).
- 2.4.16 Having reviewed the feedback received from the consultation, HS2 Ltd did consider several alternative options for the route in this area. Tunnelling was discounted as this would greatly increase costs and have a detrimental impact on sustainability. A route further west was discounted because a longer section of the A42 would need to be realigned with more demolitions and a higher cost. A route much further east was also discounted as it would negatively impact on the environment, particularly the Ashby Canal SSSI, two ancient woodlands and a Biodiversity Action Plan habitat. With the alternative options discounted, HS2 Ltd revisited the 2013 Preferred Route and reviewed the objections raised in the 2013 Consultation and considered whether mitigations could be put in place to remedy these objections.
- 2.4.17 A consideration in making the 2016 proposal was to avoid the impacts on the manufacturing businesses based in the Westminster Industrial Estate in Measham and the Measham Wharf housing development. By moving the 2013 alignment approximately 80m to the east and adopting a longer viaduct over the River Mease, demolition of a major manufacturing business, and large local employer, can be avoided. The Government is of the view that it should be possible to satisfactorily manage impacts that may arise in constructing a route largely on viaduct through the industrial estate. The Secretary of State has also noted the view of North West Leicestershire District Council that alternative housing sites to Measham Wharf should be available if necessary.
- 2.4.18 HS2 Ltd have advised that the 2013 modified route has no impact on journey times and keeping the route more within the A42 transport corridor has benefits which include avoiding the “islanding” of Measham, Appleby Magna and Appleby Parva, and being further away from the villages of Austrey to the south and Packington to the north with a reduction for those communities in the associated noise and visual impact. HS2 Ltd also advised that the 2016 route could require the relocation of a sewage treatment works and operational brickworks which could add to costs and risk. Those effects, along with a potential requirement for higher demolitions as well as a higher risk on local jobs could be avoided. In addition, the condition of the habitat in the area of the crossing of the River Mease proposed in 2013 is generally more degraded than that to the east of Measham and so the 2016 proposal would need further design and mitigation work to ensure harm to the SAC is avoided and would involve a longer crossing with a complex landfill interface north or the river. The Secretary of State therefore, considers a revised version of the 2013 route represents a preferable balance of the various considerations.
- 2.4.19 The Government does acknowledge that there could be impacts on units in Westminster Industrial Estate. HS2 Ltd will continue to engage with the relevant businesses as the detailed design is developed; with Highways England on the A42 realignment; and with the Environment Agency over the crossing of the River Mease SAC.

Figure 6: Confirmed modified version of the 2013 Preferred Route



2.5 Route along A42 around East Midlands Airport

What the Government proposed in 2013

- 2.5.1 The route that was consulted on in 2013 followed the A42 and crossed under junction 13 near Ashby-de-la-Zouch before passing over the A42 to the east of Tonge and Breedon on the Hill and under the East Midlands Airport and the Strategic Rail Freight Interchange major development site in a tunnel. After exiting the tunnel, the route then passed over the M1 north of junction 24 near Lockington, and crossed the floodplain of the River Soar and the River Trent on viaducts of 3.4km and 1.7km respectively.

Summary of issues from the 2013 Consultation

- 2.5.2 Issues raised during the 2013 Consultation included the engineering and construction complexities of tunnelling underneath East Midlands Airport and impacts on the East Midlands Strategic Rail Freight Interchange, as well as the effect on operation of the airport during construction. There were concerns about proximity of the route to the communities at Tonge and Breedon on the Hill, particularly the noise and visual impacts on these communities as well as visual impacts on the Trent Valley.

Alternative options that were considered

- 2.5.3 As a result of further consideration and in response to the 2013 Consultation feedback, HS2 Ltd continued work on alternative routes to avoid the need for the tunnel under the airport and the A42 crossing; and, therefore, avoid the associated engineering complexities and costs of tunnelling.
- 2.5.4 A series of alternative route alignment options which ran further to the east of the A42 were taken forward for further consideration as they avoided the need for crossing the A42 and tunnel underneath East Midlands Airport, as well as reducing the impacts on Tonge and Breedon on the Hill. In assessing these, there was a need to weigh the benefits of removing the need for tunnelling and associated challenges against any increase in journey times.

What the Secretary of State proposed in 2016

- 2.5.5 In the 2016 consultation, the Secretary of State proposed to move the route on the approach to East Midlands Airport so that it follows the eastern side of the A42 more closely before passing east of the runway and to the east of the M1. The route then passes west of Kegworth in a cutting, which would be up to 12m deep as it crosses Ashby Road. This would avoid the need to tunnel under the airport and the impacts on the Strategic Rail Freight Interchange major development site while reducing the impact on the communities at Tonge and Breedon on the Hill.
- 2.5.6 The proposed route passes through the airport's Public Safety Zone (PSZ), east of the M1, which contains the airport runway lights and Instrument Landing System. This section would be in a short cut-and-cover tunnel, below ground to minimise operational impacts.

- 2.5.7 This route would lengthen the route by 1.3km, and trains will be travelling at a lower speed (275kph), which will increase journey times by around 55 seconds.

Consultation question:

'Do you support the proposal to re-align the route in the area around East Midlands Airport? Please indicate whether or not you support the proposal together with your reasons.'

What you said in response to the 2016 consultation

- 2.5.8 A total of 99 respondents expressed support, while another 11 expressed caveated support. In contrast, 236 respondents expressed opposition to the proposed change. A further 251 respondents offered no comments or opinion on the matter, while other respondents commented without expressing clear support or opposition. More information on this can be found on the DbyD report¹⁰.
- 2.5.9 A range of views were expressed by respondents on the proposed change. A number of respondents expressed support for the proposed re-alignment given the reduced impacts on East Midlands Airport as a result of removing the need to tunnel underneath the airport. The owners of East Midlands Airport and Derbyshire County Council welcomed the proposal, noting that the realignment would benefit the local economy with benefits for businesses and local employment.
- 2.5.10 Many respondents raised concerns about potential noise pollution and local traffic congestion during the construction period. Some respondents made references to the suitability of local roads for the transportation of construction materials. Issues were raised regarding the impact on local conservation areas including the Long Whatton SSSI and woodlands including those at Pasture Wood and Cloud Wood.
- 2.5.11 There were concerns raised about the potential noise, visual and pollution impacts of the proposed re-alignment on the communities of Belton, Long Whatton, Diseworth and Kegworth. Respondents in the area expressed strong concerns about the impact on the proposed housing developments to the west of Kegworth and the height of the viaducts and embankments in the area.

Government response

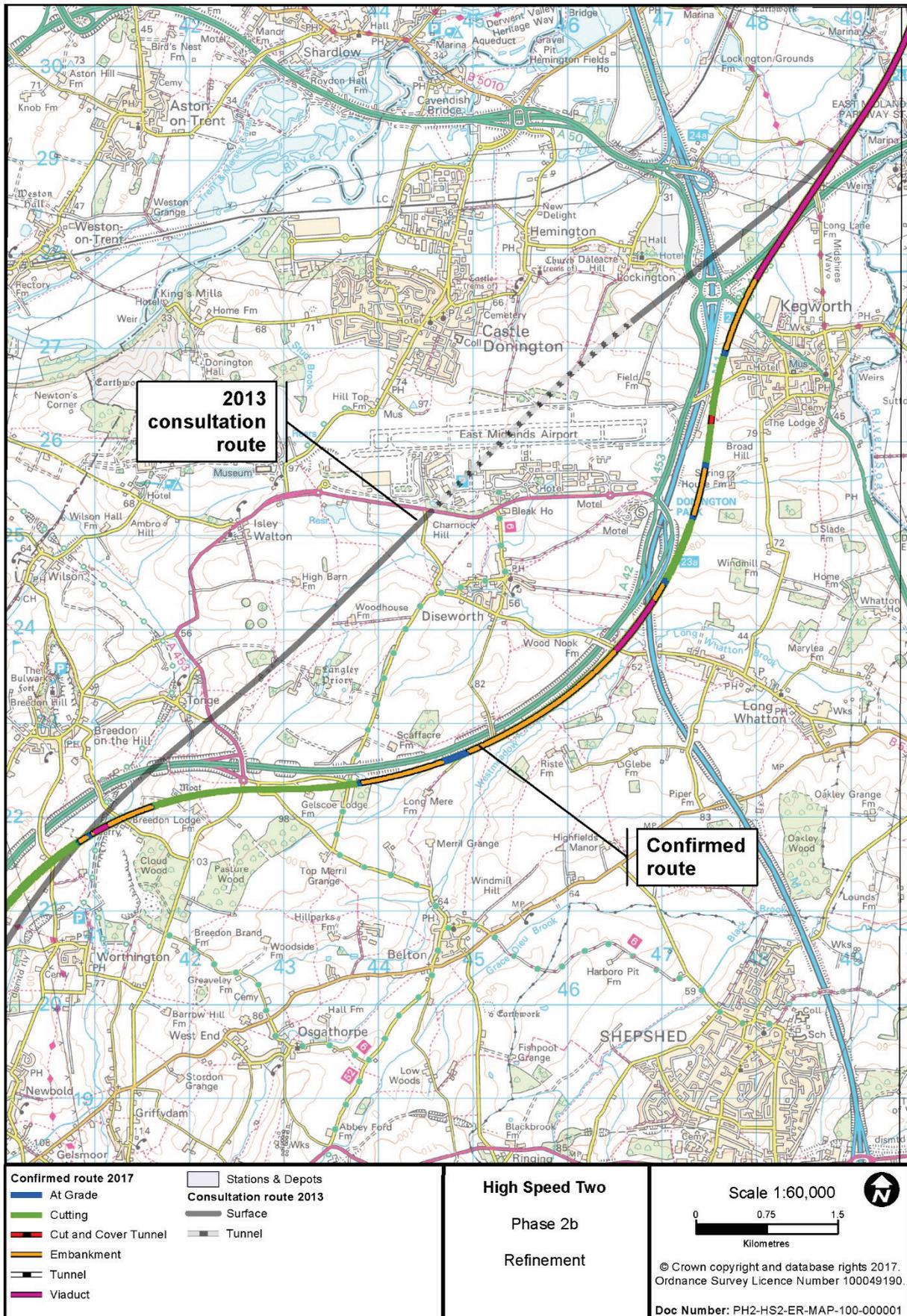
- 2.5.12 Having carefully considered all the points made by respondents, the Secretary of State has decided to confirm the proposal to move the route on the approach to East Midlands Airport. The route will follow the eastern side of the A42 before passing east of the runway and to the east of the M1 (see figure 7 below).
- 2.5.13 A number of respondents stated a preference for the 2013 Consultation Route, leading HS2 Ltd to re-assess that route against the 2016 proposal.
- 2.5.14 The 2016 route in particular avoids the engineering complexity of: tunnelling beneath an operational runway; the interface with the East Midlands Strategic Rail Freight Interchange; and the crossing of the M1/A50. The length of the River Soar viaduct is also reduced. The East Midlands Airport is the second busiest airport for freight in the UK and carries around 4.5 million passengers a year. There is a risk that tunnelling

¹⁰ <https://www.gov.uk/government/consultations/hs2-crewe-to-manchester-west-midlands-to-leeds-route-refinement-consultation-2016>

beneath the runway could affect the daily operations of the airport and so have a detrimental impact on the local economy, for example moving some of the daily functions of the airport to another site during construction.

- 2.5.15 The Government believes that on balance, the significant cost saving and reduced engineering challenges of this route outweigh the negative impacts of an additional 55 seconds to the journey time and the environmental and local impacts that arise. The noise impacts are reduced in comparison to the 2013 Consultation Route. There will be reduced impacts on the communities at Tonge and Breedon on the Hill, the Tonge Conservation Area and Langley Priory Grade II* Listed Building. On the other hand there are impacts for the communities of Belton, Long Whatton, Diseworth and Kegworth and Breedon Lodge Grade II Listed building.
- 2.5.16 The Government is aware of the issues that building a new railway presents to those who live nearby. The Government recognises that communities are concerned about the effects of construction on their local areas. HS2 Ltd is committed to managing these impacts and reducing disruption to communities, businesses and the environment in ways that reflect the best practice used by the construction industry. As the scheme progresses, HS2 Ltd will continue to work with local communities, authorities and other stakeholders as it develops the engineering design to address local effects of construction in a way which minimises potential impacts.
- 2.5.17 HS2 Ltd will be legally required to assess the impact of passing through the East Midlands Airport PSZ and demonstrate how safety can be managed. HS2 Ltd is confident of managing the impact on safety within the PSZ and will continue to work closely with Manchester Airports Group, owners of the East Midlands Airport, on ensuring the safety of the airport and the high speed route.

Figure 7: The Confirmed re-alignment of the route on the approach to East Midlands Airport



2.6 Changes to East Midlands Hub approach through Long Eaton

What the Government proposed in 2013

- 2.6.1 The route that was consulted on in 2013 crossed the River Soar and River Trent on viaducts before running at ground level through Long Eaton along the existing low-level rail corridor on the approach to the East Midlands Hub station at Toton. The route would directly impact Main Street and Station Road, and the existing high level rail line through Long Eaton would need to be widened for use by rail services on the existing network. It therefore required significant works on both of the existing rail corridors through Long Eaton.

Summary of issues from the 2013 Consultation

- 2.6.2 Issues raised during the 2013 Consultation highlighted concerns over the impact of the proposed alignment on local connectivity, particularly due to the possible impact of construction and operation of the railway on local highways.
- 2.6.3 Respondents also raised concerns over the negative impact of the proposals on house prices, with some saying that the proposals will make house prices unaffordable for local people given the proximity to the new HS2 Hub Station at Toton. Concerns were also raised over local businesses being driven away.
- 2.6.4 Alternatives to Toton as the East Midlands Hub station were also suggested. These suggestions included moving the hub to East Midlands Airport or to the East Midlands Parkway railway station.
- 2.6.5 Respondents also raised environmental issues, particularly in relation to local flooding and the impact of the route on green-belt land around Long Eaton, and the Erewash and Nottingham Canals. The proximity of the route to Bulwell Wood SSSI, Sellers Wood SSSI and Attenborough Gravel Pits SSSI was also raised.

Alternative options that were considered

- 2.6.6 Following the 2013 Consultation, extensive work was undertaken to consider alternative options for station locations in the East Midlands, which would have required a change to the proposed line of route. Engagement was also undertaken with local stakeholders to understand how well these options fitted with local aspirations. This work confirmed the view that Toton is the best location for an East Midlands Hub Station, and there has been broad consensus in the region on this. To reach the proposed station at Toton the line needs to pass through Long Eaton.
- 2.6.7 There are a number of significant constraints and challenges to identifying the most appropriate alignment through the Long Eaton area. These include the proximity of properties along the existing rail corridors; impacts on the existing rail freight yard; interactions with highways including: Station Road, Main Street, the A6005 Nottingham Road, the A52 and Derby Road; the floodplains of the rivers Trent and Erewash; the need to cross the River Erewash and the proximity to the Attenborough Gravel Pits Site of Special Scientific Interest (SSSI).

- 2.6.8 HS2 Ltd has sought to reflect these constraints while also seeking to minimise impacts on local communities and the permeability of the HS2 route through Long Eaton and Toton, as well as the technical requirements for HS2.
- 2.6.9 Tunnelling beneath Long Eaton was an option not progressed given the significant length and cost of the tunnel that would be required due to the Trent and Soar floodplains.
- 2.6.10 Two alternative route refinement options were identified that focussed construction work on a single corridor alongside the existing low-level rail tracks to reduce impacts on Long Eaton and Toton.

What the Secretary of State proposed in 2016

- 2.6.11 There are clearly significant challenges to identifying the most suitable route alignment in this area, particularly in relation to Long Eaton.
- 2.6.12 The Secretary of State proposed two options for the route through Long Eaton. These options follow the same land corridor immediately to the east of the existing low-level rail corridor but pass through Long Eaton at different heights. The options are:
- **High level option** - the first of these would lengthen the viaduct over the River Trent flood plain to approximately 4,700m, with the route passing through Long Eaton on a viaduct 16m high at the crossing of Station Road.
 - **Low level option** - a lower vertical alignment through Long Eaton, with HS2 crossing Station Road at a height of 4 metres and then travelling through Long Eaton at ground level

Consultation question:

'Do you support one of the two options being considered by the Secretary of State for the alignment through Long Eaton? Please indicate which option together with your reasons'.

What you said in response to the 2016 consultation

- 2.6.13 A total of 24 respondents expressed either support for both of the options or unspecified support for the proposals, while another six expressed caveated support. A total of 53 respondents expressed support for the high level option, while 26 respondents expressed support for the low level option. In contrast, 254 respondents expressed opposition to both proposed options. A total of 255 respondents offered no comment or opinion on either options, while other respondents commented without expressing clear support or opposition. More information on this can be found on the DbyD report¹¹.
- 2.6.14 A large number of responses included comments detailing environmental concerns, community impacts, engineering considerations and alternative suggestions. Network Rail raised concerns regarding the impact on operations in the Long Eaton area, particularly in relation to level crossings.
- 2.6.15 The main concerns expressed in response to the proposal were the impacts of both options on the local road network, traffic access and severance of the community of

¹¹ <https://www.gov.uk/government/consultations/hs2-crewe-to-manchester-west-midlands-to-leeds-route-refinement-consultation-2016>

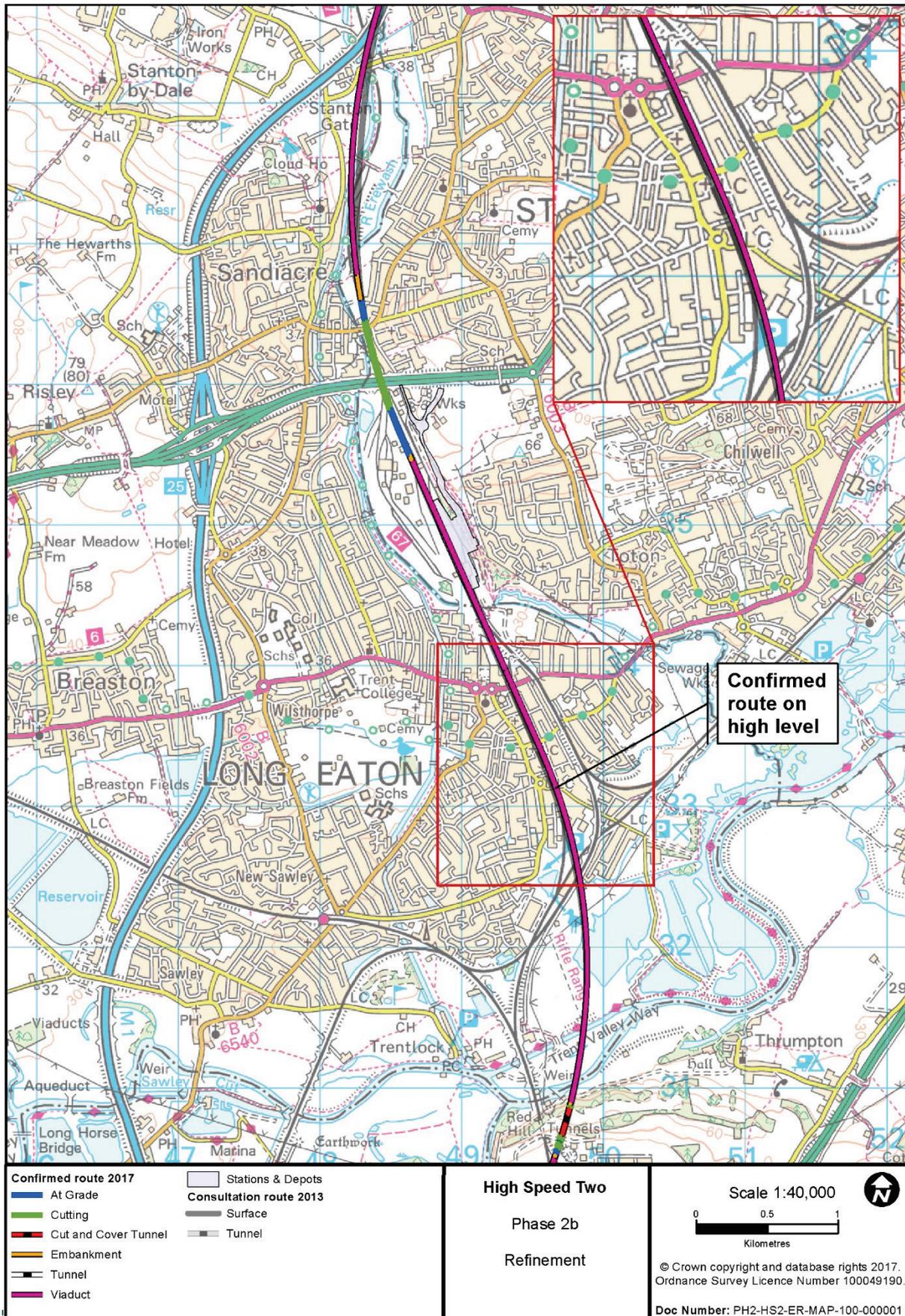
Long Eaton. There were also concerns raised about the potential noise and visual impacts on the community from both options.

- 2.6.16 There were a number of concerns raised regarding the environmental impact of the proposals, particularly in relation to local flooding issues and their impact on the route and the impact on green belt around Long Eaton and the Erewash and Nottingham Canals. Some respondents who opposed the high level option did so due to concerns about increased visual impact of the raised viaduct.
- 2.6.17 Some of the respondents who expressed a preference favoured the high level option as it would reduce impact of the route on traffic and local community, allowing the use of the two rail crossings, minimising impacts on Nottingham Road and Station Road.
- 2.6.18 Other respondents expressed a preference for the low level option (lower level viaduct) as it would have reduced visual impact and the potential reduction in noise impacts due to the lower alignment of viaduct.

Government response

- 2.6.19 Having carefully considered all the points made by respondents, the Secretary of State has decided to confirm the high level option, lengthening the viaduct over the River Trent flood plain to pass through Long Eaton on a viaduct, with HS2 directly to the east of the existing low-level rail corridor (see Figure 8 below). Compared to the lower route, this helps address concerns over flooding and permeability in Long Eaton. It also avoids a number of conflicts with the existing highways network, and reduces disruptive work on the existing railway infrastructure.
- 2.6.20 As a result of the feedback received from the 2016 consultation, HS2 Ltd have reviewed the alternative suggestions made and previous decisions on the route in this area. The majority of alternative suggestions focused on the location of the East Midlands high speed station. This was not part of the route refinement consultation conducted in 2016, but HS2 Ltd has previously considered a wide range of options for serving the East Midlands, including stations at Derby, Nottingham, East Midlands Parkway and East Midlands Airport.
- 2.6.21 The Government recognises that there will be ongoing concerns and issues in taking the high speed route through Long Eaton, including over noise, visual and construction impact. HS2 Ltd will work closely with local stakeholders and communities to consider mitigation options as it develops the design of the route for the hybrid Bill. It will also work closely with Network Rail on the interface with the current rail network.

Figure 8: The confirmed route through Long Eaton on high level viaduct



2.7 Derbyshire to West Yorkshire (M18 / Eastern route)

What the Government proposed in 2013

- 2.7.1 In 2013, the Government proposed to serve South Yorkshire via a new station on the HS2 main line close to the Meadowhall retail complex, to the north east of Sheffield. The proposed Meadowhall station site was located between Sheffield and Rotherham, 20 miles south west of Doncaster and 11 miles south east of Barnsley.
- 2.7.2 In coming to this position, the Government had recognised the potential benefits of serving Sheffield city centre. HS2 Ltd's work at that time looked at different station sites in the city centre for a station on the main line, including at both Sheffield Midland (the current station) and at the former Sheffield Victoria station. However, the Government accepted HS2 Ltd's advice that the benefits of an HS2 station at these locations would not justify the additional costs of taking the high speed line through Sheffield (including tunnelled sections) and construction of a new city centre station suitable for high speed trains. HS2 Ltd also noted that there was more risk to the performance of the whole network if it was routed through the Sheffield Midland site because of flood risks. Furthermore HS2 Ltd's analysis was that the market for travel by HS2 to and from South Yorkshire, though important, was smaller than the market further north including Leeds, York and Newcastle.
- 2.7.3 The route consulted on in 2013 through Meadowhall adopted the alignment of the existing Chesterfield to Rotherham Railway, which would have to be moved westwards over a length of 2.1 miles (3.4km), and then ran northwards through the Rother Valley. The route included a viaduct through the Waverley Major Development site, and crossed the Don Valley on another viaduct, 2.5 miles (4km) long and up to 22 metres high. Meadowhall station was to be constructed on this viaduct, at which point the structure would be about 60 metres wide.
- 2.7.4 North from Meadowhall the route followed the M1 motorway for a short distance, leaving this transport corridor to head towards the east of Barnsley where the terrain is less challenging. This section of route required deep cuttings, high embankments, high bridges and viaducts. Tunnels were required beneath Hoyland and Ardsley. Leaving South Yorkshire, the route headed north across Winterset Reservoir and then passes New Crofton.

Summary of issues from the 2013 Consultation

- 2.7.5 Following the 2013 Consultation the main issue raised about the station at Meadowhall was that the proposed site would be inconvenient for passengers to access from Sheffield city centre. Accordingly, the most commonly suggested alternative to the proposed station at Meadowhall was to locate it in the city centre, either as part of the existing station or in another central location. Two campaigns were in agreement with the 2013 proposal (21 responses) and six campaigns in opposition (785 responses).
- 2.7.6 Stakeholders along the line of the route through Meadowhall also raised a number of issues with the impacts on their communities and the wider environment. South of Meadowhall, issues were raised around proposed demolitions and environmental impacts in a number of areas including Killamarsh, Renishaw and with regard to the Chesterfield Canal restoration project. Concerns were also raised about the impact of the route on the Markham Vale Enterprise Zone, the Advanced Manufacturing Park and residential development at Waverley, and by major land owners along the route. North

of Meadowhall, concerns included the effects on Hesley Wood Scout activity centre, Hoyland, Swaithe, Cold Hiendley, Winterset Reservoir and Rabbit Ings Country Park.

Alternative options that were considered

2.7.7 HS2 Ltd had originally considered a long list of possible alternatives to the Meadowhall route and station. However, in light of the 2013 Consultation responses, an ongoing lack of consensus within Sheffield City Region about the best location for an HS2 station, and requests from some Sheffield City Region stakeholders to revisit alternatives, the Government asked HS2 Ltd to consider a further range of options for South Yorkshire, while maintaining the integrity of the service to markets in Leeds, York and Newcastle. In addition, there had been a number of new developments since 2013, including:

- The Northern Transport Strategy and Transport for the North's (TfN) aspiration for fast and frequent services between city centres
- Increased concerns about congestion on the local road network and the associated impact on local air quality around Meadowhall station, including concerns about the impact of the growth of high volume retail premises in that area
- Development of the Waverley New Community housing scheme (which would be impacted by the Meadowhall route) with 3,890 residential units, as well as commercial development and leisure/community facilities
- Better appreciation of the risks associated with construction of the Meadowhall station on the viaduct above the Don Valley (viaduct 4km long, station 60m wide, 20m above ground level)
- The potentially substantial compensation associated with the shopping centre and high numbers of demolitions along the line of the Meadowhall route, both residential and commercial

The five key decision factors

2.7.8 HS2 Ltd's work was reported by *Sir David Higgins in the Sheffield and South Yorkshire Report 2016*¹². As well as the developments outlined above, it took account of a better understanding of the effect of the proposed Meadowhall route on property and businesses, and the distribution of rail demand within South Yorkshire, with concentrated areas of long distance demand being Sheffield city centre, and the area between the city centre and Chesterfield. These led Sir David to reconsider the strategic arguments around how South Yorkshire should be best served by HS2. He set out five key factors against which possible route options were to be assessed. They were:

- Demand – from both South Yorkshire and markets further north
- The needs of Sheffield and the wider region
- Connectivity with existing rail and the wider transport network
- Topography, urban density, demolitions, and the environment
- Cost

¹² <https://www.gov.uk/government/publications/hs2-sheffield-and-south-yorkshire-report-2016>

- 2.7.9 HS2 Ltd's work confirmed previous conclusions around the cost of routing the HS2 main line through Sheffield and building a new station on that line. However, it also identified that the city centre could be accessed via a new spur from HS2, served by HS2 trains which could use the existing Midland Main Line railway.
- 2.7.10 Sir David proposed that the best way of providing a core HS2 service to South Yorkshire whilst maintaining the integrity of services to other cities on the eastern leg was:
- A 9.4km southern spur east of Stonebroom built off the HS2 main line, enabling HS2 trains to run into Sheffield city centre along the existing rail network
 - Moving the main north-south alignment to follow a more easterly alignment over some 70km between Derbyshire and West Yorkshire
- 2.7.11 HS2 Ltd's work had also identified the potential to create a connection back on the HS2 main line north of Sheffield enabling services stopping at Sheffield Midland station to travel on the high speed line to Leeds. Following Sir David Higgins' report, the Secretary of State commissioned HS2 Ltd to study the case for (a) a parkway station on the proposed main line to serve other parts of South Yorkshire, and (b) extensions to HS2 services that would otherwise terminate at Sheffield Midland to Meadowhall, Rotherham or Barnsley.
- 2.7.12 Alongside this work, HS2 Ltd had continued its work to further develop the Meadowhall route, to reduce the environmental impacts and cost of the 2013 proposal. These changes were incorporated in to what is referred to as the 'refined Meadowhall route'. The main differences between the 2013 and the refined Meadowhall route were changes to the alignment to avoid an industrial development site and a waste site in the Markham Vale area, and a change to the alignment in the Blackburn and Normanton area to avoid the need for two tunnels. As the refined Meadowhall route performs better than the original 2013 Meadowhall route on criteria such as engineering challenges, the number of demolitions required and cost, HS2 Ltd has used this refined route as the basis of subsequent comparisons with the M18 / Eastern alignment. HS2 Ltd's advice to the Secretary of State is based on a comparison of the performance of the refined Meadowhall route and the M18/Eastern route against Sir David Higgins' five factors.
- 2.7.13 The refined route was not previously published in order to avoid any potential further blight. As the Secretary of State has now announced his decision as to the route, it is included in HS2 Ltd's advice document¹³ for transparency.

What the Secretary of State proposed in 2016

- 2.7.14 The Secretary of State was minded to accept Sir David's recommendations and his view of the key decision factors to be considered. The Secretary of State launched the 2016 consultation seeking views on adopting this route as the Government's preferred route as it:
- Provided direct access into Sheffield city centre: previous work had been unable to identify an affordable way in which HS2 services could be built into the city centre. Delivering HS2 services from high speed lines onto the existing railway to Sheffield Midland overcame these issues

¹³ <https://www.gov.uk/hs2>

- Had the ability to serve additional markets: the southern connection provided the opportunity to provide a new HS2 service at Chesterfield
- Reflected the regional demand picture: enabled areas where there are higher levels of demand for long-distance rail journeys to be served, namely south west Sheffield and Chesterfield
- Reduced the overall line of route impacts: the mainline would avoid much of the challenging topography, mining risk and densely populated urban areas associated with the Meadowhall route; resulting in fewer direct property demolitions. It also had less interference with watercourses and provided an overall reduction in anticipated noise impacts
- Reduced capital costs: provided a cost saving in the region of £1bn including contingency (whilst providing for a northern junction in the vicinity of Clayton)
- Improved journey times to Sheffield city centre: provided a journey time saving to larger markets further north, including Leeds, York and Newcastle. This helped to improve the overall business case for Phase Two
- Had the potential to meet TfN's aspirations for city centre to city centre connectivity if a link on to the HS2 line north of Sheffield were to be built, thereby providing a high speed service to Leeds and destinations to the north

2.7.15 The use of Sheffield Midland for HS2 services also opened up the prospect of achieving TfN's ambition for frequent and fast city centre to city centre services between Sheffield and Leeds. The high speed line would cross the existing rail network in the vicinity of Clayton, and a junction in this area would allow trains to run between Sheffield and Leeds city centres in less than 30 minutes. The Secretary of State was minded to include such a junction in the development of the HS2 scheme and sought views on this in the consultation.

2.7.16 The proposed route itself would see a southern spur off the main high speed line east of Stonebroom to provide a dedicated link towards the existing Midland Main Line at Clay Cross, enabling high speed trains from London to serve Sheffield city centre and Chesterfield. The main HS2 route would run to the west of Bolsover, then north on a 490m long viaduct over the M1, before continuing to the west of the M1 in the existing transport corridor and passing to the west of Barlborough, east of Killamarsh, Norwood and Wales. Passing Aston the route would rise towards the M1 / M18 interchange, crossing the A57 on viaduct. The route would then run adjacent to the M18 immediately west of Bramley in cutting and then descends into the valley across the River Dearne, passing between Conisbrough and Mexborough. It then heads north, running east of Barnburgh and Hickleton and between Thurnscoe and South Kirby. Approaching Crofton from the south east, it would cross the A638 on a 300m long viaduct.

Consultation questions:

'Do you support the proposal to amend the route to serve South and West Yorkshire? Please indicate whether or not you support the proposal together with your reasons.'

'Do you support the potential development of a northern junction to enable high speed services stopping at Sheffield to continue further north? Please indicate whether or not you support the proposal and your reasons.'

'Do you support the proposed location of the northern junction in the vicinity of Clayton? Please indicate whether or not you support the proposal and your reasons.'

What you said in response to the 2016 consultation

- 2.7.17 The issues relating to how South Yorkshire should be served by HS2, and the route of the HS2 line through Nottinghamshire and South and West Yorkshire, received the greatest level of interest and response during the consultation. This reflected both the scale of the changes (around 70km of new route was proposed), and the different views as to how best to serve the region.
- 2.7.18 A total of 271 respondents expressed support for the proposal to amend the route to the M18 / Eastern alignment, while 57 respondents expressed caveated support. In contrast, 4,157 respondents expressed opposition to the proposals. A total of 151 respondents stated that they had no comments or opinion on the matter, and other respondents commented without expressing clear support or opposition. More information on this can be found on the DbyD report¹⁴.
- 2.7.19 A number of respondents expressed support for the proposed route realignment for transport and economic reasons. Sheffield City Council was very supportive of the proposal, arguing that city centres are unique drivers of their regional economies, and noting the importance of a connection via HS2 to Leeds. Sheffield City Region & Local Enterprise Partnership also noted that “Improving connections between key economic centres of the North will help drive growth and productivity, rebalancing the UK economy and contributing an additional £97bn to the UK economy by 2050”. Barnsley Metropolitan Borough Council noted that suggestions for extending classic compatible HS2 services north from Sheffield to Barnsley could ease issues at Sheffield Midland and achieve the HS2 transformational and economic re-balancing objectives.
- 2.7.20 There were strong objections to the proposed route as respondents expressed concerns about the right way to serve South Yorkshire. Doncaster Metropolitan Borough Council, whilst supportive of High Speed Rail, opposed the proposals, considering that Meadowhall was a better option for a station. Other respondents also felt that the M18 / Eastern route would not serve the wider South Yorkshire region as well as the previous Meadowhall option. Several respondents argued that TfN’s aspirations could be better delivered by services from Meadowhall rather than Sheffield city centre. Other consultees, including a number of Members of Parliament, considered that the Meadowhall route provided faster journey times to South Yorkshire, better prospects for regeneration and jobs, and more capacity at a very similar cost to the M18 / Eastern route.
- 2.7.21 A number of consultees noted the importance of planning HS2 in a manner that also helped in the development of better connectivity between cities in the North. TfN noted that by exploiting synergies between Northern Powerhouse Rail and HS2, better solutions for much improved connectivity and capacity from Sheffield could be achieved. The West Yorkshire Combined Authority also noted the importance of ensuring that HS2 and Northern Powerhouse Rail are planned in a joined up way and complement each other.
- 2.7.22 Respondents who opposed the proposed route did so for a range of reasons. While some respondents expressed support for the proposal highlighting the benefits to the region, others felt that the current proposal would bring fewer benefits to South Yorkshire but still have high impact on the local communities. Some respondents raised concerns about the impact on the local road network, traffic on the M1 and the air quality in the area. Some consultees suggested alternative alignments to the M18 / Eastern route.

¹⁴ <https://www.gov.uk/government/consultations/hs2-crewe-to-manchester-west-midlands-to-leeds-route-refinement-consultation-2016>

- 2.7.23 Respondents in a number of communities, including Newton, Blackwell, Aston, Bramley, Mexborough, Conisbrough, Barnburgh and Crofton expressed concerns relating to property demolitions, noise impacts, visual impacts and disturbance from construction operations, including concerns about road closures or realignments and impact on amenities. These concerns often conveyed strong feelings, and in some cases were also set out in collective responses such as those received from Yorkshire Against HS2, the Joint Rural Parishes (of South Yorkshire), Bramley Action Group, and Sprotbrough and Cusworth Parish Council.
- 2.7.24 A majority of respondents expressed significant concerns that the proposed route alignment would have substantial impacts on new housing developments, either completed or still under construction, in particular the Shimmer Estate in Mexborough. Some consultees questioned HS2 Ltd's evidence that the M18 / Eastern route had fewer property demolitions than the alternatives.
- 2.7.25 A number of consultees questioned HS2 Ltd's view that the M18 / Eastern route had fewer risks related to historic mine workings and had fewer geological challenges than the alternative Meadowhall route. Others noted that the Meadowhall station would also have been affected by geological issues.
- 2.7.26 Some consultees favoured the new proposals, where they removed impacts on places on the 2013 route, for example in removing any impact on the restoration of the Chesterfield Canal, on Waverley and the Innovation District, on the villages of Renishaw, Killamarsh and Treeton, or on the Rother Valley Country Park.
- 2.7.27 In terms of the possible northern junction, 204 respondents expressed agreement while 3240 were opposed. For the specific location at Clayton, 80 expressed support and 2814 opposed. Reasons given by those opposed included objection to the M18 alignment itself or to the local impacts of the junction; that the junction provides little or no benefit for communities such as Wakefield; and the practicality / benefit of the proposed train services. Those in favour tended to highlight the importance of better connections between Sheffield and Leeds.

Government response

- 2.7.28 Having carefully considered the points made by respondents to the consultation and further advice from HS2 Ltd, the Secretary of State has decided that confirming the route as consulted in 2016 (see Figure 9 below) supports his strategic aims of serving South Yorkshire whilst maintaining the integrity of the service to the larger markets in Leeds, York and the North East and direct connectivity into northern city centres in support of the Northern Powerhouse ambition. The Secretary of State's view is that the M18 route performs better overall than the Meadowhall route assessed against Sir David Higgins' five factors. The Secretary of State is therefore confirming the proposal to:
- Build a 9.4 km southern spur to the east of Stonebroom off the HS2 mainline, enabling HS2 trains to run in to Sheffield city centre along the existing rail network
 - Move the main north-south route alignment to follow a more easterly alignment over some 70km between Derbyshire and West Yorkshire
- 2.7.29 The Secretary of State has also asked HS2 Ltd to take forward work on a connection back onto the HS2 main line north of Sheffield through a northern junction in the vicinity of Clayton (with powers sought in the Phase 2b hybrid Bill) to support delivery of TfN's

ambition for frequent 30 minute services between Sheffield and Leeds. Provision for this junction is to be made within the HS2 budget.

2.7.30 The Government is acutely aware of the impacts that building a new railway has for those who live nearby, and recognises communities' concerns about the effects of construction and operation in their areas. HS2 Ltd is committed to reduce the impacts of the route as far as possible, and manage the remaining impacts to reduce disruption to communities, businesses and the environment in ways that reflect best practice within the construction industry. As the scheme progresses, HS2 Ltd will reflect the concerns of local authorities, communities and other stakeholders while developing the route design to address local effects of construction and reduce potential impacts. Options to mitigate landscape impact will also be examined more closely during the design phase. HS2 Ltd will consider in greater detail options for mitigating the landscape impact of this route alignment, including at locations such as Aston and Barnburgh. As reported below, HS2 Ltd has also progressed the work on the South Yorkshire Parkway and service extensions study.

2.7.31 The decision about how HS2 can best serve the South Yorkshire region has been difficult as the considerations informing the decision are finely balanced, and opinion amongst local stakeholders about the best location for an HS2 station in the region has remained divided. The Government recognises in particular the strength of feeling among some local residents whose properties and local environment will be significantly impacted by the preferred route. The Government's approach is to seek to maximise the benefits of HS2 and minimise impacts such as demolitions and noise. The costs and benefits of the different options must be considered in relation to the benefit it would provide, not just to Sheffield and South Yorkshire, but also to the rest of the places being served by HS2 to the north.

2.7.32 In reaching his decision the Secretary of State has considered the five key factors identified by Sir David Higgins as set out below.

Demand from South Yorkshire and markets further north

2.7.33 HS2 Ltd has confirmed its analysis and understanding of the overall demand picture. Demand for long distance rail travel emanating from South Yorkshire needs to be balanced against demand from other markets further north. The demand generated by Leeds is almost double that of Sheffield. For every 2 passengers projected to alight in the Sheffield City Region, a further 7 are travelling beyond to other destinations served by HS2.

2.7.34 HS2 Ltd's modelling of the M18 / Eastern route shows that it delivers an increase in the greater overall benefits of the full Y HS2 network compared to current modelling of the Meadowhall option.

2.7.35 The Secretary of State must decide on the strategic balance between serving South Yorkshire's needs and those of other regions further north and south. With the M18 / Eastern route enabling faster journeys to destinations with high levels of demand and the inclusion of Chesterfield, as well as increasing the overall benefits of the Y shaped network, the Secretary of State continues to judge that the M18 / Eastern route better meets the strategic objectives of HS2 than the Meadowhall route. The Secretary of State considers that Doncaster will continue to be served well by the East Coast Main Line after HS2 opens.

The needs of Sheffield and the wider region

2.7.36 HS2 Ltd has also confirmed its analysis of the needs of the South Yorkshire region. Sheffield city accounts for 50 percent of all the current city region journeys to London and Birmingham, with a further 12 percent in and around Chesterfield. Serving a station

in the centre of Sheffield, with a stop at Chesterfield, could provide additional services to these areas of demand for long distance travel.

- 2.7.37 Some respondents objected to the M18 / Eastern route arguing that it would serve the region less effectively than the Meadowhall option and that Meadowhall would be better for regional development. This view was not universal, with Sheffield City Council stating that a city centre station would better support regeneration and development. Their view was supported by the Advanced Manufacturing and Innovation District. Proposals for future development in the Sheffield City Region show that the largest increases in housing and employment growth are also proposed in Sheffield. Sheffield is therefore expected to remain the main regional centre of demand and this is reflected in HS2 Ltd's modelling.
- 2.7.38 For some towns, including Rotherham, it would take longer to reach Sheffield Midland than via Meadowhall. However this could be mitigated by shaping local services in South Yorkshire around HS2. It is also the case that Doncaster already enjoys a good rail service to London and will continue to do so beyond the opening of HS2. In consultation, a question was raised about the limitations of the demand modelling, in particular whether poorer existing services led to suppressed demand in parts of the region for long distance travel. HS2 Ltd undertook an analysis of the propensity to travel from different parts of the city region which showed broadly consistent trips per head of population by road to London and Birmingham from areas such as Barnsley and Rotherham but lower trips by rail, which lends some support to this view. However, HS2 Ltd does not believe that this would fundamentally change the conclusions reached around future demand given the wider context of the current pattern of population and employment, and expected growth in these.
- 2.7.39 The Secretary of State is satisfied that the arguments presented, combined with mitigating factors laid out by HS2 Ltd, weigh in favour of the M18 / Eastern route.

Connectivity with the existing rail and wider transport network

- 2.7.40 The Secretary of State appreciates the importance of the wider transport infrastructure which provides access to an HS2 station and supports demand and enables regional benefit whilst minimising impacts. The consultation and stakeholders comments demonstrated concerns about how a Meadowhall Station would impact on the Strategic Road Network, particularly the M1. Different concerns arise about parking and local roads serving Sheffield Midland station. There are complexities in either case in terms of connectivity with the rail network, but the Secretary of State is of the view that serving Sheffield Midland enables HS2 to serve additional markets and better support TfN's aspirations for city centre connections. It is clear that it will be necessary for the appropriate road infrastructure to be in place in order to support the development of Sheffield Midland as a hub for HS2 and this which will need to be considered as part of wider strategic planning in the region.

Topography, urban density and environment

- 2.7.41 In considering the line of route through the rural and built environments the Secretary of State has considered: topography, demolitions, noise, air quality and geological risk. HS2 Ltd has advised on the impacts of these issues and how they feed into the other key factors in order for him to make his decision. The advice from HS2 Ltd is described below.

Topography

- 2.7.42 Although the M18 / Eastern route has more impact on the landscape, it has significantly less impact on people and communities. The route avoids the need for a complex viaduct at Meadowhall, has reduced risk from former mining activities, there are fewer potential watercourse diversions and lower expected noise impacts. HS2 Ltd now has

a greater understanding of the geological risks involved in the Meadowhall route, some of which are significant. The advice has indicated that there is a lower level of risk from geological issues arising from the legacy of industrial activity on the M18 route than on the Meadowhall alignment.

- 2.7.43 The M18 / Eastern route provides access to Sheffield Midland station, which is already established in the centre of the urban area. The Meadowhall station would be a significant new construction, with a 6 track alignment on a 20m viaduct requiring the remodelling of the existing highway.

Property demolitions

- 2.7.44 HS2 Ltd assesses property demolition between options by using a consistent set of standards around engineering and route foot prints. These standards have been applied consistently between each of the options considered in South Yorkshire.
- 2.7.45 HS2 Ltd's advice is that the M18 / Eastern route would require 35 residential and 16 commercial demolitions, including 16 residential properties at the Shimmer estate. The refined Meadowhall route would require 80 residential and 47 commercial demolitions. Some respondents to the consultation argued that the M18 demolitions should be taken to include the full 216 properties originally planned at the Shimmer estate, and that on this basis the M18 demolition numbers would be higher. However, HS2 Ltd's advice is clear that – at the current level of route design, which is the same as for the Meadowhall route – only 16 properties at the Shimmer estate would need to be demolished. The entire estate has been safeguarded due to construction and engineering challenges. The Secretary of State notes that there are similar potential issues on the Meadowhall route for example at Waveley New Community and is confident that property demolitions will be significantly lower on the M18 route.

Potential demolitions	2013 Consultation Route Meadowhall	'Refined Meadowhall' Route	M18/ Eastern Route
Residential	84	80	35
Commercial and industrial	57	47	16
Overall	141	127	51

Table 1: An appraisal of potential demolitions associated with the routes through South Yorkshire

- 2.7.46 Overall the M18 / Eastern route leads to a reduction in the number of properties that would fall into safeguarding, and results in 90 fewer demolitions than the 2013 consulted route. The M18 / Eastern route has an 81 percent reduction in the total number of properties that would be eligible for statutory compensation and non-statutory property schemes compared to the Meadowhall alignment.

Landscape

- 2.7.47 The M18 / Eastern route option would have significant landscape impacts at a series of new, previously unaffected, locations along the 69km section from Tibshelf to Altofts. The option would also lead to the demolition of four Grade II listed properties, two more than under the Meadowhall route option, and would have a major setting impact on Grade II* listed Hickleton Hall.
- 2.7.48 The Meadowhall option would have moderate landscape and visual impacts as most of the route passes through developed areas. This option would lead to the demolition of two Grade II listed buildings, direct impact on one conservation area and a major setting impact on five Grade II listed buildings and one Grade II* listed building.

Air Quality

- 2.7.49 The consultation revealed that there were concerns about the impact of HS2 on local air quality around Meadowhall and Midland stations as a result of increased road traffic on both strategic roads and local roads.
- 2.7.50 In particular, in 2013 the consultation revealed some concerns that a station at Meadowhall would significantly worsen traffic on the M1 and the Meadowhall shopping centre and therefore air quality in the area. Respondents to the 2016 consultation raised similar concerns about air quality and parking impacts on local roads around Sheffield Midland. HS2 Ltd recognises that there are concerns about the ability to cope with growth at both locations and this could impact on air quality if not managed.
- 2.7.51 Concerns raised around dust and emissions from construction traffic will be considered during detailed development of the environmental impact assessment and mitigation measures. HS2 Ltd will comply with the air quality regulations, during construction.
- 2.7.52 The Secretary of State notes that a management strategy to deal with air quality will be needed with either location and that appropriate local infrastructure and regional transport connections will need to be considered irrespective of the route and station decision.

Noise

- 2.7.53 HS2 Ltd's advice is that the noise impacts of the M18 / Eastern route are around two thirds lower than those for the Meadowhall route. This reflects the fact that the Meadowhall route passes more closely to homes in the rural and urban areas.

	2013 Consultation Route Meadowhall	'Refined Meadowhall' Route	M18 / Eastern Route
Households experiencing noticeable noise impacts	17,500	29,000	9,700

Table 2: An appraisal of households experiencing noticeable noise impacts on the routes through South Yorkshire.

- 2.7.54 HS2 Ltd's analysis also demonstrates that, after refining the Meadowhall route, there are far fewer people living in close proximity to the M18 / Eastern route. Based on an indicative appraisal, the number of dwellings within 100 metres of the surface route for the 'refined Meadowhall' route is 1,000, compared with 600 on the M18 / Eastern route.
- 2.7.55 The Secretary of State considers that on grounds of topography, urban density and environmental factors, there is clear evidence in favour of the M18 / Eastern Route alignment. Urban construction of a station is not required, the route contains less risk from mining, fewer properties are required for demolition and noise impacts are significantly reduced.

Costs

- 2.7.56 The adoption of the M18 route results in an infrastructure saving of £858m (£1.2bn including contingency). As set out in the November 2016 consultation, this cost saving assumes the cost of delivering a junction in the Clayton area north of Sheffield back on to the HS2 mainline, but not the costs of electrification of the Midland Main Line (MML) between Clay Cross and Sheffield Midland or electrification of the existing railway from Sheffield to Clayton (and any signalling renewal at Sheffield). The M18 / Eastern route is therefore cheaper to construct than an equivalent route through Meadowhall after allowing for the costs of a northern junction. This reflects the fact that the Meadowhall

route required a long viaduct alongside the M1 and across the Don Valley with a station along part of its length, and is over more undulating terrain.

- 2.7.57 There were three main challenges to this view of costs in the 2016 consultation. First was the contention that HS2 Ltd had underestimated the level of risk inherent in the new route, particularly due to geological issues.
- 2.7.58 HS2 Ltd's overall estimate for the M18 / Eastern route includes contingency provision in the form of optimism bias at an average of 40 percent. This approach, which has been validated against Treasury guidance and subject to detailed assurance, was adopted throughout the Phase Two route development, and we do not consider that the risk inherent in the M18 / Eastern route is so relatively high as to warrant a different approach to risk in this area. In fact, HS2 Ltd's advice is that the geological risks are likely to be higher with the Meadowhall route (which has throughout been costed with the same approach to contingency).
- 2.7.59 The second main challenge to HS2 Ltd's appraisal of costs was that the M18 cost estimate specifically excluded a number of critical costs which would be necessary to make the proposals work in practice.
- 2.7.60 As set out in the 2016 consultation paper, HS2 Ltd has included in the cost estimate, the delivery of a junction north of Sheffield and back on to the HS2 main line, but not the cost of electrification of the Midland Main Line between Clay Cross and Sheffield Midland or from Sheffield to the north.
- 2.7.61 Some responses to consultation argued that the capital cost of the M18 route would be more than the Meadowhall route if allowance is also made for these two sections of electrification, a new parkway station on the M18 / Eastern route and the need for additional rolling stock on the M18 / Eastern route.
- 2.7.62 The Government does not agree with this analysis. It is difficult to make like for like comparisons, especially given changes in the strategic context resulting from the ambitions set out by TfN. To make a comparison in the current context, the cost of the provision of a junction to enable direct city centre Sheffield – Leeds services, currently included in the M18 option only, should either be excluded, or the cost of fully equivalent functionality should be added to both the M18 and Meadowhall routes. On the latter basis, and after allowing for rolling stock costs and HS2 Ltd's latest view of what a parkway should cost, there remains a capital cost difference of c. £1bn in favour of the M18 / Eastern route given that electrification north of Sheffield would apply in either case. In any event, although work continues, no decision has been made on a parkway station, and if diesel / electric bi-mode trains (capable of 140 mph in electric operation) were available it would be possible to operate Sheffield-Leeds services (via Clayton) without electrification north of Sheffield.
- 2.7.63 The third main challenge raised was that after allowing for the difference in net operating costs, the Meadowhall route is cheaper on the basis of the train service assumed. The Government accepts that with the service pattern assumed in the economic case there is little difference in capital plus operating costs less revenue of the Meadowhall and M18 /Eastern routes. It notes, however, that this assumed service pattern added over 1,000 seats per hour out of Euston on HS2 for the M18 route compared to that assumed for the Meadowhall route. If these were not justified by demand there would be alternative and lower cost ways of organising the train service. The Government also accepts that there is greater uncertainty in the forward projection of operating costs and revenue, and so (as set out in the economic case) demand is assumed to grow much more slowly than trend after 2037, meaning that the revenue forecasts may be conservative.

2.7.64 With these modelling assumptions, where there is little difference in total costs to government between the M18 and Meadowhall options, the Secretary of State notes that the M18 route gives overall benefits calculated to be £1.5bn higher and, therefore (as a change from Meadowhall) very high value for money.

Alternatives to the M18 / Eastern route

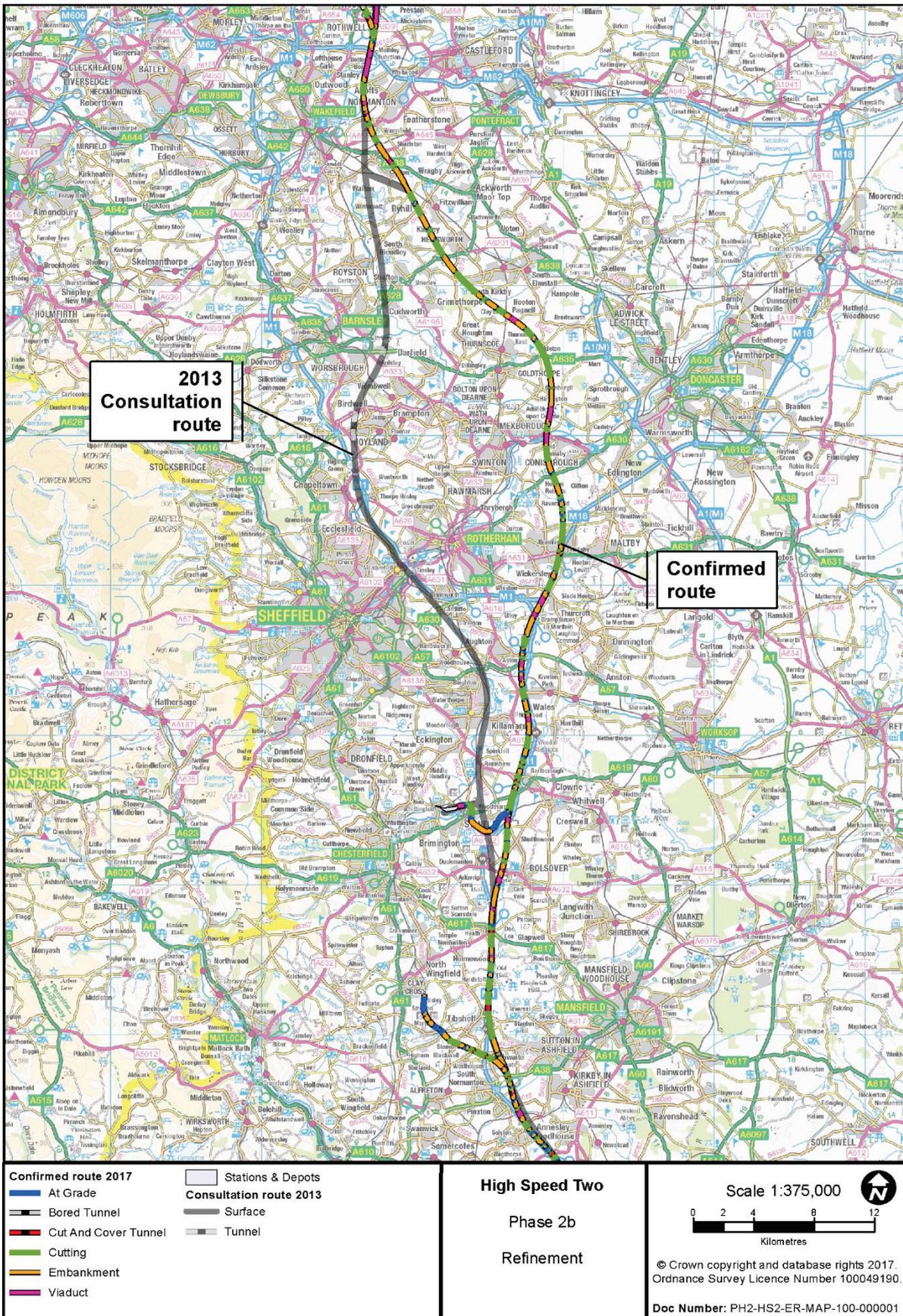
2.7.65 The Secretary of State has received advice from HS2 Ltd considering alternatives to the M18 route, including those proposed by respondents. These included routes to the east of Conisbrough. HS2 Ltd's advice, which the Secretary of State accepts, is that none of the alternative alignments considered deliver an overall improvement in the route assessment. However, during the development of the design through to hybrid Bill deposit, further local mitigations will continue to be explored.

2.7.66 Some respondents also asked whether the Meadowhall route could be considered with a spur in to Sheffield city centre and no station. The Government considers that this would be likely to strengthen the relative cost arguments in favour of the M18 / Eastern route, since the operating cost assumptions for the M18 / Eastern and Meadowhall routes would then be much more similar notwithstanding any reduction in capital cost saving.

Northern junction

2.7.67 The Secretary of State has carefully considered the points raised in the consultation about the proposed northern junction and its location. He considers the provision of such a junction, giving the ability to run fast services between the city centres of Sheffield and Leeds, to be an important additional benefit of the M18 / Eastern route. A junction near Clayton would be capable of giving Sheffield-Leeds journey times of less than 30 minutes in line with TfN's ambitions. HS2 Ltd will take forward work on the design of such a junction, and we would expect to undertake further consultation on this in due course.

Figure 9: The confirmed re-alignment of the route between Derbyshire and West Yorkshire

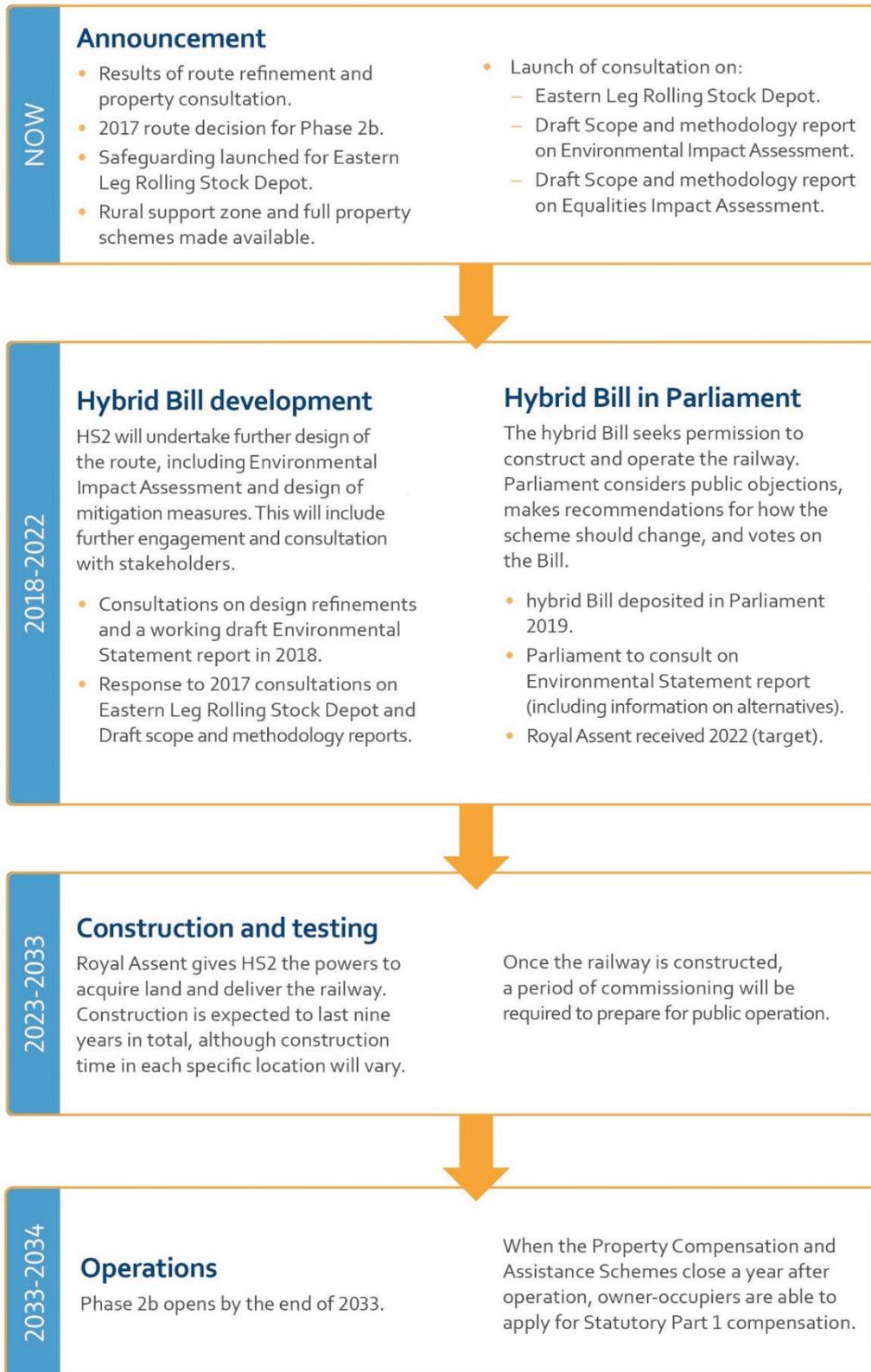


2.8 Eastern Leg Rolling Stock Depot (RSD)

- 2.8.1 The 2013 Consultation proposed a rolling stock depot (RSD) on the Eastern Leg of the Phase Two route at New Crofton. At the time, this site was a good fit with the engineering design requirement.
- 2.8.2 In the 2016 consultation, the proposed M18 / Eastern route meant that the main high speed line would pass to the east of the New Crofton depot site, rather than to the west, as was proposed in 2013. This altered the access arrangements to the RSD and had the effect of increasing the impact of HS2 on New Crofton.
- 2.8.3 During engagement and consultation, the suitability of the New Crofton site was questioned by respondents because:
- The site is currently rural in appearance (though technically brownfield as rehabilitated from industrial use)
 - It would mean the village of Crofton was surrounded on three sides by HS2 infrastructure
 - It would isolate New Crofton from villages to the south and west, and disrupt key access roads during construction
- 2.8.4 The Secretary of State had asked HS2 Ltd to review again the potential locations for the RSD. For a site to be potentially suitable, it needed to be:
- A large, flat site
 - As close as feasible to Leeds, to minimise the distance of empty train movements
 - Preferably brownfield rather than greenfield
 - Suitable for 24-hour working
 - Accessible to workforce and local transport networks
- 2.8.5 Three alternative locations were identified, and HS2 Ltd's analysis suggests that the best of these is a former power station site east of Leeds in the Aire Valley adjacent to the M1 near junction 45.
- 2.8.6 The site is on brownfield land, used previously for industrial purposes, and has good highway connections. It currently has planning consent for a large area of commercial development. HS2 Ltd's advice is that the east of Leeds RSD site has lower environmental impacts and is better operationally than the New Crofton site, with potential for significant operational cost savings, as it is closer to Leeds.
- 2.8.7 The Secretary of State is therefore minded to relocate the RSD to a site east of Leeds in the Aire Valley adjacent to the M1 and is holding a consultation on the new location before making a decision. The consultation can be found at www.gov.uk/hs2

3 Timeline

The Government has a clear plan to deliver an affordable, value for money, innovative and high performing railway, fit for the long term future of this country.



ISBN 978-1-4741-4597-8



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