

# **HS2 Ltd's Advice to Government: Eastern Leg Rolling Stock Depot Consultation**



## Department for Transport

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# 1 Introduction

1.1.1 This advice sets out the recommendations from High Speed Two (HS2) Ltd to the Secretary of State for Transport regarding the location of the Eastern Leg Rolling Stock Depot (RSD), as consulted on between 17 July 2017 and 12 October 2017. This advice explains:

- the background to the consultation, including the work reported previously to the Secretary of State prior to the July 2017 announcement, which recommended a change in the location for this depot;
- an overview of the feedback to the consultation;
- a review of work undertaken following the consultation to consider the alternative depot locations and orientations received in response; and
- our recommendations, including the justification for these recommendations.

1.1.2 Our intention is to ensure the Secretary of State has an understanding of the views expressed and the technical work undertaken by HS2 Ltd when taking his formal decision.

## 2 Scope of advice

- 2.1.1 This advice will focus on the Eastern Leg RSD, which was consulted on between July and October 2017. The site of the newly proposed Leeds East RSD and previously proposed New Crofton RSD are shown at Figure 1.
- 2.1.2 The public were informed about the nature of the consultation with the information set out in the public consultation document, entitled “High Speed Two Phase 2b Crewe to Manchester West Midlands to Leeds: Eastern Leg Rolling Stock Depot Consultation document July 2017”<sup>1</sup>. This consultation document outlines the process which resulted in the Secretary of State recommending the relocation of the RSD to a site east of Leeds, and seeks the views of the public on it.
- 2.1.3 This document does not seek to cover matters relating to the ongoing design development of the Phase 2b scheme. Advice on this will be presented to the Department for Transport (DfT) in 2018. Furthermore, this document does not set out any advice on the consultation held at the same time as the Eastern Leg RSD consultation, namely the Phase 2b Environmental Impact Assessment and Equalities Impact Assessment Scope and Methodology Reports Consultation.
- 2.1.4 This advice responds to the matters raised in response to the consultation, which are set out in the Consultation Report developed by Ipsos Mori.

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<sup>1</sup> This is available here:

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/629994/CS867\\_Eastern\\_Leg\\_Rolling\\_Stock\\_Depot\\_Consultation\\_Document\\_170714.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/629994/CS867_Eastern_Leg_Rolling_Stock_Depot_Consultation_Document_170714.pdf)

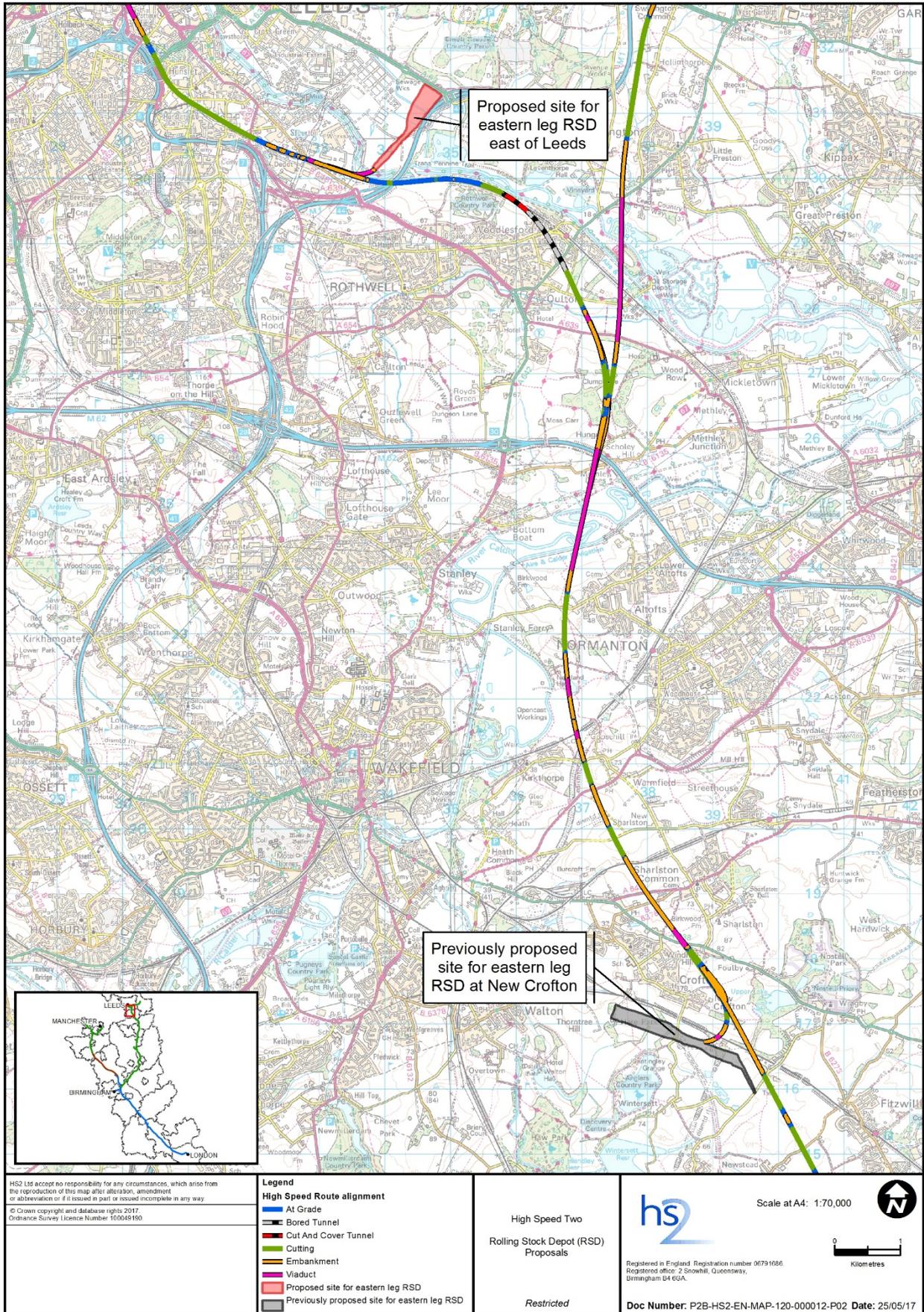


Figure 1: Leeds East and New Crofton RSD Sites

## 3 Overview of consultation

### 3.1 Development of RSD proposals

3.1.1 The main function of an HS2 RSD is for the overnight stabling, cleaning and maintenance of HS2 trains. The requirement for an RSD on the Eastern and Western Legs has been central to the development of the Phase 2b route, as strategically placed sites would be needed to ensure the railway can be operated effectively. The work to identify an RSD for the Eastern Leg of Phase 2b began at the same time as the wider route development work, allowing options to be considered in line with the developing route and station proposals.

3.1.2 The outcomes of this early work to identify suitable depot locations is set out in the 2012 Options for Phase Two of the High Speed Rail Network report, and summarised below.

#### **Original Depot Optioneering**

3.1.3 The original route development work identified 21 options for an RSD on the Eastern Leg, based on a high level analysis of the route corridor, identifying sites that met the size and location requirements for an HS2 RSD. The original option list was sifted based on a set criteria, which included engineering, operational and sustainability considerations. This work resulted in a long list of four options on the Eastern Leg being produced, which were then sifted further.

3.1.4 The previously proposed site at New Crofton was viewed as preferable as a result of its accessibility for services from Leeds as well as services from further north on the ECML. The site also offered access onto the existing, electrified network. From a sustainability perspective, whilst the site is on a brownfield site, it is entirely set within the green belt, and also in close proximity to a country park. Furthermore there would be visual impacts on the village of Crofton, and is in an area identified for regeneration. However, on the balance of considerations, it was decided that the site at New Crofton should be recommended as the preferred option.

3.1.5 The approach followed for this depot site is consistent with the approach taken for the RSD and Infrastructure Maintenance Depots (IMD) on both the Eastern and Western Legs of Phase Two.

#### **Phase Two Route Consultation 2013/14**

3.1.6 The 2013 route consultation proposed a route running to the west of Crofton, with the depot located to the south of the village. Respondents to the consultation expressed concern about the impact on the village, with very few benefits expected to be felt by the local residents to mitigate these impacts. Some respondents

suggested alternative depot locations that they asked to be considered in place of the site at New Crofton.

### **M18/Eastern route development and consultation**

- 3.1.7 Following this consultation, HS2 Ltd looked at a number of refinements to the entire Phase Two route alignment, including some refinements to the route between Derbyshire and West Yorkshire.
- 3.1.8 Further to this refinement activity, the lack of consensus in the region as well as the changing strategic transport picture in the North resulted in HS2 Ltd looking again at how the region should be served. This resulted in the proposal by Sir David Higgins of the M18/Eastern Route in the 2016 Sheffield and South Yorkshire Report. This route option was formally put forward as the Secretary of State's preferred route for HS2 in November 2016, and a public consultation was launched on the proposals between 30 November 2016 and 31 March 2017.
- 3.1.9 The proposed M18/Eastern route refinement stretched from Derbyshire to West Yorkshire, and included a new route alignment past the village of Crofton. Whilst this new alignment did not preclude the use of the same depot site, it did present a number of new impacts on the community. The depot location and new approach as a result of the M18/Eastern route alignment are set out at Figure 2.
- 3.1.10 During the engagement events relating to the M18/Eastern route announcement in autumn 2016, it became apparent that the level of impact on the community of Crofton from the new route alignment presented additional challenges. Following these events, the Secretary of State asked HS2 Ltd to look again at the site of the depot, to identify whether there was the possibility of removing the impacts on Crofton.
- 3.1.11 During ongoing engagement with local stakeholders and the local community by HS2 Ltd during this period, and in the response to the route refinement consultation, the suitability of the proposed site at New Crofton was questioned for a number of reasons. These included:
- the site is within the greenbelt, and whilst technically brownfield, has been rehabilitated following former industrial use and is currently rural in appearance;
  - the impact on the local community caused by the reconfiguration of the depot and change in access required due to the proposed realignment of the main high speed line;
  - the noise, lighting and visual impacts of the depot on the local community; and
  - the perception that the depot will cause a barrier between Crofton and villages to the south and west, and the likely impact on access into and out of the village.

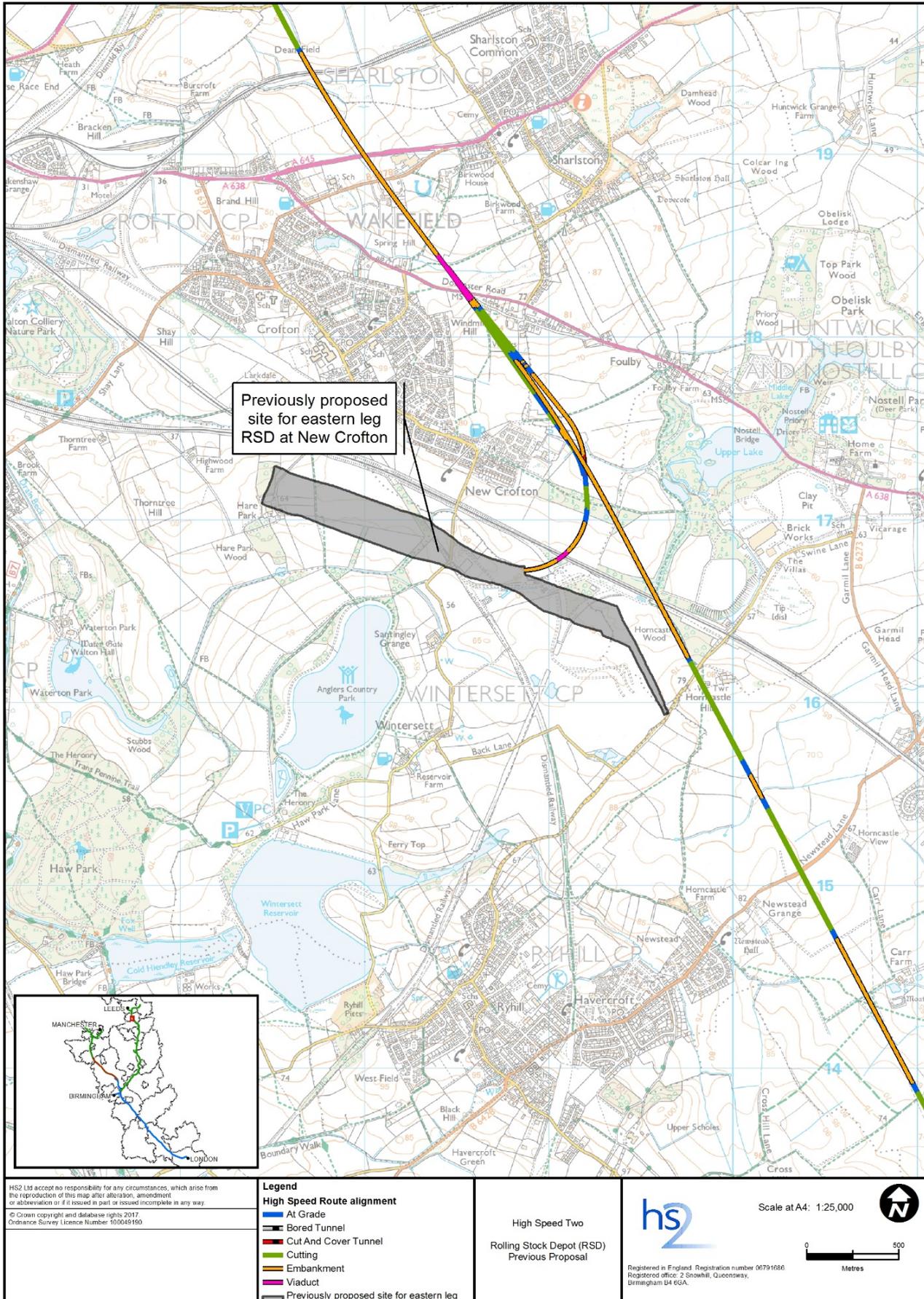


Figure 2: Previously proposed New Crofton RSD location and 2016 alignment

## 3.2 Re-consideration of Eastern Leg RSD Location

3.2.1 As set out above, the Secretary of State asked HS2 Ltd to look again at the proposed depot location, this section sets out the outcome of this work.

3.2.2 When looking for an alternative RSD site, HS2 Ltd sought to balance a number of criteria, which were as follows:

- a large, flat site (indicative footprint of approximately 300,000m<sup>2</sup>);
- as close as feasible to Leeds, to minimise empty train movements (maximum 10 minutes);
- preferably brownfield rather than greenfield site;
- suitable for 24-hour working; and
- accessible to workforce and local transport network.

### Process overview

3.2.3 We sifted the refinement options to increasing levels of detail (described as initial, intermediate and full sift). This enabled us to prioritise the more promising refinement options.

3.2.4 Reflecting the increasing level of detail, our recommendations for which refinements should be taken forward were also made subject to increasing levels of scrutiny:

- Initial sift: Options at initial sift were considered by the relevant technical teams within the Phase 2b directorate.
- Intermediate sift (Sift 2): Options at intermediate sift were considered by a panel drawn from the Phase 2b senior management team, including the head of route engineering, head of environment, head of stakeholder engagement, and policy manager.
- Full sift (Sift 3): At full sift, a Change Forum with members drawn from across HS2 made recommendations on which refinements should be presented to ministers. The Department for Transport (DfT) is represented at this stage by their HS2 Programme Representative (P-Rep).

3.2.5 A number of criteria are used to consider the relative merits of different options. Broadly, these fall into categories such as engineering; environment; community; cost; and in the case of Rolling Stock Depots, Operational considerations.

### Development of RSD options

3.2.6 As part of our work, we began by identifying a long list of potential RSD locations, which broadly met the requirements that were set for rolling stock depots on Phase 2b. The long listed RSD locations were designed to a Sift 2 level of design, and were considered by HS2 Ltd technical teams and senior representatives of key disciplines.

3.2.7 The options that were considered as part of the long list, and the process that was followed to reach the final short list of options is shown at Figure 3.

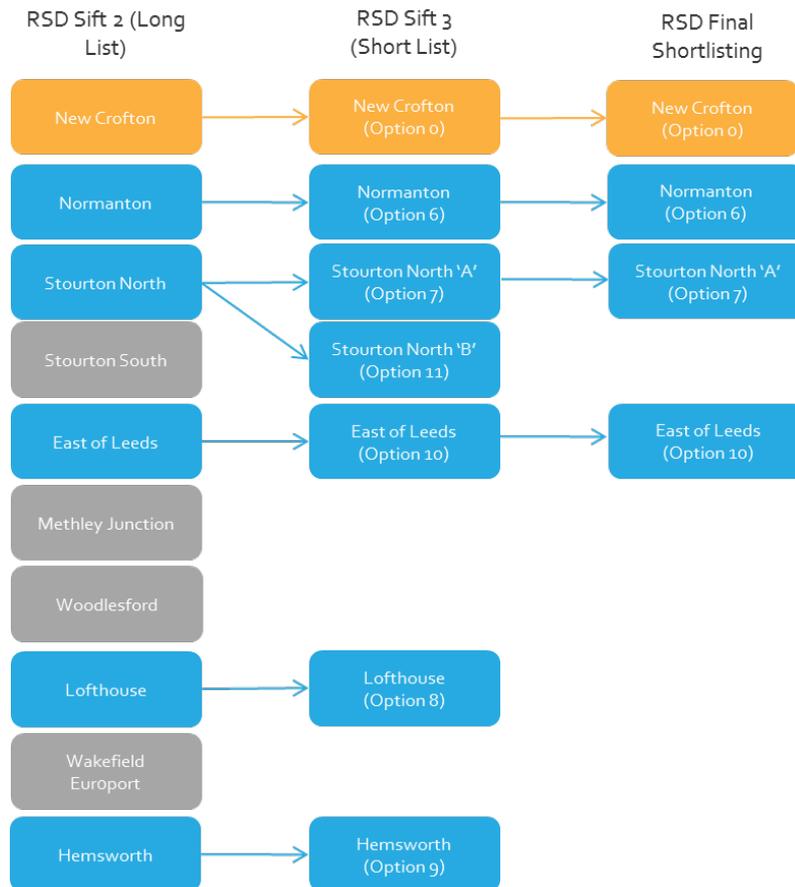


Figure 3: RSD Option Development (2017)

3.2.8 At the Sift 2 stage of design, four options were parked for reasons including high cost, sustainability impacts, community impacts and engineering complexity.

3.2.9 The remaining sites were taken forward for further consideration at a Sift 3 level of design, and received more detailed scrutiny. During the development of the options to a Sift 3 level, an additional site was considered at Stourton North, leaving two options in this area which were listed as Stourton North 'A' and Stourton North 'B'.

3.2.10 The short listed options were considered against each other, based on the key considerations of engineering complexity, sustainability impact, cost, operational impacts and high level community considerations. The short listed options are shown at Figure 4.

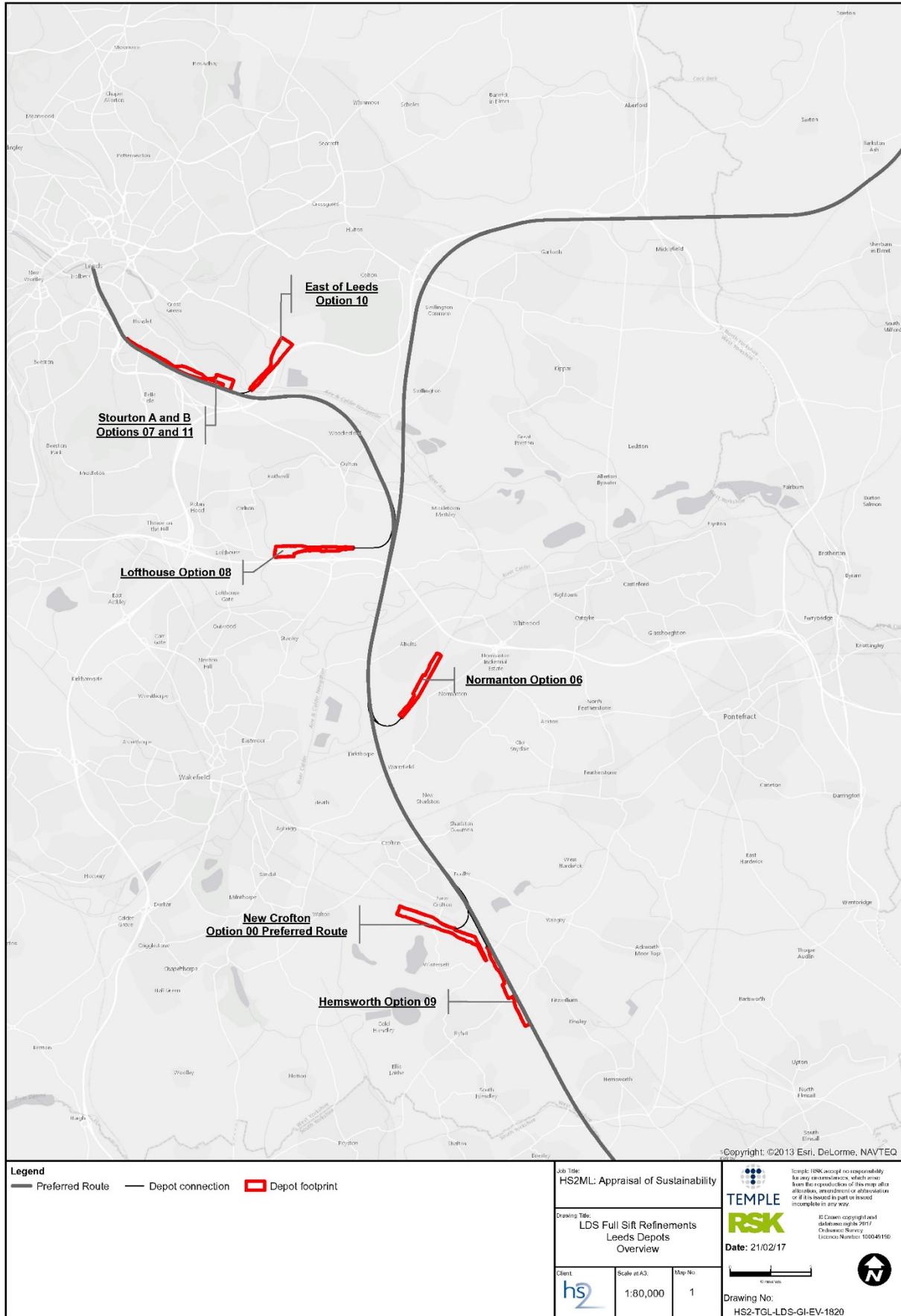


Figure 4: Short listed RSD locations

- 3.2.11 These locations were split into two key groups, the Leeds Spur Group and the Wakefield Mainline Group. The following sites were part of the Leeds Spur Group:
- Stourton A
  - Stourton B
  - Leeds East (Temple Green)
  - Lofthouse
- 3.2.12 Some of the challenges faced by all depot locations in the Leeds Spur group relate to returning services from York, and the need to provide for outstabling. Furthermore, Maintenance Sidings would be required on the mainline, which could not be accommodated in the depot footprints.
- 3.2.13 The Wakefield Mainline Group included:
- New Crofton (Baseline)
  - Normanton
  - Hemsworth
- 3.2.14 The challenges faced by the Wakefield Mainline Group include the longer distance for empty rolling stock to return from service, and site locations more remote from large urban areas.
- 3.2.15 The outcome of the sift for the Leeds Spur Group was that the site at Stourton North 'B' was not taken forward as a result of the issues it presented in relation to the highways in the direct vicinity of the site, and potential flooding impacts. Furthermore, from an operational perspective, the site offered no improvement over Crofton. Lofthouse was also not taken forward due to a range of sustainability impacts and its greenfield location.
- 3.2.16 Similarly for the Wakefield Mainline Group, Hemsworth was not taken forward for further consideration as it was a greenfield site, and would still require a junction to be constructed in the vicinity of Crofton. It would also introduce further community impacts in the area.
- 3.2.17 The decision was made to take forward the remaining four options to a final sift, at which consideration would be given to a number of additional factors. These included value management opportunities on the depot locations, further detail on potential land and property considerations, further information on potential outstabling and other related factors. In addition, the historic uses of the sites would be described as part of the review.
- 3.2.18 Further consideration was given to the remaining four depot locations at a final sift. The Stourton North 'A' depot location was not taken forward as a result of high costs, with consideration of land and property costs included, and other challenges related

to the site location including highways impacts and flooding. The Normanton site was not taken forward for reasons including a higher cost, sustainability impacts, and proximity to communities. Our analysis demonstrated similar impacts to those at Crofton, which would result in the shifting of impacts from one community to another, where the newly affected community was not already experiencing significant impacts from the HS2 line of route. In addition, this proposal would have required the reconstruction of the existing Normanton station.

- 3.2.19 Regarding the New Crofton RSD site, following the change in the M18 route alignment announced in November 2016, our analysis showed that the depot was left with a sub-optimal operational layout, and there remain significant community and sustainability impacts and concerns associated with this site.

### **Recommendation**

- 3.2.20 It was therefore concluded that, as the Leeds East depot site works better operationally, with scope to further improve the layout and operational arrangements, this site should be recommended to the Secretary of State as the preferred Eastern Leg RSD location. The proposed location for the depot is shown at Figure 5. The Secretary of State accepted HS2 Ltd's recommendation, and decided to announce this site as his preferred location, subject to public consultation.

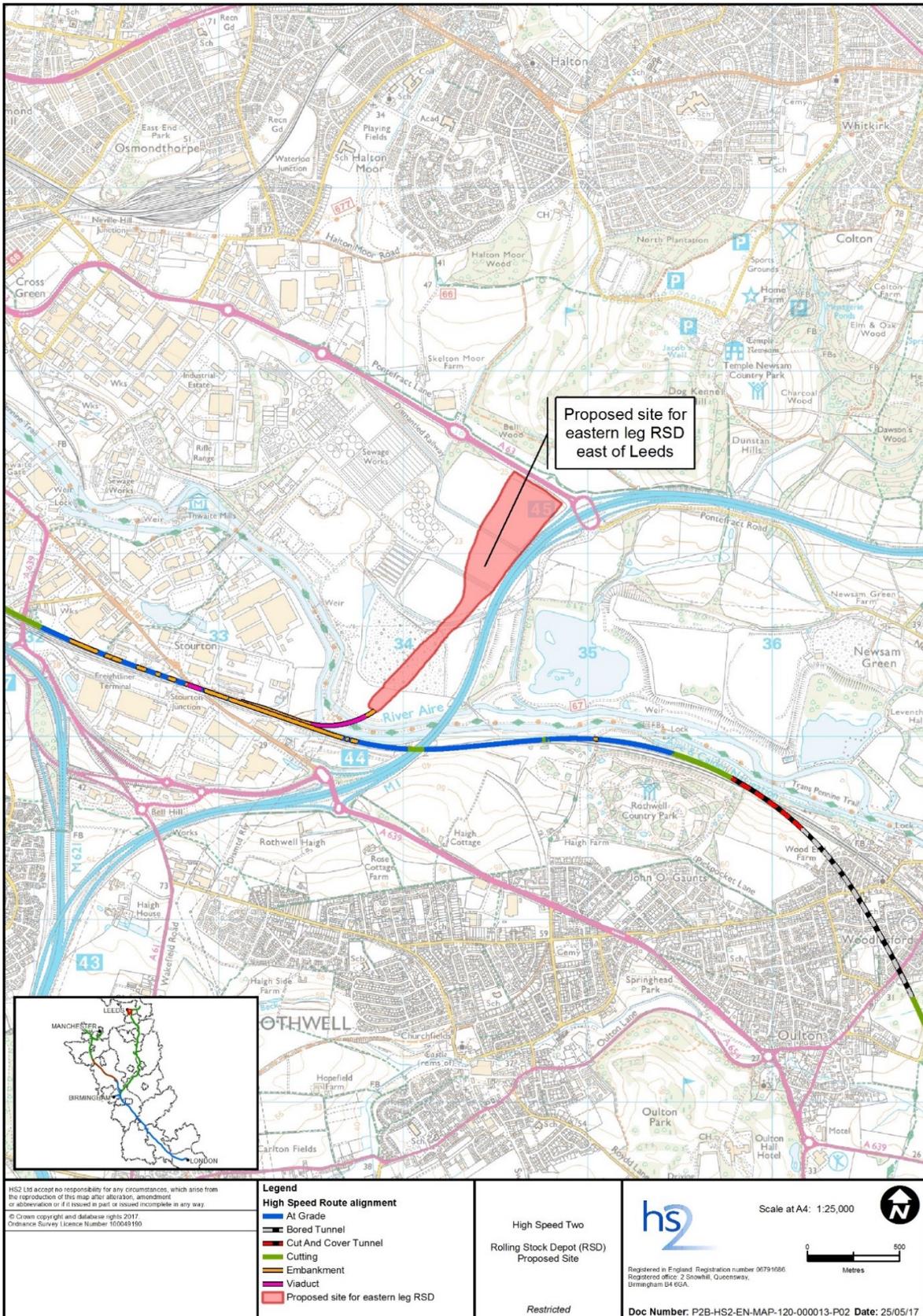


Figure 5: Proposed Leeds East RSD location

## 4 Eastern Leg RSD Consultation

### 4.1 Scope of consultation

4.1.1 The consultation held between 17 July 2017 and 12 October 2017 sought the views of the public on the Secretary of State's view that the Eastern Leg Rolling Stock Depot should be moved from the previously proposed location at New Crofton, to a site east of Leeds.

4.1.2 Consultees were asked the following question, which was found at 2.4.6 of the Consultation document:

**Do you support the proposal to locate the Eastern Leg Rolling Stock Depot on a site east of Leeds in the Aire Valley adjacent to the M1? Please indicate whether or not you support the proposal, together with your reasons.**

### 4.2 Overview of feedback to the consultation

4.2.1 This section sets out the key themes that came across within the responses to the Eastern Leg RSD consultation. The full report on the consultation responses is available with this advice, and will be published on the HS2 website following the announcement.

#### Responses to consultation

4.2.2 A significant majority of respondents to the consultation supported the proposal to relocate the Eastern Leg RSD to a site east of Leeds. The reasons for support generally centred around the suitability of the site, the reduction of impacts on rural communities, particularly Crofton, the proximity of the site to Leeds Station, the connectivity of the site, and because of the benefits the site could bring to the region.

4.2.3 A significant amount of respondents raised their support for the reduction on impacts to rural communities, particularly the community of Crofton, who had been concerned about the amount of HS2 infrastructure around their village, and the impacts from the 24 hour operation of the depot in a rural location. Further support came for the reduction of impacts on local amenities, such as the loss of footpaths connecting communities with local parks and reservoirs. The National Trust supported the reduction of the impact on the Grade I listed Nostell Priory and its Grade II listed surrounding parkland. Whilst they remain concerned about the HS2 mainline, they supported the proposals to move the depot.

4.2.4 Respondents also supported the use of a brownfield site in a largely industrial area, next to the M1. Respondents felt that this location was more suitable for a 24 hour

working depot than the previously proposed site on a restored greenfield site in a rural setting.

- 4.2.5 Other support related to the economic benefits from using a site in this area, with more benefits expected to be felt for the region by having the depot located here. The site would have good connectivity to the M1, which would assist with access to the site for construction, and for employees based there once the railway and depot were operational. Finally, the proximity to Leeds station was seen to be delivering benefits to the operational railway, with a shorter distance for trains to have to travel for accessing the depot from their terminus station.
- 4.2.6 A smaller number of respondents to the consultation raised their concerns with the proposal to relocate the RSD to the Leeds East site. These concerns included the impacts on nearby communities, including noise, visual and traffic impacts, and the addition of further HS2 infrastructure in the area. Further concerns that were raised included the impact on the M1, the existing site development, adjacent waterways, and potential impacts on some local amenities.
- 4.2.7 A number of local residents raised concerns about the proposed re-location of the RSD to this site, particularly residents from Woodlesford and Swillington. Their concerns were largely around the shifting of impacts from Crofton to them. Their concerns revolved largely around the noise, visual and air quality impacts during both operation and construction, and the level of traffic impacts during the construction phase. They were concerned about the large amount of HS2 infrastructure in the area, which they felt this would exacerbate.
- 4.2.8 Concerns were raised by some of the key local stakeholders regarding the impact on a proposed development on the site, which they view will have a significant positive impact on jobs, business rates and local growth and regeneration. These respondents also suggested alternative depot layouts, in order to reduce these impacts. The alternatives are dealt with separately below.
- 4.2.9 Some respondents raised the impacts the site would have on the waterways adjacent to the depot site, the River Aire and the Aire and Calder Navigation. As above, some of these respondents suggested alternative access alignments to the depot, which they view would reduce the impacts on these waterways, which will be dealt with below.
- 4.2.10 Further concerns related to the potential impact on local amenities, including the Trans-Pennine Trail, and the potential impact on Temple Newsam House and Gardens.
- 4.2.11 Technical feedback related to the nature of the ground conditions on the site, which would need to be addressed. Highways England raised a number of points for

consideration around the site proposal, including the proximity of the site footprint area to land owned by them, the impact on the existing park and ride facility on the site, and planned future upgrades to roads in proximity to the site. Further organisations supported the proposals, but raised queries about the proposals, including Network Rail and North Yorkshire County Council, both of whom questioned provision for stabling of services in York, and, in the case of Network Rail, the expected impacts on the existing rail network in the proximity of the depot.

### **Suggested alternative locations**

- 4.2.12 There were two key alternative site locations that were suggested by respondents to the consultation.
- 4.2.13 The first of these alternative sites was for HS2 to utilise the disused Healy Mills Goods Yard at Ossett, Wakefield. A suggestion was made that this site could have strategic benefits in the future, as it has good connectivity to Leeds and Manchester. A further suggestion was made for a depot location to the south of the previously proposed New Crofton site, near to the communities of Havercroft and Ryhill.
- 4.2.14 A review of these alternatives is available in Section 5.2 below.

### **Suggested alternative site orientations and approach**

- 4.2.15 A number of respondents suggested alternative orientations of the proposed RSD within the wider site, in order to reduce impacts on the existing proposed developments. Several reorientations were suggested for the depot, including suggestions of smaller depots, and those with a greater rotation to move the RSD away from the prime development areas adjacent to the M1 junction 45.
- 4.2.16 Further respondents suggested alternative approaches from the HS2 mainline. The consulted option proposes a viaduct across the River Aire, and Aire and Calder Navigation, at a significant skew. The view of the Canal and Rivers Trust, the Inland Waterways Association and other relevant bodies is that this skewed crossing would have significant impacts on the watercourses, and suggested alternative approaches that reduced this impact.
- 4.2.17 A review of these suggestions is available in Section 5.3 below.

## **4.3 Feedback not within scope of consultation**

- 4.3.1 A large number of respondents from the local area shared their views on alternative elements of the HS2 scheme that were not within the scope of the consultation. Principally, a large number of respondents have concerns with the proposed viaduct on the HS2 mainline, which crosses the River Aire, and Aire and Calder Navigation north east of Woodlesford. Views were shared about the height and length of this

viaduct, with the majority of the respondents mentioning this viaduct, requesting an alternative approach to be adopted. Furthermore, respondents commented on a perceived lack of consultation on this proposal.

- 4.3.2 It should be noted that this viaduct was part of the Phase Two scheme as consulted on between September 2013 and January 2014, which afforded residents the opportunity to raise their concerns about the proposals. HS2 Ltd looked at refinements in this area between January 2014 and November 2016, including the proposals to tunnel under Woodlesford on the Leeds Spur instead of a further viaduct around the community there, and options for alternative routes to the ECML, which was not taken forward.
- 4.3.3 Furthermore, residents in the area will be able to respond to further consultations on the Phase 2b scheme, with the working draft Environmental Statement due to be consulted on in 2018, the formal Environmental Statement consultation following deposit of the hybrid Bill, and petitioning against the deposited scheme, if their interests are specially and directly affected by it.
- 4.3.4 HS2 Ltd will ensure that engagement with these communities addresses these points to prevent any misunderstanding about the scope of this consultation.
- 4.3.5 A number of further points were made in response to the consultation, which were beyond the scope of the consultation. In these instances, where appropriate, the information will be used to help inform the further development of the hybrid Bill scheme.

## 5 Responding to consultation feedback

### 5.1 Analysis of feedback

- 5.1.1 In response to the feedback received during the ELRSD consultation, we have reviewed the key concerns raised to ensure it does not present new information that would cause us to revisit our previous conclusions.
- 5.1.2 A central theme throughout the responses opposing the proposed relocation were the impacts on the local communities near to the depot site, including Woodlesford and Swillington. We recognise the concerns from residents in the area about the impacts from the operation of the RSD, and the construction of the site and railway. We also understand the concerns regarding potential traffic impacts on the roads in the area during construction. HS2 Ltd will be undertaking an Environmental Impact Assessment (EIA) on the proposed route, which, if confirmed, would include the depot at this site. In doing so, we will develop an understanding of the environmental sensitivities concomitant with the predicted impacts associated with the construction and operation of the depot, and we will bring forward proposals to mitigate these impacts where practicable to do so. We will continue to engage with these communities over the emerging impacts being assessed, and our proposed mitigation.
- 5.1.3 Regarding the concerns related to the impact on the proposed development on the site, these are dealt with in further detail in Section 5.3 below.
- 5.1.4 We also recognise the concerns about potential impacts on local amenities, including the Temple Newsam House and the Trans-Pennine Trail. As above, during hybrid Bill development, and through the EIA process we will be developing an understanding of our impact on these amenities, and developing mitigations where practicable. HS2 Ltd will also seek to engage with the relevant stakeholders during this period to discuss how these impacts might be avoided or mitigated.
- 5.1.5 With regards to more technical feedback, we will be engaging with the Environment Agency during our scheme development and EIA, where we will look to discuss the ground conditions on this site. We will also engage with Network Rail over plans for outstabling, once we have determined our wider stabling strategy. Finally, we will also engage with Highways England during our further design work to seek to alleviate their concerns.
- 5.1.6 We are therefore confident that, following an analysis of the key concerns raised in the consultation, our previous decision to recommend this site was correct. In order

to understand whether alternative sites existed that would deliver a better depot site than the proposed site (Leeds East), we then looked to consider suggested alternative depot locations, and depot configurations, which were raised as part of the consultation.

## 5.2 Review of alternative RSD site locations

5.2.1 As set out in Section 4.1 above, we received two alternative site locations in response to the consultation. These were for sites in Ryhill and Ossett.

5.2.2 For the purposes of our consideration of these alternative depot sites, the baseline proposition against which the others would be compared was the Leeds East depot site, as consulted on between July and October 2017.

### Ossett

5.2.3 The suggested alternative site for the Eastern Leg RSD in Ossett, was for HS2 to utilise the disused Healy Mills Goods Yard, which is located south-west of Wakefield, next to the communities of Ossett and Horbury. The site is shown in Figure 6 below.

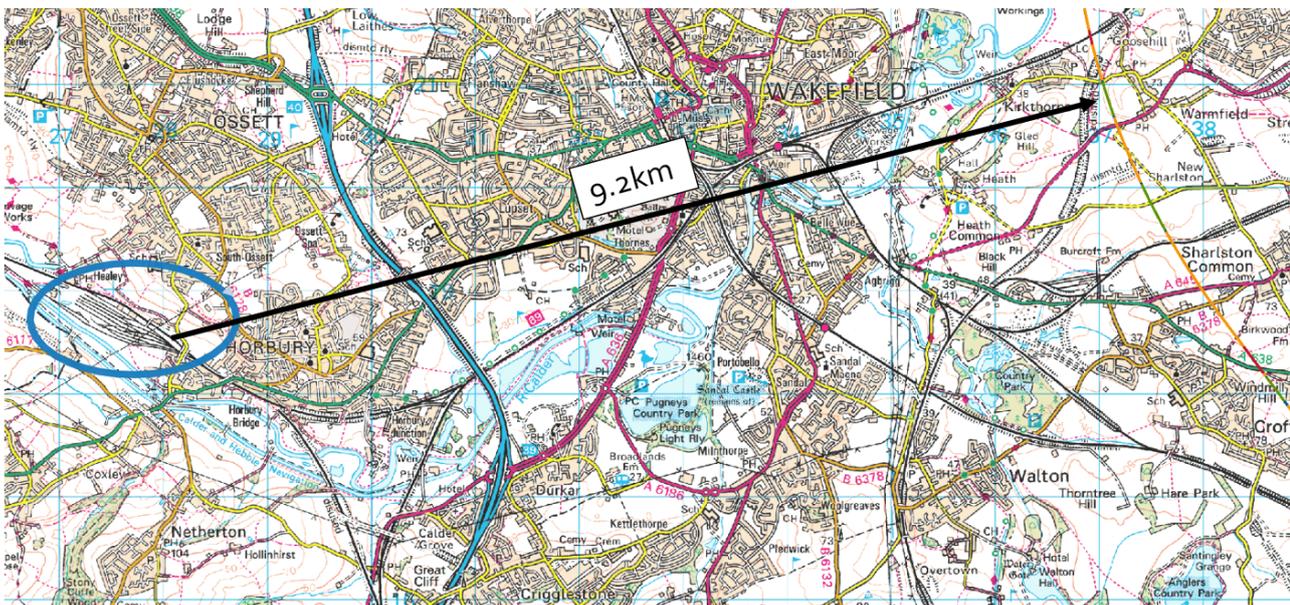


Figure 6: Proposed Ossett RSD Site

5.2.4 This existing railway depot was opened in 1963 and used principally for freight wagons, with at least 50 percent of the traffic at the site used for transporting coal. Sidings had been located in this area since the 1920s. The site mostly closed in the 1980s, with uses of the site reduced to the stabling of withdrawn trains and changeover of freight crew, until it was finally closed in 2012. The site remains in a disused state.

- 5.2.5 Whilst the site does have some existing railway infrastructure, it is located approximately 9.2km from the HS2 mainline, based on a direct measurement. Accessing this site from the HS2 line would either require the construction of an entirely new spur, or considerable upgrades to the existing lines here, in addition to a junction from the HS2 mainline.
- 5.2.6 The site is located next to the River Calder, which had been realigned during the development of the existing depot. This proximity to watercourses would present potential challenges, including the risk from contamination during construction of an HS2 depot on this site. Furthermore, this area is in Flood Zone 2, which presents further challenges for construction and operation. The site is close to the existing communities of Horbury and Ossett, who would face potential noise and visual impacts from the construction and operation of a depot in this area. Furthermore, these are entirely new communities, which have not been impacted by HS2 previously.
- 5.2.7 The construction of a new HS2 spur or upgrade works to the existing lines to access this site would also have significant impacts to the communities built up around these lines, and would require possessions on the classic network, increasing disruption to passengers and freight movements. A junction would also need to be constructed from the HS2 mainline, which would potentially impact on the community of Kirkthorpe.
- 5.2.8 A depot on this site would be further from Leeds station than the baseline, introducing higher operational expenditure. However, it would be able to facilitate HS2 trains travelling from the ECML, which is an improvement on the baseline proposal.
- 5.2.9 The existing depot site would likely require extensive re-construction and re-configuration to be used as an HS2 depot, and it is unclear whether an optimum depot layout could be achieved within the footprint of the existing site. Furthermore, there is limited capacity to expand the site beyond the current depot footprint, owing to the proximity constraints posed by the adjacent river and communities, and due to the topography of the area.
- 5.2.10 It is expected that this site would present a significant worsening over the baseline option, with higher sustainability impacts, engineering complexity, community impacts, and cost, whilst also being a worse strategic fit, and likely more challenging from an operational perspective. For these reasons, this option was not taken any further.

## Ryhill

5.2.11 A further alternative that was suggested in response to the consultation was to utilise a site on the HS2 mainline, located south of the previously proposed New Crofton RSD location, and north of the communities of Ryhill and Havercroft. The proposed site location is shown in Figure 7 below.

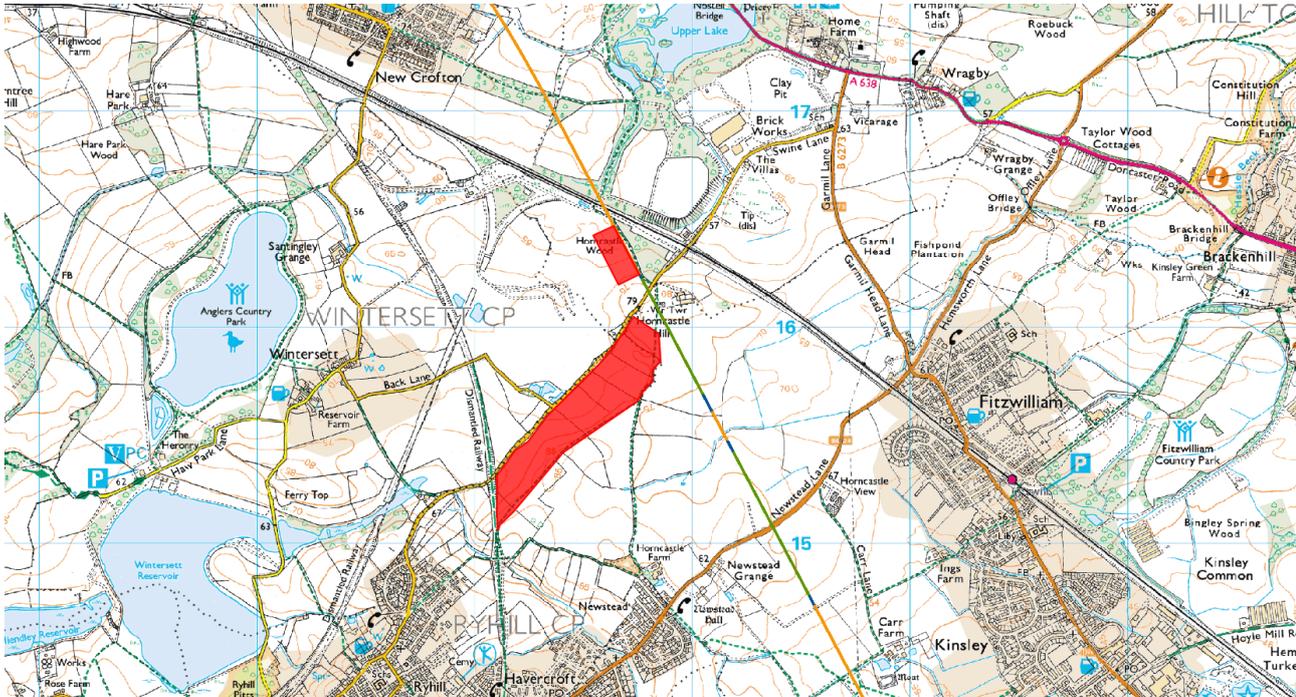


Figure 7: Proposed Ryhill RSD Site

5.2.12 This site is located on Grade 3 agricultural land, which is currently in agricultural use. This depot site would not be on a brownfield site, which would require a departure from the requirements for an HS2 RSD. Further to this, the construction and operation of the depot in this location would introduce noise and impacts on the communities of Ryhill and Havercroft, and would potentially introduce additional impacts to the community of Fitzwilliam.

5.2.13 The site is located in close proximity to Winterset Reservoir and one of its feeder drains, which potentially presents risks from contamination during construction of the depot. Furthermore, the rural nature of this site would present significant issues of accessibility of the depot, both for those working at the site during operations, but also for providing materials and workforce for its construction. Access to the depot for trains could be challenging, as the HS2 line here is in a cutting, due to the nature of the land, which is at the top of a hill. This would present a number of challenges, and may require the demolition of the existing water tower.

5.2.14 The depot location could also have visual impacts during both construction and operation on the Grade I listed Nostell Priory and associated Grade II listed parkland.

- 5.2.15 The return of the depot to this area would present significant challenges from the local communities, principally as a result of the proximity to the previously affected community of Crofton, and because of the rural nature of the site. Furthermore, it is unlikely that the depot location would have the support of the local authority, which currently occurs for the baseline option.
- 5.2.16 Operationally, it is unlikely that the depot layout would have an optimum layout, owing to the site being smaller than what is usually required for an HS2 RSD. Furthermore, extending the depot in length would not be feasible, as a result of the existing infrastructure in the area, and proximity to communities. The depot would require further empty coaching stock journeys from Leeds Station, increasing operational expenditure, however, there would be accessibility for services returning from the ECML.
- 5.2.17 Our assessment of this option is that, when compared with the baseline option, it would perform worse from an operational perspective, it would have a higher overall cost, significantly worse community and sustainability impacts and some challenging engineering elements. Finally, it fails to meet specifications over size and the land it is constructed on. For these reasons, this option was not taken any further.

## 5.3 Refinement of RSD site orientation

- 5.3.1 In response to the consultation, HS2 Ltd received several alternative depot orientations from key regional stakeholders. These stakeholders included the developer and land owner, and the city council and combined authority. The suggested reorientations from key stakeholders followed a common theme, principally to move the depot away from the land adjacent to the M1, therefore directly impacting the elements of the site further from the motorway junction.

### Aire Valley Land Proposed options

- 5.3.2 The combined response from Aire Valley Land LLP (AVL) and Harworth Group, two of the major landowners of this site, proposed three alternative depot sizes and orientations, which adopt a significantly smaller depot footprint. Their response makes assumptions regarding the number of trains that the depot would be used to stable, however, these assumptions do not meet the HS2 requirements for the depot.
- 5.3.3 Their first proposed option (AVL Option A), which is shown at Figure 8 below, includes capacity for stabling eight 200m train sets, which is 30 fewer than is required for this depot. The site does not meet the requirements on a number of fronts, including on the amount of maintenance facilities available, and the number of single points of failure (two on this design). A number of other issues exist with the design, including the proximity to the sub-station, which has potential safety

implications, and the use of scissor crossovers, which have a higher maintenance risk.



Figure 8: Proposed AVL Option A

- 5.3.4 It was therefore decided that this depot would not meet the relevant requirements and therefore could not be taken forward as the design of the RSD.
- 5.3.5 Their second proposed depot layout was AVL Option B, shown in Figure 9 below. This layout had capacity for 34 200m train sets, four fewer than the HS2 requirements, as well as an under provision of maintenance facilities within the depot. The design also includes a single point of failure, and access to some of the maintenance facilities would require trains to shunt back onto the River Aire viaduct, dramatically restricting movements into and out of the site. Finally, among numerous other issues, the internal layout and footprint precludes safe walking routes throughout the site, increasing safety challenges with the design.
- 5.3.6 It was therefore decided that this depot proposal would not meet the relevant requirements and therefore could not be taken forward as the design of the RSD.

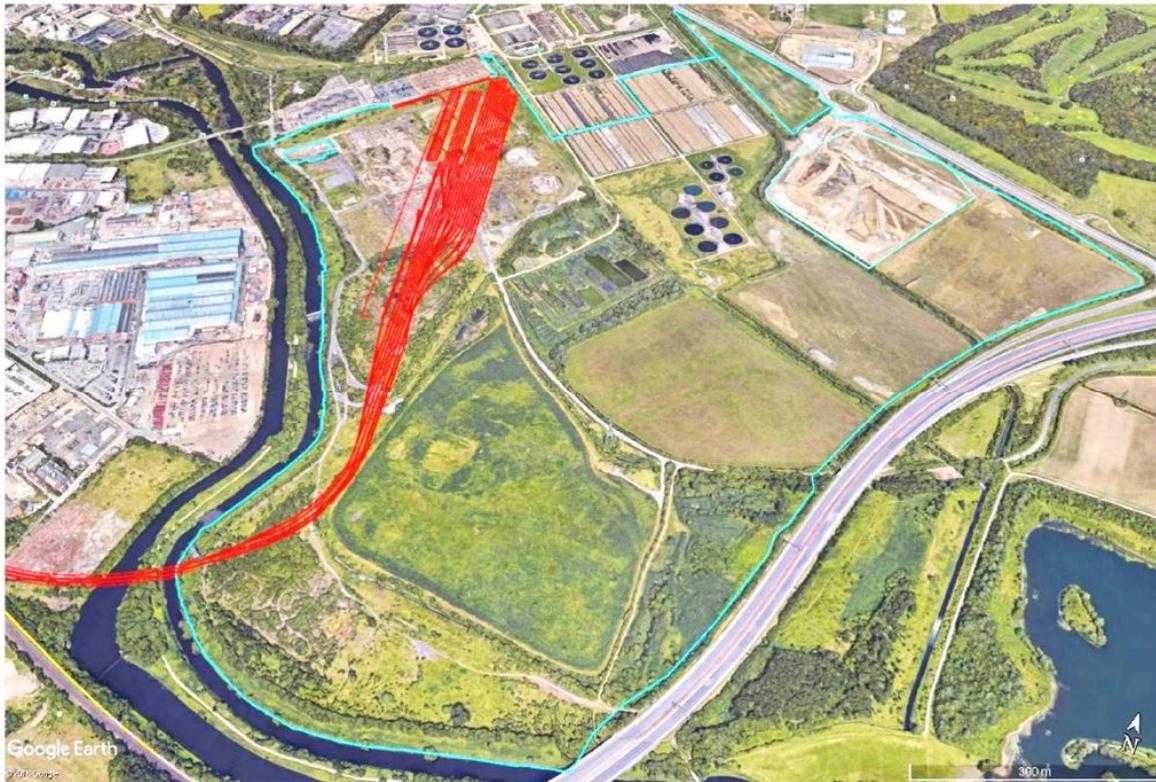


Figure 9: Proposed AVL Option B

- 5.3.7 The final proposed depot layout, AVL Option C, is shown at Figure 10. This site is aligned further into the development site, but avoids the key development area adjacent to the M1. However, the site has capacity for stabling 34 200m train sets, four fewer than required, and has a shortage of maintenance facilities. The site also includes a single point of failure, and, as with AVL Option B, requires trains to shunt onto the approach viaduct to access particular facilities. Other issues present in AVL Option B are also replicated.
- 5.3.8 It was therefore decided that this depot proposal would not meet the relevant requirements and therefore could not be taken forward as the design of the RSD.



Figure 10: Proposed AVL Option C

### Leeds City Council

- 5.3.9 The options put forward by Leeds City Council, West Yorkshire Combined Authority and Leeds City Region Enterprise Partnership (LCC) show a re-oriented footprint of the RSD, based on the safeguarded area put forward by HS2 Ltd for consultation. Their proposal does not include specific internal layouts or requirements, however the alignment of their two options are broadly similar to AVL Options A and C.
- 5.3.10 An example of two proposed orientations received from LCC are shown in Figure 11.
- 5.3.11 We have not specifically reviewed these depot proposals, as the options did not include internal layouts. However, Section 6.2 below sets out our work to review the feasibility of re-orienting the compliant HS2 depot designs, taking on board the principal behind the suggestions by LCC in their proposals, which was to reduce the direct impact on the key development land adjacent to the M1.

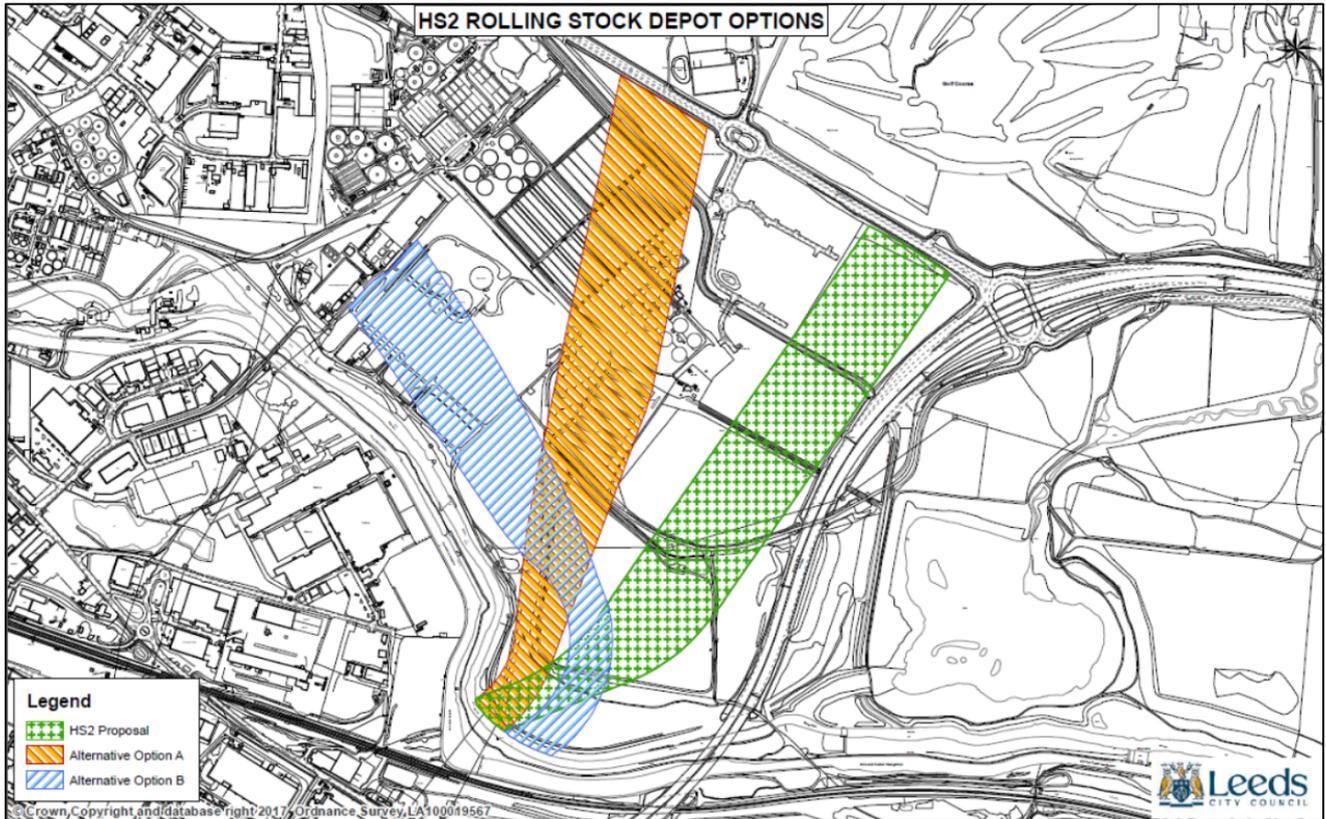


Figure 11: LCC proposed depot orientations

## 5.4 Refinement of RSD site access

- 5.4.1 A number of organisations with interests in the waterways that the current HS2 depot access alignment crosses responded with concerns about the proposed location of the crossing.
- 5.4.2 The currently proposed alignment over the River Aire and the Aire and Calder Navigation crosses these waterways at a high skew. This will require consideration during further design development in order to reduce the impacts on the waterways, in particular if we are to avoid any pillars of the viaduct being located in the waterways. The Navigation is very wide at this point to allow for the safe manoeuvring of freight vessels round a 90 degree bend in the navigation. Reducing the width of the navigation through the placement of pillars within it would impact on the use of this navigation for transporting freight materials.
- 5.4.3 The alternative proposal put forward in the consultation would take a different alignment between the HS2 line and the depot site, crossing the waterways at a different point. This different crossing point meant that the skew was significantly reduced, potentially reducing impacts on these waterways. The proposal was put forward by the Canal and River Trust, and received support from other organisations with interests in these waterways. Their proposal is shown at Figure 12.

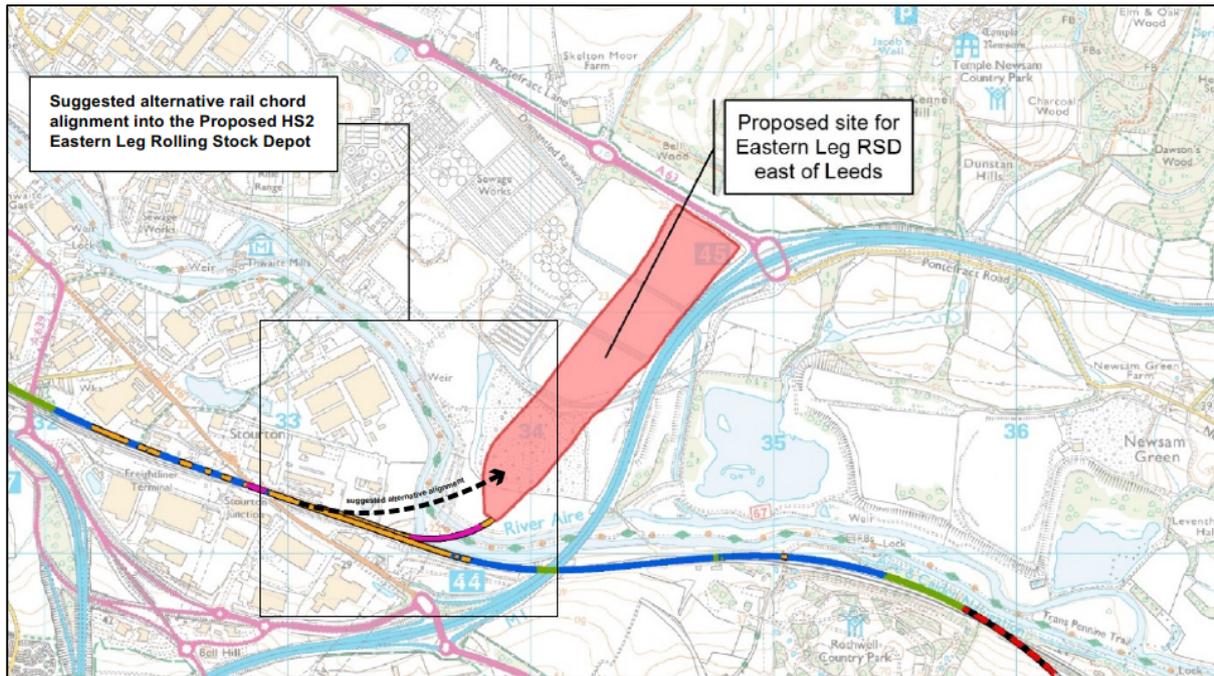


Figure 12: Alternative Depot Access Alignment

5.4.4 HS2 Ltd has considered the proposals received and refined the depot access viaduct location. The proposal recommended to the Secretary of State is set out in Figure 13. Whilst this design is not identical to those suggested by the CRT, it does remove some of the impacts on the waterways associated with the consulted proposal.

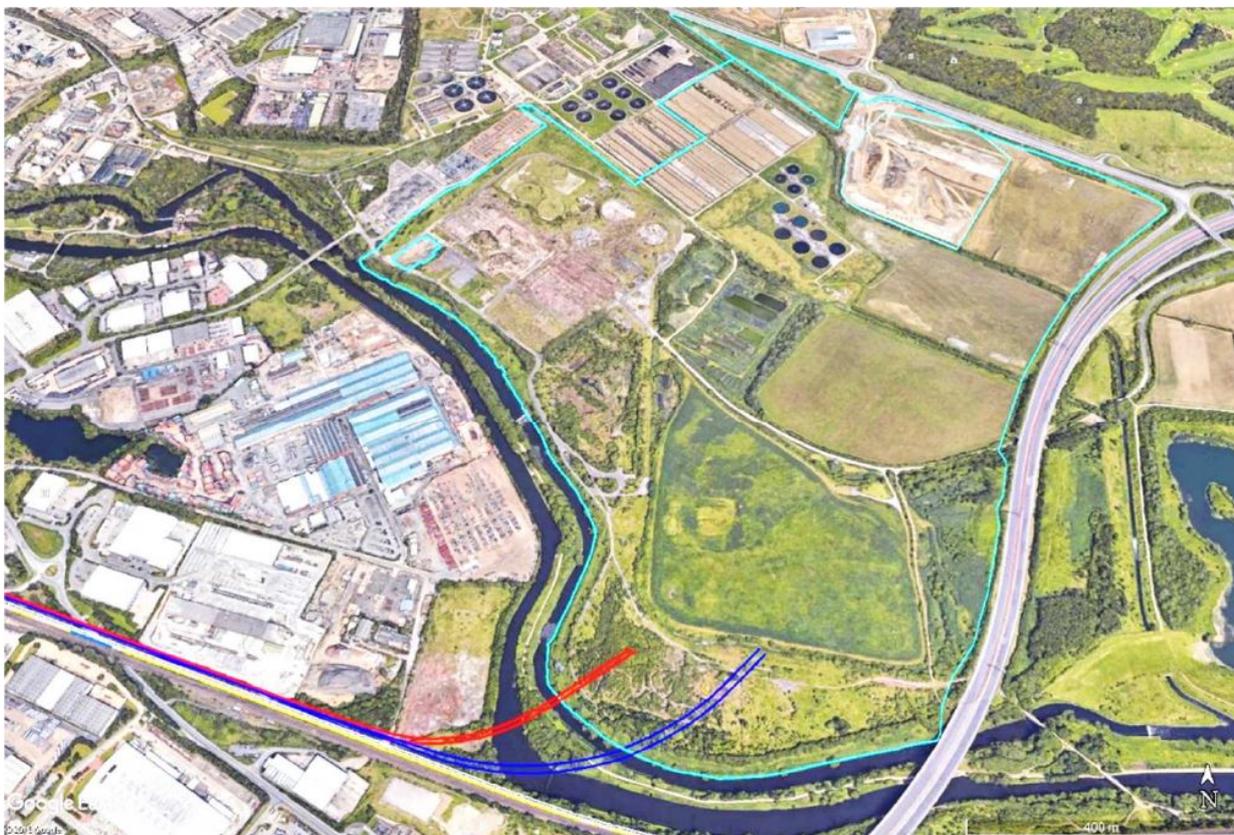


Figure 13: Consulted vs Refined Depot Access

## 6 Design Development and Orientation

### 6.1 Depot Layout

6.1.1 As part of the wider hybrid Bill design development process being undertaken on Phase 2b, the operational layout of depots on the HS2 network have been reviewed and, where appropriate, re-designed.

6.1.2 This is, in part, as a result of additional specifications and requirements that are put on the scheme design at this stage of the development process. Further influences include the specialist, technical input from our Rail Systems Application Design Consultants (RSADS), who have provided specialist rail systems input into the scheme design for the first time, and input from our Rolling Stock and Depot colleagues within HS2 Ltd who have recently concluded a re-design of Washwood Heath RSD on Phase One.

6.1.3 This additional input highlighted that the Leeds East RSD design as consulted on did not fully comply with the new requirements and standards for the depot, and required a re-design. This re-design work was undertaken in parallel with responding to the consultation, allowing us to make robust assessments of the reoriented depot options, based on compliant, operable depot designs.

#### **Consulted Baseline**

6.1.4 The baseline depot layout, as consulted on, is shown in Figure 14 below. As set out above, following a review of this depot layout with our consultants and technical teams within HS2 Ltd, it was found to not be compliant with the updated depot requirements and standards, and was required to be re-designed.

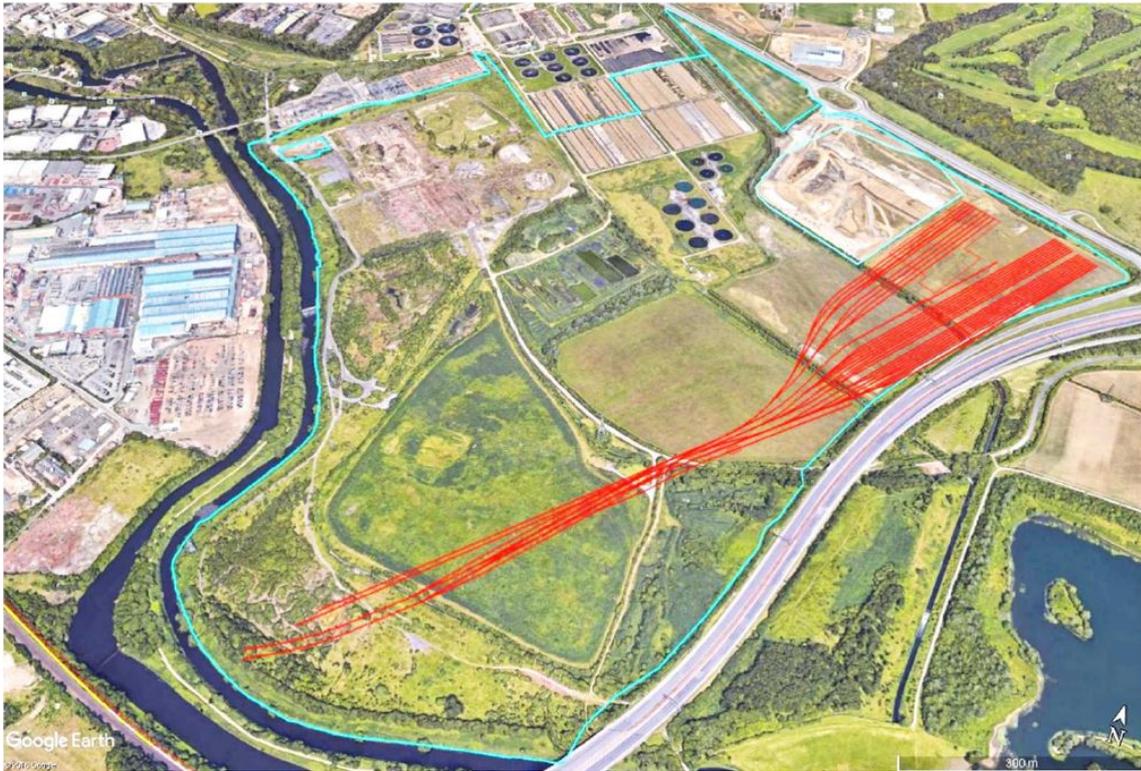


Figure 14: Consulted Baseline

6.1.5 Specifically, the Leeds East depot layout that had been consulted on only provided capacity to stable 32 200m train sets, 6 fewer than the requirement of 38. Similarly the depot design did not have sufficient maintenance facilities, including, specifically, too few Wheel Lathe roads, Heavy Lift roads, and Bogie Drop roads. Similarly it did not include a test track, nor did it include High Output Ballast (HOB) sidings or On-Track Machine (OTM) sidings, with two of each required. Finally, the depot had a single point of failure, which is not acceptable as a failure on the depot would have significant operational impacts on the railway.

6.1.6 It was therefore concluded that the depot would need to be re-designed in order to meet HS2 specifications and requirements.

### Options developed

6.1.7 The work on developing compliant depot layouts produced a number of potential options, which were sifted down to three.

6.1.8 Option A, which is set out in Figure 15 below, consists of a stabling area at the northern end of the site, adjacent to the M1 Junction, with the train shed towards the southern end. The maintenance facilities are in two separate buildings, and all trains requiring maintenance in either building will need to enter the main stabling area before reversing into the facilities

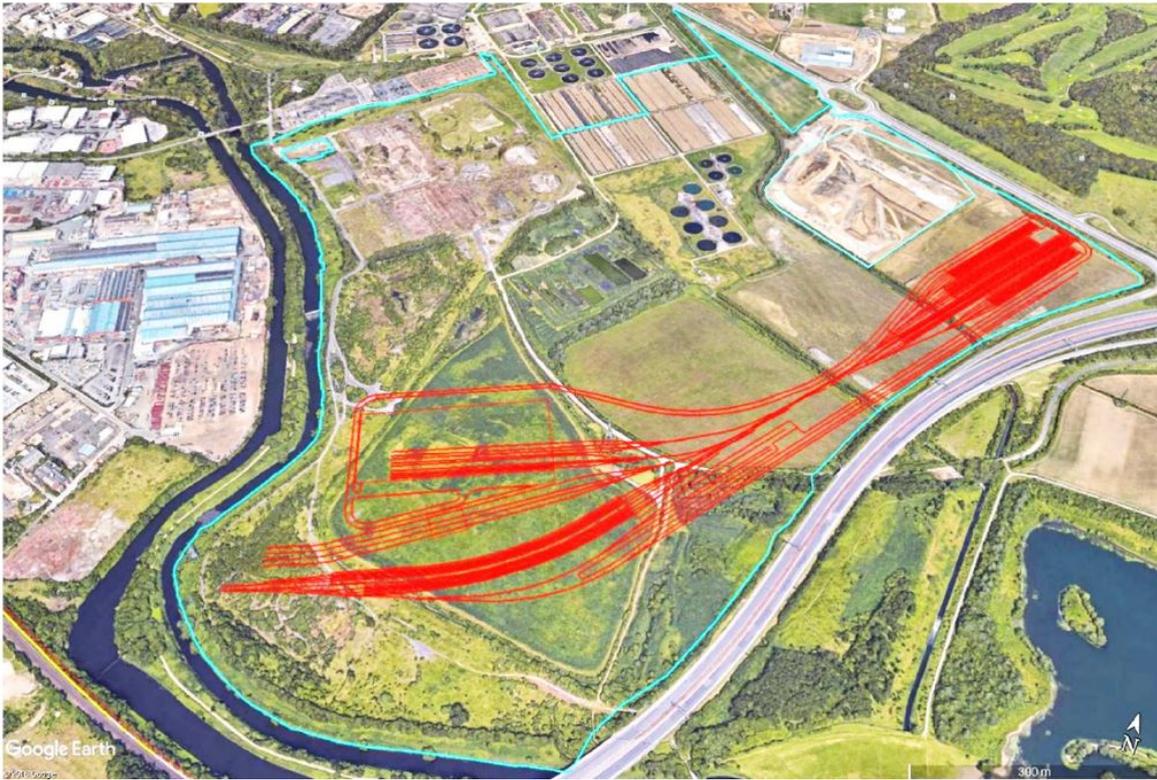


Figure 15: Option A

- 6.1.9 The depot design met required specifications, although it does require the stabling to be in two separate areas, and includes two buildings for the maintenance facilities.
- 6.1.10 Option B, which is shown in Figure 16, has a similar layout to Option A, except that the main train shed is located at the northern end of the site, alongside the main stabling area. As with Option A, the stabling facilities are in two areas, and there are two train sheds for the maintenance of trains, albeit more is included in the larger shed.
- 6.1.11 Option B does meet the specifications for the depot layout, however, it does take out a larger amount of the wider site and would therefore impact on more of the permitted development, which was a key impact raised in the consultation process.

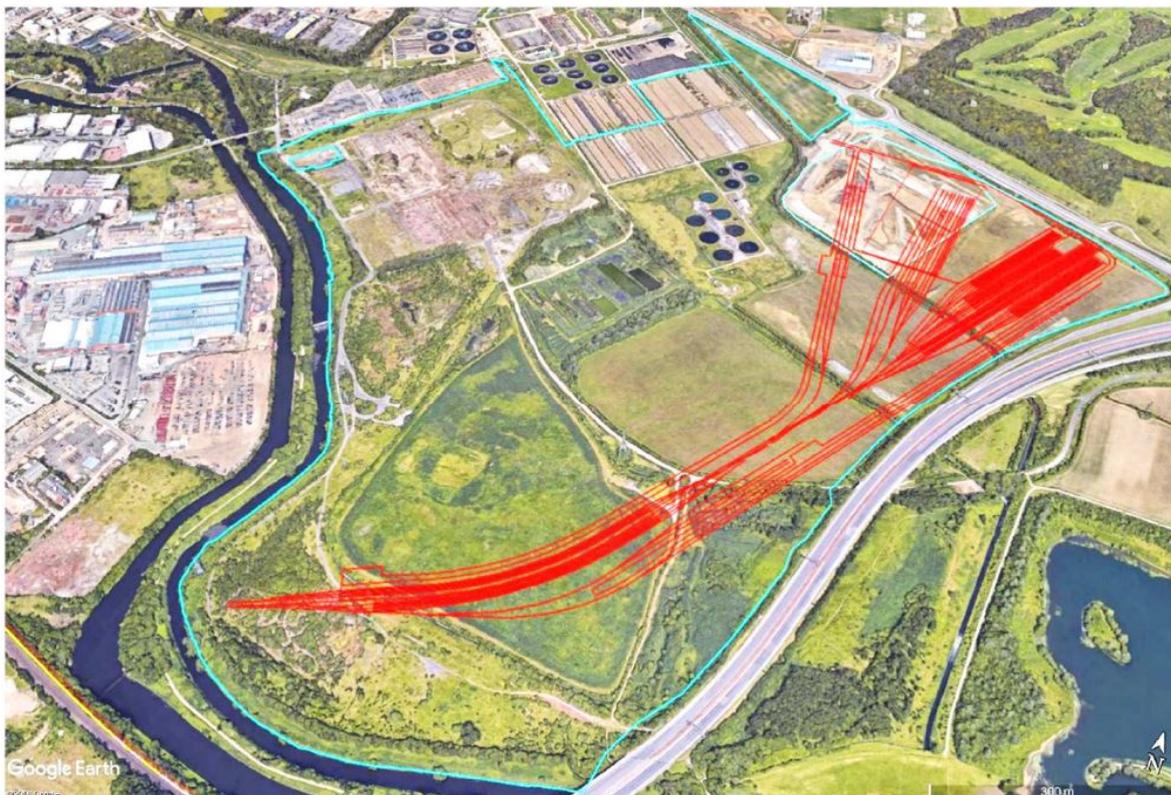


Figure 16: Option B

6.1.12 Option C, which is shown in Figure 17 below, consists of a main stabling area, with room for all 38 required train sets, and a maintenance facility which included all of the different maintenance requirements in one train shed. All the stabling roads led to a headshunt, which also included a secondary washer, and allowed trains to reverse into the maintenance facilities.

6.1.13 This option met the required specifications, and reduced the amount of land take on the prime development area adjacent to the M1 Junction 45.

6.1.14 Following work to identify the preferred internal layout, HS2 Ltd and our consultants undertook both a “day in the life of” workshop, which considered the operational requirements for the depot and assessed the various options designed. We also undertook a Sift of the internal layouts. It was agreed that Option C provided the optimal internal layout of those reviewed, and was taken forward as the preferred option.



Figure 17: Option C

## 6.2 Depot Orientation

- 6.2.1 In order to address the queries in the consultation, principally from LCC and AVL/Harworth, we instructed our consultants to determine whether any of the three shortlisted depot layouts could be rotated to reduce the impact on the development site.
- 6.2.2 As the options put forward by LCC were re-orientations of the safeguarded area of the consulted depot layout, which, as set out above, was found to not be compliant, we have not specifically addressed these proposals. However, we have sought to understand the implications of re-orienting the compliant depot concept layouts.
- 6.2.3 The outcome of this work found that the re-orientations of Options A and B both had a major impact on the A63 and either the existing water treatment plant or the Amazon distribution centre on the other side of the A63, as shown in Figure 18 and 19 respectively below. These were therefore considered to not be feasible, and were not considered further.
- 6.2.4 Similarly, the rotation of Option C also directly impacted on the A63, requiring a significant length of the headshunt to be located over or under the road. Option C1 is shown in Figure 20 below.

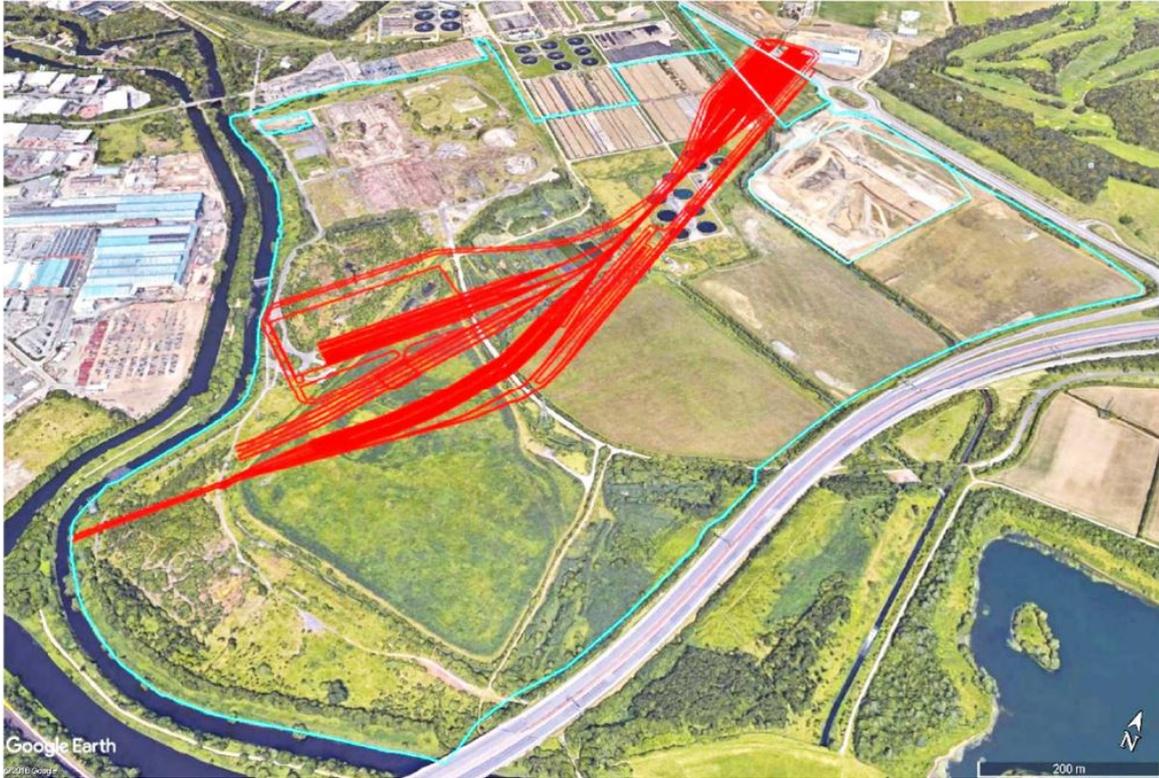


Figure 18: Re-orientation of Option A

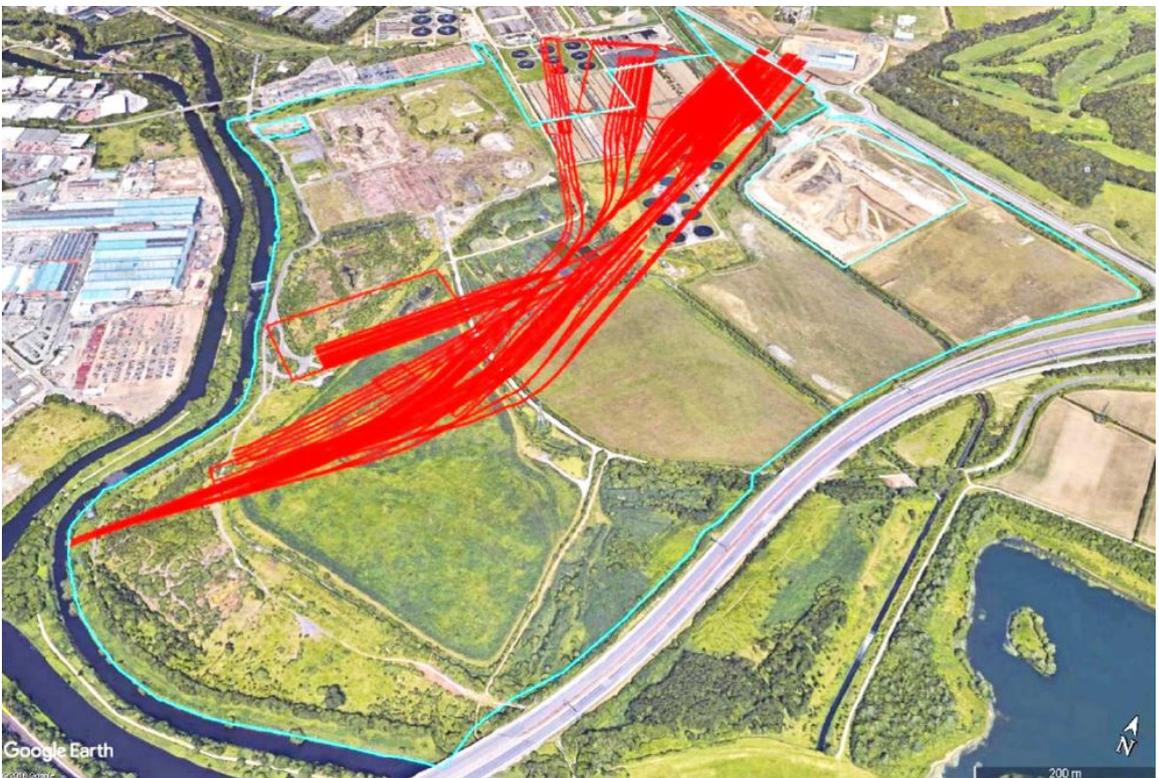


Figure 19: Re-orientation of Option B

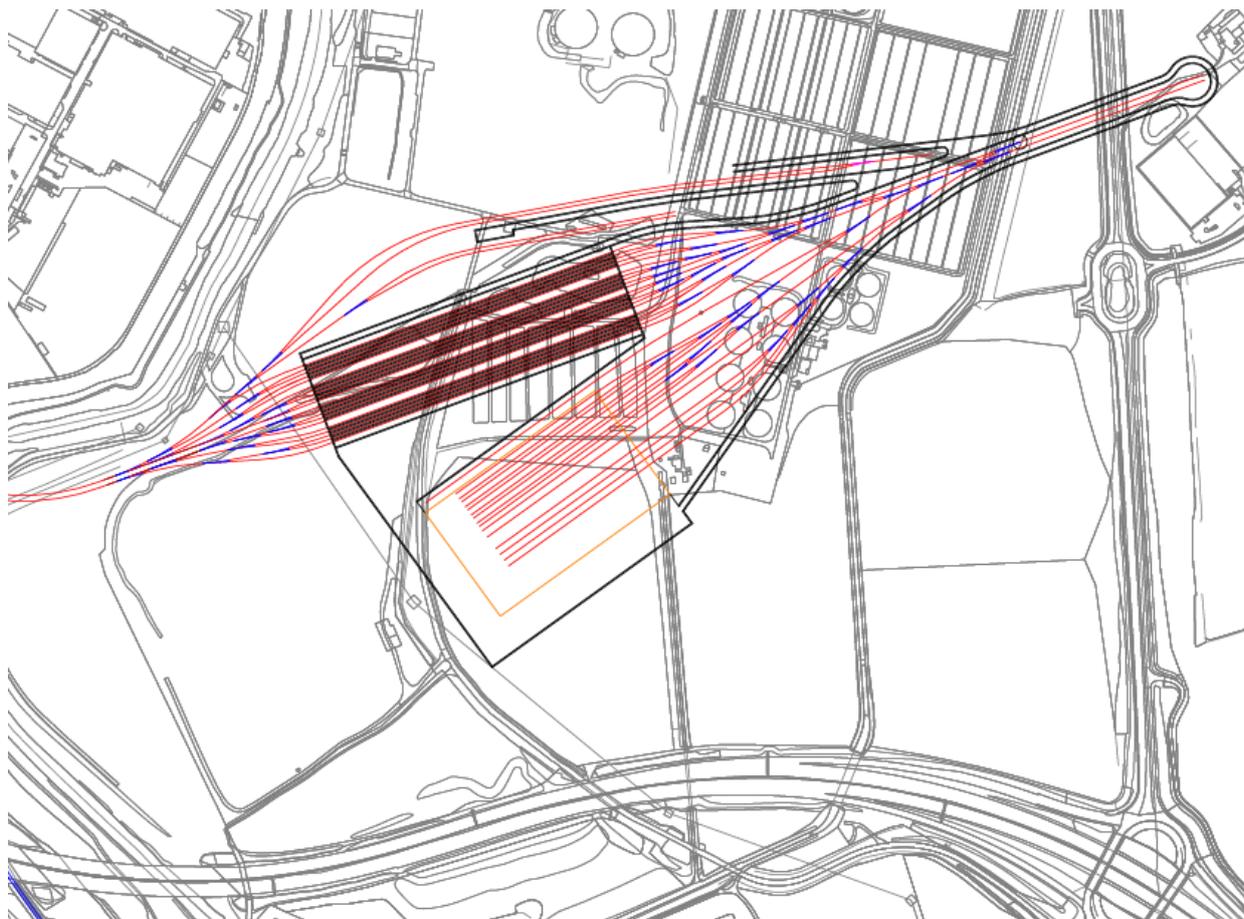


Figure 20: Re-orientation of Option C

- 6.2.5 As the impact on the A63 and sites north of the A63 were less substantial, and as Option C was the preferred internal layout, work was undertaken to identify whether Option C1 could be internally refined in order to reduce the impact on the A63.
- 6.2.6 Consideration was given as to whether further refinements could be made to bring the headshunt within the site boundary, thus reducing the direct impact on the A63. However, in order to do so, the depot would depart from HS2 track alignment standards, it would be required to have a reduced length of stabling sidings, the removal of some through sidings, a reduction in the length of the headshunt and potentially further refinements. These changes would result in a significantly constrained depot layout, which would likely have major operational deficiencies, higher lifetime operational costs, more significant maintenance requirements, potentially lower safety standards, and may still not fit within the site once the design has been considered further at the detailed design stage.
- 6.2.7 It is therefore considered that it would not be feasible to reorient the depot within the existing site, without significantly constraining the operation of the depot.

## 7 Recommendation

### Location

- 7.1.1 Based on the feedback received in response to the consultation, which was both overwhelmingly positive about the proposed change and did not present any significant new impacts over and above those already understood by HS2 Ltd, and based on the consideration of proposed alternative sites, which did not demonstrate any improvement over the baseline option, HS2 Ltd believes that the Leeds East site is the right location for the Eastern Leg RSD.
- 7.1.2 In order to address the comments raised in the consultation by the Local Authority and landowners, we undertook analysis of whether an RSD could be reoriented on the site to remove the impact on the key development land adjacent to the M1. The outcome of this work has shown that it would not be feasible to place an HS2 depot on the western side of the site without having a significant impact on the A63, and a direct impact on either the operating water treatment facility or the Amazon distribution centre.
- 7.1.3 We therefore recommend that the Eastern Leg RSD be confirmed as being located on this site, in its consulted orientation, adjacent to the M1.

### Land take

- 7.1.4 The work undertaken to develop compliant depot concepts has led us to identify a preferred depot layout, referred to as Option C (as shown in Figure 17) within this document. We are taking this forward as our option for further development, and we expect that it will require an altered land take on the wider site. This updated boundary is set out in Figure 21 below. This is an indicative boundary, based on our emerging expectation of the land required for constructing and operating the depot.
- 7.1.5 We therefore recommend that the Secretary of State confirms the updated land boundary for the ELRSD, which has taken into account of our preferred internal design, whilst noting that it will be further refined as we develop the design for the working draft Environmental Statement.

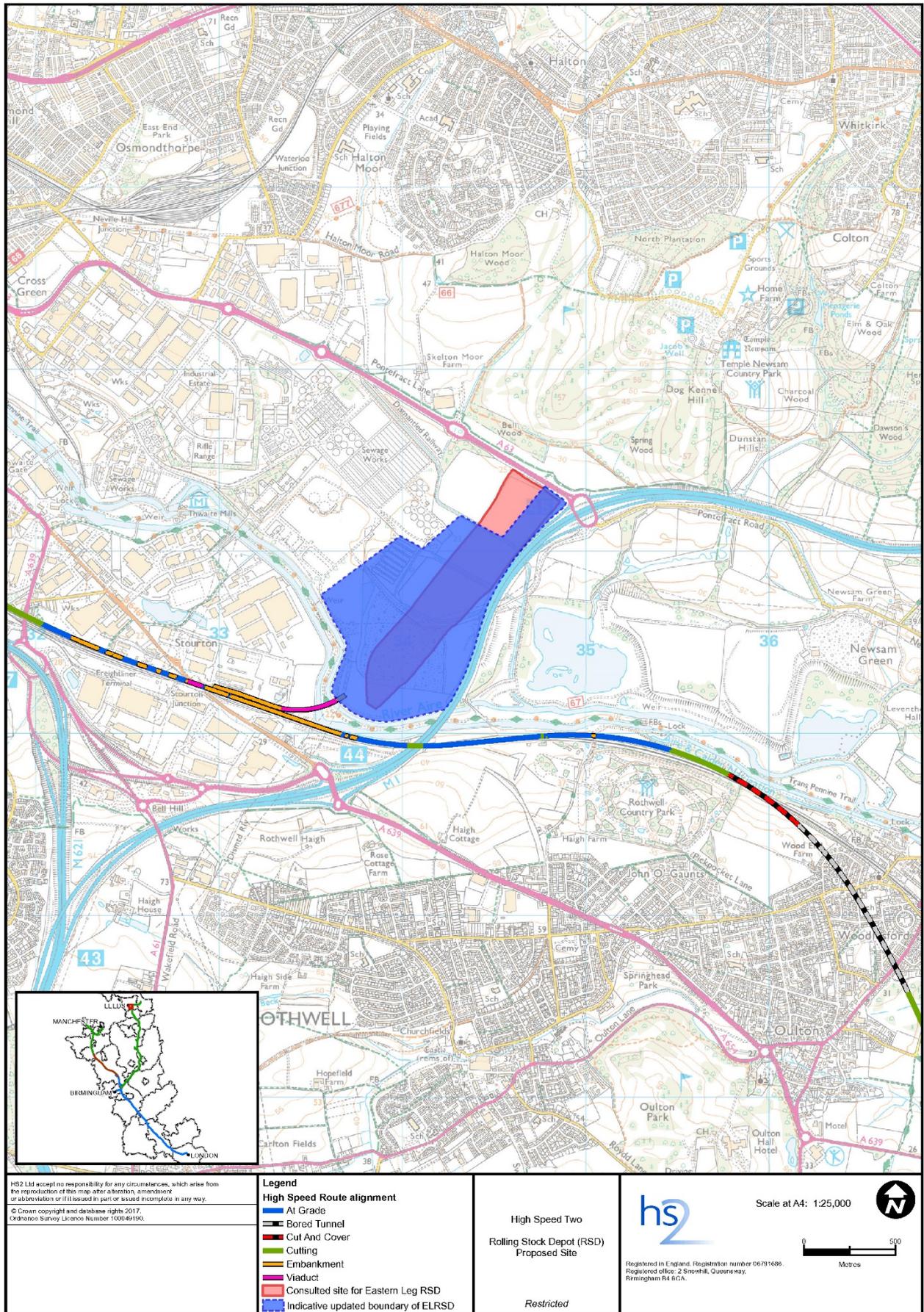


Figure 21: Emerging Land Boundary for Leeds East RSD

## 8 Next steps

- 8.1.1 Further design work will be taken place to develop Option C into a level required for hybrid Bill submission. This will include developing the design and placement of ancillary features, the development of construction and logistics plans, and an analysis of the environmental impacts of the depot's construction and operation.
- 8.1.2 This further design work will inform the updated safeguarding for the site, due later this year, and will be available in the WDES. It is expected that the safeguarding will be based on the boundary shown at Figure 21, but may be subject to further refinement as the design develops.
- 8.1.3 As part of our work to further develop this option, we will engage with the Local Authority and the land owners over the emerging design, to ensure that our work can integrate with their aspirations for the site.

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