



**High Speed Rail (London – West Midlands) Act
2017**

HS2 Ltd

London Borough of Hillingdon

West Ruislip Portal and Retained Embankment

Schedule 17 Plans and Specifications Written
Statement for Information

LBH.S232.PS.21

Contents

Abbreviations and definitions	3
1 Introduction	5
1.1 Background Information	5
1.2 Terms of Reference	5
1.3 Introduction to High Speed 2	6
1.4 High Speed Rail (London – West Midlands) Act 2017	6
1.5 High Speed Two: Code of Construction Practice	7
1.6 Environmental Minimum Requirements	7
1.7 Structure of Written Statement	8
2 Site Location and Characteristics	9
2.1 Site Location	9
2.2 Surrounding Highway Network	15
3 Description of the Works	17
3.1 Introduction	17
3.2 Works for Approval	17
3.3 Other Relevant Works	24
3.4 Indicative Mitigation	27
3.5 Construction Method	31
3.6 Archaeology	33
3.7 Environmental Management during Construction	34
4 Design Criteria and Rationale	35
4.2 Design Constraints	38
4.3 Options Considered	39
4.4 Noise Barriers	39
5 Grounds for Determination	41
5.2 Preserve the local environment or amenity	43
5.3 Road safety or on the free flow of traffic in the local area	43
5.4 Archaeological or historic interest or nature conservation value	43
5.5 Locating the development elsewhere within the development's permitted limits	44
6 Pre-submission Consultation	45
7 Construction Programme	47
8 Other Consents	48

List of Tables

Table 1: Schedule 17 Address Details and Description of Works	5
Table 2: Schedule 17 Plans and Specifications Submission Details	7
Table 3 - Plans showing layout of fences and walls (location only for approval)	24
Table 4 - Drawings with indicative mitigation proposals	28
Table 5 - Ground for determination under Paragraph 3 of Schedule 17 of the HS2 Act	42
Table 6: Pre-submission Consultation with LPA and Statutory Consultees	46
Table 7: Proposed Programme and Sequence of Works	47
Table 8: Other Consent Requirements	48

List of figures

Figure 1 - Indicative location plan	9
Figure 2 -The surrounding area to the application site	11
Figure 3 - Sites of Borough Importance	12
Figure 4 - Scheduled Monuments	14
Figure 5 - Listed Buildings	15
Figure 6 - Local highway network	16
Figure 7 - Schematic plan of the main elements within the application boundary and surrounding area	18
Figure 8 – Indicative view of West Ruislip Portal headhouse from south-east	20
Figure 9 - Existing Route of Footpath U81 Source: LB Hillingdon Definitive map	25
Figure 10 - Proposed landscape treatment to the portal and land to the north between the portal and Ruislip Golf Course	29
Figure 11 - Precedent images showing the design intent for the space north of the portal	29
Figure 12 - West Ruislip Portal rendered plan	35
Figure 13 - Schematic overview of West Ruislip Portal	36
Figure 14 - Indicative view towards the portal entrance showing the grassed embankment beyond	36
Figure 15 - Impression of headhouse from hard-standing area	37
Figure 16 - Views looking form the south and south-west	38

Abbreviations and definitions

CDE – Common Design Element; a structure or part of a structure comprising common design parameters that would be adopted at multiple locations on the Phase 1 route.

CFA – Community Forum Area

CoCP – Code of Construction Practice

CSjv – Costain Skanska joint venture

EA – Environment Agency

ES – Environmental Statement (as amended)

EMR – Environmental Minimum Requirements

EWC – Early Works Contractor

GLAAS – Greater London Archaeology Advisory Service

GWSI: HERDS – Generic Written Scheme of Investigation: Historic Environment Research and Delivery Strategy

HE – Historic England

HS2 – High Speed 2 Ltd.

LB Hillingdon – London Borough of Hillingdon

LLAU – Limits of Land to be Acquired or Used

LOD – Limits of Deviation

LPA – Local Planning Authority

LS-WI – Local Scheme of Written Investigation

MWCC – Main Works Civils Contractor

NE – Natural England

SCS – Skanska Costain Strabag joint venture

S1 – HS2 Area South Lot 1 - Euston Tunnels and Approaches; extending from Euston Station to Old Oak Common (exclusive).

S2 – HS2 Area South Lot 2 - Northolt Tunnels; extending from Old Oak Common to Harvil Road (exclusive).

UKPN – United Kingdom Power Network

1 Introduction

1.1 Background Information

Site	Details
Scheme	High Speed 2
Applicant	High Speed Two (HS2) Limited
Applicant Address	c/o Agent: SCS Railways Joint Venture (SCS) Third Floor, Victoria House 37-63 Southampton Row London WC1B 4DA
Site Address	Site to the west of High Road/Ickenham Road and north of the Chiltern Mainline and east of the River Pinn in the London Borough of Hillingdon
Description	Plans and Specifications submission under Schedule 17 of the High Speed Rail (London-West Midlands) Act for works comprising: The West Ruislip Portal, the Portal Headhouse and Site Compound, a section of the West Ruislip Retained Embankment, associated earthworks (including retaining walls and ecological ponds), noise barriers and lighting, and boundary / security fencing (location only for approval).

Table 1 - Schedule 17 Address Details and Description of Works

1.2 Terms of Reference

- 1.2.1 This written statement is compiled in accordance with the HS2 Planning Memorandum and Planning Forum Notes as required by the planning regime established under Schedule 17 of the High Speed Rail (London – West Midlands) Act 2017.
- 1.2.2 This statement provides the London Borough of Hillingdon with information to assist with the determination of the Plans and Specifications submission under Schedule 17, in relation to the above description of works.
- 1.2.3 The information in this Written Statement is provided for information to assist in determining the request for approval. It is not for approval.

1.3 Introduction to High Speed 2

- 1.3.1 HS2 is a new high speed railway network that will connect major cities in Britain. It will bring significant benefits for inter-urban rail travellers through increased capacity and improved connectivity between London, the Midlands and the North. It will release capacity on the existing rail network and so provide opportunities to improve existing commuter, regional passenger and freight services.
- 1.3.2 Phase One of HS2 will provide a dedicated high speed rail service between London, Birmingham and the West Midlands. It will extend for approximately 230km (143 miles). Just north of Lichfield, high speed trains will join the West Coast Main Line for journeys to and from Manchester, the North West and Scotland.
- 1.3.3 For further information on HS2 and the route through the London Borough of Hillingdon please refer to the Planning Context Report for the London Borough of Hillingdon, deposited with the Council by HS2 Ltd.

1.4 High Speed Rail (London – West Midlands) Act 2017

- 1.4.1 The High Speed Rail (London – West Midlands) Act 2017 ('the Act') provides powers for the construction and operation of Phase 1 of High Speed Two. HS2 Ltd is the nominated undertaker in relation to the works subject to this Plans and Specifications submission.
- 1.4.2 Section 20 to the Act grants deemed planning permission for the works authorised by it, subject to the conditions set out in Schedule 17. Schedule 17 includes conditions requiring the following matters to be approved or agreed by the relevant LPA.
- Construction arrangements (including large goods vehicle routes);
 - Plans and specifications;
 - Bringing into use requests; and
 - Site restoration schemes.
- 1.4.3 This is therefore a different planning regime to that which usually applies in England (i.e. the Town and Country Planning Act) and is different in terms of the nature of submissions and the issues that the LPAs can have regard to, in determining requests for approval.
- 1.4.4 Schedule 17 of the Act sets out the grounds on which the LPA may impose conditions on approvals, or refuse requests for approval.
- 1.4.5 This Written Statement includes information supporting the Plans and Specifications submission in relation to the matters outlined in Table 2 below.

Site	Details
West Ruislip Plans and Specifications (permanent works)	<ul style="list-style-type: none"> • Building works: West Ruislip Portal (including ventilation slots), Portal Headhouse, Substation building, noise barriers • Road vehicle park • Earthworks: West Ruislip Portal hood covering, West Ruislip Retained Embankment, retaining walls, ecological ponds • Location of fences or walls • Artificial lighting equipment

Table 2 - Schedule 17 Plans and Specifications Submission Details

1.5 High Speed Two: Code of Construction Practice

1.5.1 HS2 Ltd as the nominated undertaker is contractually bound to comply with the controls set out in the Environmental Minimum Requirements (EMRs). The EMRs include the High Speed Two Code of Construction Practice (CoCP).

1.6 Environmental Minimum Requirements

1.6.1 The Environmental Statement (ES) is an assessment of the likely significant environmental effects of the proposed HS2 railway and the proposals to avoid, reduce or remedy these likely significant environmental effects.

1.6.2 HS2 Ltd as the nominated undertaker is contractually bound to comply with the controls set out in the Environmental Minimum Requirements (EMRs). These controls along with the powers contained in the High Speed Rail (London - West Midlands) Act and the Undertakings and Assurances will ensure that impacts which have been assessed in the ES will not be exceeded.

1.6.3 The EMRs comprise the following suite of documents:

- Code of Construction Practice (CoCP)
- Planning Memorandum
- Heritage Memorandum
- Environmental Memorandum
- Undertakings and Assurances

1.7 Structure of Written Statement

1.7.1 This document will cover the following sections:

- Section 2 provides an overview of the location and context of the design element;
- Section 3 gives further detail on the works for approval and the plans and specifications being submitted including indicative mitigation and other relevant works (not for approval in this application);
- Section 4 sets out the design proposals and any known constraints to the design;
- Section 5 sets out the grounds for determination of this application;
- Section 6 covers pre-submission consultation;
- Section 7 set outs the indicative programme for the construction of the works; and
- Section 8 covers all consents related to the asset and any conditions that have emerged through consultation discussion.

2 Site Location and Characteristics

2.1 Site Location

2.1.1 The site is located within the London Borough of Hillingdon, which is an outer west London Borough that spans from the border of Heathrow Airport in the south, to the districts of Harefield and Northwood in the north. Immediately to the east are the neighbouring outer London areas of Harrow and Wembley, with Central London approximately a further 14 miles to the east. The Colne Valley Regional Park is immediately to the west of the Borough, with a small area of the park partially within the Borough boundary. The A40 runs through the middle of the Borough on an east-west alignment, and to the north of this are the predominantly residential suburbs of Ickenham and Ruislip.

2.1.2 All the land included within the application boundary currently forms part of the Ruislip Golf Course, from Ickenham Road Bridge in the east stretching west by north-west to approximately 100m from the River Pinn (see Figure 1). The application site is bounded by the Network Rail Chiltern Line to the south. The nearest residential receptors to the application site are on The Greenway, which lies to the South of the Network Rail Chiltern Line.

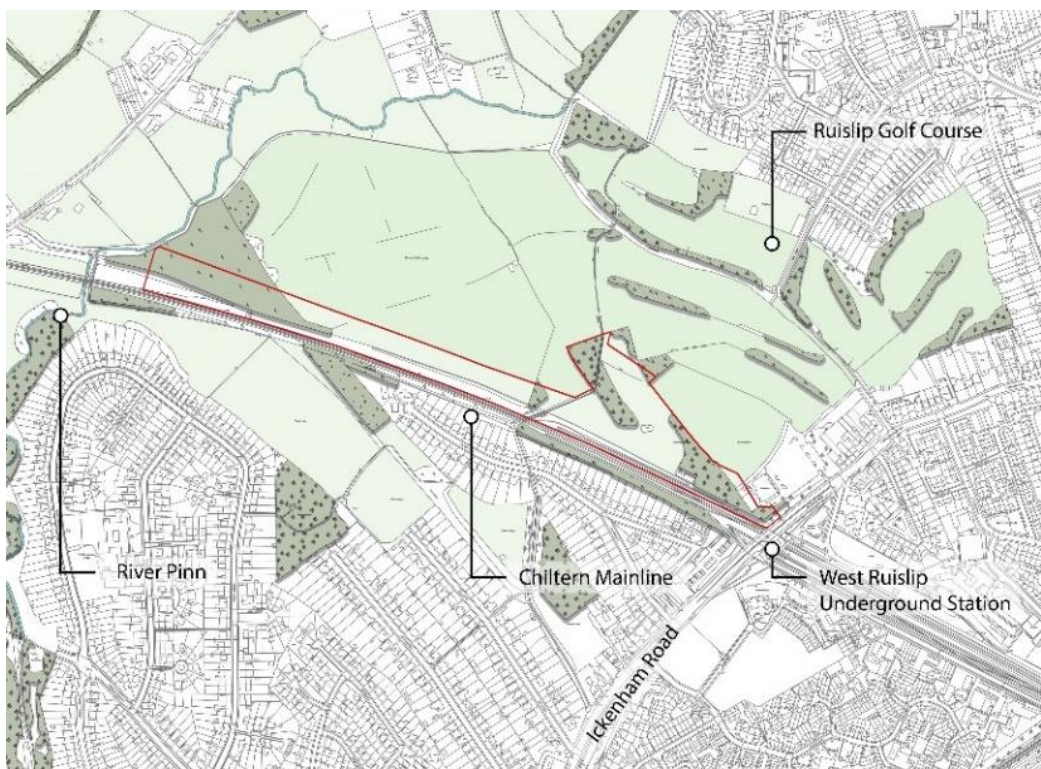


Figure 1 - Indicative location plan

2.1.3 Ruislip Golf Course is an 18-hole facility owned by the London Borough of Hillingdon with associated driving range, and pro shop located within a building that is now a public house. The parkland course was built in 1922, and has many mature trees, ponds and streams, and a Public Right of Way (PRoW), Footpath U81, passes through the application site to link up with the Hillingdon Trail, the wider network of footpaths within the golf course to the north. Footpath U81 crosses the existing Chiltern Main Line via a subway, which provides a connection between Ruislip Golf Course and The Green way.

2.1.4 As a result of the area within the application boundary being permanently lost to the HS2 works, the remaining golf course layout will be suitably remodelled, the design for which is the subject of a separate planning application under the Town and Country Planning Act 1990.

Adjacent Land Uses

2.1.5 To the north west of the site, the area of Newyears Green is more rural in nature, consisting predominantly of open fields that lie within the boundary of the Colne Valley Regional Park (see Figure 2). The Royal Air Force station, RAF Northolt, is located to the south east, west of Ickenham adjacent to south Ruislip. Significant areas of open space include Riverside Walk Public Open Space, Ruislip Golf Course and Ruislip Common and Lido.

2.1.6 The Chiltern Main Line rail corridor is immediately adjacent to the south of the site, with services that can be accessed from nearby West Ruislip Station, on the east side of Ickenham Road. Services operate on the 112-mile route northwards to Birmingham Snow Hill via High Wycombe, Banbury and Leamington Spa, and southwards to London Marylebone.

2.1.7 The London Underground Central Line West Ruislip Branch also runs from the station, which forms the end of the line, and connects Ruislip eastwards to Central London and the wider tube network.

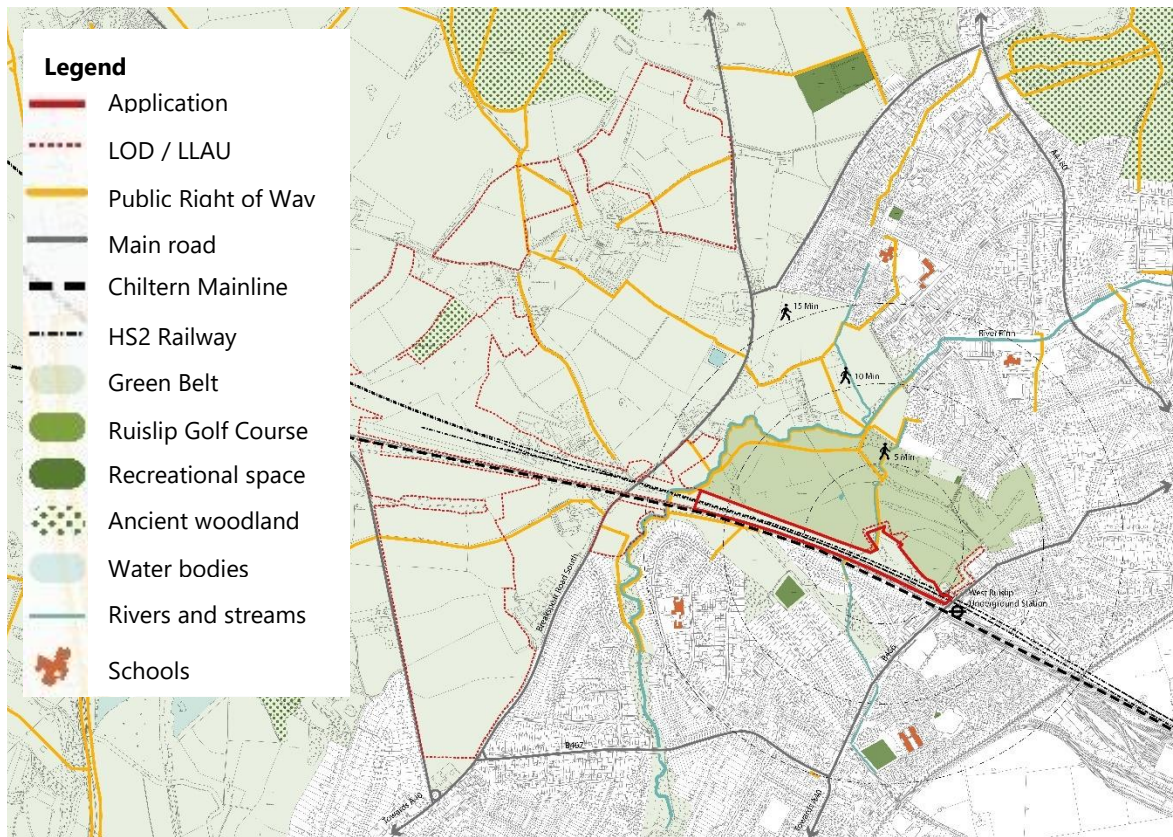


Figure 2 -The surrounding area to the application site

Environmental Characteristics

2.1.8 The following environmental designations are of relevance to the application site, although they do not all necessarily fall within the application site boundary:

- The site partially intersects with the locally designated non-statutory Ruislip Golf Course and Old Priory Meadows Site of Biological Importance 1 (SBI.1) in the section of retained embankment to the west of the site. The impacts of this have been assessed in the Environmental Statement (as amended) and a loss of habitat was identified.
- The site partially intersects with a groundwater Source Protection Zone (SPZ); this is categorised as Zone I – Inner Protection Zone

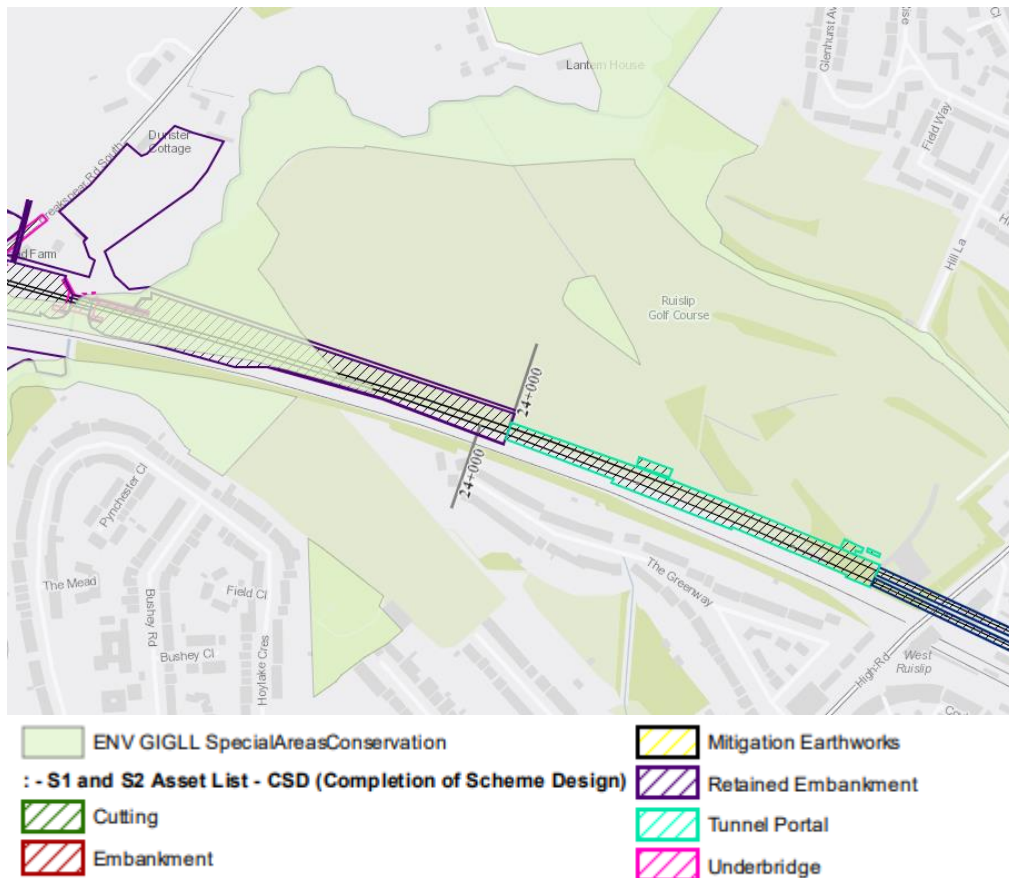


Figure 3 - Sites of Borough Importance

2.1.9 The following habitats and species have been identified within the application site:

- The Department for Environment, Food & Rural Affairs (DEFRA) has identified the following habitats within the application site:
 - Good quality semi-improved grassland
 - Deciduous woodland
 - Lowland meadows
 - Conifer trees
 - No main habitat but additional habitat exists

- The Department for Environment, Food & Rural Affairs (DEFRA) has identified the following species within the application site:
 - Lapwing
 - Snipe
 - Grassland Assemblage Farmland Birds

- HS2 ecological surveys identified the following species within or in proximity of the application site:

- Great Crested Newt
- Potential for various bat species.
- Slow worm (low population)
- Grass snake (low population)

2.1.10 In line with the Environmental Minimum Requirements (EMRs) outlined in Section 1.6, the application proposals have been assessed as having no change on the impacts reported in the Environmental Statement (ES) (as amended). Indicative mitigation measures are outlined in Section 3.4.

Heritage Characteristics

2.1.11 The site does not contain any listed or locally listed heritage assets. There are three Grade II listed buildings located in the residential area to the north-east of the site as well as a cluster to the south around B466 High Road and B467 Swakeleys Road. In the wider area, there are some significant heritage assets to take account of:

- There are five Scheduled Monuments in the surrounding area: Brackenbury Farm moated site, Medieval moated site south-east of Brackenbury Farm, Ruislip motte and bailey, Pale Park and Ickenham Manor Farm. Each of the Scheduled Monuments is between 0.5-2.5km from the application site (see Figure 4).
- There are a number of Grade II listed buildings and one Grade II* listed building within the wider surrounding area to the application site. The closest listed building is approximately 0.5km from the application site (see Figure 5).
- There are several areas of Ancient and Semi Natural Woodland in the surrounding area: Bayhurst Wood, Mad Bess Wood and Park Wood are located between 2-3km from the proposed site.

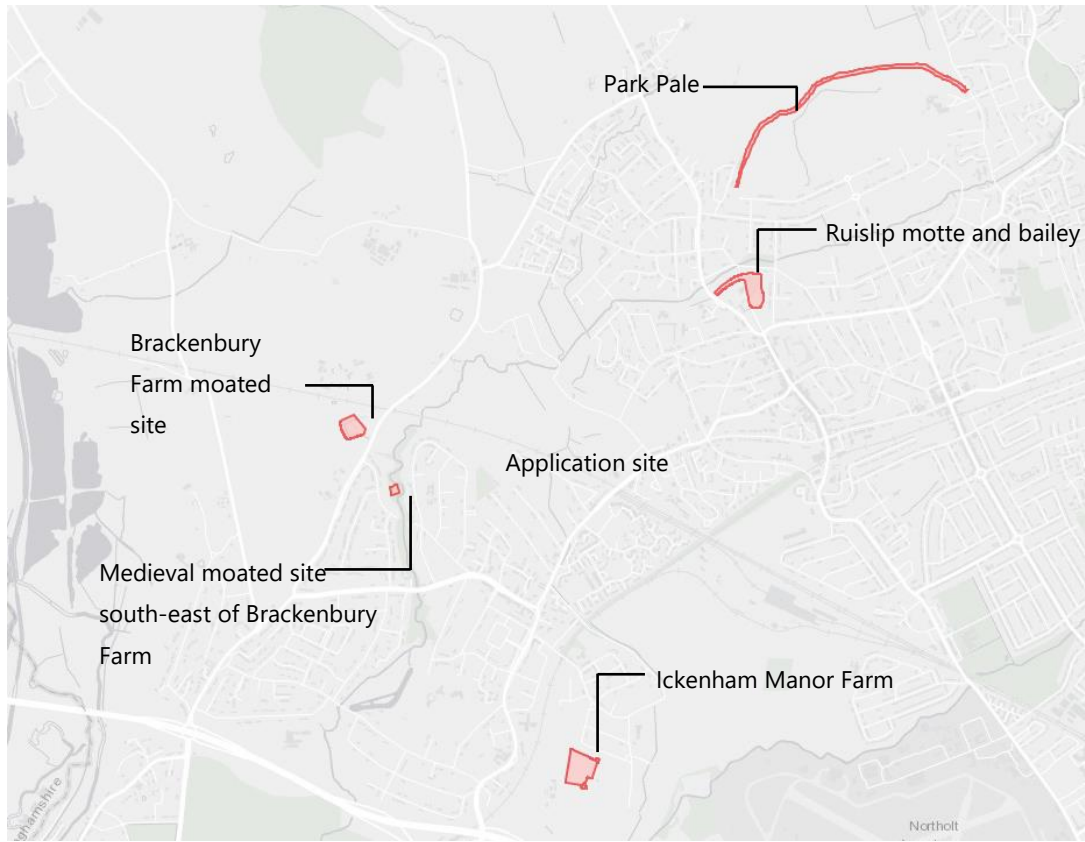


Figure 4 - Scheduled Monuments

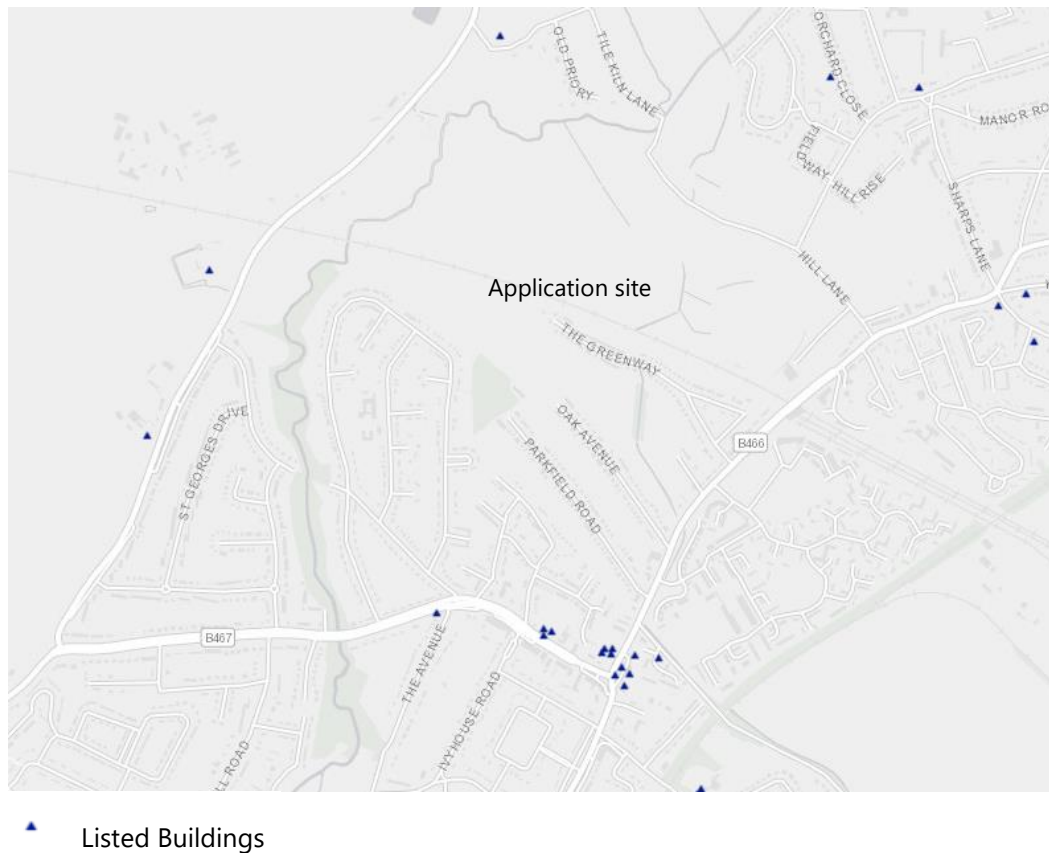


Figure 5 - Listed Buildings

2.1.12 In line with the Environmental Minimum Requirements (EMRs) outlined in Section 1.5, the application proposals have been assessed as having no change to the impacts on culture and heritage reported in the Environmental Statement (ES) (as amended). Due to the distance of from the application site, the proposals are not considered to have any permanent, direct impacts on the heritage assets identified.

2.2 Surrounding Highway Network

2.2.1 The B466 High Road connects Ickenham and Ruislip in a south west-north easterly direction, crossing over the Chiltern Main Line Railway, with West Ruislip London Underground / Overland Rail Stations located on the east side opposite Ruislip Golf Course (see Figure 6). Further to the west, Breakspear Road South is located in a south-north alignment along the boundary of the Colne Valley Regional Park, and via the B467 Swakeleys Road, links to the A40, a major arterial route into / out of Central London.

2.2.2 To the west, the A40 eventually becomes the M40 motorway to the north, which provides access northwards to Oxford and Birmingham, and connects to the London orbital M25 motorway.

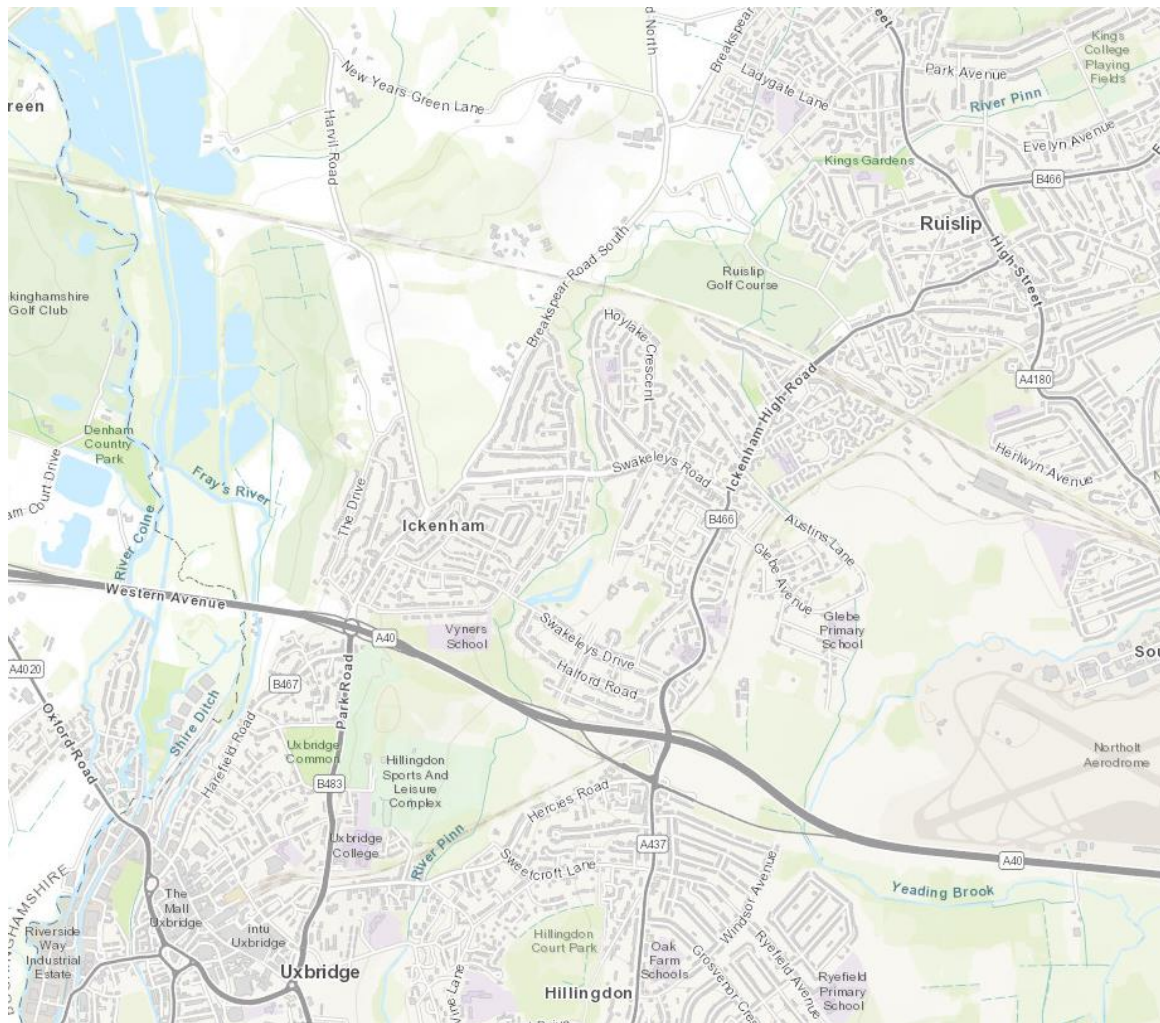


Figure 6 - Local highway network

3 Description of the Works

3.1 Introduction

- 3.1.1 This Written Statement supports the Schedule 17 submission for the approval of Plans and Specifications for the West Ruislip Portal and Retained Embankment package.
- 3.1.2 The Plans and Specifications submitted for approval are listed in the proforma accompanying the application. A summary of the proposed works for approval is provided in Section 3.2 below with a summary of other relevant works in 3.3.
- 3.1.3 Section 3.4 summarises the indicative mitigation relevant to the works being submitted in accordance with paragraph 7.5.2 of the Planning Memorandum.
- 3.1.4 Sections 3.5 - 3.7 provide information on other aspects of the works to assist in understanding the context of the works being submitted for approval. The information in Sections 3.4 - 3.7 is not for approval under Schedule 17.

3.2 Works for Approval

- 3.2.1 The above ground section of the HS2 alignment in the West Ruislip area forms part of the western end of the Lot S2 package of works. The following works are requested for approval in this submission:
- Building works (Schedule 17, paragraph 2): West Ruislip Portal (including ventilation slots), Portal Headhouse, Substation building
 - Earthworks (Schedule 17, paragraph 3): West Ruislip Portal hood covering, a section of the West Ruislip Retained Embankment, retaining walls, ecological ponds
 - Site noise, or dust screens (Schedule 17, paragraph 3): noise barriers
 - Road vehicle parking (Schedule 17, paragraph 3)
 - Fencing/walls (location only) (Schedule 17, paragraph 3)
 - Artificial lighting equipment (Schedule 17, paragraph 3)
- 3.2.2 All the remaining S2 works to the west of the application boundary, (including the associated structures for the diversion of Footpath U81) River Pinn Bridge, Breakspear Road Bridge, Gatemead Embankment and Copthall Green Tunnel through to Harvil Road (including the three proposed new bridges over the Chiltern Line, HS2 tracks and

Newyears Green Bourne) and the Northern and Southern SPAs will be the subject of separate submissions for approval under Schedule 17 of the HS2 Act.

3.2.3 The principal design elements relating to the proposed railway in the West Ruislip area covered by this submission, in the context of the immediate surrounding area, are illustrated in the schematic plan in Figure 7.



Figure 7 - Schematic plan of the main elements within the application boundary and surrounding area

3.2.4 The Northolt Tunnels alignment will rise up towards the existing ground level at a point just inside the south-eastern corner of Ruislip Golf Course, adjacent to the Chiltern Main Line and directly opposite West Ruislip Station. Through the entire length of the tunnel portal ('The West Ruislip Portal'), the alignment continues to rise until a 'level' point at approximate chainage 24+000, just to the west of the portal mouth, after which the ground level reduces down by approximately 10m to the River Pinn, necessitating the construction of the proposed West Ruislip Retained Embankment to carry the railway at a suitable level over the River Pinn and beyond.

3.2.5 The relevant scheduled works as set out under Schedule 1 of the Act to which this Schedule 17 submission relates are:

- Work No. 1/61 - A railway (2.27 kilometres in length), partly in tunnel commencing by a junction with the termination of Works Nos. 1/15 and 1/1 passing north westwards and terminating at a point 225 metres north of the junction of Harvil Road with Skip

Lane. Work No. 1/61 includes a shaft at West Ruislip and bridges over the River Pinn and Breakspear Road South

The West Ruislip Portal (including ventilation slots and hood covering)

- 3.2.6 The West Ruislip Portal will comprise a shallow-sloped below-ground structure that will act as a connecting, transition section between the Northolt Tunnels to the east and the above-ground open section of railway to the west.
- 3.2.7 The portal will consist of the following main sections:
- A Tunnel Boring Machine (TBM) launch chamber, which in the permanent case will act as a shaft and support a headhouse building, containing a vertical circulation core and one level of basement;
 - A section of cut and cover tunnel forming a porous portal with ventilation slots; and
 - An open retained cut.
- 3.2.8 More detail on the basis for the portal design is contained in Section 4.
- 3.2.9 The porous portal will be formed of a 210m long cut-and-cover box with contiguous pile walls. The roof of the portal will have a row of 0.5m wide ventilation slots located above both the up and down train lines. The ventilation slots will contain strong steel mesh for safety reasons. The total width of the porous portal will vary slightly, from 23m at the connection with the headhouse to 24.7m at its widest point at the portal mouth.
- 3.2.10 Earthworks will be formed on top of the portal roof structure to form the portal hood cover, ranging in depth from approximately 1.5 metres at the eastern end (adjacent to the headhouse) down to 0.3m adjacent to the portal mouth, to allow the landscaping scheme to be implemented, and as far as possible, to give the portal a flat, green appearance to allow it to blend into the surrounding landscape.
- 3.2.11 A maintenance access route (not for approval) will be located on top of the porous portal (northern side). It will enable access to the underground attenuation tank located adjacent to the portal on the north side, as well as to the portal mouth and retained embankment. As the route will rarely be used there is no requirement for it to comprise a hard surface. A grassed surface will therefore ensure that it blends in with the overall green nature of the portal landscaping. Low column lighting will be installed along the track (see paragraphs 3.2.22 - 3.2.24 below); this will only ever be turned on when the route is used for night time maintenance, or in the event of an emergency at the portal mouth, during times of darkness.

West Ruislip Portal Headhouse and Compound

- 3.2.12 The shaft (constructed initially as the TBM launch chamber) at the far eastern end of the portal will enable emergency intervention to, and evacuation from the HS2 tunnels to/from the surface. At the top of the underground shaft, a headhouse building will be constructed that will contain two separate staircases to allow intervention/evacuation; the building will also house a variety of mechanical and electrical equipment.
- 3.2.13 The headhouse will be formed of one principal element at a continuous, single storey height of 7.2m, with a footprint of 25.4m x 26.7m, with one basement level. The exterior finish of the headhouse building will be predominantly timber with metal doors and louvres. The timber cladding will help to integrate the building into the largely natural and wooded setting, adjacent to Ruislip Golf Course. The building will have a 'green roof' incorporated on top as a means of promoting ecological connectivity throughout the area. More detail on the design rationale for the building is contained in Section 4.



Figure 8 – Indicative view of West Ruislip Portal headhouse from south-east

- 3.2.14 The West Ruislip Portal headhouse building will have a green roof with structural loading sufficient to ensure that support exists for it without the need for extra columns for increased loads. As a deep substrate green roof, the majority of proposed planting will reach heights up to 1m high; the green roof will be at a position 0.5m above roof level with the parapet at 1m above roof level, therefore approximately 0.5m of greenery will be visible (see paragraph 3.4.8 for more details).
- 3.2.15 Within the compound, a hardstanding area of 854m² is provided for the parking of emergency and maintenance vehicles which forms a 'road vehicle parking area' as

defined under Paragraph 3 of Schedule 17 of the Act. This area meets the relevant minimum HS2 Technical Standards. The parking area will consist of large robust concrete slab paving which has been selected to visually match the semi-industrial lineside character of the site.

- 3.2.16 Access into the secure compound will only be possible via security gates in the north western corner, from the Ruislip Golf Course car park. Works will be undertaken to widen the current single lane access road into the golf course car park from Clack Lane to the north, such that it becomes a shared access for both HS2 personnel/vehicles and golf course patrons. However, this will be the subject of separate future submissions under Schedule 4 (Highways) and Schedule 17, if necessary, of the HS2 Act.

Substation

- 3.2.17 A substation, to be owned and operated by UK Power Networks (UKPN), will be located to the east of the hardstanding area for road vehicle parking, adjacent to the West Ruislip Portal Headhouse. The substation will be one building, single storey height of 4.2m, with a footprint of 10.0m x 5.0m. Details of the substation building are illustrated on the General Arrangement Plan (3 of 3) (1MC04-SCJ-AR-DGA-SS05_SL7-120121) and Portal Sections and Elevations (1MC04-SCJ-AR-DSE-SS05_SL07-122152) submitted as part of this application.
- 3.2.18 The external materials of the substation and associated means of enclosure have been chosen to reflect the overall design of the headhouse and the surrounding area. The south and north elevations consist of metal panels and louvres whilst the east and west elevations are comprised of black brick and the roof will consist of a concrete slab.

West Ruislip Retained Embankment and Retained Cut

- 3.2.19 To the west of the portal mouth, the HS2 alignment will continue to rise to grade level within an open retained cut, approximately 80m in length, also formed using contiguous pile retaining walls. Fair faced concrete retaining walls will be formed on either side, sloping downwards to the west, at which point the walls will transition to noise barriers (see paragraphs 3.2.27- 3.2.32).
- 3.2.20 To the west of the portal headhouse over the top of the portal, the topography of the land reduces by approximately 10m over a 200m section down to the River Pinn. To ensure that the HS2 track alignment is maintained at the required, flat level, as well as being high enough to pass over the River Pinn and Breakspear Road, the West Ruislip Retained Embankment will be constructed to support the railway connecting directly with the proposed new bridge over the River Pinn, outside of the application boundary to the west.

- 3.2.21 The embankment will be constructed using free-draining granular material and will be formed upon the shoulder of the existing Chiltern Line embankment to the south, with a shallow slope formed down to security fencing on the north side, which will form the border with Ruislip Golf Course. As implied above, the embankment will rise to approximately 10m in height at its highest point just prior to the River Pinn bridge. For clarity, only the section of the embankment to the west up to the wingwall of the proposed River Pinn Bridge is included for approval within this submission.

Lighting

- 3.2.22 This application seeks approval for the design of lighting equipment, with respect to the emissions of light. The overall objective of the lighting design for the compound will be to provide the necessary lux levels to facilitate the few occurrences when emergency intervention to/from the tunnels via the shaft is necessary. However, at all other 'normal' times of darkness, when the building is unattended, and no maintenance works are being undertaken, lighting will be kept to a minimum in order to preserve local and environmental amenity. This will be achieved as follows, and illustrated by lighting contour plans (1MC04-SCJ-EL-DGA-SS05_SL07-120101, 1MC04-SCJ-EL-DGA-SS05_SL07-120110) and lighting model details (1MC04-SCJ-EL-DDE-SS05_SL07-124001):
- 3.2.23 The east, north and south external facades (for east and south facades see Figure 8 above) of the headhouse building will be permanently lit to a very low level by luminaires attached to the building itself, to a maximum of 5 lux, to act as a reference point from the surrounds
- 3.2.24 The compound entrance gate will be permanently lit to a very low level, a maximum of 5 lux, on both sides, to ensure the necessary level of security is achieved
- 3.2.25 The entire compound will be lit to 20 lux maximum in the event of an intruder entering without authorisation, in order to support CCTV operations. CCTV cameras respond better and more rapidly if there is an initial low level of background lighting rather than lighting coming on from complete darkness. Therefore, low levels of lighting will be maintained permanently. Compound lighting will be via luminaires attached to free standing poles located around the perimeter of the compound.
- 3.2.26 The proposed lighting columns will be approximately 6m in height and spaced roughly 20m apart.

Noise Barriers

- 3.2.27 To ensure that operational airborne noise and vibration that will arise from HS2 trains will be reduced to appropriate levels, trackside noise barriers will be installed on both sides for substantial sections of the alignment within the London Borough of Hillingdon. The

design, external appearance and location of noise barriers require approval under Schedule 17 of the HS2 Act. The nearest sensitive receptors are the residential properties on The Greenway, which lies to the South of the Network Rail Chiltern Line.

- 3.2.28 The eastern extent of the noise barriers within this submission will be from a point approximately 80m to the west of the portal mouth, where the railway alignment is just below ground level. Both barriers will extend westwards, to the western extent of the application boundary, just before the proposed new River Pinn Bridge (subject to future request for approval). For clarity, the barriers will then carry on continuously westwards, for the entire length of the West Ruislip Retained Embankment, River Pinn Bridge, Gatemead Embankment and Breakspear Road South Bridge. These sections will form part of a separate submission for approval under Schedule 17 of the HS2 Act.
- 3.2.29 The barriers will be located parallel to, and approximately 3m either side of the tracks, the close proximity to the noise source (train wheels) ensuring that the acoustic performance of the barriers is maximised. The barrier on the north (golf course) side will be 2.5m in height (from top of rail (ToR)), with the barrier on the south side (bordering the Chiltern Line railway) 5m in height (from ToR), both of which replicate the assumptions in the ES (as amended).
- 3.2.30 The barriers will be formed of precast concrete panels, with absorptive material to the rail-facing side, slotted into steel posts. The barriers on both sides will be 'cranked', the top sections (above the bottom 2.5m) being inverted inwards at a slight angle. The outward facing panels will also contain a suitable architectural treatment to ensure that their external appearance is sympathetic to the surrounding area. Both these elements will help to minimise the visual impact of the barriers, and to ensure that the railway blends naturally into the landscape as much as possible.
- 3.2.31 The results of the ground-borne noise and vibration assessment show there will be no adverse vibration effects.
- 3.2.32 More information relating to the above, including the technical justification behind the noise barrier specification, is contained within the Noise Demonstration Report (1MC04-SCJ-EN-REP-SS05_SL07-000003) submitted for information as part of this application.

Ecological ponds

- 3.2.33 Five ecological ponds are proposed in the area to the north of the portal headhouse building. The main function of the ponds is to provide replacement habitat appropriate for great crested newts. The scale and setting of the ponds has been designed with advice from ecology specialists. The pond volumes range from 85m³ to 800m³ to provide for different habitat environments and activities. Hibernacula will be located on the periphery of the ponds to allow great crested newts to seek refuge.

3.2.34 The ponds will also perform some drainage functions and therefore additional capacity has been incorporated into the design of the ponds to enable the temporary storage of water runoff during heavy rainfall events prior to being slowly released into the Ruislip Golf course drainage system. The design has been developed in parallel with the drainage proposals for Ruislip Golf Course to enable a coordinated approach to water management. Furthermore, pond margin planting has been integrated into the areas on the edges of the ponds, which can be flooded at times and still maintain an appropriate habitat function.

Fences/walls (location only for approval)

3.2.35 The headhouse building will be located within a secure compound, encircled predominantly by approximately 2.4m high security fencing, with sections of dark grey brick wall comprises the boundary to the north and south of the compound hardstanding area and headhouse building.

3.2.36 The substation will be separated from the main operational compound by an approximately 2.8m security fencing and an approximately 1.2m high brick wall mounted by an approximately 1.6m security fence on the boundaries facing the golf course.

3.2.37 Only the location of boundary walls and fencing are for approval under Schedule 17 of the HS2 Act, however some materials have been specified in order to reflect the local context and characteristics. Details are contained on the following plans:

Drawing number	Drawing title
1MC04-SCJ-EV-DPL-SS05_SL07-121010	Hard Landscape General Arrangement Plan (1 of 4)
1MC04-SCJ-EV-DPL-SS05_SL07-121011	Hard Landscape General Arrangement Plan (2 of 4)
1MC04-SCJ-EV-DPL-SS05_SL07-141001	Hard Landscape General Arrangement Plan (3 of 4)
1MC04-SCJ-EV-DPL-SS05_SL07-141002	Hard Landscape General Arrangement Plan (4 of 4)

Table 3 - Plans showing layout of fences and walls (location only for approval)

3.3 Other Relevant Works

Access arrangements

3.3.1 Access arrangements from the public highway to the secure compound will be subject to a separate approval process, and where necessary agreements will be sought with relevant landowners to ensure maintenance and emergency access is retained at all times.

3.3.2 The assumed access to the secure compound is via the existing access on Clacks to the Ruislip Golf Course car park, and across the car park. It is expected that this access would not require any building works and instead the existing hardstanding areas can be used.

Work No 1/62 (footpath diversion and associated works subject to separate requests for approval)

3.3.3 The associated scheduled work is:

- Work No. 1/62 - A footbridge with ramps over Works Nos. 1/60, 1/61 and 1/63 commencing at a point 102 metres east of the junction of The Greenway with footpath U81 and terminating at a point 140 metres north-east of that junction

3.3.4 The current north-south route of Footpath U81 will be permanently severed by the HS2 alignment at the point where it passes underneath the Chiltern Line railway and into the Ruislip Golf Course to the north (see Figure 9)

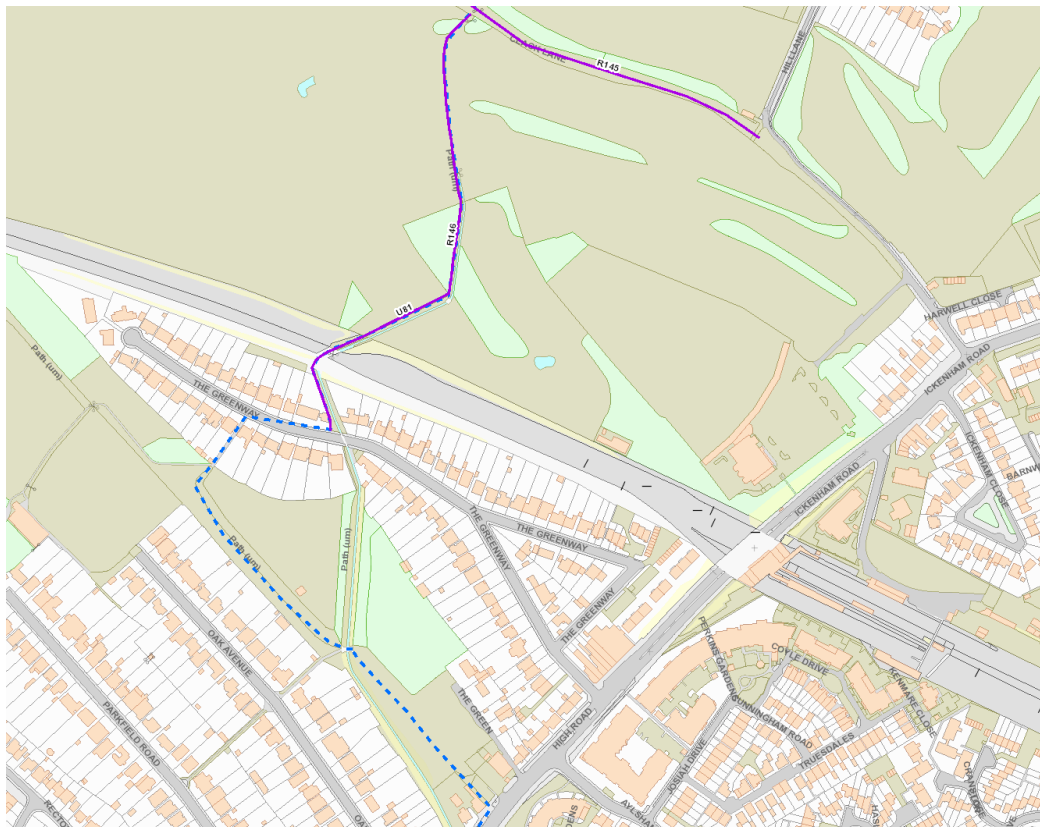


Figure 9 - Existing Route of Footpath U81

Source: LB Hillingdon Definitive map

<http://lbhillingdon.maps.arcgis.com/apps/View/index.html?appid=91b11349f29f40ec9770eba1108229ae>

3.3.5 Powers to divert this Public Right of Way (PRoW) are already granted in Schedule 4 of the Act. The diversion of this footpath is shown indicatively in the drawings submitted as part

of this application. The physical elements relating to this diversion will require Plans and Specifications approval under a separate Schedule 17 application (the ramp structure to the south, between the portal and the Chiltern Line, the parapet walls enclosing the footpath on top of the portal, related earthworks and fencing (location only)); these elements are not for approval within this submission.

New east-west footpath

- 3.3.6 This application includes the indicative route of a new east-west public footpath within the new area of open space created to the north of the HS2 alignment, between the portal and the golf course / driving range, and will comprises:
- Two branches that commence from different points on the diverted Footpath U81 but converge together to the east to provide a link to the golf course pro shop, car park and Fairway public house;
 - A new path to the west from a junction with the diverted U81, along the new fence line to an access gate, where, outside of the application boundary, the path would route westwards into the golf course to link up with Footpath U46 adjacent to the River Pinn
- 3.3.7 In order to be officially classified as a Public Rights of Way (PROW), consent would need to sought separately via either the Town and Country Planning Act 1990 (Section 247, 248 or 257) or the Highways Act 1980 (Section 119), and by doing this, the path also provides a viable alternative to the implementation of the Footpath U81 diversion referred to above, the location for which contains significant challenges in terms of providing a safe environment for users.
- ### **Ickenham Stream Permanent Diversion**
- 3.3.8 The Ickenham Stream's north-south flow through the Ruislip Golf Course and beyond will be permanently obstructed by the HS2 alignment as it rises through the West Ruislip Portal. As a result, the stream will be diverted permanently, and will form part of the works to remodel the golf course that are the subject of a separate TCPA planning application.
- 3.3.9 The Ickenham Stream is not classed as a 'Main River', and as a result, the right of approval for the detailed design of the diversion will fall to the London Borough of Hillingdon as 'Lead Local Flood Authority' (LLFA).
- 3.3.10 A submission for approval for this will therefore be made in the future under the Land Drainage Act 1991 as the works fall outside of the HS2 Act Limits.
- 3.3.11 It should be noted that prior to the implementation of the permanent diversion, there will be a separate temporary diversion of the stream, on a different alignment to the

permanent, which will be within HS2 Act limits. Hence, consent for this diversion will be sought under Schedule 33 Part 5 of the Act.

3.4 Indicative Mitigation

- 3.4.1 In addition to the works for which approval of Plans and Specifications is required, the overall mitigation scheme in this location includes the works set out in paragraphs 3.4.4 - 3.4.21 below.
- 3.4.2 The mitigation will comprise part of the overall mitigation scheme in relation to the scheduled works.
- 3.4.3 Details of the indicative mitigation are submitted for consultation in accordance with paragraph 7.5.2 of the Planning Memorandum are shown on drawings in the Table 4 (below) and are the subject of a separate consultation letter.

Document number	Document title
1MC04-SCJ_SDH-LS -DGA-SS05_SL07-480001	Landscaping General Arrangement Plan
1MC04-SCJ_SDH-LS-DSE-SS05_SL07-482006	West Ruislip Portal Landscape Cross-Sections (sheet 1 of 5)
1MC04-SCJ_SDH-LS-DSE-SS05_SL07-482007	West Ruislip Portal Landscape Cross-Sections (sheet 2 of 5)
1MC04-SCJ_SDH-LS-DSE-SS05_SL07-482008	West Ruislip Portal Landscape Cross-Sections (sheet 3 of 5)
1MC04-SCJ_SDH-LS-DSE-SS05_SL07-482009	West Ruislip Portal Landscape Cross-Sections (sheet 4 of 5)
1MC04-SCJ_SDH-LS-DSE-SS05_SL07-482010	West Ruislip Portal Landscape Cross-Sections – (sheet 5 of 5)
1MC04-SCJ_SDH-LS-DPL-SS05_SL07-532002	West Ruislip Embankment Landscape Cross-Section
1MC04-SCJ_SDH-LS-DPL-SS05_SL07-481008	West Ruislip Portal Soft Landscape Plan – shrubs (sheet 1 of 4)
1MC04-SCJ_SDH-LS-DPL-SS05_SL07-481009	West Ruislip Portal Soft Landscape Plan – shrubs (sheet 2 of 4)
1MC04-SCJ_SDH-LS-DPL-SS05_SL07-481003	West Ruislip Portal Soft Landscape Plan - tree planting (sheet 1 of 4)
1MC04-SCJ_SDH-LS-DPL-SS05_SL07-481004	West Ruislip Portal Soft Landscape Plan - tree planting (sheet 2 of 4)

Document number	Document title
1MC04-SCJ_SDH-LS-DPL-SS05_SL07-531005	West Ruislip Retained Embankment Soft Landscape Plan – shrubs (sheet 3 of 4)
1MC04-SCJ_SDH-LS-DPL-SS05_SL07-531006	West Ruislip Retained Embankment Soft Landscape Plan – shrubs (sheet 4 of 4)
1MC04-SCJ_SDH-LS-DPL-SS05_SL07-531001	West Ruislip Retained Embankment Soft Landscape Plan - tree planting (sheet 3 of 4)
1MC04-SCJ_SDH-LS-DPL-SS05_SL07-531002	West Ruislip Retained Embankment Soft Landscape Plan - tree planting (sheet 4 of 4)
1MC04-SCJ_SDH-LS -DSH-SS05_SL07-481007	Soft Landscape Planting Schedule
1MC04-SCJ-EN-REP-SS05_SL07-000003	Noise Demonstration Report

Table 4 - Drawings with indicative mitigation proposals

Landscape and visual

- 3.4.4 The landscaping associated with the works for approval will aim to create a green corridor that makes HS2 form part of the bigger landscape picture in the London Borough of Hillingdon context in line with the overall Landscape Design Approach, which is based on the values 'Conserve', 'Enhance', 'Restore' and 'Transform'.
- 3.4.5 HS2 Phase 1 Information Paper E16 outlines how the new landscaped areas created along the Hs2 Phase 1 route will be maintained. The landscape design has been developed in accordance with this.
- 3.4.6 The potential visual intrusion of the West Ruislip Portal will be limited via the use of landscaping to integrate the structure into the setting of the golf course edge whilst enhancing the biodiversity and wider ecological connectivity of the site.



Figure 10 - Proposed landscape treatment to the portal and land to the north between the portal and Ruislip Golf Course

3.4.7 The design of the space to the north of the portal aims to provide accessible green space with permanent water bodies, creating rich habitat value, as indicatively shown in Figure 10. The landscape design will also provide additional recreational and educational value to users as footpaths weaves through the different habitats and timber decked sections by the ponds.



Figure 11 - Precedent images showing the design intent for the space north of the portal

3.4.8 The green roof on the West Ruislip Portal Headhouse is designed to generate the following key benefits:

- Biodiversity - the depth of the substrate provides sufficient opportunity for a mix of shrub and herbaceous planting suitable for providing part of the mitigation for the

habitat lost due to the construction.

- Aesthetic value - the variety of planting provides opportunities to maximise the visual / aesthetic appearance, maximising the visual benefits for the adjacent residential properties.
- Storm water retention - a greater substrate depth will enable more storm water retention, which is an important asset, as the design proposals have in general changed the nature of the existing site from a permeable to an impermeable area.

Ecology

- 3.4.9 The proposed wetland habitat to the north of the West Ruislip Portal will reduce adverse ecological impact on the conservation status of the assumed medium population of great crested newts in line with section 7.4.41 of the Environmental Statement (as amended).
- 3.4.10 The proposed design will result in no additional areas of land being impacted beyond those outlined in the Environmental Statement (ES) (as amended). Hence, no additional species have the potential to be impacted additionally to those identified within the ES.
- 3.4.11 Ecological surveys undertaken by the Early Works Contractor (EWC) demonstrate that not additional species will be affected relative to those identified in the ES (as amended).
- 3.4.12 Previous surveys of ponds in Community Forum Area 6 (CFA6 – South Ruislip to Ickenham) returned negative but recent surveys undertaken by EWC identified great crested newts in Ruislip Golf Course.
- 3.4.13 A large badger sett has been observed within Ruislip Golf Course through site visits, but a badger survey has not been carried out yet; an updated badger field signs survey will be undertaken in the scope of work of EWC. Also within the scope of work of EWC is a reptile habitat survey.
- 3.4.14 Appropriate mitigation will be developed in line with the EMRs and implemented dependent on the outcomes of the surveys and subject to the appropriate licenses (see Section 8).
- 3.4.15 Consultation with Natural England (NE) and the Environment Agency (EA) has been undertaken throughout design development (see Section 6).

Operational Noise

- 3.4.16 The existing baseline noise levels identified in the Environmental Statement (ES) are principally generated by road traffic from Harvil Road, Breakspear Road South and the

B466 Ickenham Road and railway traffic from the Chiltern Main Line and London Underground. This gives rise to typical daytime sound levels of 65dB.

- 3.4.17 In West Ruislip, traffic creates the overriding noise and high sound levels are observed at locations close to B466 Ickenham Road with typical daytime sound levels of 75dB. It is anticipated that future traffic movements are likely to remain comparable to the ES with gradual increases over time.
- 3.4.18 The HS2 route wide approach to noise mitigation is to, where possible, position the track alignment away from communities and as low in the ground as possible. Where the railway is above ground, the noise levels will be lower than existing operational trains in the UK; this will be achieved through a number of measures within the rolling stock design (see Environmental Statement Volume 5: Appendix SV-001-000).
- 3.4.19 In addition to the above, a series of noise mitigation measures have been incorporated into the design of the overall railway in the West Ruislip area. Details relating to the noise barriers are provided above (paragraphs 3.2.25 - 3.2.30), and the technical justification of these structures, and the other mitigation measures within the portal itself, is contained within the Noise Demonstration Report (1MC04-SCJ-EN-REP-SS05_SL07-000003) that is included as part of this submission.
- 3.4.20 The works have been designed to be compliant with the EMRs, technical standard and Information Paper E22 'Control of noise from the operation of stationary systems' as far as it is practical to do so at this stage in the design process. The Rail Systems Contractor will be responsible for the design, construction and commissioning of stationary systems, later in the programme, and assessing for operational compliance with the environmental controls established by the Act. Steps will be taken to control and reduce adverse noise impacts as far as is reasonably practicable.
- 3.4.21 For the civils works, as they relate to stationary systems, particular consideration has been given to: space provision for attenuators on air-moving plant; positioning of terminations and openings to reduce sound transfer to nearby sensitive premises; sizing of systems to run at peak efficiency; massing of buildings to attenuate noise from headhouses and spatial provision for vibration isolation.

3.5 Construction Method

- 3.5.1 The works subject to this request for approval of Plans and Specifications will be undertaken in accordance with the HS2 Code of Construction Practice and the Class Approval issued by the Secretary of State (March 2017).

3.5.2 This section summarises the general construction methodology and the main temporary works arrangements. The arrangements described may alter, are for information and background only and do not form part of this request for approval.

3.5.3 The portal structure will be constructed in two main sections: the piled wall section and the cast in-situ wall section. Construction sequences have been developed for all the necessary works in this area; some of the works will run concurrently:

- TBM launch chamber;
- deep (roof level below existing ground level) section of the porous portal;
- shallow (roof level above existing ground level) section of the porous portal, where retained height during construction >6.5m;
- open retained cut section; and
- underground attenuation tanks at the portal mouth.

3.5.4 The retained embankment will be constructed in the following stages:

- removal of unsuitable existing ground;
- replacement of removed ground (including stone columns); and
- construction of embankment.

3.5.5 During the construction period, there will be a number of sequenced temporary works, the major ones of which are:

- temporary propping to the TBM launch chamber, porous portal and tanks;
- bridging slab over north east corner of launch chamber to support 5m wide haul road (to be incorporated into permanent works);
- strengthening of headwall for TBM launch (to be incorporated into permanent works);
- sheet piled walls to support excavation above buried section of porous portal and tanks;

- allowance in design of temporary sheet piles and permanent contiguous piles for crane loading during TBM installation (131 tonne maximum load);
- construction of the roof slab over the cut-and-cover section adjacent to the Headhouse to accommodate site facilities during construction; and
- installation of a temporary railhead and tunnel segment storage area.

3.5.6 There will be one main construction site compound for these works, known as the 'Portal Compound'. There will be one satellite compound for the construction of the retained embankment, known as the Breakspear Road Satellite Compound.

3.6 Archaeology

3.6.1 The HS2 Heritage Memorandum (part of the HS2 Environmental Minimum Requirements) explains that a route-wide Generic Written Scheme of Investigation: Historic Environment Research and Delivery Strategy (GWSI: HERDS) has been prepared in consultation with Historic England (HE) and the local planning authorities. It sets out the research framework and general principles for design, evaluation, investigation, recording, analysis, reporting and archive deposition to be adopted for the design development and construction.

3.6.2 The Heritage Memorandum sets out the approach to archaeology prior to enabling and construction works; the research undertaken for the Environmental Statement will be reviewed. Where required, for the purposes of delivering investigation and recording, additional detailed desk-based assessment and/or field evaluation will be carried out and this will inform the development of location-specific investigation and recording works (a location-specific Written Scheme of Investigation (LS-WSI)). These documents will be developed in consultation with Historic England and the relevant local authority and will follow the objectives set out in the GWSI: HERDS.

3.6.3 The arrangements for the management of archaeology during construction are not a matter for approval under Schedule 17.

3.6.4 An Archaeological Project Plan has been prepared by EWC, which sets out the baseline data and methodology for intrusive archaeological investigation in the area due north of the Chiltern Main Line and currently occupied by Ruislip Golf Course. An archaeological desk-based assessment of the golf course has also been produced and is included as part of the Ruislip Golf Course TCPA application.

3.6.5 Furthermore, an LS-WSI has been prepared by EWC, to accompany the Project Plan, which provides further detail on the methodology for intrusive archaeological

investigation in the relevant application site area. The purpose of this evaluation is to identify the location, extent, preservation and significance of any previously unrecorded heritage assets within the footprint of West Ruislip Portal and Gatemead Embankment.

- 3.6.6 The project plan and evaluation have been discussed with the advisor for Greater London Archaeological Advisory Service (GLAAS) in a number of consultation meetings (see Section 6). In consultation with the archaeological advisor and Historic England (HE), an overarching strategy has been developed along with a project plan for Geoarchaeological and Medieval Landscape Investigations across Sector 2. The scope of these strategies has been discussed at meetings and workshops with representatives from Area Central and Area South EWC with GLAAS and Historic England.

3.7 Environmental Management during Construction

- 3.7.1 The Environmental Memorandum (part of the HS2 Environmental Minimum Requirements) sets out the arrangements for the management of environmental issues during construction and the Code of Construction Practice (CoCP) sets out specific details and working practices that apply. The CoCP is supported by Local Environmental Management Plans (LEMPs) which include specific measures by topic, applicable to each relevant local authority area. The LEMP relevant to the works subject to this Schedule 17 submission is Hillingdon LEMP (May 2019).
- 3.7.2 Environmental management arrangements during construction do not form part of this request for approval of Plans and Specifications under Schedule 17.
- 3.7.3 Within the wider Hillingdon area, a number of protected or important species have been identified in the vicinity of the overall HS2 works. Where necessary, protected species licenses are obtained, and the requirements of the licenses are complied with.

Inter-Contract Co-ordination

- 3.7.4 There are no other immediately adjacent Main Works Civils Contracts (MWCCs); the border of the S2 contract with C1 is further to the west (approximately 2km) of the application site, at the realigned Harvil Road.

Ruislip Golf Course is immediately adjacent to the West Ruislip Portal and West Ruislip Retained Embankment and will be remodelled to accommodate the main HS2 works. This work is to be undertaken as a separate part of the main works contract for S2. Co-ordination is ongoing on the design proposals for the railway and golf course works, and the golf course will be the subject of a separate consent application under the Town and Country Planning Act (1990).

4 Design Criteria and Rationale

West Ruislip Portal

4.1.1 The function of the West Ruislip Portal is to provide:

- A Launch Shaft for the Tunnel Boring Machine (TBM),
- A physical transition from the tunnel to the at grade section of the railway,
- An access for emergency passenger evacuation
- An access for emergency fire brigade intervention and
- Absorb the pressure wave of the train through a porous roof.



Figure 12 - West Ruislip Portal rendered plan

4.1.2 The portal is set within a shallow cutting to the west becoming an enclosed box at the portal mouth. Grass covered embankments wrap up over the sides of the portal box and across the portal roof so that the visual impact of the portal as it rises out of the ground is diminished and integrated into the surrounding landscape, as demonstrated in Figure 12.

4.1.3 Burying the portal softens the overall form helping to create an elegant visual transition from open cutting to underground box (see Figure 13 and Figure 14).

4.1.4 The design characteristics have been informed by the HS2 design guidance and feature:

- Fileted corners for smooth transition between portals and tunnels;
- Continuous slot to house the openings; and
- Landscaping over the structure to blend into the environment.

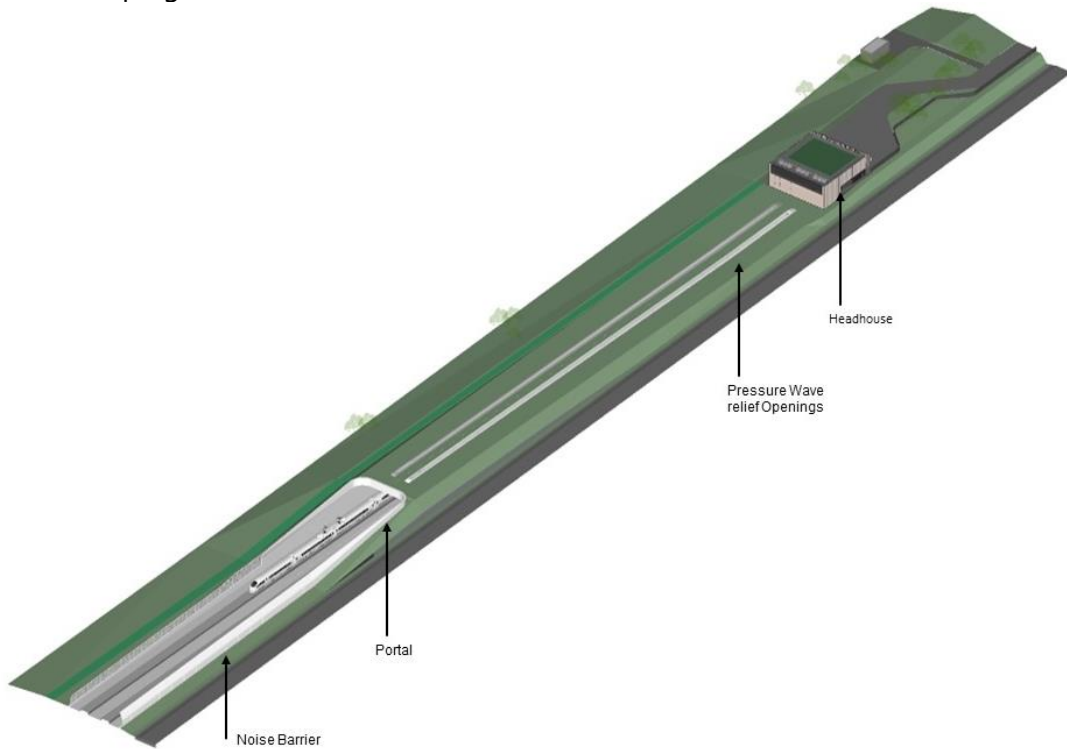


Figure 13 - Schematic overview of West Ruislip Portal

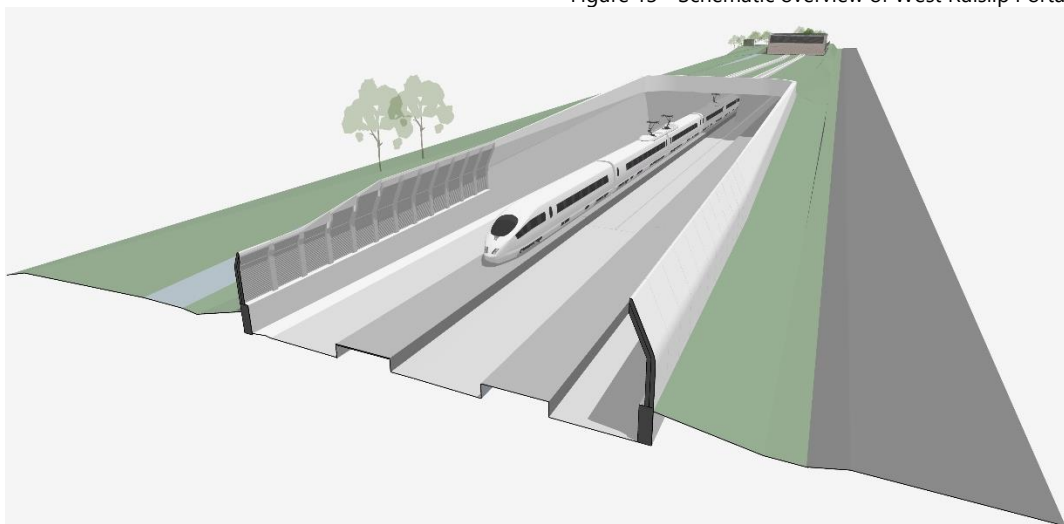


Figure 14 - Indicative view towards the portal entrance showing the grassed embankment beyond

Portal Headhouse

4.1.5 The headhouse is conceived as a sculptural element embedded in a landscaped setting in a way that enhances the green corridor running alongside the Chiltern Mainline railway.

To minimise its visual impact a lower technical level has been planned below ground with only a single storey building above ground facing onto a hard-standing area, as shown indicatively in Figure 15.

- 4.1.6 The headhouse will be clad predominantly in timber to ensure that the building's external appearance integrates with the new landscaping established on top of the portal, as well as the adjacent Ruislip Golf Course. The timber will be a sustainably sourced softwood which has been modified to provide a high performance and durable finish that naturally weathers to a silver grey maintaining its appearance over its entire life cycle.



Figure 15 - Impression of headhouse from hard-standing area

- 4.1.7 Metal panels, doors and louvers clad the technical areas at low level providing the high degree of security required. The steel cladding will be factory coated in a dark grey to compliment the light silver-grey timber. Grey engineering brickwork completes the palette of materials providing a robust base to the building which extends to an apron around the headhouse protecting the technical basement level.
- 4.1.8 Large louvred areas have been located at high level behind a timber slatted screen which ensures continuity of the timber enclosure whilst minimising the visual impact of the technical elements of the building.

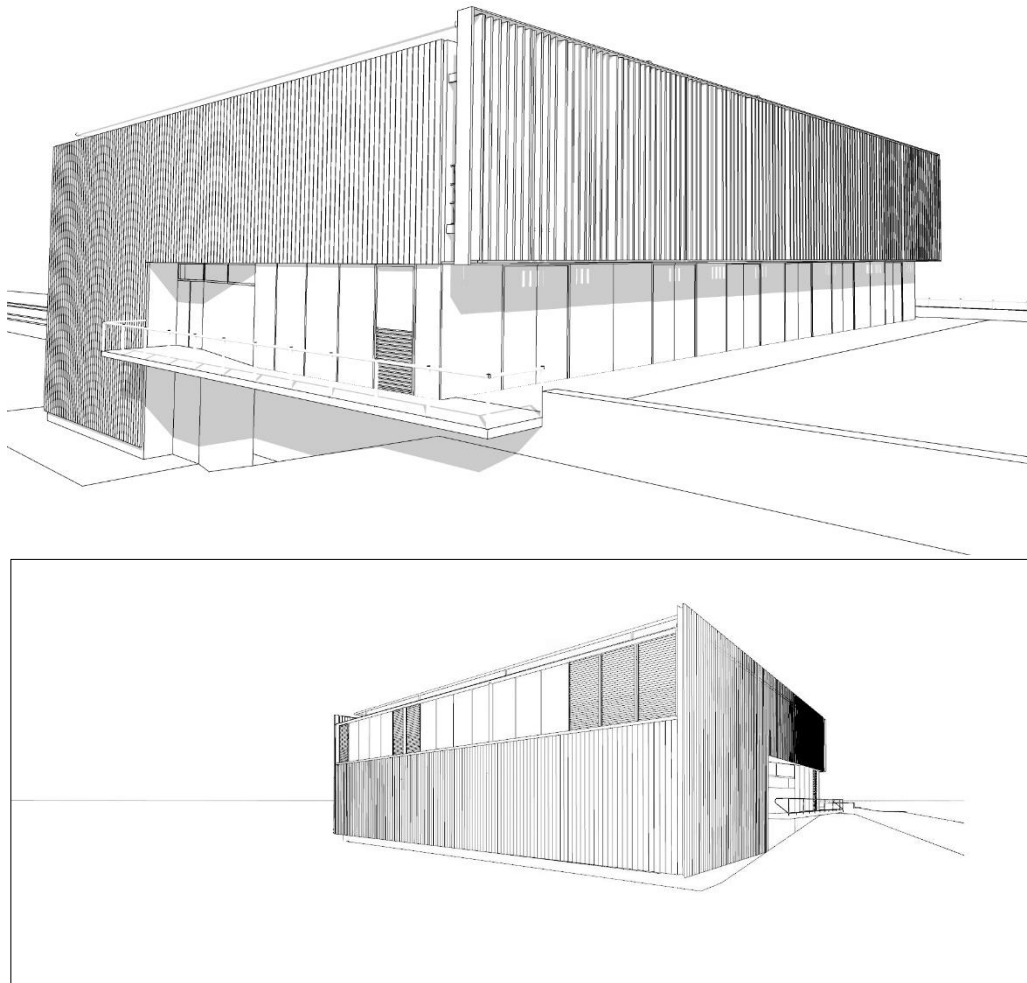


Figure 16 - Views looking from the south and south-west

- 4.1.9 A further bank of louvers forms a continuous feature to the west elevation and contributes to the three-dimensional form that supports the concept of the headhouse as a sculptural element within the landscape (see Figure 16).

4.2 Design Constraints

- 4.2.1 The permanent works in the West Ruislip area have had to consider the following constraints:

- Minimising the impact on residents in the area;
- Defining and mitigating the impact on landowners in the area;
- Management of construction traffic and changes to key roads in the area, including permanent realignment of some road networks;

- Interaction with Ruislip Golf Course, Uxbridge Golf Course and Ruislip Rifle Club;
- Impact on environmentally designated sites in the area; and
- Interaction with existing Public Rights of Way.

4.3 Options Considered

4.3.1 The Hybrid Bill included a Reference Design for the scheme within the West Ruislip area, the assessment of which was included within the Environmental Statement (ES) (as amended). Since then, the design has been developed, and has evolved, through Scheme Design and Early Detailed Design stages, into that which is included within this submission for approval.

4.3.2 In the ES (as amended), the portal and ramp structure consisted of diaphragm walls forming an earth retaining box structure with an approximate length of 520m. The headhouse on top of the portal structure was approximately 32m x 30m x 5.5m. Through the development of the design, the portal structure has increased from the original 88m in length to allow for greater sound attenuation, and to provide improved visual screening. It is now proposed that the portal walls will be constructed from contiguous piles rather than as diaphragm walls. The roof of the porous portal will also now incorporate earthworks, and soft landscape planting on top.

4.3.3 The ES (as amended) specified the extent of the West Ruislip Retained Embankment but did not include any details of the design.

4.3.4 The proposals contained within this submission have been assessed as being in compliance with the Phase One Environmental Minimum Requirements (EMR) general principles. The alterations to the design from the reference design are considered to result in no change to the impacts reported in the ES (as amended).

4.4 Noise Barriers

4.4.1 Line-side noise barriers are included for approval in this application; details of the design can be found above (paragraphs 3.2.27 - 3.2.32) and in the Noise Barrier drawing (1MC04-SCJ_SDH-AR-DEL-SS05_SL07-483212). The noise barriers will stretch from the portal wingwalls to the western extent of the application boundary; the intention is that the noise barriers will continue further west to the Copthall Covered Tunnel (subject to separate requests for approval).

4.4.2 The design of the noise barriers accords with the emerging route-wide Common Design Element (CDE) proposals for line-side noise barriers presented to the Phase 1 Planning

Forum. The noise barriers have been conceived to provide a high-quality design that contributes to the HS2 route-wide identity and sits comfortably within the family of other CDEs whilst maintaining the flexibility to meet differing acoustic requirements.

- 4.4.3 A Noise Demonstration Report (1MC04-SCJ-EN-REP-SS05_SL07-000003) has been submitted as part of this application and sets out an assessment of the expected operational noise impacts; the proposed design results in a material reduction in the adverse noise impacts compared to the ES (as amended).

5 Grounds for Determination

5.1.1 In accordance with Schedule 17 of the Act, the relevant planning authority may only refuse to approve plans or specifications on defined grounds.

5.1.2 Paragraph 2 of Schedule 17 outlines the grounds for determination for 'building works', which in this submission include:

- intervention Shaft Headhouse;
- portal Mouth Structure;
- porous Portal Ventilation Slots; and
- UKPN Substation.

5.1.3 The grounds for determination under Paragraph 2 of Schedule 17 are as follows:

- (a) the design or external appearance of the building works ought to be modified—
 - (i) to preserve the local environment or local amenity,
 - (ii) to prevent or reduce prejudicial effects on road safety or on the free flow of traffic in the local area, or
 - (iii) to preserve a site of archaeological or historic interest or nature conservation value, and is reasonably capable of being so modified, or
- (b) the development ought to, and could reasonably, be carried out elsewhere within the development's permitted limits.

5.1.4 Paragraph 3 of Schedule 17 outlines the grounds for determination for 'other construction works', which in this submission include:

- road vehicle parking area within operational compound;
- earthworks (ponds, embankments, portal hood covering, retaining walls);
- fences and walls;
- external lighting equipment; and
- noise barriers.

5.1.5 The grounds for determination under Paragraph 3 of Schedule 17 are as follows:

Development	Possible grounds for refusal of approval
A road vehicle park.	<p>That the design or external appearance of the works ought to, and could reasonably, be modified—</p> <ul style="list-style-type: none"> (a) to preserve the local environment or local amenity, (b) to prevent or reduce prejudicial effects on road safety or on the free flow of traffic in the local area, or (c) to preserve a site of archaeological or historic interest or nature conservation value. <p>That the development ought to, and could reasonably, be carried out elsewhere within the development’s permitted limits.</p>
Earthworks. Sight, noise or dust screens.	<p>That the design or external appearance of the works ought to, and could reasonably, be modified—</p> <ul style="list-style-type: none"> (a) to preserve the local environment or local amenity, (b) to prevent or reduce prejudicial effects on road safety or on the free flow of traffic in the local area, or (c) to preserve a site of archaeological or historic interest or nature conservation value. <p>If the development does not form part of a scheduled work, that the development ought to, and could reasonably, be carried out elsewhere within the development’s permitted limits.</p>
Fences and walls (except for sight, noise and dust screens).	<p>That the development ought to, and could reasonably, be carried out elsewhere within the development’s permitted limits.</p>
Artificial lighting equipment.	<p>That the design of the equipment, with respect to the emission of light, ought to, and could reasonably, be modified to preserve the local environment or local amenity.</p> <p>If the development does not form part of a scheduled work, that the development ought to, and could reasonably, be carried out elsewhere within the development’s permitted limits.</p>

Table 5 - Ground for determination under Paragraph 3 of Schedule 17 of the HS2 Act

5.2 Preserve the local environment or amenity

- 5.2.1 As discussed in Sections 3.2 and 4, the visual impact of all 'building works' (Paragraph 2), road vehicle parking (Paragraph 3) and earthworks (Paragraph 3) has been reduced by the careful design of materials, locations and screening to maximise the integration of the works into the local environment. Therefore, it is not considered that the design or external appearance of the works ought to be modified to preserve local environment or amenity.
- 5.2.2 As outlined above (paragraphs 3.2.27 - 3.2.32) the noise barriers have been designed to limit visual impact by minimising their height whilst retaining an appropriate acoustic function and incorporating a suitable architectural treatment on the outward facing panels. This is to ensure that their external appearance is sympathetic to the surrounding area and local amenity.
- 5.2.3 The lighting design for approval in this application has been developed to minimise impacts to local sensitive receptors and preserve local amenity. As described above (paragraphs 3.2.22 - 3.2.26) low level lighting (maximum 5 lux) will be maintained during night time operation within the secure compound, for security reasons. CCTV cameras respond better and more rapidly if there is an initial low level of background lighting instead of it coming on from complete. In the event of an intruder entering without authorisation, the entire compound will be lit to 20 lux maximum, in order to support CCTV operations. Therefore, full lighting of the compound will only occur extremely infrequently.

5.3 Road safety or on the free flow of traffic in the local area

- 5.3.1 It is not considered that the works will have any detrimental impact on road safety or the free flow of traffic in the local area. Measures to control road safety and traffic impacts are covered under the Act EMRs (see Section 1.6), particularly the Code of Construction Practice.
- 5.3.2 As identified above (paragraphs 3.3.1 - 3.3.2) the assumed access to the permanent secure compound is via the existing access from Clack Lane to the Ruislip Golf Course car park, and through the car park to the proposed access gates. Any consents required for these works will be sought separately in the future and, where necessary agreements will be sought with the London Borough of Hillingdon.

5.4 Archaeological or historic interest or nature conservation value

- 5.4.1 The Act EMRs (see Section 1.5), specifically the Code of Construction Practice and the Heritage Planning Memorandum, set out the control measures for heritage assets (including archaeology) and ecology in relation to the design development and construction of the HS2 scheme.

5.5 Locating the development elsewhere within the development's permitted limits

- 5.5.1 The works have been located in accordance with the route alignment of the HS2 rail scheme, as contained within the Act and the accompanying parliamentary plans, and the associated technical requirements arising from the operation of the railway. Therefore, it is not considered that the works ought to or could reasonably be located elsewhere within the development's permitted limits.

6 Pre-submission Consultation

6.1.1 Pre-submission consultation with the Local Planning Authority, statutory consultees and other relevant stakeholders is summarised in Table 6 below.

Consultee Name	Consultation Date	Method of Consultation / Attended by	Summary of Consultation Outcome
London Borough of Hillingdon	10/11/2017	Meeting and presentation	<ul style="list-style-type: none"> • Introduction to works in the Hillingdon area. • Key issues discussed include: traffic numbers, sustainable placement, haul roads, street works, damage liability, temporary stopping up of roads, community engagement, security.
London Borough of Hillingdon	19/12/2017	Meeting and presentation	<ul style="list-style-type: none"> • Discussion on traffic impacts and traffic management systems • Road conditions survey to be carried out by HS2 on all ES identified lorry routes. • Aspiration to transport as much material by rail as possible and to set up new railhead as soon as possible.
London Borough of Hillingdon	09/02/2018	Meeting and presentation	<ul style="list-style-type: none"> • Provide 6-month look-ahead for Schedule 17 consents.
London Borough of Hillingdon	09/03/2018	Meeting and presentation	<ul style="list-style-type: none"> • Route context (including key landscape assets) and notable changes since AP4. • Design approach including the landscape design vision and wide design considerations. • Initial Design Studies including wider West Ruislip, northern SPA, southern SPA, West Ruislip Portal, South Ruislip Vent Shaft and headhouse.
London Borough of Hillingdon	24/05/2018	Meeting and presentation	<ul style="list-style-type: none"> • Presentation of current 'material by rail' strategy, and responses provided to LB Hillingdon questions from 09/03/2018 Schedule 17 meeting.

Consultee Name	Consultation Date	Method of Consultation / Attended by	Summary of Consultation Outcome
London Borough of Hillingdon	28/09/2018	Meeting and presentation	<ul style="list-style-type: none"> Update on Scheme Design of Hillingdon assets. Flood Assessment Maps to be resent to LBH. Meeting to be organised on Flood Risk with attendance from EA. Meeting to be organised on construction and logistics to address range of queries raised by LBH.
London Borough of Hillingdon	06/12/2018	Meeting and presentation	<ul style="list-style-type: none"> Pre-application meeting with focus on landscaping and lighting
London Borough of Hillingdon	10/01/2019	Meeting and presentation	<ul style="list-style-type: none"> Pre-app to discuss architectural design, noise barriers and future Schedule 7 Bringing Into Use applications

Table 6 - Pre-submission Consultation with LPA and Statutory Consultees

- 6.1.2 Consultation has been undertaken with all other relevant statutory consultees throughout the design development process. Statutory consultees have been informed of any changes to the proposed design throughout this process.
- 6.1.3 Meetings and presentations have been held with the Greater London Archaeology Advisory Service (GLAAS) to discuss the proposals for the portal, headhouse and retained embankment at West Ruislip.
- 6.1.4 Consultation with Natural England (NE) and the Environment Agency (EA) has been carried out via email, where documents and drawings have been provided for comment and discussion.

7 Construction Programme

7.1.1 A high-level programme for the works subject to this submission and how they fit into the overall programme for other works in the area is contained in Table 7 below. The programme for works on site may vary from the indicative dates shown.

Activity	Quarter
HS2 Site Set Up	Fourth Quarter 2019
Commence West Ruislip Portal Construction	First Quarter 2020
Commence Construction of Porous Portal/Roof Slab	First Quarter 2020
Commence Earthworks on Retained Embankment	Second Quarter 2020
Commence Construction of West Ruislip Headhouse	First Quarter 2022
Testing & Commissioning of WR Headhouse	Fourth Quarter 2024
Footpath U81 Diverted	First Quarter 2024
HS2 Site Set Up	Fourth Quarter 2019

Table 7 - Proposed Programme and Sequence of Works

8 Other Consents

8.1.1 Other main consents likely to be required for the works are summarised in Table 8 below. Consent requirements may alter during design development and further consents not identified may be required.

Consent	Works Requiring Consent
Ecological license	PL Great Crested Newts Licence application.
Ecological license	PL Badger Licence Application.
HS2 Act - Schedule 33 Protective Provisions	Flood Defence consent for diversion of a river.
HS2 Act - Schedule 33 Protective Provisions	Piling works in a Source Protection Zone (SPZ).
HS2 Act - Schedule 4 Part 1	Construction of permanent new access to public highway Temporary interfere with highway to enable construction of access.
HS2 Act - Schedule 4 Part 3	Diversion of existing Public Right of Way.
HS2 Act - Schedule 17	Bringing Into Use Consent (West Ruislip Portal and Retained Embankment) Site Restoration (West Ruislip Portal and Retained Embankment) Plans and Specifications (River Pinn Bridge and Breakspear Road South) Plans and Specifications (Work No. 1/62)
Town and Country Planning Act (1990)	Remodelling of Ruislip Golf Course

Table 8 - Other Consent Requirements