

# 10. Biodiversity

## 10.1 Introduction

10.1.1 This chapter sets out the results of an assessment of the potential effects of completing the enabling works to allow, and the implementation of, full runway alternation during easterly operations on biodiversity within the airport and the defined surrounding area (10.3.2). This chapter should be read in conjunction with the Project description (Chapter 3).

## 10.2 Policy and Legislative Context

### Legislative Requirements

10.2.1 In preparing this biodiversity assessment, account has been taken of relevant legislation and regulations, namely:

- The Conservation of Habitats and Species Regulations 2010 (SI 2010/490) (hereafter referred to as the Habitats Regulations 2010);
- Wildlife and Countryside Act 1981 (as amended);
- Protection of Badgers Act 1992; and
- Natural Environment and Rural Communities Act 2006 (NERC Act).

### Policy Context

10.2.2 **Table 10.1** lists the issues from planning policy guidance and development plan policies which have been considered in assessing effects on biodiversity receptors.

**Table 10.1 Policy Issues to be considered in preparing the Environmental Statement**

Policy	Policy issue
<i>National planning policies</i>	
NPPF section 11	Local planning authorities should aim to conserve and enhance biodiversity, including through refusing developments which result in the loss or damage of irreplaceable habitats.
<i>Regional planning policies</i>	
The London Plan 2011: Policy 7.19 – Biodiversity and Access to Nature	Not adversely affect the integrity of European sites and prevention of significant adverse effects on European or nationally designated sites, or on populations or conservation status of protected species, or priority species or habitats.  Protection of statutory and non-statutory sites of nature conservation importance at a level commensurate with their importance.  Enhancement or creation of important habitats during development, especially those identified in the London or Borough BAP.
<i>Local planning policies</i>	

Policy	Policy issue
London Borough of Hillingdon UDP 1998: saved policies (2007) EC1, EC2, EC3, EC4, EC5 and EC6	Protection of statutory and non-statutory nature conservation sites. Retention/creation of wildlife habitats during development, including on derelict/vacant land.
The Hillingdon Local Plan: Part 1 2012: (Adopted November 2012) Policy EM7	The protection and enhancement of all Sites of Importance for Nature Conservation. Sites with Metropolitan and Borough Grade I importance will be protected from any adverse impacts and loss. Borough Grade II and Sites of Local Importance will be protected from loss with harmful impacts mitigated through appropriate compensation.  The protection and enhancement of populations of protected species as well as priority species and habitats identified within the UK, London and the Hillingdon Biodiversity Action Plans.  Appropriate contributions from developers to help enhance Sites of Importance for Nature Conservation (SINCs) in close proximity to development and to deliver/ assist in the delivery of actions within the Biodiversity Action Plan.  The provision of biodiversity improvements from all development, where feasible.  The provision of green roofs and living walls which contribute to biodiversity and help tackle climate change.
Ealing Council UDP 2004: policies 3.8 and 3.9	Protection of important features such as ancient habitats, river floodplains, woodland and canals. Prevention of development on statutory and non-statutory nature conservation sites. Protection of legally protected or priority species.
London Borough of Hounslow UDP 2003: policies ENV-N.2.0, ENV-N.2.1, ENV-N.2.2, ENV-N.2.3, ENV-N.2.3A, ENV-N.2.4, ENV-N.2.5, ENV-N.2.6, ENV-N.2.7, ENV-N.2.9 and ENV-N.2.10	Protection of statutory and non-statutory sites for nature conservation. Promotion of nature conservation management on land outside of LPA planning control. Conservation, enhancement and creation of important habitats and features including green corridors and green chains. Protection of legally protected and other priority species.
London Borough of Richmond upon Thames: Adopted Core Strategy 2009: policy CP4 Development Management Plan (DMP) 2011 Policy DM 0S 5	Protection of statutory and non-statutory sites for nature conservation. Conservation, enhancement and creation of important habitats and features including green corridors and green chains. Protection of legally protected and other priority species. Preservation and enhancement of natural habitats during development.
Royal Borough of Windsor and Maidenhead Local Plan 1991-2006: saved policies N3, N4, N7 and N9	Protection/enhancement/creation of wildlife habitats including ponds, watercourses, trees and hedgerows.
<i>Other policies</i>	
UK Biodiversity Action Plan (UK BAP) (Biodiversity Reporting and Information Group, 2007)	Effects on priority habitats and species listed in the UK BAP.
London Biodiversity Action Plan	Effects on priority habitats and species listed in the London BAP.
Berkshire Biodiversity Action Plan	Effects on priority habitats and species listed in the Berkshire BAP.

## 10.3 Data Gathering Methodology

### Definition of a Potential Biodiversity Receptor

10.3.1 For the purposes of this ES the term 'potential biodiversity receptor' is used to refer to the following:

- Designated sites, and habitats and species that fall within one or more of the categories defined in **Box 10.1** and are therefore of sufficient biodiversity conservation value that effects upon them could be significant, should there be a mechanism by which the proposed Project could result in a significant effect.
- Legally protected species (**Box 10.2**) that could be affected by the proposed Project such that the law could be contravened. It should be noted that any such contravention would in all cases be a significant effect. However, such an effect always has to be avoided as all developments must comply with the requirements of the law. It must, however, still be assessed whether the development, in complying with the law, could have significant effects on the protected species in relation to the criteria above.

### Zone of Influence/Study Area

10.3.2 The potential for effects on biodiversity receptors depends upon the geographical 'zone of influence' - that is the area within which the environmental changes could affect receptors. In establishing the extent of the zone of influence for biodiversity, consideration has been paid to the nature of the activities associated with the proposed Project both at the construction and operational stages.

10.3.3 Specifically it has been considered that the zone of influence encompasses:

- Those areas that will be directly affected by construction of the new infrastructure, including the area of land required for the noise barrier; and
- The land surrounding the areas of new infrastructure to a radius of 1000m (1km) so that biodiversity receptors that could be affected by construction activities can be considered (this being the maximum distance for which it is considered that such activities could result in changes to the baseline biodiversity environment).

(Refer to **Figure 10.1**)

- Those areas that could be indirectly affected by changes in air quality (specifically nitrogen deposition or NO<sub>x</sub>) or the baseline noise environment caused by the redistribution of air traffic. This was considered to be the departure routes from the northern runway (to the east) for a distance of 10km kilometres, which will experience increased departures as a result of implementing full runway alternation on easterly operations. Also the arrivals route to the southern runway (from the west) for a distance of 15 kilometres which will experience increased arrivals as a result of the ending of the proposals. In reality, because existing (without full runway alternation) and proposed (with full runway alternation) flight tracks merge after a certain distance, the only areas that need to be considered are those that lie either beneath or within the vicinity of an existing flight track that will be subject to increases in the numbers of ATMs, or of a new flight track that will occur as a result of the proposals.
- It also encompasses a 200m radius from the western end of Runway 09L where aircraft will initiate start of roll (SOR). A 200m radius is considered appropriate because any NO<sub>x</sub> emissions or Nitrogen deposition that occur as a result of easterly aircraft departures from Runway 09L will have, at distances greater than this, dispersed to such an extent that

they cannot specifically affect local biodiversity receptors. The zone of influence for noise associated with SOR activities at the western end of Runway 09L is the area directly between the airport perimeter and the M25, where adjacent to the northern runway. It is considered that receptors west of the M25 would not be affected by SOR noise due to distance from SOR activity, high levels of background ambient noise, and noise from aircraft approaching 09R and aircraft departures on 27R.

(Refer to **Figure 10.2**)

- 10.3.4 Note that the zone of influence has been subject to refinement since the publication of the Scoping Report (**Appendix D**). This has been due to a better understanding of the exact nature of the changes being gained as the Project design has evolved and as more work has been completed to inform what this will mean to the air quality and noise environments particularly which could influence the assessment of biodiversity.
- 10.3.5 For the purposes of this report the zone of influence is also considered to be the 'Study Area'.
- 10.3.6 Detailed Cumulative Assessment Planning permissions for major developments (as defined by *The Town and Country Planning Development Management Procedure Order 2010*), specifically those which were consented within the last three years have been identified through a planning search as detailed in Chapter 4 and illustrated in **Figure 4.1**. The impacts of any highlighted major developments have been assessed in combination with the likely impacts of implementation of full runway alternation during easterly operations to assess whether there will be cumulative effects on biodiversity.

### Desk Study

- 10.3.7 It was determined that the desk study should include an ecological data search which aimed to collect information on:
- Statutory and non-statutory nature conservation sites and UK Biodiversity Action Plan priority habitats (**Box 10.1**) occurring anywhere within the Study Area; and
  - Legally protected or otherwise notable species (**Box 10.2**) that occur either on the airport, or within a 1000m radius of the enabling works.

Only information on species that occur within a 1000m radius of the Airport was collected and thus an assessment of the effects of construction activities only was completed for species separately. Effects on species as a result of increases in the levels of emissions and of noise associated with the changes in ATMs was undertaken as part of a wider assessment of effects on identified sites and their constituent parts (including the habitats and species that occur within them). This was deemed appropriate because it was considered that there was no potential for direct effects, such as breaches in legislation, to occur to species as a result of these types of activities. The effects that could occur would be more likely to affect the integrity of a site which in turn would have implications for species that occur there and thus the species would be considered as part of the assessment anyway. It was also assumed that, for the most part, species of biodiversity value, would, should they occur within a local area, be found within the protected sites that occur within the vicinity.

### Box 10.1 Designated wildlife sites, priority habitats and species

#### Statutory nature conservation sites

Internationally important sites: Special Areas of Conservation (SACs) and candidate SACs, Special Protection Areas (SPAs) and proposed SPAs, Sites of Community Importance, Ramsar sites and European offshore marine sites.

Nationally important sites: Sites of Special Scientific Interest (SSSIs) that are not subject to international designations and National Nature Reserves (NNRs)

Local Nature Reserves (LNRs) are statutory sites that are of importance for recreation and education as well as biodiversity. Their level of importance is defined by their other statutory or any non-statutory designation (e.g. if an LNR is also a SSSI but is not an internationally important site, it will be of national importance). If an LNR has no other statutory or non-statutory designation it is treated as being of borough/district -level importance for biodiversity (although it may be of greater socio-economic value).

#### Non-statutory nature conservation sites

Non-statutory nature conservation sites in London are notified as Sites of Importance for Nature Conservation (SINCs). Additionally in London, SINCs are categorised as being of Metropolitan (SMI), Borough (Grade I) (SBI), or Local importance (SLI). It is considered that SINCs of Borough Grade II importance or of Local Importance need only be considered if they are to be directly affected by habitat loss. This is because SINCs of Borough Grade II or Local importance tend to support habitats and species that are common within London and which are therefore very tolerant of such things as changes to air quality.

In Surrey, which is also within the Study Area for non-statutory sites, such are referred to as Sites of Nature Conservation Importance (SNCI). They are not graded and therefore can all be assumed to be of County importance.

#### Priority habitats and species

In this report, the geographic level at which a species/habitat has been identified as a priority for biodiversity conservation is referred to as its level of 'species/habitat importance'. For example, habitats and species of principal importance for the conservation of biological diversity in England (see the second bullet point below) are identified as of national species/habitat importance reflecting the fact that these species/habitats have been defined at a national level. The level of importance pertains to the species/habitat as a whole rather than to individual areas of habitat or species populations, which cannot be objectively valued (other than for waterfowl, for which thresholds have been defined for national/international 'population importance').

- International importance: populations of species or areas of habitat for which European sites are designated;
- Birds of conservation importance – Red or Amber;
- International importance: species listed as Vulnerable or Endangered in the UK on the IUCN Red Data List (<http://www.iucnredlist.org/apps/redlist/search>);
- National importance: Habitats and species of principal importance for the conservation of biological diversity in England. These are listed on <http://www.ukbap-reporting.org.uk/news/details.asp?X=45>. These include those UK BAP priority habitats and species that occur in England;
- National importance: Nationally Scarce or Nationally Rare species not based in the IUCN criteria;
- Nationally Scarce invertebrate species – (notable);
- Locally restricted species – County Scarce.

### Box 10.2 Legally protected species

#### Legal protection

Many species of animal and plant receive some degree of legal protection. For the purposes of this ES, legal protection refers to:

- species included on Schedules 1, 5 and 8 of the *Wildlife and Countryside Act 1981* (as amended), excluding species that are only protected in relation to their sale (see Section 9[5] and 13[2]), reflecting the fact that the Scheme does not include any proposals relating to the sale of species;
- species included on Schedules 2 and 5 of the *Habitats Regulations 2010*; and
- badgers, which are protected under the *Protection of Badgers Act 1992*

10.3.8 The data gathering exercise entailed the contacting of the relevant Local Biological Record Centres to obtain existing biological records and details about designated and non designated wildlife sites, and protected or otherwise notable species within the specified Study Area. In addition a review was made of an Ecological Desk Study undertaken in 2009 for HAL by RPS which also covered the Study Area. Sources of desk study information are listed in **Table 10.2**.

**Table 10.2 Sources of desk study information**

Topic	Source of information
Statutory nature conservation sites	Multi-Agency Geographic Information for the Countryside website www.magic.gov.uk
Non-statutory nature conservation sites	Thames Valley Environmental Records Centre (TVERC) Greenspace Information for Greater London (GIGL) Buckinghamshire and Milton Keynes Environmental Records Centre (BMERC) Surrey Biodiversity Information Centre
Records of priority species	Surrey Biodiversity Information Centre Greenspace Information for Greater London (GIGL) Heathrow Airport Ltd (RPS Report, 2009)

## Survey Work

10.3.9 An ecological survey was undertaken in August 2011 of the land where the noise barrier is to be located and for the area around this that could be affected by construction works (**Appendix Y**). The aim of the survey was to identify any potential biodiversity receptors present that could be affected by the siting of the noise barrier. The survey was undertaken in accordance with the Phase 1 habitat survey methodology<sup>1</sup>. As the standard Phase 1 habitat survey methodology is concerned with habitats only, the survey was extended<sup>2</sup> to allow for the provision of information on other ecological features; specifically to identify the presence/potential presence of legally protected or otherwise notable species.

## Consultations

10.3.10 The scoping opinion provided by LBH (**Appendix E**) provided comment related specifically to biodiversity. In addition Natural England provided a response to LBH related to biodiversity to inform its Scoping Opinion. The key issues arising from this consultation advice were considered to be the following:

- that as part of the development, opportunities for biodiversity enhancement should be sought including along the banks of the Duke of Northumberland and Longford Rivers. Enhancement measures are dealt with in **Section 10.4** of this chapter.

<sup>1</sup> Joint Nature Conservation Committee (1993) *Handbook for Phase 1 Habitat Survey*. JNCC, Peterborough.

<sup>2</sup> Institute of Environmental Assessment (1995) *Guidelines for Baseline Ecological Assessment*. E&FN Spon, London.

## 10.4 Baseline Conditions

### Sites

#### Statutory Nature Conservation Sites

10.4.1 There are no statutory nature conservation sites within or directly bordering the Airport. Within the Study Area the following statutory protected sites were identified:

- South West London Waterbodies SPA and Ramsar site (at its closest 3000m to the south-west of the Airport) – designated because of its populations of Gadwall (*Anas strepera*) and Northern shoveler (*Anas clypeata*). In addition the following SSSIs which form part of the South West London Waterbodies SPA are within the Study Area:
  - Staines Moor SSSI (part) (3000m south-west);
  - Wraysbury Reservoir SSSI (3450m south-west); and
  - Wraysbury No. 1 Gravel Pit SSSI (5700m south-west).
- Windsor Forest & Great Park SAC (8935m to the south-west) – designated primarily because of its Annex I habitat, old acidophilus oak woods with *Quercus robur* on sandy plains. This is also designated as a SSSI and part of it is a NNR.
- Richmond Park SAC: (9km to the south east) – designated primarily due to supporting the Annex II species, stag beetle and is a site of national importance for the conservation of the fauna of invertebrates associated with decaying timber of ancient trees. This is also designated as a SSSI and NNR.

10.4.2 **Figure 10.3** indicates the location of all statutory designated sites that occur within the Study Area.

#### Non-Statutory Nature Conservation Sites

10.4.3 No non-statutory nature conservation sites are found within the boundary of the Airport itself although the Lower Colne SMI lies very close to the area where the noise barrier is to be sited. 24 other non statutory sites for nature conservation occur within the Study Area.

10.4.4 **Figure 10.4** and **10.4a** indicates the location of all non-statutory designated sites that occur within the Study Area. **Tables 10.2** and **10.3** below provide a list of these sites and the nature of the designation that applies.

**Table 10.3 Non-Statutory Nature Conservation Sites (Figure 10.4)**

Name	Designation
Lower Colne	SMI (Site of Metropolitan Importance)
Stanwell II	SNCI (Site of Nature Conservation Importance)

**Table 10.4 Non-Statutory Nature Conservation Sites (Figure 10.4a)**

Figure 10.4a reference	Name	Designation
1	Hogoak Lane	Local Wildlife Site
2	Woodland adjacent to Hog Oak Lane	Local Wildlife Site
3	Hog oak lane and woodland	Local Wildlife Site
4	Nobscrook Copse	Local Wildlife Site
5	Horton - Kingsmead Main and New Lakes	Local Wildlife Site
5a	Colnebrook	Local Wildlife Site
6	Wraysbury 1 Gravel Pits	Local Wildlife Site
7	Cranford Countryside Park and Open Space	Site of Importance for Nature Conservation
8	The Crane Corridor	Site of Importance for Nature Conservation
9	London's Canals	Site of Importance for Nature Conservation
10	Gunnersbury Lane Bollo Triangle W4	Site of Importance for Nature Conservation
11	Dormers Mill Pond, Southall	Site of Importance for Nature Conservation
12	Wharncliffe Viaduct, Southall and W7 (Uxbridge Road/Greenford Road)	Site of Importance for Nature Conservation
13	Land north and West of Bridge Avenue (Brent River Park)	Site of Importance for Nature Conservation
14	Brentside Highschool	Site of Importance for Nature Conservation
15	Perivale Park Meadows, Costons Lane, Greenford	Site of Importance for Nature Conservation
16	Argyle Road, Perivale	Site of Importance for Nature Conservation
17	Argyle Road, Perivale	Site of Importance for Nature Conservation
18	Ealing Golf Course, W13 and Greenford	Site of Importance for Nature Conservation
19	Ealing Golf Course, Brentham Club, Pitshangar Park, Pitshangar Allotments	Site of Importance for Nature Conservation
19a	Mogden Sewage Works	Site of Importance for Nature Conservation
20	River Thames and Tributaries	Site of Metropolitan Importance
21	Petersham Common	Site of Metropolitan Importance

### *Habitats*

#### **On Airfield Habitats**

10.4.5 The on airfield areas that are to be the subject of construction works comprise species poor grassland that are kept managed to a sward height of 15-20cm which accords with the airport's bird strike management policy, or hardstanding (airfield pavement).

### Habitats within the Vicinity of the Noise Barrier

- 10.4.6 The noise barrier is to be located along the line of an existing fence which will be removed. The eastern half of the fence line has rank grassland and scattered scrub to its immediate north and the Terminal 5 Business Car Park to its south. The rank grassland supports species including red fescue (*Festuca rubra*), false oat-grass (*Arrhenatherum elatius*), Yorkshire fog (*Holcus lanatus*), smooth meadow grass (*Poa pratensis*), nettle (*Urtica dioica*), coltsfoot (*Tussilago farfara*), mugwort (*Artemisia vulgaris*), bristly ox-tongue (*Picris echioides*), curled leaved dock (*Rumex crispus*) and ribwort plantain (*Plantago lanceolata*), and the scrub supports species including hazel (*Corylus avellana*), crack willow (*Salix fragilis*), English oak (*Quercus robur*) and field maple (*Acer campestre*). A few semi-mature trees of the same species as the scrub are also found. It appears that this area is the result of a previous landscaping scheme associated with the car park development.
- 10.4.7 The western section of the barrier is proposed to leave the Terminal 5 Business Car Park to run through an area of landscape planting. The extreme western section is located immediately on top of the canalized bank of the Duke of Northumberland River.
- 10.4.8 The part of the River that is adjacent to the proposed location of the noise barrier was diverted as part of the Terminal 5 development. It is slow flowing and partly canalized with concrete banks. It supports, in places, both marginal and aquatic vegetation. Where vegetation exists it is quite varied and grows in mainly preplanted coir rolls and pallets although other species have colonised naturally. Species include common reed (*Phragmites australis*), canary reed grass (*Phalaris arundinacea*), water cress (*Rorippa nasturtium-aquaticum*), flowering rush (*Butomus umbellatus*), purple loosestrife (*Lythrum salicaria*) and monkey flower (*Mimulus guttatus*), soft rush (*Juncus effusus*), hard rush (*Juncus inflexus*), water forget-me-not (*Myosotis scorpioides*), marsh woundwort (*Stachys palustris*).

### BAP Habitats

- 10.4.9 Within the Study Area a number of UK BAP priority habitats are known to occur. All are found within the European Sites (other UK BAP priority habitats may also exist outside of protected sites for which there are no records):
- reedbeds – located to the south of the Airport around the edge of the King George VI and Staines Reservoirs;
  - purple moor grass and rush pasture – located within the Staines Moor SSSI;
  - floodplain grazing marsh – located within the Staines Moor SSSI;
  - lowland meadow – located within Staines Moor SSSI;
  - wood pasture and parkland – located within Windsor Forest and Great Park;
  - woodland – located within Windsor Forest and Great Park;
  - acid Grassland – located within Windsor Forest and Great Park;
  - lowland Meadow – located within Windsor Forest and Great Park;
  - standing Water – located within Windsor Forest and Great Park; and

- fen – located within Windsor Forest and Great Park.

## Species

### Species occurring within Study Area

**10.4.10 Table 10.4** details the legally protected or controlled, and/or priority species that are known to occur within the airport boundary, the development boundary or within the 1,000m Study Area. Their location is illustrated on **Figure 10.5**.

**Table 10.4 Records of Species Occurring within the Study Area**

Protected or Notable Bird Species	
Species	Location
Hedge accentor ( <i>Prunella modularis</i> )	Within Airport site, east of Terminal 5.
Kingfisher	Within Airport site, east of Terminal 5.
Reed bunting	Within Airport site, west of Terminal 5.
Kingfisher	Within Airport, north of northern runway.
Song thrush ( <i>Turdus philomelos</i> )	North of Northern Perimeter Road
Common tern ( <i>Sterna hirundo</i> ), little egret ( <i>Egretta garzetta</i> ), Skylark ( <i>Alauda arvensis</i> )	Between Longford and Harmondsworth.
Grey wagtail ( <i>Motacilla cinerea</i> ), green sandpiper ( <i>Tringa ochropus</i> ), green woodpecker ( <i>Picus viridis</i> ), hobby ( <i>Falco subbuteo</i> ), house sparrow ( <i>Passer domesticus</i> ), kestrel ( <i>Falco tinnunculus</i> ), kingfisher, little egret, mallard ( <i>Anas platyrhynchos</i> ), reed bunting, skylark, snipe ( <i>Gallinago gallinago</i> ), starling ( <i>Sturnus vulgaris</i> ), swallow ( <i>Hirundo rustica</i> ), swift ( <i>Apus apus</i> ), teal ( <i>Anas crecca</i> )	Within the Lower Colne River Site of Metropolitan Importance, west of the Airport.
Blackheaded gull ( <i>Chroicocephalus ridibundus</i> ), common gull ( <i>Larus canus</i> ), grey wagtail, green sandpiper, house martin ( <i>Delichon urbica</i> ), kestrel, lesser black-backed gull ( <i>Larus fuscus</i> ), linnet ( <i>Carduelis cannabina</i> ), little ringed plover ( <i>Charadrius dubius</i> ), lapwing, mallard, starling, swallow, swift, teal.	Adjacent to Poyle Meadows SNCI, west of the Airport.
Common gull, dunnock ( <i>Prunella modularis</i> ), house sparrow, linnet, mallard, song thrush, starling, swallow, whitethroat ( <i>Sylvia communis</i> ).	Former gravel pits south of Airport Southern Perimeter Road.
House sparrow	Bath Road, north of the Airport
Smew ( <i>Mergus albellus</i> )	Cranford Lane, east of Harlington
Skylark	Cranford Lane, east of Harlington
Linnet and lapwing	East of Harlington
Starling	South of M4, approximately 1.5km north-east of the Airport
Reed bunting	South of the M4 approximately 2km north of the Airport.
Dunnock	North of the M4, approximately 2.2km north of the Airport.

Common goldeneye ( <i>Bucephala clangula</i> )	Along the banks of the River Crane, approximately 2.5km north east of the Airport
Bewicks Swan ( <i>Cygnus columbianus</i> subsp. <i>bewickii</i> ), song thrush, greylag goose ( <i>Anser anser</i> ), Northern lapwing, kingfisher, starling.	Adjacent to Harmondsworth, approximately 1.0km north of the Airport.
<b>Protected and Notable Mammal Species</b>	
<b>Species</b>	<b>Location</b>
Soprano pipistrelle ( <i>Pipistrellus pygmaeus</i> )	Within the Lower Colne River Site of Metropolitan Importance, west of the Airport.
Brown hare ( <i>Lepus europaeus</i> )	Within Airport site, east of Terminal 5.
Unidentified pipistrelle species ( <i>Pipistrellus</i> sp.), soprano pipistrelle	Within Airport site, between Terminal 3 and 5.
Water vole	Within Airport site, north-west of Terminal 3.
Nathusius pipistrelle ( <i>Pipistrellus nathusii</i> )	Within Airport site, between Terminal 3 and 5.
Water vole	Within Airport site, immediately south of Northern Perimeter Road.
Badger ( <i>Meles meles</i> ), daubenton's bat ( <i>Myotis daubentonii</i> ), otter ( <i>Lutra lutra</i> )	Eastern edge of Harmondsworth.
Unidentified pipistrelle species, Noctule ( <i>Nyctalus noctula</i> )	Adjacent to Harmondsworth, approximately 1.0km north of the Airport.
Unidentified pipistrelle species, Soprano pipistrelle	West of Western Perimeter Road
<b>Protected and Notifiable Invertebrate, Herpetofauna, Fish &amp; Flora Species</b>	
<b>Species</b>	<b>Location</b>
Small heath ( <i>Coenonympha pamphilus</i> ) and grass snake	Within the Lower Colne River Site of Metropolitan Importance, west of the Airport.
Cornflower ( <i>Centaurea cyanus</i> ) and Small-flowered buttercup ( <i>Ranunculus parviflorus</i> )	South-western corner of the Airport, north of Duke of Northumberland River.
Stag beetle	South of Northern Perimeter Road, on the northern boundary of the Airport
Small heath	South of Bath Road, north of Airport boundary
Cinnabar ( <i>Tyria jacobaeae</i> )	South of Bath Road, north of Airport boundary
Cornflower and grass snake <i>Natrix natrix</i>	Eastern boundary of Longford
Beaded chestnut ( <i>Agrochola lychnidis</i> ), buff ermine ( <i>Spilosoma luteum</i> ), sallow ( <i>Xanthia ictertia</i> ), small squared-spot ( <i>Diarsia rubi</i> ) and white ermine ( <i>Spilosoma lubricipeda</i> )	Between Longford and Harmondsworth, north of the Airport boundary
Small heath	East of East Bedfont
Grass snake	Western banks of the Wraysbury Reservoir

**Species within the Area to be Affected by the Construction of the Noise Barrier**

10.4.11 Some of the species identified in **Table 10.4** could occur in the area of land between the T5 Business Car Park and the Duke of Northumberland River. This includes those birds which inhabit riverine environments, or scrub and grassland habitats. Furthermore the area that is to be specifically affected by the construction of the noise barrier has the potential to support grass snake (and also common toad) which are known to occur within the local vicinity, although there are no records of the species actually occurring within the area of survey itself.

10.4.12 None of the trees that are to be affected by the construction of the noise barrier were considered to have the potential to support roosting bats although it is possible that bats use the area for foraging.

**Detailed Cumulative Assessment**

10.4.13 **Table 10.5** below highlights planning permissions and developments that have been identified as potentially having cumulative effects on biodiversity in combination with implementation of full runway alternation during easterly operations.

**Table 10.5 Identified Planning Permissions with Potential for Cumulative Effects**

Reference	Permission Date	Borough	Address	Description
1 3063/APP/2009/415	14/09/2009	Hillingdon	Heathrow Park Thistle Hotel Bath Road	Demolition of existing hotel and erection of two hotels: one 4-star hotel with 250 bedrooms, and one budget hotel with 353 bedrooms.

**10.5 Environmental Measures Incorporated into the Project**

10.5.1 The environmental measures that have been incorporated into the Project, which are relevant to biodiversity, are set out in **Table 10.6**.

**Table 10.6 Rationale for Incorporation of Environmental Measures**

Potential receptor	Predicted changes and potential effects	Incorporated measure
Duke of Northumberland River	Changes in the baseline noise environment caused by an increase in the number of departures on easterlies from 09L (northern runway).	A noise barrier is to be constructed for the primary purpose of reducing the effect of increases in noise on the residents of Longford. A secondary benefit will be that it will also reduce the levels of noise for biodiversity receptors that may occur along and adjacent to the relevant section of the Duke of Northumberland River.

Duke of Northumberland River	Changes in aquatic/marginal flora and fauna caused by pollution of the River during the construction of the noise barrier.	Standard pollution prevention measures (as set out in the Environment Agency's Pollution Prevention Guidelines) would be implemented during the construction phase to prevent pollution of the ponds adjacent to the site. The detail of these prevention measures will be set out in a construction environmental management plan which will be produced prior to construction commencing.
Grass snake	Construction of the noise barrier causing the killing, injuring or disturbance of grass snakes.	Measures will be taken to ensure the compliance with the legislation that relates to this species. See section 10.9 for more information.
Species rich grassland	Construction of the noise barrier causing disturbance and removal of existing vegetation. Also enhancement of existing biodiversity resource.	A species rich grassland seed mix appropriate to the local area (the likely mix to be used is the traditional Hay meadow [MG5] mix with additional cowslip available from British Seed House) will be sown across the small areas that will be affected by the noise wall construction. The same seed mix will also be sown on the bare patches of ground that exist within the area of land between the River and where the noise barrier is to be located. The wildflower mix will help to increase the floral diversity of the site and replace any damaged grassland. .
10 x bat boxes	Enhancement of existing biodiversity resource.	10 bat boxes will be erected in semi-mature trees in the area surrounding the Duke of Northumberland River. The boxes will be made of woodcrete and will attract roosting bat species that already occur within the local area such as the common pipistrelle.
Kingfisher nesting bank	Enhancement of existing biodiversity resource.	A kingfisher nesting bank will be sited on the bend of the Duke of Northumberland River close to where the noise barrier is to be built. It will be constructed from a mixture of concrete and blocks back filled with soft stone free soil and sand. The design will allow the creation of a box, split into two chambers, filled with soil with drain pipes sloping through from mid point in the chambers out through the wall facing the river. The approximate dimensions will be 160cm x 130cm x 134 cm. It will allow the provision of nesting potential for a species that, although known to use the area, has no natural nesting habitat within this section of the River.

10.5.2 The measures listed in **Table 10.6** form part of the Project and as such, the scope of assessment and assessment of effects provided below is based upon the Project incorporating these measures.

## 10.6 Scope of the Assessment

10.6.1 The assessment process was undertaken in parallel with the process of Project design with a view to minimising the adverse ecological effects of the proposals and, where possible, delivering benefits for biodiversity. The desk study and survey work (as outlined in section 10.4) were carried out with the objective of ensuring that sufficient data were collected to identify the sites, habitat areas and species that could be significantly affected by the proposed development, and then to inform the assessment of effects on these potential receptors.

### Potential Receptors

10.6.2 **Table 10.7** lists the potential biodiversity receptors that have been identified through the baseline data gathering exercise. It also details the rationale for their inclusion specifically this being:

- the relevant category of value i.e. biodiversity conservation value or legal status<sup>3</sup>;
- the justification for their inclusion in the relevant category/ies - for biodiversity conservation value this is derived from **Box 10.1** (with the relevant level of importance also being included) and for legal status it is derived from **Box 10.2**; and
- the pathway by which an effect could occur (e.g. habitat loss, lighting, noise etc.).

**Table 10.7 Potential Biodiversity Receptors**

Potential biodiversity receptor	Category of value	Justification (level of importance)	Effect pathway
South West London Waterbodies/ Windsor Forest & Great Park/ Richmond Park	Biodiversity conservation value	Statutory designated site (International and National)	Changes in the baseline noise and air quality environments caused by changes in the operation of the airspace affecting the Sites.
UK Biodiversity Action Plan Priority Habitats	Biodiversity conservation value	National	Changes in the baseline noise and air quality environments caused by changes in the operation of the airspace affecting the Priority Habitats.
SINCs/SNCIs	Biodiversity conservation value	Non-statutory designated sites (County, Metropolitan or Borough I value)	Changes in the baseline noise and air quality environments caused by changes in the operation of the airspace affecting the Sites.
Duke of Northumberland River (diverted section)	Biodiversity conservation value	Although not subject to designation itself the diverted section of the Duke of Northumberland River is linked hydrologically to the Lower Colne SMI	Changes in aquatic/marginal flora and fauna caused by pollution of the River during the construction of the noise barrier.
Grass snake	Legal status	<i>Habitats Directive</i> <i>Conservation of Habitats and Species Regulations 2010</i> <i>Wildlife and Countryside Act 1981 (as amended)</i> <i>Countryside and Rights of Way Act 2000</i>	Killing, injury or disturbance due to construction of the noise barrier.
Breeding birds	Legal status	<i>Habitats Directive</i> <i>Conservation of Habitats and Species Regulations 2010</i> <i>Wildlife and Countryside Act 1981 (as amended)</i> <i>Countryside and Rights of Way Act 2000</i>	Disturbance of breeding birds during the period of constructing the noise barrier.

<sup>3</sup> Legal status is used in this report to refer to legally protected and controlled species.

Potential biodiversity receptor	Category of value	Justification (level of importance)	Effect pathway
Other priority species	Legal status / Biodiversity conservation value	<i>Habitats Directive</i> <i>Conservation of Habitats and Species Regulations 2010</i> <i>Wildlife and Countryside Act 1981 (as amended)</i> <i>Countryside and Rights of Way Act 2000</i>	Killing, injury or disturbance due to construction works. Also changes in the baseline noise and air quality environments caused by changes in the operation of the airspace affecting priority species.

### Potentially Significant Effects

- 10.6.3 A 'scoping' assessment was undertaken to differentiate effects that are sufficiently likely to be significant as to merit more detailed assessment, from those that are not likely to be significant (these are what are frequently referred to as 'scoped-out' effects). Part of this assessment was documented in the Scoping Report that formed the scoping request to London Borough of Hillingdon in June 2011, however, scoping continued after receipt of the Opinion as more information became available about the exact details of the Project and the ecological baseline environment.
- 10.6.4 As part of this scoping assessment, the conclusion about whether effects are sufficiently likely to be significant as to merit more detailed assessment was informed by a judgement about:
- which, if any, of the potential biodiversity receptors are legally protected or controlled, and/or are of sufficient quality (for sites and habitats) or size (for sites, habitats or species populations) that an effect upon them could be significant; and, for these receptors
  - whether the environmental changes commencing with full runway alternation on easterlies are such that there is the potential for a significant effect to occur (i.e. for the integrity of a site or for the conservation status of a habitat area or species population to be affected - as advocated in the IEEM guidance<sup>2</sup>).
- 10.6.5 If both of these criteria were met, the relevant effect was taken forward for more detailed assessment.
- 10.6.6 The following effects on potential biodiversity receptors are taken forward for detailed assessment in sections 10.8 and 10.9:
- Potential effects on the South West London Reservoirs SPA, Windsor Forest and Great Park SAC and Richmond Park SAC and their constituent parts, and non statutory site for nature conservation, due to changes in the air quality and noise baseline environments caused by the operational airspace changes and because of the SOR activities that occur as a result of the new departures in an easterly direction from the northern runway; and
  - Potential effects on grass snake as a result of killing, injuring or disturbing individuals during the construction of the noise barrier.

10.6.7 For the reasons set out below, the following potential effects are not likely to be significant and are therefore not considered further in this ES.

- *Potential effects of direct land take on protected and/or notable species, SINC's and UK Biodiversity Action Plan Priority Habitats as a result of construction activity (excluding receptors close to where the noise barrier is to be sited):* All construction activities are confined to those parts within the operational Airport boundaries where no valued biodiversity receptors occur and consequently there will be no direct effects as a result of land take on biodiversity receptors.
- *Potential effects of noise and dust on protected and/or notable species, SINC's and UK Biodiversity Action Plan Priority Habitats as a result of construction activity:* It is considered that there is no potential for biodiversity receptors to be affected significantly by construction noise as the Study Area is already very noisy because of aviation transport and other noise generating activity. In addition although construction works are proposed to occur during the night when the area is much quieter, the construction noise assessment (Chapter 6) has determined that only receptors in very close proximity to areas of construction would be affected significantly. It is considered that none of the receptors of biodiversity value that occur within close proximity of any area where construction activity is to occur could be affected significantly by construction noise. Either they have become habitually used to high levels of noise and/or they are species that can, by their nature, tolerate high levels of noise. The risk of dust generated by construction activities affecting biodiversity receptors off the Airport will be avoided by implementing dust management measures as part of the Construction Environmental Management Plan (refer to Chapter 7).
- *Potential effects on foraging/commuting bats as a result of the lighting required to facilitate the construction activities:* The only area where construction works occur close enough to potential bat foraging/commuting habitat that lighting associated with the works could impinge the habitat, is where the noise barrier is to be constructed. Here common species of bat could forage/commute. To avoid obstacle limitation surfaces some construction works for the noise barrier will have to be undertaken during the night as this is when the airport is much quieter. The period of construction for the noise barrier in totality is 10 weeks and that part which is adjacent to suitable bat foraging/commuting habitat occurs over only half of the barrier's proposed length. Therefore it is likely that the maximum period of construction and thus the time when there will be potential disturbance will be five weeks and even then this will occur only intermittently. Furthermore better foraging/commuting habitat is found along the River itself (including having as good if not better connectivity with other bat suitable habitats outside of this area), and this area will not be disturbed by construction activities including by not being impinged by construction lighting. For all of these reasons it is considered that there will be no significant effect on bats caused by lighting during construction.
- *Potential effects on foraging/commuting bats as a result of the loss of commuting and foraging habitat:* The works to construct the noise barrier will require the removal of a number semi-mature trees and shrubs, which were planted as part of a previous landscaping scheme and none of which have roost potential for bats. There will also be the temporary mowing of a strip of rank grassland that currently grows to the north of the existing barrier and, to facilitate the siting of the foundations of the noise barrier, pits at every 2.5 - 3m will also be dug. It is conceivable that bat species identified during the desk

study could use this area for commuting and/or foraging. However as such a small amount of this habitat is to be removed and because the River itself, which will not be disturbed by the proposals, provides better foraging/commuting habitat (including having as good if not better connectivity with other bat suitable habitats outside of this area) there is considered to be no potential for significant effects to bats to be caused by the loss of this habitat.

- *Potential effects on priority bird species as a result of the loss of nesting and foraging habitat:* The works to construct the noise barrier will require the removal of a number semi-mature trees and shrubs which were planted as part of the Terminal 5 landscaping scheme. There will also be the temporary mowing of a strip of rank grassland that currently grows to the north of the existing barrier and, to facilitate the siting of the foundations of the noise barrier, pits at every 2.5 to 3m will also be dug. Certain BAP Priority bird species that occur within the Study Area could conceivably use this area for nesting and/or foraging. However as such a small amount of this habitat is to be removed temporarily (any disturbed areas will be the subject of restoration and enhancement – see **Table 10.6**) and because the types of species that would use these habitats are common within the local area it is considered that the removal of this habitat is unlikely to result in any potentially significant effects occurring.
- *Potential effects on nesting birds:* Clearance of potential nesting habitat that occurs within the area where the noise barrier is to be constructed would be undertaken outside the bird breeding season (February – August inclusive) or would only take place if surveys confirm that no birds are breeding in the areas to be cleared. If nests are present, these areas would be cordoned off until after the chicks have fledged. Therefore no significant effects are likely to occur.
- *Potential effects on flora and fauna in the Duke of Northumberland River from contamination caused by soil disturbance or the accidental spillage of chemicals during the construction of the noise barrier:* The pollution prevention measures to be introduced (**Appendix C**) will ensure that all precautions are taken to avoid the potential for such incidents to occur. The Lower Colne SMI is hydrologically linked but is upstream from the River. Therefore no significant effects are likely to occur.
- *Potential effects of the ecological enhancement measures proposed:* The enhancement measures (**Table 10.6**) include the provision of a kingfisher nesting bank, 10 x bat boxes and the creation of species rich grassland where currently there is only grassland which is species poor. These measures, although valuable, are unlikely to result in a positive effect on the enhanced ecological environment that would be significant. They do however, help to meet with planning policy.
- *Potential cumulative effects of additional major developments on biodiversity in combination with the implementation of full runway alternation during easterly operations:* Only one major development was highlighted as being within the zone of influence, this is the demolition of an existing hotel and erection of two hotels in the same location as detailed in (**Table 10.5**). The development is located north of the northern runway approximately 300m south east of the River Colne SMI. Given that a hotel is currently present on site there will be no significant change of use during the operational phase therefore no significant effects are likely to occur post development. During the construction phase given the scale of the proposed works, and the largely urban nature of the Site, the adoption of noise, and dust control measures that will be adopted for avoiding

significant effects on people will also be adequate to prevent significant effects occurring on biodiversity and as such there will be no significant cumulative effects.

- The creation of new Runway Exit Taxiways (RETs) on runway 09R (which was submitted under Part 18 Permitted Development powers) to allow arriving aircraft to safely and efficiently exit Runway 09R has also been considered. However, the construction of this airport infrastructure is adjacent to the current runway which is subject to a high level of disturbance from air traffic. Given the location, scope, and timing of the proposed works it is not considered that the construction and operation of these new RETs would result in any significant effects on biodiversity.

## 10.7 Assessment Methodology

### Methodology for Prediction of Effects

10.7.1 The prediction of the effects of commencing full alternation on easterlies on the biodiversity resources identified in section 1.7 is based upon:

- the activities associated with the construction of the noise barrier, as defined in chapter 3;
- changes in air quality as a result of the changes to operation of the airspace, as defined in the air quality chapter 7;
- changes in the baseline noise environment as a result of the changes to operation of the airspace, as defined in the air and ground noise chapter (6); and
- the geographic extent, magnitude, likelihood, timing, frequency and duration of these changes.

10.7.2 The assessment of how the biodiversity resources are likely to be affected by the above activities and changes is based not only upon the results of the desk study and field surveys, but also on relevant published information, on potential biodiversity receptors' status, distribution, sensitivity to environmental changes and biology, and professional knowledge of ecological processes and functions.

10.7.3 For each receptor that is subject to detailed assessment, the assessment of effects is based, as appropriate, on the predicted future baseline conditions for that receptor in the relevant year during construction and/or once full runway alternation during easterly operations has commenced.

### Significance Evaluation Methodology

#### Negative Effects

10.7.4 For habitat areas and species, an effect is assessed as being significant if the favourable conservation status of the specified biodiversity receptor is compromised by the proposed development. Conservation status is defined by the IEEM guidelines as follows:

- “for habitats, conservation status is determined by the sum of the influences acting on the habitat and its typical species, that may affect its long-term distribution, structure and functions as well as the long-term survival of its typical species within a given geographical area; and
- for species, conservation status is determined by the sum of influences acting on the species concerned that may affect the long-term distribution and abundance of its populations within a given geographical area”.

10.7.5 The decision as to whether the conservation status of the specified biodiversity receptor has been compromised (which may relate to an adverse effect on its favourable condition or implications for the ability to restore the receptor to favourable condition<sup>4</sup>) has been made using professional judgement, drawing upon the results of the assessment of how each receptor is likely to be affected by the proposed Project.

10.7.6 A similar procedure has been used for designated sites that are affected by the Project, except that the focus is on the effects on the integrity<sup>5</sup> of each site, defined as “*the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified*”.

### Positive Effects

10.7.7 A positive effect is assessed as being significant if development activities are predicted to cause:

- an improvement in the condition of a habitat/species population from unfavourable to unfavourable recovering or favourable; or
- partial or total restoration of a site’s favourable condition.

10.7.8 If a species population, habitat or site is already in favourable condition, it is still possible for there to be a significant positive effect. There is, however, no simple formula for determining when such effects are significant and decisions about significance therefore have to be made on a case by case basis using professional judgement.

## 10.8 Assessment of Effects: European Sites, Non Statutory Sites for Nature Conservation, and Priority Habitats and Species

10.8.1 Potential effects have been assessed, on the South West London Reservoirs SPA, Windsor Forest and Great Park SAC and Richmond Park SAC, and their constituent parts, and non statutory sites for nature conservation and their constituent parts. This is where changes in the air quality and noise baseline environments will take place caused by the operational airspace

<sup>4</sup> Condition data are only available for SSSIs but professional judgement has been used to apply the same principle to habitats/species elsewhere.

<sup>5</sup> The term ‘integrity’ was first adopted for assessing effects on biodiversity within the context of Appropriate Assessments for European wildlife sites, as required under the *Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora* (the Habitats Directive). The principle of integrity in terms of the structure and function of sites is, however, equally relevant to designated sites that are not European sites. For this reason, the term was adopted by IEEM in its *Guidelines for Ecological Impact Assessment in the United Kingdom* (IEEM 2006).

changes and because of the SOR activities that occur as a result of the new departures in an easterly direction from the northern runway.

- 10.8.2 In producing the EIA scoping report to the London Borough of Hillingdon (LBH) the three European/International wildlife sites were identified in close proximity to Heathrow Airport and as a consequence, *The Conservation of Habitats and Species Regulations 2010* (the 'Habitats Regulations') may be relevant to the development. The first stage of a Habitat Regulations Assessment (screening) has been undertaken by AMEC, and examines the potential effects upon the European sites that would result from the proposed development works, both alone and in combination with other plans and projects, in order to determine whether any of these effects is likely to be significant (**Appendix Q**).

## Baseline Conditions

### European Sites

- 10.8.3 For a detailed description of the baseline ecological environment at South West London Reservoirs SPA, Great Windsor Park SAC and Richmond Park SAC please refer to the HRA Screening Report which has been submitted as part of this planning application and which is also included as **Appendix Q**. Please refer to section 10.4 of this ES for a description of the remainder of the relevant baseline ecological environment.
- 10.8.4 The South West London Waterbodies SPA was classified and registered as a SPA in 2000 on the basis of its overwintering waterfowl population, principally for the numbers of gadwall (*Anas strepera*) and northern shoveler (*Anas clypeata*) that it supports.
- 10.8.5 The Windsor Forest & Great Park SAC forms part of the largest continuous tract of woodland and parkland in Berkshire and contains a number of veteran trees. The site is designated for its atlantic acidophilus beech forests, old acidophilus oak woods and habitats of the violet click beetle (*Limoniscus violaceus*). The site also supports stag beetle (*Lucanus cervus*) and one of the largest wintering flocks of hawfinch (*Coccothraustes coccothraustes*) in Britain.
- 10.8.6 Richmond Park SAC incorporates the most important area of lowland acid grassland in the Greater London region. The Park is also a top UK site for ancient trees, particularly oaks, which have great historic and wildlife importance. The trees and associated decaying wood support nationally endangered species of fungi, as well as a remarkable range of nationally scarce invertebrates being registered as an SAC principally for the populations of stag beetle found here.

### Other Receptors

- 10.8.7 The Lower Colne Site of Metropolitan Interest (SMI) comprises sections of the Colne, Wraysbury and Frays rivers which support a diverse aquatic and marginal flora including several plants with a restricted London distribution such as river water-dropwort (*Oenanthe fluviatilis*), unbranched bur-reed (*Sparganium emersum*), great yellow-cress (*Rorippa amphibia*), bladder-sedge (*Carex vesicaria*), arrowhead (*Sagittaria sagittifolia*), narrow-leaved water-plantain (*Alisma lanceolatum*) and common water-crowfoot (*Ranunculus aquatilis*). Associated wet meadows, flooded gravel pits, ponds, alder-willow woodland and an old orchard are included within the site. The site also supports London's only native population of the nationally rare pennyroyal (*Mentha pulegium*) as well as water vole, and breeding kingfisher (*Alcedo atthis*) and grey wagtail (*Motacilla cinerea*).

## Assessment Methodology

### Air Quality Assessment Methodology

- 10.8.8 Modelling of the change in air quality as a result of full runway alternation on easterlies has been undertaken at 216 locations ( **Figure 10.6**) within the vicinity of Heathrow Airport. The potential for significant effects on biodiversity receptors of value because of changes in concentrations of NO<sub>x</sub> to which the sites are exposed has been assessed on the basis of the professional judgement of air quality experts and ecologists. Professional judgement has, however, been guided by the principle that should the overall concentration of NO<sub>x</sub> increase by less than 1% of the current contribution caused by activities associated with Heathrow Airport, the change will not result in a significant effect on biodiversity receptors.
- 10.8.9 The potential for significant effects on biodiversity receptors of value because of an increase in the deposition rates of nitrogen has similarly been undertaken using professional judgement, guided by the principle that an increase in the overall deposition rate of nitrogen of less than 1% of the current contribution caused by activities associated with Heathrow Airport will not create the potential for a significant effect.
- 10.8.10 If the threshold defined for either NO<sub>x</sub> or nitrogen deposition is, however, exceeded an assessment of how such might affect a valued biodiversity receptor, including its important component parts, has been made. This has been done by considering the sensitivity of the receptor and its component parts, to be affected by the increases in these pollutants that are predicted to occur. In doing this the UK Air Pollution Information System (APIS) has been consulted. Within this System, critical loads have been defined. A critical load is a quantitative estimate of the exposure to deposition of a pollutant, above which significant harmful effects on valued biodiversity receptors (habitats) could occur assuming the receptor is valuable enough.

### Noise Assessment Methodology

- 10.8.11 Air noise is defined as all noise caused by departing and arriving aircraft between SOR and completion of the landing run, including the use of reverse thrust where relevant. The consideration of noise issues at Heathrow Airport in this study has largely focused on air noise as the main issue. Air noise is typically represented by a series of noise contours that portray noise levels in areas surrounding airports. At Heathrow Airport, air noise contours are generated annually and can be interpreted in order to understand and assess air noise exposure upon surrounding communities. These air noise contours are produced by the UK CAA using its Aircraft Noise Contour Model (ANCON) model. In simple terms, the model works by using the characteristics of the airport and its airspace along with arrival and departure track distribution information which includes the numbers and types of aircraft that will use the airport, to calculate noise levels at various grid points surrounding the airport. The noise grid results are then used to plot noise contours which identify locations of equivalent noise exposure.
- 10.8.12 Professional judgement, informed by data on the nature and extent of likely changes in the air noise baseline environment, has been used to determine whether the ability to meet the conservation objectives could be compromised by implementation of full runway alternation on easterly operations. In addition, the sensitivity, specifically with relation to the changes that are predicted to happen, of the special interest features for which the European site in question has been designated has also been considered.

## Predicted Effects and their Significance

### Air Quality

- 10.8.13 European Sites Modelling of the change in air quality as a result of the implementation of full runway alternation on easterly operations has been undertaken at more than 58 locations to the west of Heathrow Airport. The location of these monitoring points can be found in **Figure 10.6**. More than 20 of these locations occur within the immediate vicinity of the Wraysbury Reservoir and King George VI Reservoir components of the SPA. The modelling has established that nitrogen deposition rates at all locations are predicted to be only negligible. Concentrations of NO<sub>x</sub> at those receptors within the immediate vicinity of South West London Waterbodies such as receptor 175 at Wraysbury Reservoir, experience increases of approximately 0.3 µg/m<sup>3</sup> or 0.4% of the total airport contribution. At other receptors significant reductions in NO<sub>x</sub> concentrations are predicted. For example, at King George Reservoir (receptor 182) reductions in NO<sub>x</sub> concentration are predicted to be 1.59 µg/m<sup>3</sup> or 2.6% of the airport contribution. For these reasons it is considered that changes in NO<sub>x</sub> concentration as a result of the implementation of full runway alternation on easterly operations are unlikely to compromise the ability to successfully achieve the relevant conservation objectives. The maximum increase in the deposition rate of nitrogen at those receptors within the immediate vicinity of South West London Waterbodies is 0.066 kg/ha/year at receptor 186, which is located in the centre of Staines Reservoirs, to the south of the airport. This represents an increase of only 0.5% of the total nitrogen deposition, this being significantly below the threshold (established in the assessment methodology) above which the ability to achieve the relevant conservation objectives could be compromised. As such, it is considered that there will be negligible effects on all of the SPA component waterbodies and their qualifying interest.
- 10.8.14 Windsor Forest and Great Park SAC is located nearly 6 kilometres further away from the southern runway than the South West London Waterbodies SPA, where, it has already been determined that increases in NO<sub>x</sub> emissions and nitrogen deposition brought about as a result of the implementation of full runway alternation on easterly operations will be insignificant. When overflying Windsor Forest and Great Park SAC the altitude of aircraft will therefore be significantly higher than at the South West London Waterbodies SPA. This will result in NO<sub>x</sub> and nitrogen emissions being dissipated over a wider area, resulting in lower net concentrations per unit area at ground level than at the SPA. It is therefore judged that there will be no significant negative effects on this site due to these changes.
- 10.8.15 Richmond Park SAC is located nearly 9 km further away from the southern runway than the South West London Waterbodies SPA, where, it has already been determined that increases in NO<sub>x</sub> emissions and nitrogen deposition brought about as a result of the implementation of full runway alternation on easterly operations will be insignificant. When overflying Richmond Park SAC the altitude of aircraft will therefore be significantly higher than at the South West London Waterbodies SPA. This will result in NO<sub>x</sub> and nitrogen emissions being dissipated over a wider area, resulting in lower net concentrations per unit area at ground level than at the SPA. There is therefore judged to be no potential for the conservation objectives of this site not to be achieved by these changes.

### *Other Receptors*

- 10.8.16 The modelling has established that the maximum increase in the annual mean concentration of NO<sub>x</sub> occurs at receptor 176 (approximately 420 m to the west of the northern runway), and it is only at this receptor where the threshold of 1% of the current Airport contribution is exceeded. A 6.2% increase in the current Airport contribution is predicted; this represents an

actual increase of  $4.8\mu\text{g}\text{m}^{-3}$ . The modelling has established that nitrogen deposition rates at all locations will be less than 1% of the current contribution caused by activities associated with Heathrow Airport everywhere again except at Receptor 176 where the increase is predicted to be a maximum of 3.7%. This represents an actual increase in the deposition rate of nitrogen of  $0.303\text{kg}/\text{ha}/\text{yr}$ .

- 10.8.17 Receptor 176 is located in the Lower Colne SMI, a receptor of biodiversity value. The Lower Colne SMI comprises sections of the Colne, Wraysbury and Frays rivers which support a diverse variety of habitats, fauna and aquatic and marginal flora (10.8.7). Some or all of these habitats and species are typically considered to be sensitive to increases in nitrogen deposition and/or NOx.
- 10.8.18 The Lower Colne SMI is situated close to the western end of the northern runway and within close proximity of other significant sources of nitrogen deposition and NOx (M25, M4 and other busy roads) and therefore already experiences high levels of these pollutants. In fact, the receptor already experiences concentrations of NOx of  $49\mu\text{g}\text{m}^{-3}$ , which are significantly in excess of the  $30\mu\text{g}\text{m}^{-3}$ <sup>6</sup> critical load (the critical load is set by APIS at  $30\mu\text{g}\text{m}^{-3}$  for a range of habitats including unimproved meadow and grazing marsh – these two habitats best correspond with those found on the Lower Colne SMI). Because these levels are already exceeded it is considered that the increase caused by the implementation of full runway alternation on easterlies will not result in a significant effect.
- 10.8.19 The nitrogen deposition rates at this receptor are currently  $19.7\text{kg}/\text{ha}/\text{yr}$  and are thus already very close to exceeding the lower critical load for lowland unimproved meadows and grazing marsh which is set at  $20\text{kg}/\text{ha}/\text{yr}$  (the higher critical load level is set at  $30\text{kg}/\text{ha}/\text{yr}$ ). If, as is predicted, a  $0.303\text{kg}/\text{ha}/\text{yr}$  increase in deposition occurs as a result of the commencing full runway alternation on easterlies it is possible that this will lead to an exceedance in the critical load, albeit by a very small level ( $0.003\text{kg}/\text{ha}/\text{yr}$ ). However, the reality is that the increase itself is so small that actual effects on the Lower Colne SMI are very unlikely. For these reasons it is considered that there will be no significant effects to the Lower Colne SMI as a result of increases in nitrogen deposition.
- 10.8.20 Furthermore, because increases in nitrogen deposition or NOx concentrations are lower than the thresholds set in the assessment methodology at all other locations there is no need to consider the effect of the Project on any other receptor (**Appendix R, Table R.6**).

## Noise

### *European Sites*

10.8.21 The implementation of full alternation on easterlies will result in:

- a) the introduction of regular departures from Runway 09L<sup>7</sup> in an easterly direction over Cranford;
- b) a decrease in the number of aircraft arriving on Runway 09L in an easterly direction;

<sup>6</sup> [www.apis.ac.uk/cgi\\_bin/query\\_locationresult.pl?gridref=504450%2C176500&gridchoice=uk\\_grid&habitat=Unimproved+hay+meadow&pollutant=Nitrogen+Oxides&submit.x=17&submit.y=11&submit=Next](http://www.apis.ac.uk/cgi_bin/query_locationresult.pl?gridref=504450%2C176500&gridchoice=uk_grid&habitat=Unimproved+hay+meadow&pollutant=Nitrogen+Oxides&submit.x=17&submit.y=11&submit=Next)

<sup>7</sup> The northern runway is 09L when on easterlies and 27R when on westerlies.

- c) an increase in the number of aircraft arriving on Runway 09R<sup>8</sup> in an easterly direction; and
- d) a decrease in the number of aircraft departing from Runway 09R in an easterly direction.

- 10.8.22 Of these operational changes, only c) is considered to present a potentially significant effect to an SPA component. In this case, arrival traffic to the southern runway will overfly two components of the South West London Waterbodies SPA – Wraysbury I North Gravel Pit and Wraysbury Reservoir ( Section 10.4). None of the other three operational changes would lead to increase in ATMs within the proposed zone of influence (ZOI) of the SPA components. Modelling undertaken to establish the increases of noise as a result of the implementation of the proposals at sensitive receptors surrounding the Airport, has established that the annual average increase at Staines Moor SPA component is less than 1db and is therefore considered to be located outside of the proposed ZOI.
- 10.8.23 The airport currently, on standard mode and averagely, operates on westerlies for 71% of the time. These westerly movements are already evenly split across the two runways with each experiencing a typical daily total of 328 departures when the airport is operating on westerlies. The airport operates on easterlies for only 29% of the time; this is dictated by weather conditions and so there is no pattern to when this occurs. The numbers of aircraft landing from the west of Heathrow will not change as a result of the implementation of full runway alternation on easterly operations. They will, however, be redistributed so that there is a more even division across the two runways.
- 10.8.24 Shorter term fluctuations between westerly and easterly operations can vary from this approximate long term average 71:29 split. As such, a sensitivity test was undertaken in order to establish the influence of yearly variations in modal split with respect to the effects of full runway alternation during easterly operations. Noise contours were produced for the easterly and westerly extremes for the last 20 years for the current airport use and for full runway alternation on easterlies.
- 10.8.25 In years of extreme easterly operations, 40% of movements are on easterly operations and 60% on westerly operations. In years of extreme westerly operations, 78% of movements are on westerly operations and 22% on easterly operations.
- 10.8.26 Effectively, the easterly runway alterations will lead to an increase in 328 ATMs each day overflying Wraysbury Reservoir and Wraysbury I North Gravel Pit when the airport is on easterly operations. Dependent on whether or not standard or extreme conditions are in operation, the total annual ATMs would be between 31,966 and 44,092. The existing baseline number of departures from Runways 27R and 27L (328 ATMs/day or 85,001/annum) will remain unchanged. These figures then increase to 186,764 ATMS/annum when running extreme westerlies.
- 10.8.27 Based on noise data from fixed noise monitoring locations, each ATM departure (on westerly operations) is likely to lead to a potential disturbance event on average between 80-90dB over Wraysbury Reservoir. Each ATM arrival (on easterly operations) leads to a potential disturbance event of, on average, between 70-80dB over Wraysbury Reservoir.
- 10.8.28 The following explanations provide reasoned justification as to why this proposed implementation of full runway alternation during easterly operations at Heathrow Airport would

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<sup>8</sup> The southern runway is 09R when on easterlies and 27L when on westerlies

not result in a significant adverse effect to the qualifying interest species that utilise the SWL Waterbodies SPA.

- 10.8.29 Even with a proposed annual increase of between 31,966 and 44,092 arrival ATMs overflying Wraysbury Reservoir and Wraysbury I (North) Gravel Pit, given the existing and continued noise effects of westerly departures (170,002 ATMs from Runways 27L and 27R) over both waterbodies, which are of greater amplitude and therefore more substantial disturbance events than arrival ATMs, these increases in daily and annual ATMs are unlikely to significantly affect those birds still utilising these waterbodies. Baseline disturbance would be increased further when extreme westerlies are in operation, leading to a maximum additional 16,762 ATMs/annum. It is highly likely therefore, that such continued/existing disturbance from departures overflying these water bodies is likely have either led to dispersal to other water bodies or simply habituation to this air noise.
- 10.8.30 Data from recent studies provides strong indication that a variety of potential factors have lead to the decline in utilisation of both waterbodies, but particularly Wraysbury Reservoir. Based on the review of disturbance and in particular, disturbance related activities at the SWL Waterbodies SPA, there is nothing to suggest in any of the disturbance studies undertaken to date (Briggs, 2007; Banks et al. 2004; Briggs 2012), that overflying aircraft are causing a significant effect to the integrity of the SPA. Rather, that a variety of human recreational disturbance events e.g. angling, waterskiing, sailing and dog-walking, both water based and from the shoreline appear to be contributing to a greater decline in SPA species across the designated waterbodies.
- 10.8.31 Given the decline in qualifying interest species utilising both SPA components, the current baseline numbers of gadwall and shoveler utilising Wraysbury Reservoir and Wraysbury I North Gravel Pit is such that neither body supports SPA qualifying numbers of either species. This is key to determining significance of effect to these sites, whereby low level regular disturbance effects on generally very small numbers of qualifying interest species are therefore unlikely to affect the SPA population status of either species. Furthermore the periodicity of arrival flights is always alternated between runways and therefore does not provide any overly intensive periods of disturbance. For these reasons it is not considered that the development would threaten the wintering population of either of the SPA species.
- 10.8.32 There is no potential for changes in the noise environment to cause a significant negative effect on Windsor Forest and Great Park SAC. The special interest features include woodland habitats, which by their nature could not, of course, be affected by increases in noise. In addition, although studies have identified that some species of invertebrate can be affected by noise, it is considered, that because there is already existing overflying of Windsor Forest and Great Park SAC would not be affected by any changes in the noise environment.
- 10.8.33 There is no potential for changes in the noise environment to cause a significant negative effect on Richmond Park SAC. The special interest features include stag beetles, which by their nature could not be affected by increases in noise. In addition, although studies have identified that some species of invertebrate can be affected by noise, it is considered, that because there is already existing overflying of Richmond Park SAC, they would not be affected by any changes in the noise environment.

#### *Other Receptors*

- 10.8.34 Although increases of up to 4dB ( $L_{den}$ ) on average annually associated with SOR occur close to the Lower Colne SMI, modelling has shown that increases in noise at the site itself will be

limited to 1–2dB ( $L_{den}$ ) on average annually in only very small sections of the Site. This is as indicated on **Figure 10.7**. Furthermore because such a small amount of the Site is to be affected and because the level of the noise increases are deemed to be, in the context of the Airport environment where existing noise levels are already 65-70dB ( $L_{den}$ ), very small, it is considered that there is no potential for this receptor to be affected significantly by average noise increases as a result of the Project.

- 10.8.35 It should be noted that following publication of the Aviation Policy Framework in March 2013 the primary criteria adopted in the noise chapter (see 6.9) to reflect Government policy was the area within the  $L_{aeq}$  contour. A secondary criteria was also adopted that reflected commitments made by Heathrow during consultation and was defined by the area within the  $L_{den}$  contour. As the secondary criteria represents a larger contour it has been used within this chapter.
- 10.8.36 In addition, because noise increases at the site are so small it is also considered that there is no potential for individual noise events i.e. the SOR of an individual aircraft departure, to result in a significant effect.

## 10.9 Assessment of Effects: Grass Snake

- 10.9.1 Potential effects on grass snake as a result of killing, injuring or disturbing individuals during the construction of the noise barrier.

### Baseline Conditions

- 10.9.2 Grass snakes are known to occur within approximately 1km (to the east) of the area where the noise barrier is to be constructed. There are no direct habitat links between the area of the record and the area where the noise barrier will be sited although suitable habitats for supporting the species, namely long grassland and scrub, are found.

### Assessment Methodology

- 10.9.3 A significant effect would occur if:
- the proposals affected the long-term distribution and abundance of the population of grass snake within the London Borough of Hillingdon; or
  - the legislation that relates to grass snake was to be contravened by the proposed Project.

### Predicted Effects and their Significance

- 10.9.4 Although the nearest record of the species is found at more than 1km from the area that will be subject to development a precautionary approach is to be adopted to ensure the there will absolutely be compliance with the legislation that relates to the species.
- 10.9.5 Only a small area of habitat, comprising a strip of long grassland, approximately 0.3ha in area suitable for supporting grass snake is to be disturbed on a temporary basis to allow the construction of the noise barrier. The barrier itself is to be sited along an existing fenceline and thus disturbance of the habitats will be limited and will only occur to facilitate the construction of the barrier and most particularly its foundations.

- 10.9.6 It is not considered that the short term loss of habitat for grass snake could affect the long-term distribution and abundance of the species populations within the local borough. Within the local area there is much more and better quality grass snake habitat than is to be disturbed. Furthermore the loss of the habitat is to be only temporary with areas of bare ground created by the construction of the barrier to be seeded with a species rich grassland mix after construction is complete. Furthermore any shrubs that are removed as part of the Project will be replaced on a like for like basis.
- 10.9.7 Measures will still need to be taken to ensure that the development complies with the legislation that relates to grass snake. To achieve this before construction of the barrier commences the grassland will be mown to a sward height of 5cm. This will encourage, because the habitat will offer limited cover after this cut, individual grass snake within the grassland to move to areas that are to remain untouched by the development. The area will be left for two days following the cut to allow all individuals to move, after which a reptile exclusion fence will be erected to separate the habitat from the construction area. This will ensure that grass snakes are unable to access the area during the period of the barrier construction. Once the works are complete the fence will be removed and the disturbed habitats reinstated.
- 10.9.8 It is proposed that the implementation of these measures will ensure that there will be no significant effects to reptiles caused by the works to facilitate the ending of the Cranford Agreement.

## 10.10 Summary of Significance Evaluation

**Table 10.8 Summary of significance of effects**

Receptor and summary of predicted effects	Significance <sup>1</sup> and importance of receptor	Summary rationale for significance evaluation
Potential effects on the South West London Reservoirs SPA , Windsor Forest and Great Park SAC and Richmond Park SAC and their constituent parts, and non statutory sites for nature conservation and their constituent parts, due to changes in the air quality and noise baseline environments caused by the operational airspace changes and because of the SOR activities that occur as a result of the new departures in an easterly direction from the northern runway.	NS Up to Inter-national	Increases in emissions or noise are considered to be, at sensitive biodiversity receptors, too small to cause significant effects.
Potential effects on grass snake as a result of killing, injuring or disturbing individuals during the construction of the noise barrier.	NS National	Mitigation can be employed which compliance with the legislation related to the species.
<b>Key/footnotes:</b>		
1. S = Significant NS = Not-significant		

