1MC04 Main Works - Contract Lot S2

Ecological Impact Assessment - Ruislip Golf Course S2

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1 Introduction

1.1 Overview

1.1.1 This Ecological Impact Assessment (EcIA) is prepared by Skanska Costain Strabag ('SCS JV') on behalf of High Speed Two Ltd. 'the applicant', to support the planning application for Ruislip Golf Course, London.

1.1.2 Ruislip Golf Course is a municipal golf course, owned and operated by the London Borough of Hillingdon ('LB Hillingdon'). It falls partially within the alignment of the HS2 development. The High Speed Rail (London-West Midlands) Act 2017 ('the HS2 Act'), which gained Royal Assent in February 2017, conferred the necessary powers required to construct Phase One of the railway from London Euston to Birmingham Curzon Street. The southern part of Ruislip Golf Course falls within this boundary.

1.1.3 Construction of HS2 will result in land take from Ruislip Golf Course. The applicant has committed to designing and delivering a reconfigured golf course as part of a number of Undertakings and Assurances (U&A) that were agreed with LB Hillingdon (and which eventually formed part of the Hillingdon Agreement) during the passage of the Hybrid Bill through parliament.

1.2 Site Description

1.2.1 The application site is in west London within LB Hillingdon. The application site comprises the majority of the existing Ruislip Golf Course, the area of which is 36 hectares (ha). Figure 1 shows the site.

1.2.2 The existing site is an 18 hole golf course including a driving range to the east, a main car park and club house / restaurant (Figure 1). The course is divided to the north-east by Hill Lane and Clacks Lane which provides access to the car park and club house. The course has open fairways bounded by rough grassland and mature tree belts, some of which also have understorey vegetation. The mature tree belts provide visual separation between the holes.

1.2.3 Several artificial drainage channels run through the course, connecting into the Ickenham Stream and ultimately the River Pinn. The Ickenham Stream runs north to south through the centre of the site, with the River Pinn bounding the site to the west and north-west.

1.2.4 The whole site is located within the Green Belt. The West Ruislip Golf Course and Old Priory Meadows SBI Grade 1 (SBI.I) is located partly within the site on the western and northern boundaries, and with a smaller section lying centrally within the golf course.

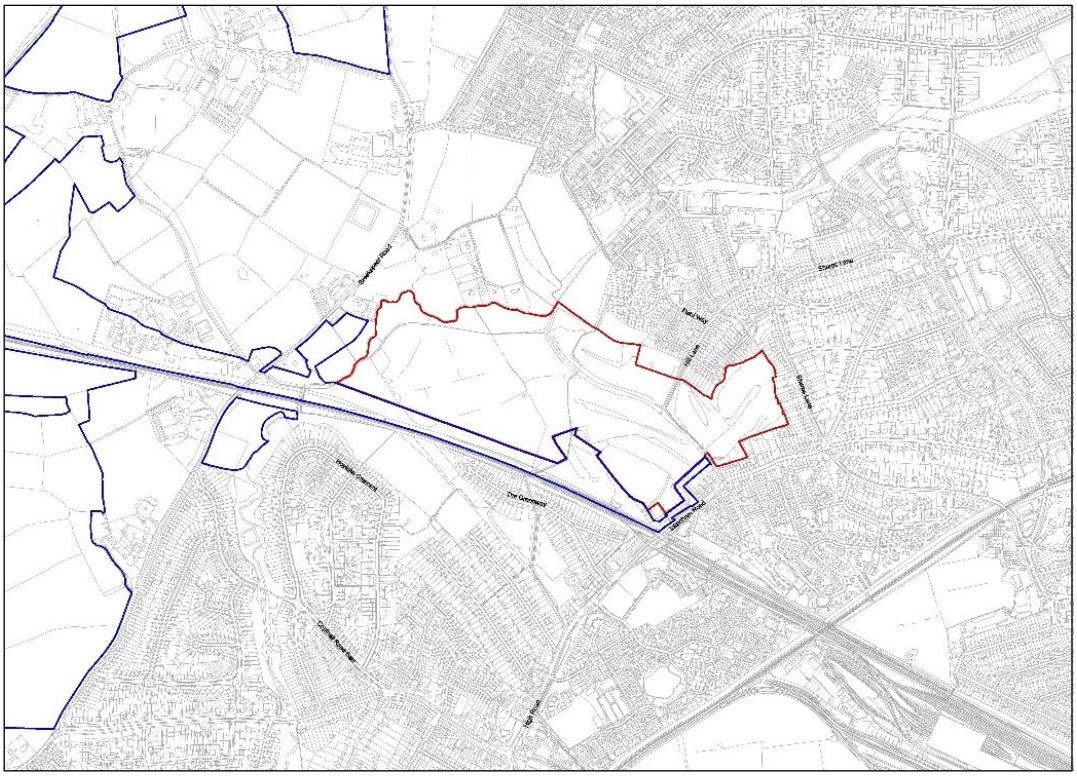

Figure 1 – Ruislip Golf Course site boundary

1.3 The Proposed Scheme

1.3.1 The Proposed Scheme comprises the remodelling of Ruislip Golf Course incorporating: reconfiguration of an 18 existing hole course into a nine hole course, short game practice area, putting green and six hole academy course; construction of a single storey rifle range; demolition of existing covered driving bays and construction of replacement bay driving range, including associated floodlights and safety netting; a new drainage system and associated ponds; ecological and landscaping works; realignment and enhancement of the Hillingdon Trail and creation of a new public footpath; excavation of a new channel for the Ickenham Stream (canal feeder); and other associated works.

1.4 Construction of the Proposed Scheme

1.4.1 Ruislip Golf Course was closed in August 2019 for the duration of HS2 works, during which time the golf course cannot be operational. Between closure of the golf course and beginning of construction, the estate will be managed and monitored to minimise any changes to the diversity and ecological value of the habitats and therefore minimise constraints to the Proposed Scheme. Construction on the golf course site will commence when materials arise from the adjacent HS2 West Ruislip Portal site, which is expected to be in September 2021. Material from the West Ruislip Portal would be stored on the Ruislip Golf Course site and then used to re-profile the new course. The construction of the new golf course is expected to take 18 months and would include:

- site establishment and removal of vegetation/trees;

- demolition of the driving range;
- earthworks, hard landscaping and planting of new trees; and
- construction of irrigation and drainage systems.

1.4.2 Construction would be complete in March 2023 when soft landscaping works would commence followed by a reestablishment period. The course will be reopened when the HS2 railway security fencing is complete in November 2024. This projected timeline is shown in Figure 2 below.

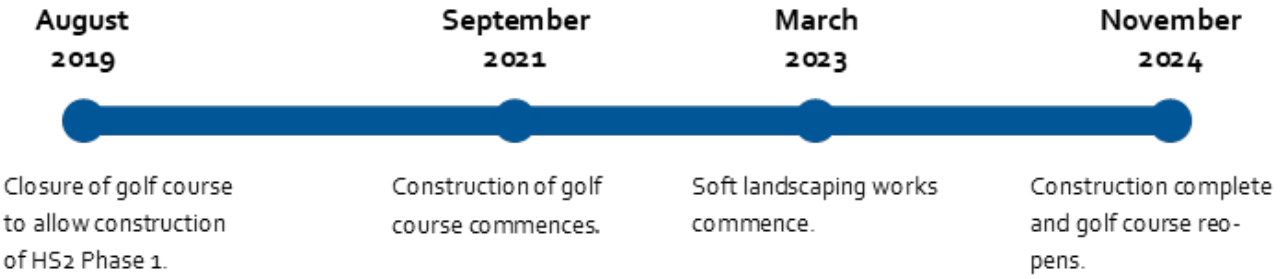

Figure 2 – Construction timeline

1.4.3 Construction work would be undertaken in accordance with the HS2 Phase One London-West Midlands Code of Construction Practice which outlines measures to reduce potential impacts on the environment.

1.5 Purpose

1.5.1 The purpose of this report is to present information on the likely significant effects of the Proposed Scheme on the ecology during the preparation, construction and operational stages. The assessment comprises:

- A review of consultation undertaken and how the responses have influenced the assessment;
- A review of the methods for surveys and assessment;
- A review of the limitations and assumptions;
- A description of the baseline conditions and an assessment of the site's ecological importance with regards to ecological features;
- A review of embedded ecology measures that have been incorporated into the design of the Proposed Scheme;
- An assessment of the potential effects on ecological features and additional mitigation and enhancement measures;
- An assessment of the residual and cumulative effects; and
- An assessment summary matrix, which reviews the potential and residual effects on

ecological features.

1.6 Consultation with Stakeholders

1.6.1 The screening opinion (Appendix A) concluded that the loss of vegetation, habitat and likely impacts on protected species are not considered to be significant in the context of EIA. The proposals are considered in accumulation with the wider HS2 Ltd works for which permission is effectively granted, the effects assessed and the impacts accepted. The opinion states that the LB Hillingdon does not consider that the proposals require EIA.

1.6.2 In addition, Natural England was consulted via email. Their response noted that areas of habitat creation along the newly diverted Ickenham Stream should be appropriate for the local area. Furthermore, as much of the arisings from West Ruislip Portal should be used on site as possible to reduce the need to remove material by lorry. These suggestions are both incorporated into the design.

2 Methodology

2.1.1 This section sets out the methodology for a desk study, field surveys and the impact assessment. It sets out the methods and resources used and establishes the spatial and temporal limits for surveys and assessments.

2.2 Methodology for Baseline

Desk Study

2.2.1 In June 2018, an ecological data search was undertaken within a 2km radius of the approximate centre of the site. Information on statutory and non-statutory sites and notable and protected species records was obtained from Greenspace Information for Greater London (GiGL). Only records of protected and notable species dated from within the last 10 years were considered in the baseline review.

2.2.2 The majority of the site was assessed as part of the planning application for HS2 Phase One, with surveys only undertaken from public rights of way. As such, the following reports were reviewed:

- Volume 2 Environmental Statement (ES)[1]; and
- Volume 5 Mapbook[2]; and
- Volume 5 ecological baseline data technical appendices for CFA1-6 Euston to Ickenham: designated sites, habitat surveys and flora[3]; amphibians, reptiles and birds[4]; mammals[5]; and invertebrates and fish[6].

Field Surveys

2.2.3 Access for field surveys was obtained to the entire golf course, including the land within the HS2 site and outside the site boundary, to inform the baseline conditions for the site.

2.2.4 The HS2 Ecological Field Survey Methods and Standards[7] were followed for all surveys, as detailed in Table 1 below. This comprises surveys undertaken to inform the planning application for HS2 Phase One, and the Proposed Scheme. Full details regarding the methods for the following surveys are provided in the Preliminary Ecological Appraisal (PEA) Report and Species Report in Appendix B and Appendix C respectively.

[1] HS2, (2013); 'London West Midlands Environmental Statement. Volume 2 Community Forum Area report CFA6 South Ruislip to Ickenham.'
[2] HS2, (2013); 'London West Midlands Environmental Statement. Volume 5 Map books CFA6 South Ruislip to Ickenham Ecology.'
[3] HS2, (2013); 'London West Midlands Environmental Statement. Volume 5 Technical Appendices CFA1-6 Euston to Ickenham Ecological baseline data: designated sites, habitat surveys and flora (EC-001-001) Ecology.'
[4] HS2, (2013); 'London West Midlands Environmental Statement. Volume 5 Technical Appendices CFA1-6 Euston to Ickenham. Ecological baseline data: amphibians, reptiles and birds (EC-002-001) Ecology.'
[5] HS2, (2013); 'London West Midlands Environmental Statement. Volume 5 Technical Appendices CFA1-6 Euston to Ickenham Ecological baseline data: mammals (EC-003-001) Ecology.'
[6] HS2, (2013); 'London West Midlands Environmental Statement. Volume 5 Technical Appendices CFA1-6 Euston to Ickenham. Ecological baseline data: invertebrates and fish (EC-004-001) Ecology.'
[7] HS2, (2013); 'London-West Midlands Environmental Statement. Volume 5 Technical Appendices. Scope and methodology report addendum (CT-001-000/2).'

Survey Type	Dates
Breeding bird surveys	June 2018 and March, April and May 2019
Bat tree climbing surveys	March to August 2017, September 2018 and May 2019
Great crested newt *Triturus cristatus* Habitat Suitability Index (HSI) surveys	April 2017
Reptile survey	May to September 2017
Great crested newt environmental DNA (eDNA) surveys	June 2017, April 2018, April and May 2019 and May 2020
Bat scoping and inspection surveys	July 2017
Bat back tracking surveys	July 2017
Extended Phase 1 habitat survey	April 2018
Great crested newt population size class assessment	May to June 2018 and April to May 2019
Badger scoping survey	June 2018
Bat emergence and re-entry surveys	June 2018 and May to July 2019
Botanical survey	July 2018
Bat activity and automated surveys	June to September 2018
Terrestrial invertebrate surveys	June to September 2018
Otter and water vole survey	August 2018

Table 1 – Surveys carried out on site

Extended Phase 1 Habitat Survey

2.2.5 An extended Phase 1 habitat survey was undertaken on 25 April 2018 following the standard methods as described in the Guidelines for Preliminary Ecological Appraisal[8] and the Joint Nature Conservation Committee (JNCC) Handbook for Phase 1 Habitat Survey[9].

Bat Surveys

2.2.6 The following bat surveys were undertaken between March 2017 and July 2019 following the standard methods as described in the Bat Surveys: Good Practice Guidelines[10] and the HS2 Phase 1 Ecological Field Survey Methods and Standards (FSMS)[7] to determine the presence of any bat roosts and identify important foraging habitat and commuting corridors:

- Bat scoping surveys – all trees on site were assessed for their level of potential to support roosting bats from the ground using binoculars and torches on 7, 13 and 19 July 2017;

[8] Chartered Institute of Ecology and Environmental Management (CIEEM) (2016); 'Guidelines for Preliminary Ecological Assessment Second Edition.'
[9] Joint Nature Conservation Committee (JNCC) (2010); 'Handbook for Phase 1 Habitat Survey.'
[10] Hundt, L. (2012); 'Bat Surveys: Good Practice Guidelines. 2nd edition. Bat Conservation Trust.'

- Climb and inspect surveys – potential roosts that could not be fully assessed during the scoping survey were climbed to re-assess their potential to support roosting bats and record signs indicating their presence on 31 March and 7, 8, 9 and 11 August 2017,18 and 25 September 2018 and 6 May 2019. These surveys focused on trees that could be impacted by the Proposed Scheme;
- Back tracking surveys – a group of trees were observed in the north-west part of the site with multiple moderate and high potential roost features at dusk and/or dawn on 3 and 4 July 2017 to track any commuting bats back to potential roosts;
- Emergence/re-entry surveys – trees 22, 41, 51 and 48 (refer Appendix C, Figure 2) were observed in June 2018 and May, June and July 2019 at dusk and dawn to record bats emerging from and returning to roost;
- Transect surveys – a pre-determined route was walked and bat activity recorded each month between June and September 2018 (refer to Appendix C, Figure 3); and,
- Automated surveys – static bat detectors were placed at strategic locations ecologists to monitor bat activity between June and September 2018 (refer to Appendix C, Figure 3).

Otter and Water Vole Survey

2.2.7 Suitably qualified ecologists conducted an otter *Lutra lutra* and water vole *Arvicola amphibius* riparian habitat assessment survey and field signs survey along the River Pinn following the HS2 Phase 1 FSMS on 1 August 2018.

Badger Surveys

2.2.8 A badger *Meles meles* survey was undertaken on 27 June 2018 by ecologists in accordance with the HS2 Phase 1 FSMS. The survey methodology is based on Harris et al. (1989)[11] and consisted of ecologists walking the site systematically to record any signs indicating the presence of badger. The surveyors recorded evidence of badger presence and/or activity including sett entrances, footprints, dung pits and latrines.

Breeding Bird Surveys

2.2.9 Breeding bird surveys were undertaken on 12 and 27 June 2018, 19 March 2019, 15 April 2019 and 7 May 2019. The breeding bird surveys involved mapping bird breeding territories in accordance with the standard methodology (Marchant, 1983[12]) and HS2 Phase 1 FSMS within the site and immediately adjacent to the site boundaries (within 20m).

Reptiles

2.2.10 Reptile surveys were undertaken between May and September 2017 in accordance with the HS2 Phase 1 FSMS. Habitats were graded on their suitability to support reptiles. The habitats

[11] Harris, S. *et al.* (1989); 'Surveying Badgers.' Mammal Society.
[12] Marchant, J. (1983); 'BTO Common Bird Census Instructions.' British Trust for Ornithology, Tring.

graded as 'good' and 'exceptional' were then surveyed using artificial refugia to determine presence/absence. Figure 6 in Appendix C shows the central locations for refugia at the site.

Great Crested Newt Surveys

2.2.11 Surveys were carried out from April 2017 to May 2019 in accordance with the HS2 Phase 1 FSMS. An HSI survey was carried out on 11 April 2017 and 20 April 2018 on all four ponds within the golf course (including those to the south of the site), followed by eDNA surveys on ponds 1, 2 and 3 on 15 June 2017 and 26 April 2018 to determine the presence or likely absence of great crested newt *Triturus cristatus*. Repeat eDNA surveys were carried out on pond 1 on 30 April 2019 and on pond 2 on 9 May 2019. Pond 4 was surveyed for eDNA for the first time on 30 April 2019. Population size class assessment surveys were undertaken on pond 3, the only pond which had positive eDNA results, between 9 May 2018 and 14 June 2018, and between 4 April 2019 and 15 May 2019. An eDNA survey was conducted on 7 May 2020 following the implementation of a mitigation strategy involving enhancements to pond 4 and the surrounding terrestrial habitat and the translocation of great crested newts from pond 3 to terrestrial habitat around pond 4 (refer to 3.4.21 for details). The locations of the ponds surveyed are displayed in Figure 7 in Appendix C.

Terrestrial Invertebrate Surveys

2.2.12 Terrestrial invertebrate surveys were undertaken in accordance with the HS2 Phase 1 FSMS between June and September 2018. An initial habitat assessment was undertaken by ecologists on 29 June 2018 and the locations for subsequent detailed survey visits were defined, which are shown on Figure 8 in Appendix C. Direct searching, sweep netting, water trapping and pitfall trapping were used to determine the presence of rare and notable invertebrate species occurring on within the marshy grassland and tall ruderal vegetation on site on 6, 10 and 31 August and 10 September 2018.

Botanical Surveys

2.2.13 A botanical survey was undertaken by a botanist on 11 July 2018 to access the potential for enhancing species diversity across specific areas of the site as shown in Figure 9 in Appendix C. This comprised West Ruislip Golf Course and Old Priory Meadows SBI.I; the wetland/ditch habitat; and semi-improved grassland habitat. The aim of the survey was to compile a list of species that were representative of the habitat types they were recorded within, to inform recommendations for enhancement and management. All botanical species were recorded and rated using the DAFOR (Dominant, Abundant, Frequent, Occasional and Rare) system of recording abundance.

2.3 Methodology for Assessment

Scope

2.3.1 The zone of influence for a project is the area over which ecological features may be subject to significant effects as a result of the Proposed Scheme. For the purposes of this assessment, the features considered and their zone of influence are:

- Designated sites – on a precautionary basis, those up to 2km of the site were considered in the assessment. This takes into account the potential for direct disturbance to interest features of designated sites associated with vegetation clearance, earthworks, construction and landscaping operations both within and up to approximately 100m from the site, as well as the potential for the River Pinn to provide a pathway for impacts to designated sites further downstream. Indirect impacts could also be more wide-ranging, with the potential for habitat loss and fragmentation to impact interest features of designated sites up to 2km from the site;
- Habitats – within the site, due to vegetation clearance and earthworks, as well as effects from the operation of the golf course; and
- Legally protected and notable species – this varies significantly depending on the species, but is considered to extend up to approximately 700m from the site as follows. There is potential for bats roosting and foraging within and up to approximately 100m from the site to be impacted by habitat loss and lighting at the driving range, although there is potential for roosting bats to be displaced further afield. Badgers forage across a large home range, indicating that impacts within the site could impact the clan beyond the boundary of the site. Assuming an average territory size of 50 ha, it can be concluded that impacts to badgers at the site could extend up to approximately 700m from the site. The loss of terrestrial habitat for great crested newt could impact the metapopulation up to 500m from the site, as this is the distance that this species typically travels from breeding ponds[13]. Breeding birds may be displaced to areas of retained habitat within the site, particularly along the River Pinn, although prolonged disturbance is likely to drive some birds further afield, likely up to 500m from the site. Impacts to reptiles are most likely to be restricted to the site, as reptiles become displaced to areas of retained habitat, but could extend to adjacent habitats, most likely up to 50m from the site. Significant effects to terrestrial invertebrates would be restricted to the site.

Identifying Ecological Features

2.3.2 Ecological features are identified and valued within a defined geographical context in line with the criteria in Table 4. This valuation takes into account a range of factors, including population trends and habitat condition.

Geographical Context	Criteria
International	Statutory sites designated or classified under international conventions or European legislation. Sites supporting habitats or species populations that are important in an international context. This includes those listed on Annexes I II, IV and V of the Habitats Directive and Annex I of the Birds Directive.
National	Statutory sites designated under national legislation, for example Sites of Special Scientific Interest (SSSIs). Sites supporting habitats or species populations that are important in a

[13] English Nature, (2001); 'Great Crested Newt Mitigation Guidelines Version: August 2001.'

	national context, including those of principal importance under Section 41 of the NERC Act 2006.
Regional	Sites supporting habitats or species populations that are important in a regional context.
County or metropolitan	Non-statutory Sites of Metropolitan Importance for Nature Conservation (SMIs). Sites supporting habitats or species populations that are important in a metropolitan, county or vice-county context, including those listed on the London Biodiversity Action Plan (LBAP).
Borough or district	Statutory designated Local Nature Reserves (LNRs), SBIs and sites supporting habitats or species populations that are important in a borough or district context.
Local	Sites of Local Importance for Nature Conservation (SLIs) and sites that have no formal designation but contain species or habitats that are important to the ecological integrity of the local area.
Site	A regularly occurring native species or habitat that is widespread and common throughout the UK.

Table 2 – Criteria for the Valuation of Ecological Features

Impact Assessment

2.3.3 This EcIA has been undertaken in accordance with the Chartered Institute of Ecology and Environmental Management (CIEEM) best practice guidance[14]. The assessment was carried out in 2019.

Characterising Impacts

2.3.4 Impacts are actions resulting in changes to an ecological feature. Both positive and negative impacts of the Proposed Scheme are identified within this assessment, and described with reference to their extent, magnitude, duration, timing, frequency and reversibility.

Significance of Effects

2.3.5 Effects are the outcomes to an ecological feature, resulting from an impact. The assessment determines the significance of potential effects on ecological features identified within their respective zones of influence. For the purpose of this EcIA, a significant effect is defined as an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general. Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national/local nature conservation policy) or more wide-ranging (enhancement of biodiversity).

2.3.6 Significant effects encompass impacts on the structure and function of defined sites, habitats or ecosystems and the conservation status of habitats and species (including extent, abundance and distribution). For habitats, conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure and functions as well as its distribution and its typical species within a given geographical area. For species,

[14] CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, Winchester.

conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area.

2.3.7 Effects can be considered significant at a wide range of scales from international to local. As features of less than local importance would not be a material consideration for the Proposed Scheme, only features of local or higher importance have been considered. This is in line with the approach for HS2 Phase One.

Cumulative Impacts and Effects

2.3.8 Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location. Multiple activities may give rise to significant effects on ecological receptors to the Proposed Scheme due to their proximity in time and space. A cumulative impact assessment has been undertaken which considers whether impacts from HS2 Phase One may elevate any effects identified in this assessment.

2.4 Assumptions and Limitations

2.4.1 The assumptions and limitations of this report include the following, with more detailed limitations of each survey type included in the Species Report in Appendix C.

2.4.2 Not all trees that were identified to have moderate or high potential to support roosting bats that could be impacted by the Proposed Scheme have been fully surveyed to establish the presence or likely absence of roosting bats, due to project timescales. As such, a precautionary baseline has been built up in line with the HS2 Phase 1 assessment[7]. This constitutes a 'reasonable worst case' basis for the subsequent assessment.

2.4.3 No account can be made of the presence or absence of a species on any single survey visit, as animals regularly move between different sites used for breeding, foraging and shelter. Professional review of past records and habitat suitability, together with the level of survey effort employed, allows for sufficient certainty about the use of the site by species of conservation concern.

3 Baseline Ecological Conditions

3.1.1 This section outlines the baseline conditions on the site in the absence of proposed activities and attributes a value to the ecological features in accordance with Table 4. Full details regarding the results of the surveys that were used to inform the following information are contained in the PEA and Species Report in Appendix B and Appendix C respectively. Features of site value or less have not been considered further in the assessment.

3.2 Designated Sites

3.2.1 The following Sites of Importance for Nature Conservation are considered further in the assessment due to the potential for impacts including habitat loss and disturbance to interest features. The other designated sites within 2km, which are described in the PEA in Appendix B, are not considered further in the assessment as there is no potential for significant effects. There are no likely impacts to interest features due to their distance from the site and the nature and scale of works. There is no habitat connectivity, given the urban context and lack of pathways for impact. The River Pinn, which forms the northern and western boundary of the site, provides a potential pathway for impacts to Sites of Importance for Nature Conservation located downstream to the south. However, the only works proposed near to the River Pinn comprise the creation of a new channel connecting the realigned Ickenham Stream with the River Pinn and associated landscaping. The rate of discharge would be reduced, as this would be controlled as it flows through the realigned Ickenham Stream. The Proposed Scheme is not expected to increase the volume of water expelled to the River Pinn; rather the surface water would be re-routed via the realigned Ickenham Stream. As such, it is not anticipated that the proposed channel would impact designated sites downstream.

West Ruislip Golf Course and Old Priory Meadows SBI.I

3.2.2 This SBI.I includes the River Pinn and Old Priory Meadows located adjacent to the site to the north. The designated area within the site includes a rich wetland habitat, enhanced by adjacent wet grassland and a drainage ditch and a linear stretch of woodland along Clacks Lane. A pond beside the railway embankment within the SBI.I and adjacent to the site (pond 3) (see Appendix C, Figure 7) supports great crested newt. There is the potential for habitat loss within the SBI.I and impacts to areas of the SBI.I that fall outside the site, including the River Pinn and Old Priory Meadows. There is also potential for impacts to interest features of the SBI.I, including terrestrial habitat for great crested newt that falls outside the boundary of the SBI.I. As such, this SBI.I will be assessed further and is considered to be of district/borough value.

Mad Field Covert, Railway Mead and the River Pinn SBI.II

3.2.3 This SBI.II is located approximately 70m to the south of the site. It contains an area of wildflower-rich grassland, a pond, mature hedgerows, complex woodland and the course of the shallow and slow-flowing River Pinn runs through it to the south. Green woodpeckers *Picus viridisa* are regularly seen in this area and the pond is home to kingfisher *Alcedo atthis*.

Due to its proximity to the Proposed Scheme and connectivity via the River Pinn, this SBI.II will be assessed further and is of district/borough importance.

3.3 Habitats

Broadleaved Semi-Natural Woodland

3.3.1 Bands of broadleaved semi-natural woodland were recorded across the site, mainly around the periphery of the site and along Clacks Lane. Along the north of the site, the woodland extends to adjacent habitat beyond the site. A wide variety of tree species was recorded, with some mature specimens, as well as varied scrub and field layers.

3.3.2 This habitat is on the Section 41 list of habitats of principal importance for the purpose of conserving biodiversity under the Natural Environment and Rural Communities Act 2006 and is a priority habitat under the London BAP, defined as lowland mixed deciduous woodland and woodland respectively. The woodland provides suitable habitat for birds, reptiles, amphibians (including great crested newt), invertebrates, and mammals including badger and bats. A main badger sett was recorded in the northern woodland within the site (see Appendix C, Figure 4). Trees within the woodland support roosting bats or provide potential roosting habitats and woodland edges provide valuable foraging and commuting habitat for common pipistrelle and soprano pipistrelle *Pipistrellus pygmaeus* bats (see Appendix C, Figure 3). Ruislip Woods SSSI and National Nature Reserve (NNR) contains 305 ha of structurally diverse and species-rich ancient woodland and is located approximately 1.23km north of the site. The broadleaved semi-natural woodland within the site is likely to provide a 'stepping stone' habitat for wildlife to migrate between the site and nearby designated sites such as Ruislip Woods.

3.3.3 Considering that this habitat is on the Section 41 list and London BAP, its value for notable and protected species, particularly its potential value to roosting bats, and its potential to enhance connectivity to nationally significant habitat, it is considered to be of district/borough value and will be assessed further.

Broadleaved Plantation Woodland and Scattered Trees

3.3.4 Strips of broadleaved plantation woodland, scattered and lines of trees were recorded across the fairway. The woodlands were well managed with little or no woodland understorey, primarily patches of bramble. Some of the trees have potential to support roosting bats and they provide nesting and foraging habitat for birds. However, they provide limited ground cover and foraging opportunities for amphibians, reptiles and invertebrates. As this habitat enhances connectivity across the site and provides habitat for bats and birds, it is considered to be of local value and will be assessed further.

Dense and Scattered Scrub

3.3.5 Areas of impenetrable scrub were primarily recorded in the northwest corner of the site, to the north of hole four, and to the east of semi-natural broadleaved woodland to the north of hole six, with other patches of scattered and dense scrub around the periphery of the site. Scrub provides cover and foraging habitat and for a range of species, including badger,

reptiles and amphibians, as well as nesting habitat for birds. It is considered to be of site value only and will not be assessed further.

Amenity Grassland

3.3.6 The site is predominantly amenity grassland associated with the fairways and greens of the golf course. This was well maintained and generally closely mown and therefore supports few common species. Due to the lack of species and high level of management of this habitat, it is considered to be of site value and therefore will not be assessed further.

Neutral Semi-Improved Grassland

3.3.7 Neutral semi-improved grassland was recorded in the central fairway within the West Ruislip Golf Course and Old Priory Meadows SBI.I, to the west of hole 13 and around the periphery of the site to the east. It was less frequently managed and consequently supported additional species than the surrounding amenity grassland. Given that the semi-improved grassland has greater diversity than the adjacent amenity grassland and provides cover and foraging opportunities for a range of species, including reptiles, amphibians, birds and invertebrates, this habitat is considered to be of local value and will be assessed further.

Marshy Grassland

3.3.8 The marshy grassland in the northwest corner of the site, primarily within West Ruislip Golf Course and Old Priory Meadows SBI.I, is botanically rich and supports a diverse assemblage of terrestrial invertebrates. Two invasive plant species were recorded, which are legally controlled under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) (WCA): Himalayan balsam *Impatiens glandulifera* and giant hogweed *Heracleum mantegazzianum.* The grassland also provides cover and foraging opportunities for amphibians, including great crested newt, slow worm and birds. However, this habitat will be retained and protected through the course of the Proposed Scheme and so will not be assessed further.

Tall Ruderal

3.3.9 Tall ruderal vegetation was recorded along either side of the footbath along Clacks Lane. Himalayan balsam *Impatiens glandulifera* was recorded, which is listed on Schedule 9 of the WCA. It provides habitat for reptiles, invertebrates and small mammals and foraging opportunities for birds. It is considered to be of site value and will not be assessed further.

Standing Water

3.3.10 Four ponds were recorded within the golf course, although only one of these was within the site (pond 4, see Appendix C, Figure 1). Pond 4 is situated within a patch of semi-natural broadleaved woodland and was therefore heavily shaded with no aquatic vegetation and was not found to provide suitable habitat for great crested newt. Ponds 1, 2 and 3 are located within the HS2 Phase One site to the south and all supported aquatic and bankside vegetation. Pond 3 has confirmed great crested newt presence (refer to Appendix C, Figure 7). A network of ditches was also recorded, which were typically narrow drainage channels lacking in aquatic or riparian planting and often dry. However, the northern-most exposed

section of Ickenham Stream supported varied emergent and bankside vegetation. The central section of Ickenham Stream was dry and the southern section was heavily shaded.

3.3.11 The ponds within the site are unlikely to meet the Section 41 assessment criteria and were not found to support great crested newt. However, standing water is a London BAP habitat. As such, standing water is of local value and will be assessed further.

Running Water

3.3.12 The River Pinn flows southwest along the northern and western boundaries of the site and joins the River Colne, a tributary to the River Thames. It has a stony substrate, with steep earth banks and bankside vegetation associated with the marshy grassland. Sections of the river are shaded by adjacent and overhanging dense scrub and trees. Giant hogweed *Heracleum mantegazzianum* was recorded along the banks, which is listed on Schedule 9 of the WCA.

3.3.13 Kingfisher was recorded singing on the fence next to the railway line approximately 18m from the site boundary. This species is listed on Schedule 1 of the WCA but was not considered to breed along the section of the River Pinn adjacent to the site during surveys in 2013 or 2018. This sighting is likely associated with Mad Field Covert, Railway Mead and the River Pinn SBI.II, which is also known to support this species. Otter and water vole have not been recorded and the river does not meet the Section 41 assessment criteria. However, rivers are a London BAP habitat and the Proposed Scheme involves the creation of a new channel connecting the re-aligned Ickenham Stream with the River Pinn. As such, running water is of district/borough value and will be assessed further.

Other Habitats

3.3.14 Considering the low ecological value of the introduced shrub, buildings and areas of concrete, they are of site value and so shall not be assessed further. The buildings lacked suitable features for roosting bats and were therefore considered to be of negligible potential[10].

3.4 Protected and Notable Species

Bats

3.4.1 Many trees were recorded with potential to support roosting bats, the majority of which are located within the bands of broadleaved plantation and semi-natural woodland. Of the 102 trees that were surveyed for bat roost potential within the site in 2017,2018 and 2019, there was one common ash *Fraxinus excelsior* with a confirmed roost (species unknown) in tree 65 (refer to Appendix C, Figure 2). A large west-facing cavity was recorded at approximately 4.5m that extends up into the tree in excess of 1m, with evidence of smoothing and staining and one bat of unknown species was found to be roosting. A common pipistrelle *Pipistrellus pipistrellus* bat potentially emerged from an unidentified tree during the backtracking and emergence and re-entry surveys. This tree is located in the northern edge of the woodland, just west of the path intersection (referred to as 'Potential emergence' Appendix C, Figure 2). The survey results indicate that these trees provide roosting habitat for a low number of male

or non-breeding female common pipistrelle bats. However, neither of these trees will be removed to facilitate the Proposed Scheme.

3.4.2 In addition, there were 32 trees with 'high' potential for roosting bats, 38 trees with 'moderate' potential, 27 with 'low' potential and four with 'negligible' potential. Of these, three trees with 'high' potential and three 'moderate' potential trees would need to be removed as they fall along the proposed re-alignment of the Ickenham Stream, within the new driving range or within or near to the ecological irrigation ponds. These trees have been climbed and/or subject to emergence and re-entry surveys and were found not to support roosting bats. The buildings were of negligible bat potential as they lacked suitable crevices for roosting bats. As the trees that support roosting bats would be retained and protected as part of the Proposed Scheme and those that would be impacted have not been found to support roosting bats, roosting bats will not be assessed further.

3.4.3 A total of eight species were recorded during the activity and automated surveys, comprising common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle *Pipistrellus nathusii*, brown long-eared bat *Plecotus auritus*, noctule *Nyctalus noctula*, Leisler's bat *Nyctalus leisleri*, serotine *Eptesicus serotinus* and a *Myotis* sp. (likely Daubenton's bat *Myotis daubentonii*). No other bat species were recorded within 2km of the site[7] .

3.4.4 Clacks Lane and the woodland edges, particularly where these are complemented with patches of rough grassland and scrub, provide valuable foraging habitat for pipistrelles. The majority of bat activity was recorded by static detector (SD)2 on the fairway, although SD4 at the Driving Range recorded the greatest diversity of species (all eight listed above). A key pipistrelle commuting corridor was recorded in the western part of the site. Key foraging and commuting activity is displayed in Figure 3 in Appendix C.

3.4.5 All bat species are fully protected under the WCA and the Conservation of Habitats and Species Regulations 2017 (Habitats and Species Regulations), which make it an offence to intentionally or deliberately capture, kill or injure or disturb bats (whether in a roost or not), and intentionally or recklessly damage, destroy or obstruct access to their roosts. Soprano pipistrelle, brown long-eared bat and noctule are listed under the former UK BAP and Section 41 list meaning they are priority species and must be considered by public authorities. The London BAP identifies all UK bat species as priorities, dealt with collectively in a grouped SAP. All eight species listed above are known to be present in London, particularly the outer boroughs[15], including Hillingdon. Most are common to locally common and widespread throughout the UK, with the exception of Nathusius' pipistrelle, serotine and Leisler's, which are rarer species. However, the survey results indicate that the site does not provide important habitat for these species, with only occasional passes recorded and no evidence of roosting at the site.

[15] London Bat Group (no date);'Bats of London.' Available at: https://londonbats.org.uk/bat-cave/bats-of-london/

3.4.6 The bat assemblage is typical for this type of suburban mosaic habitat. The site is considered to be of district/borough value to foraging and commuting bats, given the importance of the site to common and soprano pipistrelle, as well as the presence of other rarer species.

Otter and Water Vole

3.4.7 The watercourses within and adjacent to the site provide suitable habitat for water vole and otter, particularly the River Pinn given the presence of earth banks, dense bankside vegetation and, with respect to otter, mature trees and woodland within close proximity. The data search reports that water vole has been recorded within 2km of the site (the specific location was not provided), but not otter.

3.4.8 Water vole and otter surveys were undertaken on Ickenham Stream and the River Pinn for Hs2 in 2013 on sections of the watercourses to the south of the site. Neither water vole nor otter were recorded, with American mink *Neovison vison* recorded along the River Pinn. The survey conducted in 2018 identified no evidence of water vole, otter or American mink. The survey concluded that otter may be present on occasion, most likely commuting along the watercourses between areas of suitable habitat. Due to the absence of any evidence suggesting the presence of otter or water vole along Ickenham stream or the River Pinn, these species will not be considered further.

Badger

3.4.9 An extensive and active main sett was found along a bank within the northern-most broadleaved semi-natural woodland within the site, next to the northern site boundary (see Appendix C, Figure 4). The sett had 32 entrance holes of which 15 were thought to be currently active, eight to be partially disused and nine to be disused. Minimal evidence of badgers was found elsewhere on the site. Mammal paths were found in the south-western woodland of the site, crossing Clacks Lane and in the far eastern scrub next to the academy fairways and snuffle holes were found at two points in the middle of the golf course. It is considered likely that the majority of their territory extends outside the site to the north. Badgers are protected under the Protection of Badgers Act 1992 but are common throughout the UK. Due to this, the population is of local value and will be assessed further.

Birds

3.4.10 A total of 42 bird species were recorded within the site and the 20m buffer. Of these, 32 were considered likely to breed within the site, and ten were either flyover records or species using the site for foraging and/or resting only. Breeding territories of two Red listed Bird of Conservation Concern (BoCC) species[16] were recorded within the survey area: song thrush (five) and mistle thrush (two). Red Listed starling *Sturnus vulgaris* and house sparrow *Passer domesticus* were both recorded foraging at the site and are likely to breed close to the site in suitable structures. Eight Amber listed species were recorded within the survey area, but five of these were not considered to breed at the site. The remaining three, willow warbler

[16] Eaton *et al.* (2015); 'Birds of Conservation Concern 4: the population status of birds in the United Kingdom, Channel Islands and Isle of Man.' British Birds 108, 708–746.

Phylloscopus trochilus, dunnock *Prunella modularis*, and stock dove *Columba oenas*, were thought to hold five, seven, and four breeding territories respectively.

3.4.11 Table 3 lists the notable bird species that were confirmed breeding, or were possibly or probably breeding at the site and indicates their estimated number of territories and value.

3.4.12 All birds, their active nests and eggs are protected under the WCA. This legislation makes it an offence to kill, injure or take any wild bird or to take, damage or destroy the nest of any wild bird while that nest is in use or being built. Special penalties are given for these offences when related to birds listed on Schedule 1, making it illegal to intentionally disturb any wild bird listed in Schedule 1 while it is building a nest or is in, or near a nest containing eggs or young or to disturb the dependent young. Bird species listed under the Section 41 list and BoCC Red and Amber lists are of particular conservation concern.

Common Name	Scientific Name	Legal Protection & Conservation Status	Breeding Status	Estimated Number of Breeding Territories	Value
Dunnock	*Prunella modularis*	Amber list; Section 41 list	Confirmed	7	Local
House sparrow	*Passer domesticus*	Red list; Section 41 list	Possibly	Foraging only – likely to breed in suitable buildings close to the site	Local
Kestrel	*Falco tinnunculus*	Amber List	Possibly	Foraging on one visit only	District / borough
Mallard	*Anas platyrhynchos*	Amber list	Possibly	Flyover record only	Local
Mistle thrush	*Turdus viscivorus*	Red list	Confirmed	2	Local
Song thrush	*Turdus philomelos*	Red list; Section 41 list	Confirmed	5	Local
Starling	*Sturnus vulgaris*	Red; Section 41 list	Possibly	Foraging only – likely to breed in suitable buildings close to the site	Local
Stock dove	*Columba oenas*	Amber list	Confirmed	4	Local
Willow warbler	*Phylloscopus trochilus*	Amber	Confirmed	5	Local

Table 3 – Key bird species

3.4.13 Those species only foraging within the site or flying over the site in are considered to be of site value and will not be assessed further. An individual kingfisher was recorded singing on the fence next to the railway line approximately 18m from the site. This species is listed on Schedule 1 of the WCA but has not been recorded breeding at the site and will therefore not be considered further.

3.4.14 Habitats containing trees, scrub, rough grassland and water were considered key areas for breeding birds at the site, with the numbers and diversity of birds generally found to be higher in these areas. The breeding bird populations recorded within the site do not have any specific

conservation significance; they are common and widespread and would be expected in this type of habitat. However, they are notable in that their breeding populations have declined significantly in Great Britain in recent decades. The site supports a good assemblage of species typically found in similar habitats across the UK.

Reptiles

3.4.15 The mosaic of woodlands, rough grassland and wetland habitats provide suitable habitat for common reptiles. Common lizard *Zootoca vivipara* has been recorded within 1km of the site. One gravid common lizard was recorded incidentally approximately 20m south of the site boundary within the golf course, OS grid reference TQ 07533 87165. This record indicates a low breeding population of common lizard is likely to be present in suitable habitat within the golf course, including the south-western part of the site.

3.4.16 Slow worm *Anguis fragilis* has been recorded within 2km of the site. A total of 13 adult male and female slow worms were observed both on, and adjacent to the site to the south, between June and September 2017 (12 female and one male). Some of these were recorded under the same refugia on multiple visits and therefore are likely to be the same individual. A peak count of three slow worms was recorded on 11 July 2017, which indicates a low population. The results indicate that the population of slow worm is centred along the railway corridor, with only one recorded along the woodland edge on the northern edge of the fairway. The locations of these records are displayed in Figure 6 in Appendix C. The predominance of well-managed amenity grassland fragments areas of suitable habitat, which is likely to limit the suitability of the site for slow worm and common lizard.

3.4.17 Slow worm and common lizard are both listed on Schedule 5 of the WCA, which makes it illegal to deliberately or recklessly injure or kill these species. These species are also listed on the Section 41 list and all reptiles are on the London BAP. Slow worm and common lizard are both therefore of district/borough value and will be considered further.

Amphibians

3.4.18 The complex of wet ditches and ponds provide suitable breeding habitat for amphibians, including great crested newt and common toad *Bufo bufo*. Both species have been recorded within 2km of the site. Woodlands and rough grasslands also provide suitable terrestrial habitat, although similarly to reptiles, the vast expanses of amenity grassland are likely to reduce connectivity between potential breeding ponds and the suitability of the wider site for this species.

3.4.19 Four ponds were identified as potentially suitable for breeding and were subject to HSI surveys in April 2017 and 2018.the HSI score for pond 1 (outside site boundary) was 0.84, pond 2 (outside site boundary) was 0.50, pond 3 (outside site boundary) was 0.87 and pond 4 was 0.56 (refer to Appendix C, Figure 7). All four ponds were tested for great crested newt eDNA. Only pond 3 tested positive for great crested newt DNA and was subject to further survey. As presence had already been confirmed, a population size class assessment was carried out in 2018, which was repeated in 2019. During 2018, a total of 28 great crested newts were recorded along with one egg. A peak count of six adults was recorded on 31 May 2018 (four

female, two male), indicating a small population[13]. Common frog *Rana temporaria* and smooth newt *Lissotriton vulgaris* were also recorded in pond 3, and smooth newts in pond 2, both outside the site boundary. Estates management staff recorded two great crested newts (male and female) in an open irrigation box towards the western end of the golf course approximately 200m from pond 3 at OS grid reference TQ 07678 87312 on 14 May 2018, as shown in Figure 7, Appendix C.

3.4.20 In September and October 2018, the EWC implemented a mitigation strategy around pond 3 under the HS2 organisational GCN licence to facilitate construction of a haul road for HS2 Phase 1. Amphibian fencing was installed around the pond and pitfall trapping was undertaken, although no great crested newts were captured. Due to low temperatures, the destructive search could not be undertaken as planned in October 2018. The amphibian fencing was retained through the winter; however, a breach was recorded on 18 March 2019 and water was thought to have passed under the fencing both before and after this breach, which was repaired on the same day. Great crested newt eggs were subsequently recorded in pond 3 within and outside the fencing, to the west and southwest of the pond respectively. During the repeat population size class assessment in 2019, a peak count of eight adults was recorded on 23 April 2019 (four female and four male). In August and September 2019, destructive searches of the habitat surrounding pond 3 took place and no great crested newts were found. The fencing was removed following the destructive search.

3.4.21 As part of the mitigation strategy, in December 2019 and January 2020, pond 4 was enhanced to provide suitable habitat for breeding at the site until it needs to be removed to facilitate the Proposed Scheme from September 2021. This comprised the clearing of detritus and pond debris, removing overhanging branches to allow more light onto the pond and creating refugia to increase suitable terrestrial habitat for great crested newts. Egg strips were added in March 2020. Pond 3 was drawn down in the first two weeks of March 2020 and 94 great crested newts were recorded, indicating a medium population, rather than a small population as suggested by the population size class assessments conducted in 2018 and 2019. This comprised 45 females, 25 males and 24 juveniles. These were translocated to log piles and dense vegetation around pond 4. An eDNA survey was subsequently conducted on pond 4 and the result was positive.

3.4.22 The Network rail embankment to the south of pond 3 was previously enhanced for great crested newts under licence. This comprises a boulder underlay with a mixture of rough grassland and scrub. The Main Works Civils Contracts undertook pitfall trapping along the southern boundary of the rail embankment to facilitate HS2 Phase 1 in May and June 2020, which is due to be followed by a destructive search in July/August 2020. No great crested newts have been recorded to date.

3.4.23 Great crested newts can travel up to 500m to find new ponds throughout the breeding season (March to June). It is therefore likely that great crested newt is present in suitable terrestrial habitat within 500m of pond 3 and pond 4, including long grassland, woodland and scrub within the site. The site is likely to provide only part of the terrestrial habitat for the

population at the site, given that there is further suitable habitat along the railway line and to the west of the site, including hedgerows, woodland and grassland.

3.4.24 Great crested newt is fully protected under the WCA and Habitats and Species Regulations, which together make it an offence to intentionally or recklessly capture, kill, injure or disturb great crested newts and damage or destroy a breeding site or resting place or intentionally or recklessly obstruct access to any structure or place used for shelter or protection. This species is also on the Section 41 list. Common amphibians are only protected from sale under the WCA, although common toad is also on the Section 41 list.

3.4.25 Considering the presence of suitable terrestrial and breeding habitat within the site, as well as the rarity and legal protection afforded to the species, with a medium population translocated to pond 4 within the site, the population within the site is considered to be of county/metropolitan value and will be assessed further. Only smooth newt and common frogs have been recorded within the remaining three ponds. Common amphibians are considered to be of site value and will not be assessed further.

Terrestrial Invertebrates

3.4.26 The flower-rich marshy grassland and tall ruderal habitat types alongside the River Pinn were found to support a diverse assemblage of terrestrial invertebrates of mainly common species, as well as two nationally scarce species Roesel's bush-cricket *Metrioptera roeselii* and hornet hoverfly *Volucella zonaria.* Surveys undertaken as part of HS2 Phase One in May 2013 recorded four other nationally scarce terrestrial invertebrate species: two ground beetle species *Acupalpus exiguous* and *Anthracus consputus*; a leaf beetle *Orsodacne humeralis*; and umbellifer longhorn beetle *Phytoecia cylindrical*, which have the potential to occur at the site.

3.4.27 The marshy grassland alongside the River Pinn, mature pedunculate oaks and deadwood support a diverse assemblage of terrestrial invertebrate species. These habitats will be retained as part of the Proposed Scheme. The other habitats are not considered to be of particular note in terms of their potential value to invertebrates and are of site value. As such, terrestrial invertebrates will not be assessed further.

Plants

3.4.28 All of the species recorded within each habitat area sampled are common and widespread in the UK and contain species which would be expected in similar types of habitat in the UK. None of the flora has any specific conservation significance, although the sampled habitats provide foraging and nesting opportunities for birds and foraging opportunities for invertebrates, badgers and bats. Flora at the site is therefore considered to be of site value and therefore will not be assessed further.

Other Mammals

3.4.29 Other wild mammals are likely present on the site, such as red fox *Vulpes vulpes* and rabbit *Oryctolagus cuniculus*. As these species are common, their populations within the site are considered to be of site value and will not be assessed further. Hedgehog *Erinaceus europaeus* is on the Section 41 list and has been recorded approximately 500m north of the site, but

there are no records within the site. As they have not been recorded on site, they will not be assessed. There are no records of hazel dormouse *Muscardinus avellanarius* within 2km of the site and, given the lack of suitable habitat and connectivity to suitable woodland and hedgerows outside the site, there is not considered to be potential for this species to occur at the site.

3.5 Summary of Baseline

3.5.1 Ecological features that that have been considered in detail in the assessment and their value are summarised in Table 5.

Ecological Feature	Geographic Level of Importance
West Ruislip Golf Course and Old Priory Meadows SBI.I	District/borough
Mad Field Covert, Railway Mead and the River Pinn SBI.II	District/borough
Broadleaved semi-natural woodland	District/borough
Running water	District/borough
Broadleaved plantation woodland, broadleaved scattered trees, neutral semi-improved grassland and standing water	Local
Bats	District/borough
Badger	Local
Birds	Local to district/borough
Slow worm	District/borough
Common lizard	District/borough
Great crested newt	County/metropolitan

Table 4 – Ecological features

3.5.2 Wild mammals, common amphibians and invasive plant species fall below the threshold for assessment. Furthermore, although no roosting bats have been recorded at the site and therefore do not need to be assessed, precautionary mitigation measures are required. As such, due to their legal protection, appropriate embedded ecology measures have been incorporated into the Proposed Scheme to ensure adherence to wildlife legislation.

3.6 Change in Baseline

3.6.1 The baseline survey data was gathered in 2013 and over the last four years (2017 to 2020) and the majority of the assessment was completed in autumn 2019. The assessment for great

crested newts was updated in the summer of 2020. Construction of the golf course would commence when material from the HS2 Phase 1 West Ruislip Portal becomes available in September 2021.

3.6.2 Fauna may change their spatial distribution at various scales over time. Species may also return to, or colonise new areas at any future time, particularly if there is a change in the habitat structure. The golf course closed in August 2019 to allow construction of HS2 and thus it is expected that maintenance of the site will reduce for over two years prior to the commencement of construction; however, the habitats at the site will be monitored and managed to minimise any changes to the diversity and ecological value of the habitats and therefore minimise constraints to the Proposed Scheme. Activity at the site will diminish, but activity adjacent to the site associated with HS2 will increase significantly. As such, there is potential for the baseline conditions at the site to change. The broad habitat types are unlikely to change, however, reduced management and changes in activity within and adjacent to the site have potential to alter habitat structure and diversity and species' populations and distribution.

3.6.3 Amenity grassland and small areas of semi-natural and plantation woodland that fall within the central and southern part of the site, within the planning application boundary and within HS2 Act Limits, will need to be removed as part of the early works for HS2 Phase 1. These habitats will be replaced with topsoil storage areas and hardstanding, which will still be there when the golf course remodelling works start in September 2021. This will alter the baseline conditions, as it is expected that these areas will be of no ecological value. These areas are due to be remodelled from January 2024.

4 Assessment of Effects

4.1 Environmental Design

4.1.1 The Proposed Scheme has been designed to avoid and minimise ecological effects, mitigate impacts and provide ecological enhancements in line with the National Planning Policy Framework (NPPF)[17]. Ecologists advised designers from an early stage on ecological constraints and opportunities based on the results of baseline surveys. These measures include:

- Retaining all existing valuable habitats on site where possible, including West Ruislip Golf Course and Old Priory Meadows SBI.I, marshy grassland and broadleaved semi-natural woodland and mature trees which contain potential roost features for bats. The location of trees to be retained subsequently informed the topographic design;
- Integrating retained features with the landscape design to improve habitat connectivity and enhance the SBI;
- Designing habitats to support protected and notable species that have been recorded in and around the site, to increase populations and distribution. This includes a pond in the northern part of the site, within West Ruislip Golf Course and Old Priory Meadows SBI. I, which has been designed to support breeding great crested newt. Any great crested newts found during clearance works within the golf course would be translocated to this pond; and
- Developing native plant lists for proposed soft planting across the site to increase biodiversity, and improve cover and foraging opportunities for wildlife, including bats, great crested newt, slow worm and invertebrates. This includes the pond margins, stream corridor, ecological linking habitat, woodland canopy, understorey and ground cover, and rough grass, as well as the highly maintained play areas (semi-rough, fairway and driving range).

4.2 Embedded Ecology Measures

4.2.1 Construction of the Proposed Scheme would be undertaken in accordance with the HS2 Phase 1 Code of Construction Practice (CoCP)[18]. Key elements of this document are as follows:

Ecological Management – General Provisions

4.2.2 Appropriate measures will be adopted to protect the ecology of the area, with special attention to specified areas of ecological value.

[17] Ministry of Housing, Communities & Local Government, (2018); 'National Planning Policy Framework.'
[18] High Speed 2, (2017); 'High Speed Rail (London-West Midlands) Environmental Minimum Requirements Annex 1: Code of Construction Practice.'

4.2.3 The nominated undertaker will require its contractors to manage impacts from construction on ecological resources, including the following:

- local wildlife sites (i.e. non-statutory sites designated for nature conservation);
- protected and notable species; and
- other habitats and features of ecological importance (including linear/ecological corridors and surface and groundwater bodies).

4.2.4 Where reasonably practicable, environmental mitigation will be provided via the design and implemented by the contractors within the works. An Ecological Review Group will be established to provide independent advice on the monitoring of created habitats. This may require preparatory work to be undertaken ahead of the start of construction to permit timely progress of the programme.

4.2.5 Ecological management measures will include the following, as appropriate:

- summary of features of interest for all known areas of nature conservation interest which may be affected due to construction;
- plans (e.g. within the relevant Local Environmental Management Plans (LEMP)) showing the locations of all known areas of nature conservation interest that may be affected due to construction, including access routes;
- provision of guidance on ecological best practice methods to be followed in order to mitigate potential ecological effects during construction;
- plans (e.g. within the relevant LEMP) showing the location for all fences/barriers to be erected for the purpose of controlling animal movements during and after construction (e.g. deer, badger and amphibian fencing);
- plans showing the location of any ecological features which are to be created/installed prior to construction (e.g. bat roosting features/boxes, otter holts);
- procedures to be adopted in the event of unanticipated discovery or disturbance of protected species or important habitats;
- reference to the relevant procedures, including any special measures, to be implemented in the event of a pollution incident, where this occurs on or adjacent to a designated nature conservation site or where protected or notable species are known to be present, or other habitats and features of ecological importance; and
- ecology site management plans and European protected species licences to include the information above (where appropriate) for:
  - terrestrial habitats;
  - wetland habitats;

- European protected species (e.g. great crested newt and bats); and
- other protected and/or notable species as appropriate (e.g. badgers, breeding birds, common reptiles, invertebrates, and Schedule 9 (Wildlife and Countryside Act 1981) invasive species, such as Japanese knotweed).

4.2.6 The contractors will, where it is reasonably practicable, reduce any habitat loss, by keeping the working area to the minimum required.

Measures to Reduce Potential Impacts on Ecological Resources

4.2.7 Management measures for potential ecological impacts are addressed in other sections of this document and are not repeated here. These include measures relating to:

- protection of retained habitat, including trees;
- control of dust;
- control of water quality and flow;
- control of noise and vibration; and
- lighting.

4.2.8 The programming of construction works will take cognisance of the requirements set out in the ES, other relevant project documents and ecological best practice guidance. In particular, the timing of construction works will be undertaken with due regard to site clearance works to mitigate potential impacts on protected and/or notable species.

4.2.9 In addition to the measures described in other sections, management of construction activities to minimise ecological effects will include, where relevant:

- provision of appropriate watching briefs to be implemented during construction works;
- relocation or translocation of species, soils and plant material;
- reinstatement of any areas of temporary habitat loss and any arrangements necessary for displaced species to maintain long-term conservation status of those species concerned;
- restoration and replacement planting (e.g. trees, hedgerows, scrub and grassland) to reinstate any retained habitats adversely affected during construction; and
- use of by-products of construction to enhance mitigation provision (e.g. use of felled timber to provide dead wood habitat).

4.2.10 Prior to and during construction, there will be consultation with Natural England, the Environment Agency, local wildlife trusts and planning authorities as appropriate.

Statutory Designated Sites, Non-statutory Sites, Protected Habitats and Species

4.2.11 The nominated undertaker will require its contractors to manage impacts upon non-statutory sites of ecological interest and other areas of notable habitat.

4.2.12 The nominated undertaker will require its contractors to obtain and comply with the requirements of any wildlife licences, including all protected species licences necessary for construction.

Control of Invasive and Non-native Species

4.2.13 Appropriate measures for the treatment/control of invasive, non-native species (both plants and animals) and injurious weeds will be implemented.

4.2.14 Appropriate construction, handling, treatment and disposal procedures will be implemented in relation to these and any other species listed in Schedule 9, Part I or Part II of Section 62 of the Wildlife and Countryside Act 1981, as amended, or the Weeds Act 1959 to prevent the spread of such species. Advice in the Environment Agency's publication Managing invasive non-native plants (April 2010) will also be referenced in determining the strategy.

4.2.15 Route-wide measures will be implemented to promote bio-security and minimise the risk that invasive non-native species and diseases are spread as a consequence of the project.

4.2.16 A programme of works will be implemented which will reflect the fact that it can take a number of years to eradicate invasive species such as Japanese knotweed.

4.2.17 Removal of invasive species will take account of ecological best practice guidance, and appropriate measures will be taken to identify and protect other features of environmental importance (e.g. heritage assets).

Monitoring

4.2.18 The nominated undertaker will define a programme for undertaking ecological surveys prior to and during construction. The surveys will be used to verify the baseline ecological conditions described in the ES, to refine the mitigation and control measures required during construction as appropriate and to provide appropriate monitoring during construction.

4.2.19 The nominated undertaker will require its contractors to undertake appropriate monitoring of the consequences of construction works on ecological resources and of the effectiveness of the management measures designed to control ecological effects, associated with works that may affect protected or notable species, statutory designated or non-statutory sites of ecological interest.

Supplementary Embedded Ecology Measures

4.2.20 The following precautionary measures are required in addition those outlined within the CoCP as summarised above. Trees with 'high' and 'moderate' roost potential that need to be felled are subject to works that have potential to impact roosting bats should be subject to a climb-and-inspect survey by a licensed bat worker, to define any requirements for further

mitigation. Trees with 'low' bat roost potential that need to be removed should be soft felled, whereby the trees are cut in sections and lowered to the ground to allow any bats to escape, under the guidance of a licensed bat worker.

4.3 Construction

West Ruislip Golf Course and Old Priory Meadows SBI.I

4.3.1 The Proposed Scheme would result in habitat loss within the SBI.I of approximately 0.9 ha, 5% of the SBI.I, associated with earthworks, the creation of new tees and public footpaths, the proposed great crested newt breeding pond and channel connecting Ickenham Stream with the River Pinn. This primarily consists of amenity grassland in the western and north-eastern parts of the site, although approximately 0.1 ha of scrub and marshy grassland would be lost of accommodate the great crested newt pond and Ickenham Stream channel where it connects to the River Pinn. Earthworks would also require the loss of habitat adjacent to the SBI.I, including neutral semi-improved grassland and a small patch of broadleaved semi-natural woodland. Noise, lighting and general activity are also expected to cause disturbance to wildlife within the SBI.I and displacement to other habitats within and adjacent to the site. No works are proposed to woodland habitats within the SBI.I and the majority of the scrub and marshy grassland habitats would not be impacted. Embedded mitigation would avoid direct and indirect impacts to these habitats, including the protection of retained habitats and the control of water quality. However, given the proximity of works, there is potential for disturbance to wildlife associated with these habitats, including birds and bats. Clearance and earthworks within the SBI.I and the wider site would result in the loss of terrestrial habitat for great crested newts, which is an interest feature of the SBI.I.

4.3.2 Impacts during construction therefore comprise the loss of habitat adjacent to and within the SBI.I and temporary disturbance. Disturbance would be temporary, as impacts are only expected during construction, primarily associated with earthworks and clearance. Disturbance and habitat loss is likely to have an adverse effect on the integrity of this designated site and the features it is designated for, notably great crested newts.

4.3.3 The Proposed Scheme would provide enhancements to the SBI.I through habitat creation within and adjacent to the SBI.I, including the great crested newt pond, new woodland, rough grassland and wetland habitats associated with the re-aligned Ickenham Stream. Linking habitat with semi heathland typology is proposed along the stream corridor and across the site to improve connectivity across the site and to the SBI.I. The corridor would hold water on a temporary basis during periods of rainfall.

4.3.4 Habitat creation within and adjacent to the SBI.I would increase biodiversity, improve connectivity and provide cover and foraging opportunities for wildlife, including bats, birds, slow worm and great crested newt. The great crested newt pond provides suitable breeding habitat for this species and connects to terrestrial habitat across the golf course, particularly Ickenham Stream corridor, and linking habitats and patches of woodland. The potential effect in the short term is not significant, given that the Proposed Scheme would impact a small area of the SBI.I and protect the most valuable habitats. However, in the long term the effect is

permanent significant beneficial at a district/borough scale, considering the proposals for habitat creation which complement and enhance existing habitats within the SBI.I.

Mad Field Covert, Railway Mead and the River Pinn SBI.II

4.3.5 Given that this SBI.II is located 70m to the south of the site, there is potential for disturbance to interest features of this SBI.II, specifically kingfisher, mallard and green woodpecker. Of particular note is kingfisher, which is listed on Schedule 1 of the WCA and has been incidentally recorded close to the site. However, this species is not currently considered to breed along the River Pinn adjacent to the site, indicating that the section of River Pinn adjacent to the site does not provide important habitat for this species.

4.3.6 There is no potential for impacts to important habitats within the SBI.II. No works are proposed to the River Pinn and embedded mitigation would avoid indirect impacts, including the control of water quality. Levels of noise, vibration, dust and lighting are considered to be minimal given the nature and scale of the proposed works and embedded control measures would further minimise the magnitude of any impact. As such, potential effects on this SBI.II are not significant.

Broadleaved Semi-Natural and Plantation Woodland

4.3.7 The Proposed Scheme involves the loss of approximately 0.63 ha of broadleaved semi-natural and 0.45 ha of plantation woodland, due to the need for clearance ahead of earthworks. The loss of broadleaved semi-natural woodland would result in the loss of Section 41 and London BAP habitat. This would result in the loss of trees with potential to support roosting bats. The woodlands also provide suitable habitat for birds, slow worm, great crested newt and invertebrates, although the broadleaved plantation woodland is of limited value for these species and species groups due to the lack of understorey or field layers.

4.3.8 New woodlands would be planted within the site as part of the Proposed Scheme to compensate for the loss of woodland, comprising trees with 150cm, 300cm and 600cm centres, dominated by beech *Fagus sylvatica*, pedunculate oak, hornbeam *Carpinus betulus* and English elm *Ulmus procera*. Woodland understorey and linking habitat would provide cover beneath and adjacent to the canopy planting, including dogwood *Cornus sanguinea*, spindle *Euonymus europaeus* and hazel *Corylus avellana*. Native species have been selected, which support higher levels of biodiversity.

4.3.9 The area of woodland habitat creation significantly exceeds that lost as a result of the Proposed Scheme. The total area of woodland habitat creation is 3.69 ha, which includes woodland understorey and linking habitat to provide cover for wildlife. Given that woodland habitat creation includes appropriate native broadleaved species with understorey planting, it is considered that this provides appropriate mitigation for the habitat lost. However, these habitats would take time to mature. The majority of canopy planting comprises trees with 150cm centres within the out of play areas. The short-term potential effect on both semi-natural and plantation woodland is therefore not significant. However, the long-term residual effect is permanent significant beneficial. The effect on the semi-natural woodland is at a district/borough scale and on the plantation woodland is local.

Broadleaved Scattered Trees

4.3.10 The Proposed Scheme involves the loss of approximately 200 trees (this figure includes trees within woodland), due to the need for clearance ahead of earthworks. The loss of trees has been minimised, but this includes habitat for birds and invertebrates.

4.3.11 The loss of scattered broadleaved trees would be mitigated by the creation of woodlands and individual tree planting, comprising five standard (heavy) pedunculate oak trees with 350cm to 500cm centres. The majority of tree removal is within woodlands, while the magnitude of impact on scattered trees is comparatively low. Given this, and since tree planting would compensate for the removal of scattered trees, the potential effect is not significant.

Neutral Semi-Improved Grassland

4.3.12 The majority of the neutral semi-improved grassland, approximately 0.15 ha, would be lost during the course of earthworks, including the area in the western part of the site near to the SBI.I and sections around the eastern periphery of the site. These areas support a greater diversity of plant species than the amenity grassland and provide habitat for slow worm, great crested newt and invertebrates.

4.3.13 Areas of rough grassland are proposed with a diversity of native grasses and wildflowers, including tufted hair grass, red fescue *Festuca rubra* and lady's bedstraw *Galium verum*. Furthermore, the linking habitat incorporates grassland habitat, with scrub, including gorse *Cytisus scoparius* and ling *Calluna vulgaris* and occasional silver birch trees. The driving range peripheral habitat also increases diversity, including crested dog's-tail *Cynosurus cristatus* and sheep's fescue *Festuca ovina*.

4.3.14 The proposed grassland habitats would not take long to establish and are expected to provide an enhancement considering the area proposed and diversity of native species. The area of rough grassland is expected to increase as a result of the Proposed Scheme, with 7.17 ha of rough grassland, linking habitat and driving range peripheral habitat proposed around the play areas. This is compared to approximately 0.15 ha of semi-improved grassland due to be lost. As such, the potential effect is permanent significant beneficial at a local scale.

Standing Water

4.3.15 Pond 4, standing water associated with Ickenham Stream and the wet ditches are expected to be lost as a result of earthworks and the re-alignment of the stream. Approximately 535m of Ickenham stream is being realigned. This includes the northern-most section of Ickenham Stream, which was considered to provide important open water habitat.

4.3.16 Three ponds are proposed across the site. This includes the great crested newt pond, with marginal and submerged vegetation, including species such as water forget me-not *Myosotis scorpioides* for egg-laying, as well as terrestrial habitat linking to the surrounding landscape. Two large permanent ponds are also proposed, between 0.19 and 0.52 ha in size, also with marginal planting. These are expected to be too large to provide suitable habitat for great crested newt. The Proposed Scheme also involves the creation of wetland areas, with native marginal and wet grassland planting. Ickenham Stream would be diverted to provide an

ecological drainage corridor for the golf course. These wetlands would have natural profiles with marginal planting including marsh-marigold *Caltha palustris*, hemp agrimony *Eupatorium cannabinum* and meadowsweet. The stream corridor would reflect marshy grassland habitat, with species including meadowsweet and tufted hair grass.

4.3.17 The creation of ponds and wetland areas would increase the area of standing water and marginal planting on the site and increase the diversity of wetland species. This is expected to enhance the wetland habitats associated with West Ruislip Golf Course and Old Priory Meadows SBI.I and provide breeding habitat for great crested newt, which is not currently present at the site. The residual effect on standing water is therefore permanent significant beneficial at a local scale.

Running Water

4.3.18 A new channel is proposed connecting the realigned Ickenham Stream with the River Pinn. There would be changes to the flow of water where the new channel intersects the River Pinn; however, to minimise any such changes, the proposed channel would be as parallel as possible to the River Pinn. The design of the intersection with the River Pinn would be developed at detailed design. The rate of discharge to the river would also be reduced. However, there are not expected to be changes to the volume of water expelled to the River Pinn as a result of the Proposed Scheme.

4.3.19 Embedded mitigation would avoid direct and indirect impacts to the river, including the protection of retained habitats and the control of water quality. As such, any potential effects on running water are not significant.

Bats

4.3.20 Trees with potential to support roosting bats that need to be removed to facilitate the Proposed Scheme have been surveyed to assess the presence or likely absence or roosting bats and no roosts have been recorded.

4.3.21 Vegetation clearance would result in a loss of foraging and commuting habitat for bats, mainly common and soprano pipistrelle, but also rarer species that were recorded less regularly, including Nathusius' pipistrelle, serotine and Leisler's bat. The majority of the woodlands that provide valuable flight lines for bats would be retained, including Clacks Lane and the semi-natural broadleaved woodlands around the periphery of the site. However, flight lines along the northern fence line of the driving range and in the middle of the fairway would be lost. Furthermore, the loss of rough grassland and scrub around the woodlands would impact insect availability and the suitability of the site for foraging. This is likely to be compounded by the use of lighting during construction, which is likely to disturb foraging and commuting bats, as lit conditions pose a barrier to movement[19].

[19] Bat Conservation Trust and the Institution of Lighting Professionals, (2018); 'Bat Guidance Note 08/18 Bats and artificial lighting in the UK. Bats and the Built Environment series.'

4.3.22 The Proposed Scheme incorporates new canopy planting with woodland understorey and field layers, more extensive areas of rough grassland, as well as improved wetland habitats. These habitats all incorporate a diversity of species, more so than exists currently, that would attract insects and provide improved foraging habitat for bats.

4.3.23 There would be a temporary loss of habitat during construction prior to habitat creation as well as temporary disturbance associated with lighting. Once the landscaping has been completed, it would also take time for the habitats to mature. As such, in the short-term, the potential effect on the assemblage of foraging and commuting bats is temporary significant adverse at a district/borough scale. However, in the long-term, the potential effect is permanent significant beneficial at a district/borough scale.

Badger

4.3.24 The Proposed Scheme has been designed to avoid earthworks within 30m of the main sett. The woodland in which the main sett is located would be retained throughout construction. There are landscaping works within 30m, comprising woodland understorey, linking habitat and rough grassland; however, these works are unlikely to cause significant disturbance. As stipulated in the CoCP, a suitably qualified ecologist would be required to undertake surveys prior to and during construction to verify the baseline conditions and undertake watching briefs during construction. Should any additional setts be recorded, appropriate exclusion zones would need to be established to avoid the risk of disturbance and damage to the setts, or otherwise a licence would need to be applied for to facilitate the Proposed Scheme.

4.3.25 Temporary habitat loss across the wider site is unlikely to have a significant impact on badgers given that few signs of badger activity were recorded within the site despite the presence of suitable habitat. The Proposed Scheme is therefore unlikely to reduce access to or the availability of foraging habitat. The proposed woodlands and linking habitat, as well as rough grassland, would provide suitable habitat for badgers, but considering that the wider site is not currently being utilised, this is unlikely to have a significant effect. As such, the potential effects of disturbance, habitat loss, and habitat creation on badgers are not significant.

Birds

4.3.26 Stock dove, song thrush, willow warbler, mistle thrush and dunnock were confirmed as breeding and have potential to be impacted by the loss of woodland, scattered trees, scrub and rough grassland. The majority of breeding territories were located in areas of retained broadleaved semi-natural woodland along Clacks Lane, around the periphery of the site and in areas of broadleaved semi-natural woodland within the fairway. However, three territories, two for dunnock and one for mistle thrush would need to be removed. Kestrel, mallard and red kite, which have been recorded foraging or flying over the site also have the potential to be impacted by the loss of woodland, scrub and grassland habitats. It is likely that the removal of rough grassland and scrub around the woodlands, as well as disturbance associated with earthworks, could deter birds from nesting within areas of retained habitat, particularly in the central areas of the site.

4.3.27 The loss of standing water and grassland has potential to result in the loss of breeding and foraging habitat for mallard. House sparrow, swift and starling were only recorded foraging and typically breed in buildings and therefore their breeding habitat is unlikely to be impacted.

4.3.28 The implementation of embedded mitigation would avoid the loss of nests, eggs and young and the potential for an offence under the WCA. Furthermore, the protection of retained habitats would prevent the loss of the most valuable breeding habitat along the River Pinn and in the broadleaved semi-natural woodland. However, clearance and earthworks have the potential to lead to the loss of breeding and foraging habitat for notable species and may deter them from breeding in adjacent habitats. Disturbance during construction would be minimised through the implementation of the CoCP, including the control of noise. There is potential for the Proposed Scheme to impact a range of notable bird species, including kestrel, which is of district/borough value.

4.3.29 The impact of habitat loss would be compensated by habitat creation and enhancement, notably the provision of understorey woodland planting to enhance existing woodlands and the creation of new native woodlands with understorey and field layers. The linking habitats would increase connectivity across the site and the re-aligned Ickenham Stream would provide enhanced wetland habitats for a range of bird species, including kingfisher and mallard. Furthermore, the areas of rough grassland would provide improved foraging and nesting habitat for a range of species.

4.3.30 There would be temporary disturbance during construction, as well as habitat loss prior to the completion of landscaping. New habitats would also take time to mature. As such, the potential effect on birds is temporary significant adverse at a district/borough scale. However, in the long term, the Proposed Scheme is expected to deliver permanent enhancements. As such, the long-term effect is permanent significant beneficial at a district/borough scale.

Slow Worm

4.3.31 The population of slow worm in the northwest part of the site is unlikely to be impacted by the Proposed Scheme, as the marshy grassland, scrub and woodland habitats would be retained. Furthermore, the majority of records in the southern part of the golf course were outside the site, indicating that habitat loss due to the Proposed Scheme along the southern boundary would also not have a significant effect on the population. It should be recognised that all suitable habitats within the site were not surveyed and there is potential for this species to occur in other locations. The implementation of embedded ecology measures would avoid harm to slow worms and an offence under the WCA.

4.3.32 The landscape strategy provides improved habitat for slow worm, particularly the linking habitat, rough grassland and woodlands. The inclusion of reptile hibernacula within rough grassland habitat would provide an additional enhancement. The creation of new habitats with connectivity across the site, including between the populations along the River Pinn in the north and railway corridor to the south, provides an opportunity for slow worm to increase

their distribution and population, providing an enhancement. As such, the potential effect on slow worm is permanent significant beneficial at a local scale.

Common Lizard

4.3.33 Habitat clearance required for the Proposed Scheme would remove suitable habitat for this species which includes the marshy grassland, scrub and woodland habitats throughout the site. It should be recognised that not all suitable habitats within the site were surveyed and therefore there is potential for this species to occur in other locations beyond the woodland outside the southern boundary of the site where this species was recorded incidentally. The implementation of embedded ecology measures would avoid harm to common lizard and an offence under the WCA.

4.3.34 The landscape strategy provides improved habitat for common lizard, particularly the linking of rough grassland and woodland habitats. The inclusion of reptile hibernacula within rough grassland habitat would provide an additional enhancement. The creation of new habitats with connectivity across the site, particularly between the population in the south-west of the site with the rest of the golf course, provides an opportunity for the distribution and population of common lizard to increase their, providing an enhancement. As such, the potential effect on common lizard is permanent significant beneficial at a local scale.

Great Crested Newt

4.3.35 The Proposed Scheme would result in the loss of pond 4, which tested positive for great crested newt eDNA in 2020. As pond 4 was enhanced for great crested newt in early 2020, this pond is now more likely to support breeding. The loss of woodland and grassland across the site would lead to a loss of terrestrial habitat for great crested newt, as well as disturbance, particularly within 250m of ponds 3 and 4. The implementation of embedded mitigation would minimise the risk of harm to great crested newt, via the EPS licencing process. Suitable connecting terrestrial habitat has been incorporated into the Proposed Scheme, particularly the linking habitat, rough grassland and woodland.

4.3.36 The proposed great crested newt pond in the north of the site has been designed to provide breeding habitat for great crested newt. It provides a receptor site for great crested newts displaced from the site as a result of the Proposed Scheme. The location has been selected and the topography designed with the aim of ensuring that the pond holds water during at least one summer every three years. Marginal and submerged planting is proposed as well as linking habitat with scrub planting to the south of the pond, which would restrict views and access to the pond without casting shade over the pond. A ha-ha is also proposed between the pond and the PRoW, which would also be vegetated. These measures would be implemented to minimise disturbance from the public and dogs off the lead.

4.3.37 The potential effect of the loss of terrestrial habitat, creation of terrestrial and breeding habitat and disturbance to great crested newt is significant adverse at a county/metropolitan scale, in the absence of a strategy for conserving the population of great crested newts at the site.

4.4 Operation

Bats

4.4.1 Between 20m and 30m high net fencing is proposed around the driving range. Bats are likely to use the proposed woodlands around the driving range as flight lines, but are not likely to fly into the netting given the detailed picture of the environment provided by echolocation.

4.4.2 New floodlighting is proposed at the driving range that has potential to disturb foraging and commuting bats. The hours of operation would remain as existing, closing at 9pm Monday to Thursday and 7.30pm on Friday to Sunday. No additional lighting is proposed across the golf course. There is no potential for lighting at the driving range to disturb existing roosts; the trees with bat potential that would be lit by the proposed lighting would need to be removed during construction.

4.4.3 The driving range has six columns fixed to the roof and four floodlights on each post, totalling 24 lamps. The proposed Berm System provides multiple lighting points along the full length of the outfield. Seven floodlights are also mounted on the range roof to illuminate the first 25 metres of the outfield. A specification for the current or proposed bulbs or existing lighting levels have not been provided to allow a detailed comparison. However, the proposed outfield is larger, therefore lighting is expected to cover a larger area. Proposed light levels are up to +50 lux within and, in discrete locations, immediately adjacent to the driving range. The majority of light spill is to the west of the range, up to +20 lux over the proposed ecological mitigation pond, linking habitat and woodland planting.

4.4.4 The static detector located at the driving range recorded a wide range of species and the northern fence line of the driving range provided valuable foraging habitat for common and soprano pipistrelle bats. There is no light spill along Clacks Lane, therefore retaining this dark foraging corridor for bats. However, the lighting is expected to limit the potential value of ecological irrigation pond to the east of the driving range to foraging bats, as well as the woodland planting to the north, south and west, due to light spill in these areas.

4.4.5 The extent of impact is more wide-ranging than existing, but is nevertheless restricted to the southeast corner or the site, maintaining key foraging and commuting routes across the rest of the site. Impacts are only expected in the early evening, with no impact expected in mid-summer when bat activity is most intense as the sun sets later than 9pm. Since there is already floodlighting at the site and since the impacts are limited spatially and temporally, the effect on foraging and commuting bats is not significant.

4.5 Mitigation

4.5.1 This section describes additional measures designed to reduce or compensate for significant ecological effects.

Badger

4.5.2 Badger setts would be protected in accordance with the HS2 Phase 1 Ecology Technical Standards and HS2 Phase 1 Ecological Principles of Mitigation[7]. Fencing would be erected at a

distance of 30m from the entrance holes of the main sett to mitigate disturbance to badgers from human activities. If there is potential for works within 30m to cause disturbance, such as the use of heavy machinery within 30m or lighter machinery within 20m, this work would be undertaken under the HS2 route-wide badger licence. This licence would cover any works that would otherwise result in an offence under the Protection of Badgers Act 1992.

Great Crested Newt

4.5.3 The proposed pond would be created and planted (including surrounding habitats) at least a year prior to the commencement of works impacting suitable terrestrial habitat for great crested newt (including the woodland, rough grassland and scrub habitats), to allow the vegetation and invertebrate populations to become established prior to translocation. It would be close to a well-trodden path, although the Public Right of Way (PRoW) runs further south along the woodland edge. The PRoW would therefore be re-established along the correct route.

4.5.4 Great crested newts would be translocated from pond 4 and terrestrial habitat within the site to the proposed pond and surrounding habitat. This work would be undertaken in line with the HS2 Phase 1 Ecology Technical Standards[3] and Ecological Principles of Mitigation[7], under the HS2 Phase 1 organisational licence or a standard EPS Mitigation Licence. A mitigation strategy would be devised, and a method statement prepared.

Operation

4.5.5 There are no mitigation measures required during operation.

4.6 Residual Effects

Construction

West Ruislip Golf Course and Old Priory Meadows SBI.I

4.6.1 The residual effect is the same as the potential effect; not significant in the short term and permanent significant beneficial at a district/borough scale in the long term, as per the potential effect.

Broadleaved Semi-natural and Plantation Woodland

4.6.2 The residual effects are not significant in the short term and permanent significant beneficial in the long term (district/borough scale for semi-natural woodland and local scale for plantation woodland), as per the potential effects.

Neutral Semi-improved Grassland

4.6.3 The residual effect is permanent significant beneficial at a local scale, as per the potential effect.

Standing Water

4.6.4 The residual effect is permanent significant beneficial at a local scale, as per the potential effect.

Bats

4.6.5 The residual effect on foraging and commuting bats is temporary significant adverse at a district/borough scale in the short term and permanent significant beneficial at a district/borough scale in the long term, as per the potential effect.

Badger

4.6.6 The protection of setts would avoid disturbance to badgers. The residual effect on badgers is not significant.

Birds

4.6.7 The residual effect on birds is temporary significant adverse at a district/borough scale in the short term and permanent significant beneficial at a district/borough scale in the long term, as per the potential effect.

Slow Worm

4.6.8 The residual effect on slow worm would be permanent significant beneficial at a local scale, as per the potential effect.

Common Lizard

4.6.9 The residual effect on common lizard would be permanent significant beneficial at a local scale, as per the potential effect.

Great Crested Newt

4.6.10 Implementation of the mitigation strategy would ensure the appropriate management of works to promote a long-term increase in their distribution and population at the site. Furthermore, the Proposed Scheme is expected to provide improved terrestrial habitat for great crested newt. As such, the residual effect on great crested newt is permanent significant beneficial at a county/metropolitan scale.

Operation

4.6.11 There are no significant effects associated with the operation of the Proposed Scheme.

4.7 Cumulative Effects

4.7.1 The following sections identify where there is potential for cumulative effects on ecological features. HS2 Phase One and the proposed Thames Water Diversion are of relevance to this assessment.

West Ruislip Golf Course and Old Priory Meadows SBI.I

4.7.2 Pond 3 within the SBI.I has been removed as part of the early works package, ahead of the construction of West Ruislip Portal. As such, there will be no potential disturbance impacts to wildlife at this pond, which falls within the boundary of the SBI.I.

4.7.3 Construction work for HS2 Phase One is due to take place between June 2019 and December 2025, with works to West Ruislip Portal, including tunnelling, landscaping, drainage and

construction of the headhouse post-September 2021 when works at the site are due to commence. HS2 Phase 1 will result in the loss of approximately 2.2 ha of habitat. The Thames Water Diversion will involve the loss of approximately 0.053 ha within the SBI.I. In combination with the Proposed Scheme, this comprises 17% of the SBI.I. The impact of HS2 Phase 1 will be mitigated by enhancing connectivity between the sites along the railway line, such that the residual effect was not considered significant. However, there would be a combined impact of habitat loss and disturbance within the SBI.I at the same time, which would result in a cumulative temporary significant adverse effect at a district/borough scale. The long-term cumulative effect is as per the potential effect, permanent significant beneficial at a district/borough scale.

Broadleaved Semi-Natural and Plantation Woodland

4.7.4 Construction work at Ruislip Golf Course, Newyears Green Covert and Copthall Covert associated with HS2 Phase 1 will result in the loss of approximately 6 ha of secondary semi-natural broadleaved woodland and small areas of plantation. The potential effect on woodland at the golf course was considered to be permanent adverse at a district/borough level. Native broadleaved woodland planting was considered to mitigate for the impact of habitat loss, such that the residual effect was not significant. Approximately of 0.2 ha of broadleaved plantation and 0.05 ha of semi-natural woodland within the site need to be removed as part of the Thames Water Diversion works. This comprises an area of common alder *Alnus glutinosa* plantation and pedunculate oak semi-natural woodland. On balance, the cumulative effect on semi-natural woodland is not significant, given the extent of semi-natural woodland habitat removal required to facilitate HS2 Phase 1. The cumulative effect on plantation woodland is not significant in the short term, but significant beneficial at a local scale in the long term.

Standing Water

4.7.5 Three ponds within the golf course will be lost as a result of HS2 Phase One (ponds 1, 2 and 3), resulting in a potential permanent significant adverse effect at a district/borough level. The MSD site provides mitigation for the loss of ponds at the site. The MSD site is located between Harvil Road and Breakspear Road South at grid reference TQ 067 876 and provides four ponds (with aquatic vegetation), two hibernacula and grassland planting. Furthermore, up to three areas of standing water would be created within West Ruislip Portal directly south of the site boundary.

4.7.6 HS2 Phase One involves the diversion of Ickenham Stream, which will result in the loss of open watercourse and riparian habitats. The potential effect was considered to be significant adverse at a local/parish level. The creation of a sinuous watercourse including native planting with local species including riparian plants and trees was considered to reduce the effect of the loss of part of the stream and result in overall enhancement. Given the potential for HS2 to provide an enhancement in conjunction with the Proposed Scheme, the potential effect remains permanent significant beneficial at a local scale.

Bats

4.7.7 The HS2 Phase One ES does not make any reference to impacts on bats associated with works at the golf course. However, following the implementation of mitigation, it was anticipated that any adverse impacts on bats during construction will be reduced to not significant. The cumulative effect on foraging and commuting bats is temporary significant adverse to permanent significant beneficial at a district/borough scale, as per the residual effect.

Birds

4.7.8 Habitat loss associated with HS2 was considered to result in an adverse significant effect on birds at a local/parish scale, however this effect was compensated for as part of the development. The ES does not provide further details regarding local/parish scale effects. The cumulative effect remains as per the residual effect; temporary significant at a district/borough scale in the short-term, but permanent significant beneficial at a district/borough scale in the long term.

Slow Worm

4.7.9 Construction of West Ruislip Portal could displace slow worm onto the site, which would alter the baseline conditions, most likely increasing populations and the distribution of species in sub-optimal habitats within the site. However, the implementation of embedded ecology measures and habitat creation at the golf course would mitigate these cumulative effects. As such, the cumulative effect on slow worm is permanent significant beneficial at a local scale, as per the residual effect.

Common Lizard

4.7.10 Construction of West Ruislip Portal could displace common lizard onto the site, most likely fragmenting the population in the woodland to the southwest of the site. However, the implementation of embedded ecology measures and habitat creation at the golf course would mitigate these cumulative effects. As such, the cumulative effect on common lizard is permanent significant beneficial at a local scale, as per the residual effect.

Great Crested Newt

4.7.11 The loss of two ponds, part of a ditch and approximately 2ha of suitable terrestrial habitat to facilitate HS2 Phase 1 was considered to result in a permanent adverse effect on the conservation status of an assumed medium population of great crested newt that is significant at up to the county/metropolitan level. This has since been confirmed as a medium population. It was considered that the proposed provision of replacement ponds, terrestrial habitat and hibernation habitat would be sufficient to maintain the favourable conservation status of the population affected. The Merck Sharp Dohme (MSD) provides replacement ponds, but it was not considered feasible to translocate great crested newts to the MSD site, as the population at the golf course is too small to translocate successfully; at least 100 individuals are required with an equal sex ratio. Four ponds have also been designed at Ruislip Portal to provide suitable breeding habitat for great crested newt. These will not be established in time to provide a receptor site but would provide valuable terrestrial and

breeding habitat that could be utilised by great crested newts at the site during the operation of the Proposed Scheme.

4.7.12 The Thames Water Diversion will require the removal of terrestrial habitat for great crested newt, including woodland and grassland, though it is expected that this would be re-instated following the works.

4.7.13 Habitat loss and creation and disturbance associated with these cumulative schemes in conjunction with the Proposed Scheme is expected to result in a permanent significant beneficial effect at a county/metropolitan scale, as per the residual effect, considering the collaborative approach to mitigation for this species.

4.8 Assessment Summary Matrix

4.8.1 Table 5 provides a summary of the impacts and the significance of any residual effects for each feature, the mitigation measures required and the means by which mitigation measures can be secured.

Ecological Feature	Impact	Significance of Potential Effect	Mitigation	Significance of Residual Effect	Significance of Cumulative Effect
Construction					
West Ruislip Golf Course and Old Priory Meadows SBI.I	Habitat loss and creation and disturbance	Short term – not significant Long term - permanent significant beneficial at a district/borough scale	N/A	Short term – not significant Permanent significant beneficial at a district/borough scale	Short term – temporary significant adverse at a district/borough scale Long term – permanent significant beneficial at a district/borough scale
Mad Field Covert, Railway Mead and the River Pinn SBI.II	Disturbance	Not significant	N/A	Not significant	N/A
Broadleaved semi-natural woodland	Habitat loss and creation	Short-term – not significant Long-term – permanent significant beneficial at a district/borough scale	N/A	Short-term – not significant Long-term – permanent significant beneficial at a district/borough scale	Not significant
Broadleaved plantation woodland	Habitat loss and creation	Short-term – not significant Long-term – permanent significant beneficial at a local scale	N/A	Short-term – not significant Long-term – permanent significant beneficial at a local scale	Short-term – not significant Long-term – permanent significant beneficial at a local scale
Broadleaved scattered trees	Habitat loss and creation	Not significant	N/A	Not significant	N/A
Neutral semi-improved grassland	Habitat loss and creation	Permanent significant beneficial at a local scale	N/A	Permanent significant beneficial at a local scale	N/A
Standing water	Habitat loss and creation	Permanent significant beneficial at a local scale	N/A	Permanent significant beneficial at a local scale	Permanent significant beneficial at a local scale

Ecological Feature	Impact	Significance of Potential Effect	Mitigation	Significance of Residual Effect	Significance of Cumulative Effect
Running water	Reduced water quality	Not significant	N/A	Not significant	N/A
Bats	Habitat loss and creation and disturbance	Foraging and commuting short term – temporary significant adverse at a district/borough scale Foraging and commuting long term – permanent significant beneficial at a district/borough scale	N/A	Foraging and commuting short term – temporary significant adverse at a district/borough scale Foraging and commuting long term – permanent significant beneficial at a district/borough scale	Foraging and commuting short term – temporary significant adverse at a district/borough scale Foraging and commuting long term – permanent significant beneficial at a district/borough scale
Badger	Disturbance and habitat loss and creation	Not significant	Protection of the main badger sett from disturbance	Not significant	N/A
Birds	Habitat loss and creation and disturbance	Short-term – temporary significant adverse at a district/borough scale Long term – permanent significant beneficial at a district/borough scale	N/A	Short-term – temporary significant adverse at a district/borough scale Long term – permanent significant beneficial at a district/borough scale	Short-term – temporary significant adverse at a district/borough scale Long term – permanent significant beneficial at a district/borough scale
Slow worm	Habitat loss and creation and disturbance	Permanent significant beneficial at a local scale	N/A	Permanent significant beneficial at a local scale	Permanent significant beneficial at a local scale
Common lizard	Habitat loss and creation and disturbance	Permanent significant beneficial at a local scale	N/A	Permanent significant beneficial at a local scale	Permanent significant beneficial at a local scale
Great crested newt	Habitat loss and creation and disturbance	Permanent significant adverse at a county/metropolitan	Great crested newt mitigation strategy	Permanent significant beneficial at a county/metropolitan scale	Permanent significant beneficial at a county/metropolitan scale
Operation					

Ecological Feature	Impact	Significance of Potential Effect	Mitigation	Significance of Residual Effect	Significance of Cumulative Effect
Bats	Disturbance from lighting	Not significant	N/A	Not significant	N/A

Table 5 – Assessment summary matrix

Appendix A: Screening Opinion

HILLINGDON
LONDON

Harriet Parker
Arup on behalf of SCS Railways Joint Venture (SCS)
Third Floor, Victoria House
37-63 Southampton Row
London
WC1B 4DA

Via e-mail:
Harriet.Parker@arup.com
Katie.Kerr@arup.com

Dear Harriet,

Request for a Screening Opinion under Town & Country Planning (Environmental Impact Assessment) Regulations 2017

RECONFIGURATION OF RUISLIP GOLF COURSE INCLUDING THE IMPORTATION OF INERT MATERIAL

Thank you for referring the screening request for the above development.

1.1 EIA Regulations

The site covers an area of approximately 40 Hectares. The development falls within Schedule 2 (10) 'Urban Infrastructure Projects; the proposals could also constitute a waste disposal operation and therefore captured by Schedule 2 (11) Other Projects (b) installations for the disposal of waste.

1.2 Approaches to Screening

The aim of the EIA screening stage for Schedule 2 development is determine if there are likely to be significant environmental effects or not. The criteria for determining likely

significant effects are set out in Schedule 3 of the EIA Regulations. These are to be applied on a case by case basis. Furthermore the EIA guidance suggests that:

> *Environmental Impact Assessment should not be a barrier to growth and will only apply to a small proportion of projects considered within the town and country planning regime.*

The application of EIA to planning applications is therefore a rare occasion. Developments of an abnormal size or impact are more likely to require EIA.

1.3 Sensitivity of the Site

The development site is not considered to be sensitive in the context of EIA as set out in Regulation 2 [Interpretation].

There are no statutory designations on the site and no regional or national designations. Part of the site is non-statutorily designated at a local level as a 'site of importance for nature conservation (SINC)'.

1.4 Likely Significant Effects

The screening request has identified two environmental areas in which likely significant effects may arise. These are archaeology and biodiversity.

1.4.1 Archaeology

The screening request states:

> *Potential direct physical impacts on the historic ridge and furrow and historic canal feeder Ickenham Stream as a result of reconfiguring the golf course and landscaping;*
>
> *Potential direct physical impacts by construction work and landscaping with a below ground impact on any surviving buried archaeological deposits, associated with terrace gravels and alluvium surviving in the golf course and*
>
> *Potential setting effects on built heritage as a result of construction will be assessed.*

The screening request concludes:

> *A range of archaeological assets would be likely to be permanently lost due to the Proposed Scheme including the medieval ridge and furrow, Ickenham canal feeder stream and potential buried archaeological features.*

There is no clarity within the screening request as to how these features would be permanently lost through the course of the development, particularly as the site is already an operational golf course and will be subject to the importation of material as opposed to extraction. There is also no explanation as to why the features identified constitute a

particularly sensitive issue given the site carries no designations; the ridge and furrow system has already been undermined by the existing golf course and does not represent a feature of special importance in this area; the canal feeder is not a designated structure and the screening request does not present the site as being likely to yield particular archaeological features of merit.

As the site carries no archaeological designations or policy protections then it cannot be said to be overly sensitive or exceptional in terms of archaeology. Finally, Historic England has provided pre-application advice which concludes:

> *... that the development could cause harm to undesignated archaeological remains and historic landscape features. However the likely significance of the assets affected and scale of harm to them, taking account of proposed mitigation, is such that I do not consider it likely that there would be significant harm as defined in the EIA Regulations and the effects can be managed using planning conditions.*

The Council does not agree with the conclusions that the development would result in likely significant archaeological effects that would trigger EIA. The site carries no designations and there is no information presented that suggests it is of exceptional merit or sensitivity. Furthermore, the site is already a golf course and the proposal is to reconfigure the golf course through the importation of inert material with intentions of minimum disruption.

Given the above, the Council does not agree with the findings of the Screening Request and does not believe there is likely to be any significant effects in relation to archaeology in the context of EIA.

1.4.2 Biodiversity

The site undoubtedly has biodiversity value as set out in the screening request. Part of the site is a designated (non-statutory) site of importance for nature conservation (Borough grade 1). This is sub regional designation meaning the site is of local importance but not of strategic importance.

Whilst there are likely to be protected species on site, these are not likely to be in numbers that are of national importance. Furthermore, the proposals have been designed to avoid the most sensitive areas and whilst there will be loss of trees this will be on a level of local importance only.

Furthermore, the proposals are considered in accumulation with the wider HS2 Ltd works for which permission is effectively granted, the effects assessed and the impacts accepted. These works will result in a significant reduction in treeline along the railway to the south of the site and will result in offsite mitigation for the relocation of sensitive species.

The loss of vegetation, habitat and likely impacts on protected species are not considered to be significant in the context of EIA.

1.4.3 Other Environmental Topics

The Council considers that the screening request provides a robust and comprehensive analysis of the remaining environmental topics. The Council accepts and agrees with the conclusions that the following impacts will not result in likely significant effects in the context of EIA:

- Landscape and Visual
- Land contamination
- Traffic and transport
- Air quality

In addition, it is noted that **flood and water management** has not been assessed. The proposals do have the potential to alter the drainage regime on the site and consequently may increase the risk of flooding to people and property.

The risk is not considered to be of more than local importance and will be dealt with through standard planning application processes.

1.5 Summary

EIA is triggered where the effects of the development are likely to be significant. The Council has determined that this development will **not** give rise to likely significant effects.

The development falls within the thresholds of Schedule 2 of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 Using the selection criteria outlined in Schedule 3 of the Regulations the London Borough of Hillingdon **does not** consider that the proposals require EIA.

The above conclusion is based on the need for EIA and likely significant effects in that context. The Council has the right to refuse the application based on its subsequent determination of the significance of effects through the application of standard planning policies. In this regard, the use of 'significance' differs in context.

If you wish to discuss any of the above further, of have any questions, please do not hesitate to contact Ian Thynne using the details at the foot of the first page.

Yours sincerely,

James Rodger

Head of Planning Services **Date: 16 November 2018**

Appendix B: Preliminary Ecological Appraisal

Document Title	Document number
Preliminary Ecological Appraisal Report – Ruislip Golf Course S2	1MC04-SCJ_SDH-EV-REP-SS05_SL07-000006

Appendix C: Species Report

Document Title	Document number
Species Report – Ruislip Golf Course S2	1MC04-SCJ_SDH-EV-REP-SS05_SL07-000007