



REPORT

Heathrow Western Hub

EIA SCOPING REPORT

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Definitions

The following definitions are used throughout this Scoping Report:

- “Airports National Policy Statement” or “ANPS” is the policy framework for expansion at Heathrow Airport and the primary basis for decision making on any development consent application for a new Northwest Runway Scheme.
- “Northwest Runway Scheme” or “NRS” – the Government’s preferred scheme for airport capacity expansion as identified in the ANPS;
- “Heathrow Western Hub” – the proposed new and reconfigured terminal facilities (including aprons) providing core components of the NRS;
- “Proposed Development” or “HWH DCO” – Heathrow Western Hub along with all necessary and associated onsite and offsite supporting infrastructure and mitigation;
- “Northwest Runway” the runway component of the NRS;
- “Heathrow Airport Limited (HAL) DCO Project” – the components of the NRS being proposed by HAL (as currently defined in the HAL Stage I consultation); and
- “Heathrow Airport” the existing operational airport at Heathrow.

Executive Summary

This Scoping Report supports a request by Arora Holdings Limited ('the Applicant') for a formal Scoping Opinion from the Planning Inspectorate in relation to Heathrow Western Hub along with all necessary and associated onsite and offsite supporting infrastructure and mitigation (the 'Proposed Development'). This Scoping Report has been prepared in accordance with Regulation 10 of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 which enables the Applicant to seek a Scoping Opinion from the Planning Inspectorate on the information to be included in an Environmental Impact Assessment (EIA).

The Proposed Development consists of the reconfiguration and expansion of terminal and airfield facilities on the western boundary of Heathrow Airport. It also includes changes to the existing road and rail surface access infrastructure, public transport upgrades, changes to river alignments and flood storage, supporting facilities, and other associated works necessary to deliver the scheme, including landscaping and biodiversity improvement works. The Proposed Development does not include works to construct the new Northwest Runway (or any air traffic associated with it), or the changes to the M25 to allow the new Northwest Runway to cross the motorway.

The Applicant's vision is to deliver and operate a terminal hub on the western boundary of Heathrow Airport to cater for the predicted growth outlined in the Airports National Policy Statement (2018). The Proposed Development will establish a global gateway to the UK and create a new benchmark for efficient terminal delivery, design and operation. Heathrow Western Hub will provide a focus for a sustainable transport interchange, establish a new front door to Heathrow Airport and seek to minimise the impacts of a dispersed development strategy.

This report presents an initial overview and description of the project and a review of the potential impacts associated with the construction and operation of the Proposed Development. This report aims to identify the likely significant effects arising from the Proposed Development on the physical, human and biological environments and outlines the approach to understanding baseline conditions and addressing environmental impacts through the EIA process.

This Scoping Report documents the first stage of the EIA process, outlining; the receptors that will be considered during the EIA, the planned approach to data gathering, the characterisation of the existing environment, the assessment of potential impacts, and approach to development of mitigation measures.

The EIA will be undertaken by experienced and well qualified technical specialists using industry best practice and following appropriate and relevant guidance. Key topics for investigation within the EIA are expected to be air quality and odour, biodiversity, carbon and greenhouse gases, climate change, community, economics and employment, historic environment, health, landscape and visual amenity, land quality and waste, major accidents and disasters, noise and vibration, traffic and transport and water.

The Scoping Report is seeking an opinion on:

- The environmental topics that should be included in the EIA;
- The relevant components of the Proposed Development and the resultant likely significant effects;
- Those effects not likely to be significant that do not need to be considered further;
- The data that has been gathered (and will be gathered);

- The approach to determining the study areas for each topic; and
- The assessment methods that will be used to determine likely significant effects.

The Scoping Report builds on earlier informal consultation and stakeholder engagement and provides a more formal and comprehensive opportunity for stakeholders to engage with the development of the project. The Scoping Report therefore forms part of a larger ongoing programme of consultation with stakeholders and communities which will continue throughout the EIA and DCO application process.

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Abbreviations

Abbreviation	Description
AADT	Annual Average Daily Traffic
ACRP	Airports Cooperative Research Programme
ADMS	Atmospheric Dispersion Modelling System
AET	Around the End Taxiway
AIL	Abnormal Indivisible Load
AIRS	Archaeology Investigation and Research Strategy
AMI	Acute Myocardial Infarction
ANG	Air Navigation Guidance
ANPS	Airports National Policy Statement
AONB	Area of Outstanding Natural Beauty
APA	Archaeology Priority Area
APM	Automated People Mover
APZ	Archaeology Priority Zone
AQEG	Air Quality Expert Group
AQMA	Air Quality Management Area
ATC	Air Traffic Control
ATM	Air Transport Movement
BAP	Biodiversity Action Plan
BEIS	Department for Business, Energy and Industrial Strategy
BGS	British Geological Survey
BIS	Biodiversity Information Service
BMV	Best and Most Versatile
BNS	Biological Notification Sites
BPM	Best Practicable Means
BRE	Building Research Establishment
BRES	Business Register and Employment Survey
BS 5228	British Standard on Noise
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication
CAP	Civil Aviation Publication
CCC	Committee on Climate Change
CCRA	Climate Change Risk Assessment
CDM	Construction Design and Management

Abbreviation	Description
CEA	Cumulative Effects Assessment
CEMP	Construction Environmental Management Plan
CERC	Cambridge Environmental Research Consultants
CFMP	Catchment Flood Management Plan
CIEEM	Chartered Institute of Ecology and Environmental Management
CIHT	Chartered Institution of Highways and Transportation
CIRIA	Construction Industry Research and Information Association
CL:AIRE	Contaminated Land: Applications in Real Environments
CO	Carbon Monoxide
COMAH	Control of Major Accident Hazards
CORSIA	Carbon Offsetting Reduction Scheme for International Aviation
COSHH	Control of Substances Harmful to Health
CPZ	Compulsory Purchase Zone
CRN	Calculation of Railway Noise
CRTN	Calculation of Road Traffic Noise
CSM	Conceptual Site Model
CTA	Central Terminal Area
CWS	County Wildlife Site
DCLG	Department for Communities and Local Government
DCO	Development Consent Order
DEFRA	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges
DoWCoP	Definition of Waste Code of Practice
DWP	Department for Work and Pensions
EASA	European Aviation Safety Agency
EclA	Ecological Impact Assessment
EEA	European Economic Area
EIA	Environmental Impact Assessment
EMEP	European Monitoring and Evaluation Programme
EMF	Electromagnetic Field
EMP	Ecological Management Plan
END	Environmental Noise Directive
EPUK	Environmental Protection UK

Abbreviation	Description
ERF	Exposure Response Functions
ES	Environmental Statement
EU ETS	EU Emission Trading System
FEMAs	Functional Economic Market Areas
FWMA	Flood and Water Management Act
GDP	Gross Domestic Product
GEART	Guidelines for the Environmental Assessment of Road Traffic
GEP	Good Ecological Potential
GES	Good Ecological Status
GHG	Greenhouse Gases
GIS	Geographic information System
GLA	Greater London Authority
GLAAS	Greater London Archaeology Advisory Service
GLHER	Greater London Historic Environment Record
GTA	Guidance on Transport Assessment
HAA	Historic Area Assessments
HAL	Heathrow Airport Limited
HCB	Hexachlorobenzene
HDV	Heavy Duty Vehicle
HER	Historic Environment Record
HGV	Heavy Goods Vehicle
HPI	Habitat of Principal Importance
HRA	Habitat Regulations Assessment
HSPG	Heathrow Strategic Planning Group
HWH	Heathrow Western Hub
IAN	Interim Advice Note
IAQM	Institute of Air Quality Management
ICAO	International Civil Aviation Organization
ICE	Inventory of Carbon and Energy
IDBR	Inter-Departmental Business Register
IEMA	Institute of Environmental Management and Assessment
IFRC	International Federation of Red Cross
IRC	Immigration Removal Centre
JHWS	Joint Health and Wellbeing Strategy

Abbreviation	Description
JNCC	Joint Nature Conservation Committee
JSNA	Joint Strategic Needs Assessment
LAQM	Local Air Quality Management
LBAP	Local Biodiversity Action Plan
LDV	Light Duty Vehicle
LEP	Local Enterprise Partnership
LFD	Landfill Directive
LGP	London Geodiversity Partnership
LIGS	Locally Important Geological Site
LNR	Local Nature Reserve
LSE	Likely Significant Effect
LSOA	Lower Layer Super Output Area
LVIA	Landscape and Visual Impact Assessment
LWS	Local Wildlife Sites
MPT	Market Power Test
MSOA	Middle Layer Super Output Area
MTS	The Mayor's Transport Strategy
NAP	National Adaptation Programme
NATS	National Air Traffic Services
NCD	Non-communicable Disease
NERG	Noise Expert Review Group
NHLE	National Heritage List for England
NMU	Non-motorised Users
NN NPS	National Networks National Policy Statement
NNR	National Nature Reserve
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxide
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NPS NN	National Policy Statement for National Networks
NRFA	National River Flow Archive
NRPB	National Radiological Protection Board
NRS	Northwest Runway Scheme
NSIP	Nationally Significant Infrastructure Project

Abbreviation	Description
O ₃	Ozone
ONS	Office for National Statistics
OS	Ordnance Survey
OSA	Open Space Assessment
PCB	Polychlorinated Biphenyl
PCM	Pollution Climate Mapping
PCOC	Potential Contaminants of Concern
PEI	Preliminary Environmental Information
PEIR	Preliminary Environmental Information Report
PFRA	Preliminary Flood Risk Assessment
PGA	Peak Ground Acceleration
PIC	Personal Injury Collison
PINS	The Planning Inspectorate
PM	Particulate Matter
PPG	Planning Practice Guidance
PPV	Peak Particle Velocity
PRA	Preliminary Risk Assessment
PRoW	Public Rights of Way
PSDH	Project for the Sustainable Development of Heathrow
RAS	Recreation Asset Survey
RBD	River Basin District
RBMP	River Basin Management Plan
RICS	Royal Institute of Chartered Surveyors
RIGS	Regionally Important Geological Site
RNR	Roadside Nature Reserve
SAC	Special Areas of Conservation
SAS	Surface Access Strategy
SDTB	Strategic Digital Transport Baseline
SFRA	Strategic Flood Risk Assessment
SINC	Site of Importance for Nature Conservation
SMP	Shoreline Management Plan
SNCI	Site of Nature Conservation Interest
SO ₂	Sulphur Dioxide
SPA	Special Protection Area

Abbreviation	Description
SPZ	Source Protection Zone
SRN	Strategic Road Network
SSSI	Site of Special Scientific Interest
SWMP	Site Waste Management Plan
TA	Transport Assessment
TCPA	Town and Country Planning Act
TEU	Treaty on European Union
TfL	Transport for London
TIN	Technical Information Note
TRL	Transport Research Laboratory
UNECE	United Nations Economic Commission for Europe
UNFCCC	United National Framework Convention on Climate Change
UXO	Unexploded Ordnance
VCO	Volatile Organic Compound
VDV	Vibration Dose Value
WebTAG	Government Transport Analysis Guidance
WFD	Water Framework Directive
WHO	World Health Organisation
WRAP	Waste & Resources Action Programme
ZOI	Zone of Influence
ZTV	Zone of Theoretical Visibility

I Introduction

I.1 The Proposed Development

- I.1.1 This Scoping Report has been prepared in accordance with Regulation 10 of the Infrastructure Planning (Environmental Impact Assessment (EIA)) Regulations 2017 ('the EIA Regulations'). It is submitted on behalf of Arora Holdings Limited ('the Applicant') to request a Scoping Opinion from the Planning Inspectorate (PINS) (on behalf of the Secretary of State) in respect of its Proposed Development at Heathrow Airport. The Proposed Development is a component of the Government's preferred NRS as set out in the ANPS.
- I.1.2 The Proposed Development comprises the reconfiguration and expansion to the west of Terminal 5 (T5) to create terminal and airfield facilities that will be called Heathrow Western Hub. The Proposed Development also includes associated infrastructure (including surface access, airport supporting facilities and relocation of displaced uses, where appropriate, and other works) necessary to deliver this component of the NRS and to enable it to fit within the wider NRS. Other proposed works include landscaping, ecological improvement works and works to watercourses.
- I.1.3 The Proposed Development will provide terminal facilities to enable the delivery of at least 260,000 air transport movements per annum, which is in accordance with policy on the expansion of airport capacity at Heathrow Airport as set out within the ANPS.
- I.1.4 The Proposed Development excludes the proposed new Northwest Runway. It also excludes the major M25 alterations necessary to accommodate the Northwest Runway. Both of these elements are currently being promoted by HAL through a separate 'DCO process, seeking approval for these elements as part of the HAL DCO Project. The Proposed Development represents an alternative vision to HAL for the terminal infrastructure component of the NRS.
- I.1.5 The Proposed Development provides an integrated solution with the HAL DCO Project, and as a result will only include associated works that are necessary to deliver the terminal facilities, mitigate their impacts or physically accommodate them within the wider NRS being promoted by HAL.
- I.1.6 The information on the HAL DCO Project in the public domain contains a number of options, and therefore the exact development beyond the area required for Heathrow Western Hub that will be included within the Proposed Development has yet to be determined. At this stage, therefore, the extent of the Proposed Development for the purposes of this Scoping Report and the EIA scoping process more generally, is defined widely and is likely to be reduced following receipt of further information on the HAL DCO Project.
- I.1.7 The extent of the Proposed Development at this stage is shown in **Figure I.1**. This includes the principal works area under consideration for Heathrow Western Hub and land being considered for associated works. To illustrate setting, the area for the proposed Northwest Runway is also shown, however this does not form part of the Proposed Development.
- I.1.8 A more detailed description of the Proposed Development, including its proposed interface with the HAL DCO Project is provided in **Chapter 3 'The Proposed Development'**.

The Applicant

- I.1.9 The Applicant is a major private property, construction and hotels group. Its business is based

at Heathrow Airport and it has been operating business and hospitality facilities, and working with airlines at the airport for over two decades. The Applicant is a significant land owner within the footprint of the Government's preferred NRS at Heathrow Airport. This includes the Sofitel Hotel, which was developed by the Applicant alongside T5 and has been operated since as the only on-site hotel at the terminal.

- I.1.10 The current proposals for the provision of new terminal capacity at Heathrow Airport have been in development for over two years and are supported by a team of experts, experienced in the design and implementation of major airport and infrastructure projects around the world.
- I.1.11 The Applicant believes there is a better way to deliver the increased capacity at Heathrow Airport identified in the ANPS.
- I.1.12 The Applicant's vision is to deliver and operate a new terminal hub on the western boundary of Heathrow Airport to cater for the predicted growth outlined in the ANPS. The Proposed Development will establish a global gateway to the UK and create a new benchmark for efficient terminal delivery, design and operation. It will also provide a focus for a sustainable transport interchange, establish a new front door to Heathrow Airport and seek to minimise the effects of a dispersed development strategy.
- I.1.13 A full description of the benefits and objectives of the Proposed Development is provided in **Chapter 3 'The Proposed Development'**.

Background

- I.1.14 The UK has the third largest aviation network in the world, and London's airports serve more routes than the airports of any other European city. However, London and the South East are now facing longer-term capacity problems. Heathrow Airport is operating at capacity today, Gatwick Airport is operating at capacity at peak times, and the wider London airports system is forecast to be at capacity by the mid-2030s (Department for Transport (DfT), 2017).
- I.1.15 In September 2012, the Government established the independent Airports Commission to examine the requirement for additional capacity to maintain the UK's position as Europe's most important aviation hub. In July 2015, the Airports Commission unanimously concluded that the proposal for a Northwest Runway at Heathrow Airport, combined with a significant package of measures to address its environmental and community impacts, presented the strongest case and offered the greatest strategic and economic benefits (Airports Commission, 2015).
- I.1.16 In October 2016, the Government announced that a Northwest Runway at Heathrow Airport was its preferred scheme to deliver additional airport capacity in the South East of England (DfT, 2016). This was confirmed when the Government formally designated the ANPS as a National Policy Statement (NPS) under the provisions of Part 2, section 5(1) of the Planning Act 2008 (the "Act") on 26 June 2018.
- I.1.17 The ANPS is the Government's primary basis for making decisions in relation to development consent applications for the NRS at Heathrow Airport. The General Principles of Assessment section (paragraph 4.3) of the ANPS (DfT, 2018) explains how the ANPS applies to Heathrow Airport:

"The Airports NPS applies to schemes at Heathrow Airport (in the area shown within the illustrative scheme boundary map at Annex A) that include a runway of at least 3,500m

in length and that are capable of delivering additional capacity of at least 260,000 air transport movements per annum, and associated infrastructure and surface access facilities. In particular, it also applies to the reconfiguration of and provision of new terminal capacity to be located between the two existing runways at Heathrow Airport”

- 1.1.18 Annex A referred to in the ANPS is reproduced in **Figure 1.2** (and the illustrative redline area identified on that map is hereinafter referred to as the "NRS Illustrative Boundary").

Relationship with the wider NRS

- 1.1.19 The Proposed Development will not include works required for the construction and operation of the new Northwest Runway and associated M25 alterations to accommodate the Northwest Runway. It assumes that these components will be developed, owned and operated by HAL in line with their current proposals.
- 1.1.20 The Applicant is seeking provide high-quality new and reconfigured terminal facilities, capable of providing all of the necessary terminal capacity to support the NRS. However, as explained above, to ensure that the Proposed Development can fit seamlessly within the wider NRS, it has been necessary to include additional linking elements beyond Heathrow Western Hub. It is not however envisaged that the Applicant would construct or operate all of these additional linking elements and the Applicant's DCO will include the powers and rights for construction and operation of appropriate parts of the Proposed Development to be undertaken by HAL.
- 1.1.21 The Proposed Development has therefore been designed so that, should the Applicant's DCO application be granted, it would be compatible with the HAL DCO Project and the wider NRS.

1.2 Policy and Background

National planning policy

Airports National Policy Statement

- 1.2.1 The ANPS sets out planning policy in relation to applications for any nationally significant airport infrastructure project (NSIP) in the South East of England. The background to ANPS, and how it applies to Heathrow Airport, has already been set out above. However, the ANPS also contains a number of key statements that are of importance in demonstrating support for the principle of the Proposed Development:
1. *It [the ANPS] will also have effect in relation to terminal infrastructure associated with the Heathrow Northwest Runway scheme and the reconfiguration of terminal facilities in the area between the two existing runways at Heathrow Airport (paragraph 1.15).*
 2. *The Airports NPS does not identify any statutory undertaker as the appropriate person or appropriate persons to carry out the preferred scheme (paragraph 1.15).*
 3. *It is possible that an applicant for development consent in respect of the preferred scheme will promote more than one application for development consent, dealing with different components individually (paragraph 1.16).*
 4. *The Airports NPS has effect in relation to the delivery of additional airport capacity...it also applies to proposals for new terminal capacity located between the new Northwest Runway and the existing Northern Runway at Heathrow Airport, as well as the reconfiguration of terminal facilities in the area between the two existing runways at Heathrow Airport. Each is also capable of constituting a nationally significant infrastructure project (paragraph 1.40).*

5. *The Airports NPS applies to schemes at Heathrow Airport (in the area shown, for this purpose, illustratively, within the scheme boundary map at Annex A) that include a runway of at least 3,500m in length and that are capable of delivering additional capacity of at least 260,000 air transport movements per annum, and associated infrastructure and surface access facilities. In particular, it also applies to the reconfiguration of and provision of new terminal capacity to be located between the two existing runways at Heathrow Airport (paragraph 4.3).*
 6. *To benefit from the full support of policy within the Airports NPS, any application(s) will have to fall within the boundaries and parameters set out in the Airports NPS. However, the form of a development for which an application is made is a matter for the applicant. The Airports NPS does not prejudice the viability or merits of any particular application, detailed scheme or applicant (paragraph 4.11).*
- 1.2.2 The ANPS also sets out some general principles for EIA which are important in forming the approach to scoping. These are set out in Section 4 (Assessment principles) of the ANPS and include:
1. *The Examining Authority should ensure that likely significant effects at all stages of the project have been adequately assessed (paragraph 4.13)*
 2. *The effects of any changes in operations, including the number of air traffic movements, during the construction and operational phases must be properly assessed and mitigation secured for any significant effects (paragraph 4.13)*
 3. *The environmental statement ("ES") should, when considering cumulative effects, provide information on how the effects of an applicant's proposal would combine and interact with the effects of other development (paragraph 4.14).*
- 1.2.3 Section 4 of the ANPS sets out criteria for good design, which should meet the principal objectives of the scheme whilst mitigating the adverse impacts of the development. It also recognises that there may be opportunities for the applicant to demonstrate good design in terms of siting and design measures relative to existing landscape and historical character and function, landscape permeability, landform, and vegetation.
- 1.2.4 Section 4 of the ANPS also emphasises the importance of both value for money and the relationship between cost and affordability. Paragraph 4.39 states that the applicant should demonstrate in its application for development consent that its scheme is cost-efficient and sustainable, and seeks to minimise costs to airlines, passengers and freight owners over its lifetime.
- 1.2.5 Section 5 (Assessment of Impacts) of the ANPS sets out the scope and approach to the assessments that the applicant will need to carry out, likely mitigation requirements and key considerations for decision-making. The requirements of the ANPS in relation to the EIA and how they have been or will be met in the scoping/EIA process are described in more detail in the individual topic chapters of this Scoping Report below.

National Policy Statement for National Networks

- 1.2.6 The National Policy Statement for National Networks (NPS NN) is also relevant as the Proposed Development will include modifications to Junctions 14 and 14a of the M25, which in itself is will qualify as a NSIP to be promoted for development consent under the Act.
- 1.2.7 As explained in **Chapter 3 'The Proposed Development'** of this Scoping Report, the

Proposed Development does not include the major realignment works to the M25 required to allow the proposed new Northwest Runway to cross the motorway. The junction modifications proposed by the Applicant will tie in with the M25 realignment, to be delivered by the HAL DCO Project.

- 1.2.8 The NPS NN sets out the policy used by PINS and the Secretary of State to make a decision on all major road projects. The Applicant will therefore have regard to this and the preparation of the Scoping Report has been informed by the NPS NN. The NPS NN will also guide the design of the highway elements of the Proposed Development.
- 1.2.9 It should however be noted that the ANPS states that, if there is conflict between the ANPS and another NPS, such as the NPS NN, the conflict should be resolved in favour of the NPS that has been most recently designated, in this instance, the ANPS.

Draft Environmental (Principles and Governance) Bill

- 1.2.10 The Draft Environmental (Principles and Governance) Bill sets out how the Government intends to maintain environmental standards once the United Kingdom leaves the EU, and builds on the vision of the 25 Year Environment Plan, by creating a new framework for long-term environmental policy and accountability, including requirements for the government to have a plan for environmental improvement, to publish a set of environmental metrics and measure progress in improving the environment. The requirements of the draft bill will, where appropriate and relevant, be taken into account during the EIA process.

Regional planning policy

- 1.2.11 The London Plan (most recently adopted in March 2016 and draft replacement published in December 2017) sets out the Mayor of London's strategic approach to development in the Greater London area.
- 1.2.12 The adopted London Plan (March 2016) states that adequate airport capacity serving a wide range of destinations is critical to the competitive position of London in a global economy, but opposes any further expansion at Heathrow Airport involving an increase in the number of aircraft movements (Policy 6.6 Aviation). Policy on aviation is updated in the draft new London Plan (December 2017), which states that the Mayor's support for the expansion of Heathrow Airport is dependent on the environmental and social impacts of the expansion, both positive and negative.

Local planning policy

- 1.2.13 The ANPS sets the primary policy for the determination for additional capacity at Heathrow, however, local planning policy will be a material consideration in the determination of any application, provided it is consistent with the ANPS, and will be important in the preparation of any Local Impact Report prepared by relevant local authorities with regard to the DCO application.
- 1.2.14 The existing Heathrow Airport site falls within the London Borough of Hillingdon, however there are eight other local authorities within 4km of the airport. A plan indicating the administrative boundaries surrounding Heathrow Airport is provided at **Figure 1.3**.
- 1.2.15 The National Planning Policy Framework (NPPF) directs that each local authority should produce a Local Plan for its area. Local Plans set out the strategic priorities for the area, drawn up over an "appropriate" time scale, normally a 15-year horizon.

- 1.2.16 As the NPSs form the basis for decision making on NSIPs, NSIPs are not subject to Regulation 38(6) of the Planning and Compulsory Purchase Act 2004, which states that determination of planning consent must be made in accordance with a local development plan. Local planning policy does not therefore set the tests for the acceptability of NSIPs.
- 1.2.17 However, some Local Plan policies may be relevant where they inform the assessment of potential effects e.g. by identifying land allocations and environmentally sensitive areas. If there is a conflict between NPS and local policies, the NPS takes precedence.
- 1.2.18 The EIA will consider Local Plan policies where relevant to the consideration of impacts. The DCO application papers will also include documents such as the Planning Statement which will include an analysis against relevant national, regional and local planning policies.

1.3 Planning Consents and Environmental Impact Assessment

Airport-related development

- 1.3.1 A DCO is required for the Proposed Development by virtue of sections 14(1)(i), 23 and 31 of the Act.
- 1.3.2 This is consistent with paragraph 1.40 of the ANPS which recognises that both new and reconfigured terminal capacity are each capable of constituting an NSIP. Paragraph 1.16 of the ANPS also explicitly recognises that it is possible for there to be more than one application for development consent, dealing with different components individually.

Highway-related development

- 1.3.3 The Proposed Development also includes alterations to Junction 14 and 14A of the M25. These works comprise alteration of a highway for which the Secretary of State is the highway authority.

The Development Consent Order

- 1.3.4 For NSIPs an application is made to the Secretary of State for a DCO. As part of its application the Applicant will, insofar as possible, seek all consents and powers required to construct, operate and maintain the Proposed Development, informed by extensive pre-application discussions. Although not an exhaustive list, these may include:
- Planning, listed building and conservation area consent for the Proposed Development, subject to the requirements specified within the DCO;
 - Power to undertake works on and to public highways and provisions relating to the regulation of traffic;
 - Powers to stop up public highways;
 - Powers to compulsorily acquire land, new rights over land and to extinguish existing rights; and
 - Provisions relating to the safeguarding of land required for construction and operation of the Proposed Development.
- 1.3.5 Notwithstanding the powers that the DCO will provide, it will also detail a number of additional consents, licenses and notifications that will need to be obtained, made or put in place following the granting of the Order to enable works to start. This includes protective

provisions for various statutory authorities. The DCO will not, however, contain all the consents that the developments contractors will require to enable works to start. Some consents of this type, such as those required under Section 61 of the Control of Pollution Act 1974, will need to be obtained in accordance with the relevant statutory legislation.

Environmental Impact Assessment

- 1.3.6 EIA has been established in the UK since 1988 and can be defined as “a systematic process to identify, predict, and evaluate the environmental effects of proposed actions and projects. This process is applied prior to major decisions and commitments being made.” (Sadler and Fuller et al. 2002).
- 1.3.7 The role and importance of EIA was further strengthened when it was formally recognised in the Rio Declaration on Environment and Development, under Principle 17. “Environmental impact assessment, as a national instrument, shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority” (United Nations 1994).
- 1.3.8 In Europe, the legal basis for EIAs was originally formed within the European Community Directive 85/337/EEC, which sets out the requirements for the preparation of an EIA for certain types of projects where they are likely to have significant effects on the environment. The initial Directive of 1985 and its three amendments have since been codified by Directive 2011/92/EU of 13 December 2011. This has been further amended by Directive 2014/52/EU, which forms the basis of the EIA regime in Europe and is transposed into UK law for NSIPs by the EIA Regulations.
- 1.3.9 In accordance with the EIA Regulations a formal EIA will be required as part of the application for a DCO and an ES, the report documenting the EIA process, will be prepared.
- 1.3.10 The ES will describe the likely significant effects predicted to occur as a result of the construction and operation of the Proposed Development, whether alone or in combination with other relevant development. It supports, and is submitted as part of, the DCO application.
- 1.3.11 In accordance with Regulations 6(1) and 8(1)(b) of the EIA Regulations, the Applicant has confirmed to PINS the intention to provide an ES for the Proposed Development. The approach to EIA, with respect to the Proposed Development, is described in greater detail in **Chapter 4 ‘Approach to EIA’** of this Scoping Report.
- 1.3.12 In overview, the EIA process will consist of the following key stages:
- EIA Screening: Screening is normally undertaken to determine, in cases where it is not clear, if a development requires an EIA to be undertaken. The Proposed Development is an EIA development in accordance with the EIA Regulations and so a screening opinion is not required;
 - EIA Scoping: Scoping is the first major milestone of the EIA process and sets out the initial project description, identifies the key topics of potential environmental impact and sets out the proposed methodologies by which these impacts are proposed to be investigated and assessed as part of the EIA process. The ‘Scoping Opinion’ published by PINS is a crucial part of the Scoping process, in which it outlines its response to the scope, and level of detail the Applicant is proposing to include in the ES. In accordance with Regulation 14(3)(a) of the EIA Regulations, where a Scoping Opinion has been adopted, the

Applicant's ES should "be based on the most recent scoping opinion adopted (so far as the proposed development remains materially the same as the proposed development which was subject to that opinion)";

- Preliminary Environmental Information (PEI): PEI is the umbrella term that describes a range of information that is provided by the Applicant in advance of the formal submission of the final ES alongside the DCO to assist consultees to understand the likely environmental effects of the Proposed Development and to inform their consultation responses. The Applicant's Statement of Community Consultation will set out how the Applicant intends to publicise and consult on the PEI. The PEI can include an early version of the ES, although it is not a necessity, to allow stakeholder feedback to inform the final submission and aims to reach agreement with key stakeholders on key impacts and mitigation proposals in advance of the DCO examination where possible; and
- Environment Statement (ES): The ES is the final report which sets out the methods, data, assessments, consultation and recommendations of the EIA process to inform the decision-makers during the examination and determination process.

Habitats Regulations Assessment

- 1.3.13 The Proposed Development has the potential to result in the alteration of or impacts to habitats or species protected under the Conservation of Habitats and Species Regulations 2017 ("the Habitats Regulations"), which transpose the Habitats Directive (92/43/EEC) into national law. Therefore, a Habitats Regulations Assessment (HRA) will be required to support the DCO application.
- 1.3.14 The proposed approach to the HRA is provided in **Chapter 6 'Biodiversity'**. HRA will be dealt with in parallel to the EIA. The HRA will flow naturally from the EIA with methodology applied to the EIA being taken a step further to identify whether the Proposed Development is likely to give rise to likely significant effects on any European sites, and if yes whether there will be an adverse effect on site integrity (alone or in-combination with other plans of project).

1.4 The Scoping Report

- 1.4.1 The role of this Scoping Report is to identify the main aspects of the human, physical and biological environment likely to be significantly affected by the construction and operation of the Proposed Development, and to assist with agreeing the extent and approach to relevant environmental studies to be undertaken as part of an EIA for PINS (on behalf of the Secretary of State) and relevant consultees to consider.

Requirements

- 1.4.2 The Scoping Report has been prepared in support of a request for a Scoping Opinion from PINS. Regulation 10(3) of the EIA Regulations defines the information that must be provided when a Scoping Opinion request is made, namely:

- "(a) a plan sufficient to identify the land;*
 - (b) a description of the proposed development, including its location and technical capacity;*
 - (c) an explanation of the likely significant effects of the development on the environment;*
- and*

(d) such other information or representations as the person making the request may wish to provide or make.”

I.4.3 PINS Advice Note 7: EIA, PEI, Screening and Scoping (PINS, 2017) also provides advice on the information that should be provided in the Scoping Report. **Table I.1** lists the suggested information requirements and identifies where they are presented in this Scoping Report.

Table I.1 Suggested Scoping Report Contents in PINS Advice Note 7

Suggested Scoping Report Contents (Based on Advice Note 7)	Relevant Sections in this Scoping Report
The Proposed Development	
An explanation of the approach to addressing uncertainty where it remains in relation to elements of the Proposed Development e.g. design parameters	Chapter 3 and Chapters 5 to 18
Referenced plans presented at an appropriate scale to convey clearly the information and all known features associated with the Proposed Development	Figure I.1
EIA Approach and Topic Areas	
An outline of the reasonable alternatives considered and the reasons for selecting the preferred option	Section 1.5 of Chapter 1 ‘Introduction’
A summary table depicting each of the aspects and matters that are requested to be scoped out allowing for quick identification of issues	‘Scoping of Potential Effects’ section of Chapters 5 to 18
A detailed description of the aspects and matters proposed to be scoped out of further assessment with justification provided	‘Scoping of Potential Effects’ section of Chapters 5 to 18
Results of desktop and baseline studies where available and where relevant to the decision to scope in or out aspects or matters	‘Baseline Conditions’ section of Chapters 5 to 18
Aspects and matters to be scoped in, the report should include details of the methods to be used to assess impacts and to determine significance of effect e.g. criteria for determining sensitivity and magnitude	‘Approach to Assessment’ section of Chapters 5 to 18
Any avoidance or mitigation measures proposed, how they may be secured and the anticipated residual effects	‘Approach to Mitigation’ section of Chapters 5 to 18
Information Sources	
References to any guidance and best practice to be relied upon	‘Approach to Mitigation’ section of Chapters 5 to 18
Evidence of agreements reached with consultation bodies (for example the statutory nature conservation bodies or local authorities)	‘Stakeholder Consultation’ section of Chapters 5 to 18
An outline of the structure of the proposed ES.	Section 4.9 of Chapter 4 ‘Approach to EIA’

Scoping objectives

I.4.4 The objectives of the scoping process are to:

- Describe the overall approach to the EIA (and HRA);
- Identify the environmental topics that are proposed to be assessed;
- Eliminate any topics proposed not to be assessed (i.e. be “scoped out”);
- Define the technical, spatial and temporal scope of the study for each topic;

- Define the approach and methodology for baseline studies;
- Define the approach and methodology for predicting environmental effects and for evaluating the significance of each effect;
- Identify the methods to be adopted for incorporation of mitigation, monitoring and other environmentally driven modifications into the design, as it develops; and
- Provide a basis for agreeing the approach to the EIA and HRA, and the methodologies to be followed with relevant stakeholders.

1.5 Consideration of Alternatives

- 1.5.1 The EIA Regulations require the ES to contain a description of the reasonable alternatives studied by the Applicant as are relevant to the Proposed Development, with an indication of the main reasons for selection of the proposed project design and a comparison of the environmental effects.
- 1.5.2 For the purpose of alternatives, the Proposed Development could be considered on three levels, at the national level, the scheme level and the project level. At the national level a lengthy analysis of alternatives for UK airport expansion preceded the development and adoption of the ANPS and resulted in the selection of Heathrow as the preferred location for new airport capacity in the Southeast of England. The ANPS has therefore already examined both need for new capacity and its preferred location and therefore, it is not proposed to revisit this level of alternatives within the EIA. The ANPS has also identified the NRS as the preferred scheme to deliver additional capacity and the scheme in relation to which the NPS has effect. As explained earlier, the ANPS sets boundaries and parameters for the final scheme for which development consent is sought, which includes new and reconfigured terminal capacity.
- 1.5.3 The second level of alternatives is the broad scheme alternatives and for the Proposed Development. An alternative scheme for new and reconfigured terminal capacity exists in the form of the HAL DCO Project. It is therefore proposed that the principal components of the HAL DCO Project which are different from the Proposed Development form the key comparison scheme design for the purpose of the consideration of broad scheme alternatives. As HAL has not yet consulted on its preferred proposals for terminal capacity, it is not yet known precisely which alternatives will be considered, However, the EIA for the Proposed Development will consider the relevant main alternatives in the HAL DCO Project.
- 1.5.4 The final level of alternatives is at the project level and includes development design, optioneering, technology, location, size and scale of specific site elements. These design decisions are an iterative process and are informed via consultation, technical surveys and assessments, environmental assessments and cost benefit analysis.
- 1.5.5 Following the broad methodology set out above, the consideration of alternatives will be presented as part of the Preliminary Environmental Information Report (PEIR) and ES, to demonstrate how the Applicant has considered reasonable alternatives for the Proposed Development.

1.6 References

Airports Commission (2015) Airports Commission: Final Report [Accessed: 13/11/18] Available at: <https://www.gov.uk/government/publications/airports-commission-final-report>

Airports Commission (2015) Airports Commission: Final Report [Accessed: 13/11/18] Available at: <https://www.gov.uk/government/publications/airports-commission-final-report>

Department for Transport (2016) Oral statement to Parliament: Airport capacity [Accessed: 13/11/18] Available at: <https://www.gov.uk/government/speeches/airport-capacity>

Department for Transport (2017) Airport expansion: Updated Appraisal Report Airport Capacity in the South East [Accessed: 13/11/18] Available at: <https://www.gov.uk/government/publications/airport-expansion-updated-cost-and-benefits-appraisal>

Department for Transport (2018) Airports National Policy Statement: new runway capacity and infrastructure at airports in the South East of England [Accessed: 13/11/18] Available at: <https://www.gov.uk/government/publications/airports-national-policy-statement>

Infrastructure Planning (Environmental Impact Assessment) Regulations (2017) [Accessed: 13/11/18] Available at: <http://www.legislation.gov.uk/uksi/2017/572/contents/made>

Report of the United Nations Conference on Environment and Development (Rio de Janeiro, 3 -14 June, 1992), Annex I, Rio Declaration on Environment and Development.

Sadler B & K Fuller et al. (2002) UNEP Environmental Impact Assessment Training Resource Manual, 2nd Edition, UNEP, Geneva.

The Planning Act (2008) [Accessed: 13/11/18] Available at: <https://www.legislation.gov.uk/ukpga/2008/29/contents>

The Planning Inspectorate (2017) Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements [Accessed: 13/11/18] Available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/>

2 Description of Existing Site and Surroundings

2.1 Principal Works Area

- 2.1.1 As shown on **Figure 1.1**, the principal works area under consideration for Heathrow Western Hub is located between the existing T5 building and the M25 motorway. This area will include terminal facilities and airfield expansion, as well as surface access infrastructure and works to watercourses.
- 2.1.2 Existing built development within the principal works area consists of the T5 building, the Applicant's Sofitel Hotel, and associated car park facilities. These are separated from an area of green belt land to the west of the principal works area by the Western Perimeter Road and the A3044 (Stanwell Moor Road). The northern extent of the principal works area is defined by the access road to junction 14A of the M25 that provides direct access from the motorway to the Western Perimeter Road and T5. The southern extent of the principal works area is defined by the A3113 (Airport Way) and Spout Lane that provides access to a number of residential properties and some industrial buildings.
- 2.1.3 The designated green belt land sits within the Colne Valley Regional Park. It is understood that the area has been subject to spoil deposition as part of the T5 development, which has been restored for potential agricultural use (London Borough of Hillingdon, 2009). The River Colne dissects this area of land as it flows north to south from Longford towards Stanwell Moor.

2.2 Surroundings

- 2.2.1 Heathrow Airport is located approximately 15 miles west of Central London, within the London Borough of Hillingdon. The airport consists of two parallel east–west runways along with four operational terminals (T2, T3, T4 and T5). It is surrounded by suburban housing, business premises and mixed-use open land to the north and south; suburban housing and business premises to the east; and three large reservoirs, mixed-use open land, housing and business premises to the west (DfT, 2013). The airport sits on a site that covers approximately 1,227 hectares.
- 2.2.2 The airport is bounded by the A4 (Bath Road) to the north (and the M4 motorway beyond that), the A3044 (Stanwell Moor Road) to the west (and the M25 motorway beyond that), the Southern Perimeter Road and the A30 (Great South-West Road) to the south, and the Eastern Perimeter Road and the River Crane to the east.
- 2.2.3 The nearest major urban areas to the airport are Hounslow (to the east) and Staines to the south-west. Smaller communities immediately surrounding the airport include Sipson, Longford, Harlington, Cranford, Hatton, East Bedfont, Stanwell, Stanwell Moor, Horton, Poyle, Colnbrook and Harmondsworth.
- 2.2.4 Heathrow Airport lies within the hydrological catchment of the River Thames. There are a number of tributaries of the Thames in the vicinity of the site, including the River Colne to the west of the airport and River Crane to the east. The Duke of Northumberland and Longford Rivers are two artificial watercourses known as the 'Twin Rivers' that flow along the western and southern boundaries of the airport site. The course of the Twin Rivers was initially changed in the 1940s to enable the construction of Heathrow Airport and was then

diverted more recently to enable the construction of T5.

2.3 Existing Infrastructure

Runway arrangement

2.3.1 Heathrow Airport currently has two runways operating in segregated mode (where landing aircraft are allocated to one runway and departing aircraft to the other). The two parallel runways are concrete with grooved asphalt, and orientated in an east-west alignment with a separation of approximately 1.4km. The dimensions of the runways are as follows:

- Northern runway: 3,902 metres long and 50 metres wide; and
- Southern runway: 3,658 metres long and 50 metres wide.

2.3.2 The runways are designed to operate the largest commercial aircraft, categorised as Code F by European Aviation Safety Agency (EASA) standards, which has a wingspan up to 80 metres wide.

Terminals and satellites

2.3.3 Heathrow Airport is served by four passenger terminals, which provide 133 contact stands with air bridges for passenger boarding and disembarkation and a further 64 remote stands (HAL, 2017). Terminal 1 (T1) was closed for passengers in 2015.

2.3.4 The current passenger terminal configuration at Heathrow Airport is as follows:

- T2, the Queens Terminal, is the airport's newest terminal, opened in 2014. The terminal currently consists of a main processing building (T2A) and one satellite to the east (T2B) which is accessed via a walking tunnel under the taxiway. The baggage facilities are housed in the adjacent T1, which is now closed for all other operations. T2 handles circa 18 mppa;
- T3 is the oldest terminal at the airport. Opened in 1967, it handles circa 17 mppa;
- T4 is located south of the southern runway and handles circa 8 mppa;
- T5 to the west of the airfield consists of a main terminal building (T5A) and two satellites (T5B and T5C). An underground Automated People Mover (APM) enables access to the satellites. T5 is the largest terminal at the airport and currently handles circa 33 mppa.

2.3.5 The arrangement of the existing terminals is shown on **Figure 2.1**.

Taxiways and aprons

2.3.6 The passenger terminals, aircraft aprons and aircraft stand areas across the airfield are serviced by a network of taxiways, as can be seen on **Figure 2.1**. These feature signage, marking and lighting systems which are compliant with the UK Civil Aviation Authority's (CAA) "Civil Aviation Publication (CAP) 168 – Licensing of Aerodromes" (CAA, 2014). This enables the safe movement and manoeuvring of aircraft between the runways and the stands.

2.3.7 Aprons are defined areas on an airport intended to accommodate aircraft for the purposes of loading or unloading passengers or cargo, refuelling, parking, or maintenance. Heathrow has aprons for each terminal building along with a cargo apron to the south of the airport for freight operations and a maintenance apron on the eastern side of the airport.

Ancillary facilities

- 2.3.8 There are a variety of ancillary facilities on the airport which are required to support the operation and maintenance of the airport. These are both landside and airside and examples include: aircraft fuelling facilities, air and ground traffic control infrastructure, baggage facilities, energy and utility infrastructure, commercial air related buildings, vehicle parking areas, transport infrastructure and emergency services facilities.
- 2.3.9 The Air Traffic Control (ATC) tower is located on the central part of the airfield between the Central Terminal Area (CTA) and T5. The height of the ATC tower structure is 87 metres, which provides unobstructed 360° views of the entire airfield for controllers.
- 2.3.10 Cargo facilities are primarily located on the southern part of the airport with aircraft maintenance facilities situated at the far eastern end of the airfield between the two runways.

Road access

- 2.3.11 All of the passenger terminals at Heathrow Airport can be accessed by road. There is direct access to the M25 and M4 and to other local and trunk roads.
- 2.3.12 Heathrow is currently encircled by two rings of local roads: the inner ring is formed by the northern, eastern, southern and western perimeter roads; the outer ring consists of the A4, A312, A30 and A3044. Heathrow's terminals are connected to the inner ring by an access road between the Western Perimeter Road and T5, and the northern tunnel between the CTA and the Northern Perimeter Road. As well as providing access to the airport, these routes provide accesses to and from local communities and for through traffic.
- 2.3.13 The existing road access arrangement is shown on **Figure 2.2**.

Car parking and on-airport transport

- 2.3.14 The T5 planning inquiry resulted in a planning condition that imposes a cap of 42,000 car parking spaces for the airport as a whole. A limit of not more than c. 17,500 spaces are designated for airport workers, with the remaining spaces designated for public use. This car parking is provided around the perimeter of the airport and adjacent to the terminals.
- 2.3.15 In addition, car parking is provided within tenanted areas for staff and operations associated with the business premises at the airport. Some airport-related car parking is also located off site.
- 2.3.16 Passenger and staff connections from car parks to the terminals is primarily by bus operation, plus an automated vehicle at T5. For passengers being dropped off at the airport, there are free set-down lanes outside the terminals. There is no free pick up area adjacent to the terminals, and most passengers being collected from a flight use the paid short stay car park or one of the longer stay car parks for free (if they are staying for less than two hours).

Public transport

- 2.3.17 Rail access to London is available via the Heathrow Express to/from London Paddington, with stations at T2/3, T4 and T5, and the London Underground Piccadilly line. Future extensions of the rail line are planned from the T5 station through to Slough (Western Rail Link to Heathrow) and through to the South West suburban lines near Staines station and beyond (Southern Rail Link to Heathrow). The Heathrow Connect service, which ran to/from Paddington, ceased in 2018, ahead of becoming part of the Elizabeth line (Crossrail) in autumn

2019.

- 2.3.18 Currently, there are a number of bus/coach options for accessing Heathrow. This includes rail-air bus services which provide direct buses/coaches to Heathrow from the national rail, coach services and TfL buses which connect Heathrow and towns in West London.

2.4 Operations

- 2.4.1 Air traffic at Heathrow Airport is managed by National Air Traffic Services (NATS), the air navigation service provider. NATS ensure that aircraft landings and take-offs are appropriately sequenced by controlling the speed and lengths of routings prior to aircraft being directed onto a final approach or following take off. NATS also manage aircraft ground movements.
- 2.4.2 For safety and performance reasons aircraft typically take off and land into the wind. In the UK, the wind is mostly from the south west. That means the majority of aircraft (approximately 70% a year) make their final approach over London and take off towards the west. This is known as 'westerly operations' (HAL, 2018).
- 2.4.3 When the wind blows from the east (and is over five knots), the direction of operation is switched and aircraft land from the west over Berkshire and take off towards the east. This is known as 'easterly operations' and occurs approximately 30% of the time (HAL, 2018).
- 2.4.4 During westerly operations, the airport operates a procedure known as runway alternation to provide local communities living under the final approach into the airport with periods of relief from aircraft noise. The alternation pattern means that, between the hours of 06:00 and 15:00, one runway is used for landings and the other for take-offs. After 15:00 and until 23:00 the orientation is swapped so that the runway that previously supported only departures then only supports arrivals and vice versa (HAL, 2018).
- 2.4.5 Runway alternation is not currently possible during easterly operations. This is due to the now rescinded Cranford Agreement. The Cranford Agreement (1952) was a Ministerial verbal statement of best endeavours to avoid using the Northern Runway at Heathrow Airport for departures in an easterly direction over Cranford (DfT, 2008).
- 2.4.6 After public consultation, the previous Government ended the Cranford Agreement in January 2009, with the aim of distributing noise more fairly around the airport. Implementation of the ending the Cranford Agreement would enable runway alternation to be introduced when the airport is on easterly operations and give affected communities predictable periods of relief from over flying aircraft. The Coalition Government reaffirmed their support for this decision in September 2010. Although the Cranford Agreement has ended, HAL has not yet implemented full runway alternation during easterly operations because physical works are required to the airfield to facilitate the operational changes (DfT, 2010).
- 2.4.7 In May 2013, a planning application was submitted by HAL for the creation of a new access and exit taxiways along with a new hold area and acoustic noise barrier, which would enable full runway alternation on easterly operations. Planning permission was initially refused by the London Borough of Hillingdon in March 2014. However, in February 2017 permission for the works was granted by PINS following an appeal by HAL against the decision. It is now understood that HAL intends to wait until a decision is made on the proposed third, Northwest Runway (i.e. the HAL DCO Project) before initiating plans to alternate runways on easterly operations.

- 2.4.8 Restrictions on night flights have been in place at Heathrow since 1962. The current regime which is in place from October 2017 to 2022 restricts Heathrow to 5,800 take-offs and landings a year between 23:30 and 06:00. The restrictions are set by the Department of Transport (DfT) as part of the Government defined noise measures under the Civil Aviation Act 1982. The Government consults on the night flight regime for Heathrow every five years.
- 2.4.9 Heathrow also has a voluntary ban in place that prevents flights from landing before 4:30am. To limit or reduce the number of people significantly affected by aircraft noise at night, the Government also sets noise restrictions by limiting landing and take-offs for noisier aircraft.

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3 The Proposed Development

3.1 Background

3.1.1 The ANPS establishes the NRS at Heathrow Airport as the preferred location and scheme for delivering additional airport capacity in the South-East. It also sets out the scope and parameters with which an application will need to comply, to have the full policy support of the ANPS. Some of the key parameters of the ANPS are as follows:

- The ANPS has effect in relation to the provision of a Northwest Runway at Heathrow Airport (paragraph 1.40);
- The ANPS applies to schemes at Heathrow Airport that include a runway of at least 3,500m in length and that are capable of delivering additional capacity of at least 260,000 air transport movements per annum, and associated infrastructure and surface access facilities (paragraph 4.3);
- The ANPS also applies to reconfiguration and provision of new terminal capacity to be located between the two existing runways (paragraph 4.3);
- It is possible that an applicant for development consent in respect of the preferred scheme will promote more than one application for development consent, dealing with different components individually (paragraph 1.16); and
- The ANPS does not identify any statutory undertaker as the appropriate person or appropriate persons to carry out the preferred scheme (paragraph 1.15).

3.1.2 Against this background, the Proposed Development comprises components of the NRS at Heathrow Airport.

3.1.3 To this extent, it overlaps, and would replace, certain components of the HAL DCO Project.

3.1.4 HAL is currently progressing a scheme development process to identify the precise scope of its DCO application. As the Proposed Development is delivering components of the wider NRS, it also includes those additional works necessary to integrate it seamlessly with the HAL DCO Project. Until more information is known about the precise details of the HAL DCO Project, the definition of the Proposed Development is being drawn widely for the purposes of EIA scoping.

3.1.5 In order to assist the EIA scoping process, key differences between the HAL DCO Project and the Proposed Development are identified throughout this chapter by text boxes.

3.1.6 For ease of cross-referencing and comparison, this description of the Proposed Development has used the same broad structure as Chapter 3 of the HAL Scoping Report from **Section 3.5** onwards.

3.2 Overview of the Proposed Development

3.2.1 The Proposed Development consists of the reconfiguration and expansion of terminal and airfield facilities on the western boundary of Heathrow Airport. The proposed Heathrow Western Hub principally comprises the following components of the NRS, as illustrated in **Figure 1.1**:

1. New and reconfigured terminal capacity which will increase the number of passengers for which the airport is capable of providing air passenger transport services by at least 50 million passengers per year and be capable of supporting an additional 260,000 air transport movements per annum;
2. Expansion of the existing airfield, including taxiways to service the new Northwest Runway, and to provide aprons and stands for Heathrow Western Hub and to connect to the new Northwest Runway;
3. Changes to the existing road and rail surface access infrastructure, including local road changes and alterations to junction I4 and I4A of the M25;
4. Public transport upgrades;
5. Changes to river alignments and flood storage;
6. Associated supporting facilities, including cargo, aircraft maintenance, fuel storage, waste and water treatment facilities, public utilities, generation plant to support the energy demand of the airport and consolidation of car parking (to the extent required);
7. Displaced uses;
8. Other airport related development; and
9. Other associated works necessary to deliver the scheme, including landscaping and ecological improvement works.

The Proposed Development does not include works to construct the new Northwest Runway (or any air traffic associated with it) or the changes to the M25 to allow the new Northwest Runway to cross the motorway. It does however include local road changes and alterations to Junctions I4 and I4A of the M25 to provide appropriate road access to the reconfigured terminal capacity and to accommodate the new airfield to the west of T5.

3.3 Regulatory Background, Vision and Project Objectives

Regulatory background

- 3.3.1 The Applicant believes that competition drives innovation, efficiency and value and that expansion within the NRS is a once in a generation opportunity to assess and incorporate the benefits of competition at Heathrow Airport. The primary opportunity is in the provision and operation of additional terminal capacity and this is enabled by the ANPS which explicitly recognises that it is possible for there to be more than one application for development consent, dealing with different components individually.
- 3.3.2 The Applicant is a major stakeholder in the NRS, both as a landowner and with significant business interests at Heathrow Airport. The Proposed Development is an alternative to the HAL DCO Project for the terminal elements of the NRS. It includes the reconfiguration and expansion of terminals to the west of Heathrow Terminal 5. The Proposed Development integrates new passenger facilities with Terminal 5 through reconfigured terminal capacity. The Applicant's application for development consent will seek powers to construct, own and

operate Heathrow Western Hub and powers for HAL to deliver and operate other key components of the development.

- 3.3.3 The Applicant believes that the Proposed Development will implement components of the NRS efficiently and effectively, reflecting the intrinsic legacy benefit of introducing ongoing competition to the operation of the UK and Europe's most important aviation hub.
- 3.3.4 Heathrow Airport is currently operated by a single company, HAL. HAL is subject to licencing and pricing controls by the Civil Aviation Authority (CAA). These controls derive from the CAA's determination that HAL meets the Market Power Test (MPT), which was last undertaken in January 2014. This determined that HAL has significant market power in the market for the provision of airport operation services for both full service carriers and associated feeder traffic at Heathrow Airport.
- 3.3.5 The Applicant's Proposed Development plans have been developed in continuous dialogue and engagement with the CAA and airline groups who use Heathrow Airport. The Applicant's role has been welcomed as a means to evidence the benefits that may be derived from the introduction of competition at Heathrow Airport.
- 3.3.6 The CAA has a statutory duty to promote competition in the provision of airport operation services in the exercise of its functions under the Civil Aviation Act 2012 ("CAA 2012"). This is set out in Section 1 of the CAA 2012:
- SI(1): The CAA must carry out its functions under this Chapter in a manner which it considers will further the interests of users of air transport services regarding the range, availability, continuity, cost and quality of airport operation services.
 - SI(2) The CAA must do so, where appropriate, by carrying out the functions in a manner which it considers will promote competition in the provision of airport operation services."
- 3.3.7 Moreover, the CAA's Strategic Plan (2016-2021) Making Aviation Better: Our Key strategies (CAP 1360), includes a number of references to the importance of competition:
- Where competition is not effective, we intervene to promote and protect consumers' interests (paragraph 3.1);
 - We take a different approach to delivering choice, value and fair treatment – here we want to see well-informed and confident consumers driving vigorous competition between businesses to provide what consumers want as efficiently and innovatively as possible (paragraph 3.2); and
 - Finally, we will work closely with other competition authorities to do our bit to strengthen effective end-to-end oversight of competitive conditions for aviation services and take coordinated action where there are features that prevent effective competition (paragraph 3.20).
- 3.3.8 The CAA has considered its powers to enable competition at Heathrow Airport as set out in its Technical Information Note (TIN) published in August 2018 (CAA, 2018). The key points are as follows:
- There can be multiple operators at a particular airport;

- Separate terminal development and operation as part of Heathrow Airport’s expansion is possible within the regulatory framework of the CAA 2012;
 - The CAA has regulatory and licensing powers to deal with multiple operators at a particular airport;
 - If a separate operator is introduced, it could be subject to the CAA’s regulation and licensing, similar to HAL;
 - The CAA has sufficient legal powers through its licensing to enable this. Licensing an alternative operator is one of several regulatory tools the CAA could use; and
 - The CAA has the power to require HAL to enter into contractual or other arrangements with the developer and operator of a new terminal if that was necessary and proportionate to further the CAA’s statutory duties, including to further the interests of consumers and promote competition.
- 3.3.9 The CAA has subsequently set out its proposals as to how it will incorporate the TIN principles into its assessment of alternative party proposals and competition in its consultation paper, CAP 1722 (CAP 1722), dated October 2018 and entitled ‘Economic regulation of capacity expansion at Heathrow: policy update and consultation’.
- 3.3.10 In this, the CAA confirms its position as a statutory consultee and its intention to consider any necessary adjustments to the existing regulatory framework to facilitate and support alternative party proposals, with particular reference to the Applicant’s plans. This would include consideration of the overall shape of the regulatory framework and possible interactions with HAL along with any applicable regulatory incentive schemes and regulatory interface between an alternative provider and HAL to allow flexibility in the development and operation of their infrastructure. The CAA plans to continually review progress of both HAL and the Applicant’s plans through the DCO process in its role as a statutory consultee.

The Applicant’s vision

- 3.3.11 The Applicant believes there is a better way to deliver the increased capacity at Heathrow Airport identified in the ANPS.
- 3.3.12 The Applicant has a fresh perspective. The vision is to deliver and operate a new terminal hub on the western boundary of Heathrow Airport to cater for the predicted growth outlined in the ANPS. The Proposed Development will establish a global gateway to the UK and create a new benchmark for efficient terminal delivery, design and operation. Heathrow Western Hub will provide a focus for a sustainable transport interchange, establish a new front door to Heathrow Airport and seek to minimise the effects of a dispersed development strategy. The Proposed Development will seek to improve connections for and better integrate Heathrow Airport with the local community and establish an attractive setting for the airport and the surrounding area.

Project objectives

- 3.3.13 The Applicant’s application for development consent will seek powers to construct, own and operate Heathrow Western Hub.
- 3.3.14 The Proposed Development will seek to evidence and establish how its design, implementation and approach aligns with the following operating components of the NRS which will offer

significant advantages to consumers.

3.3.15 The design and implementation of the Proposed Development has been, and continues to be, undertaken in accordance with the following high-level objectives:

- **Efficiency:** lower development cost and less land take compared to the HAL DCO Project, without compromising on quality or mitigation;
- **Future focused:** embed sustainability principles in the design through a sustainability framework and incorporate cutting edge technology to enhance operational efficiency and passenger experience;
- **Flexible:** enable a phased increase in terminal capacity in line with demand;
- **Design quality:** embed design excellence and leadership in the project process to secure a high-quality outcome;
- **Passenger focused:** improve passenger experience and reduce costs (through lower development costs and/or the introduction of competition);
- **Airline focused:** improve operational efficiency and flexibility through design and technology to maintain and optimise the mix of long haul, short haul and domestic routes;
- **Community focused and long-term partnership:** deliver beneficial outcomes for the local community and economy, not merely mitigate adverse effects; be a good neighbour and deliver and catalyse improvement in the local communities, nearby London Boroughs and West London more generally.
- **Connectivity:** ease and improve intermodal passenger flow through a new public transport interchange at the new terminal and better access to sustainable forms of public transport, including for the wider community; and improve the quality and environment of the local road network.
- **Environment:** minimise adverse environmental effects and as far as possible enhance the local environment through a less dispersed development strategy.
- **A new gateway:** establish a clear setting for the new terminal and enhance the quality of the wider environment of Heathrow Airport in recognition of its status as a gateway to the UK, including through seeking a joined up spatial planning strategy with local authorities for airport related development.

3.3.16 The Proposed Development will be informed by effective and proactive engagement with all stakeholders, focusing on options, benefits, impacts and mitigation.

3.4 Integration with the HAL DCO Project

3.4.1 As set out above, the Applicant's principal interest is consenting, constructing and operating the Heathrow Western Hub to serve the Northwest Runway component of the NRS being developed and operated by HAL. The Applicant is however acutely aware of the necessity to ensure that its proposals for the Heathrow Western Hub fit seamlessly into the Northwest Runway component of the HAL DCO Project.

3.4.2 On the basis that the HAL DCO Project has not yet been fully defined, at this stage the Applicant cannot fully determine the level of additional components (over and above the Heathrow Western Hub and associated infrastructure and works to roads and waterways)

which will need to be included within its DCO application to ensure that this seamless integration is achieved. For the purposes of the Scoping Report, it has therefore assumed that the Proposed Development would include all necessary components to support expanded capacity, including associated development, ancillary uses and, potentially, displaced uses (excluding the Northwest Runway and associated M25 realignment works).

- 3.4.3 It is however anticipated that as further details of the HAL DCO Project emerge (likely to be following HAL's Stage Two consultation in June 2019) that the scope of the Proposed Development could be significantly reduced.

3.5 Project Design

- 3.5.1 As set out above in **Section 3.2**, the HWH DCO application starts from the basis that the ANPS is supportive of a NRS at Heathrow Airport.
- 3.5.2 Against the background of the ANPS, the Proposed Development comprises components of the NRS at Heathrow Airport.
- 3.5.3 The Applicant's starting point was to establish how to best deliver the NRS and meet the requirements of the ANPS. This initially focussed on terminal location, design and delivery.
- 3.5.4 Following an assessment of alternatives, it was concluded that locating terminal capacity to the west of Terminal 5 would best deliver the policy requirements of the ANPS for the reasons set out earlier in this Scoping Report (see further the Applicant's Vision and Objective set out in **Section 3.3** above).
- 3.5.5 The design development process for the Proposed Development is founded on a contextual appreciation of Heathrow Airport and its wider environment. The Applicant's baseline work seeks to identify not only receptors to inform technical assessment, but also inform the design strategy.
- 3.5.6 The Applicant's design approach is to establish a project vision, masterplan framework and design objectives (Phase 1) that inform the design options for the HWH DCO (Phase 2) and related 'components' (Phase 3). The design process will be underpinned by two stages of consultation which will inform the project design as part of an iterative process. The Applicant will identify preferred options for the components which will be tested and developed as part of a masterplan options process (Phase 4). The masterplan options process will ultimately result in the identification of a preferred masterplan (Phase 5) which will form the basis of the DCO application.
- 3.5.7 The Applicant is principally concerned with progressing the promotion, construction and operation of new and reconfigured terminal capacity to serve Heathrow Airport. Following a review of the Scheme Development Report undertaken by HAL (HAL, 2018) and careful consideration of terminal models, the Applicant is focusing on new terminal capacity to the west of Heathrow Airport rather than a dispersed terminal model, to better meet the needs of the ANPS.
- 3.5.8 The Applicant's process to progress the selection and design of the Proposed Development, comprises the following key phases:
- **Phase 1** (complete) – Define the Masterplan Framework and Project Design Objectives – this stage focussed on defining the Applicant's objectives and establishing a masterplan framework for the HWH DCO (see **Section 3.4** above), within which options would be

evaluated. The Applicant's Stage 1 consultation will outline the design framework and project objectives;

- **Phase 2** (complete) – Terminal Options – A terminal location options review was undertaken to identify a preferred location. This stage has concluded that the Applicant will be consulting on a DCO for terminal capacity in the west portion of Heathrow Airport, closely adjoining Terminal 5 and the M25 – the Heathrow Western Hub. The Applicant's Stage 1 consultation will be based on this preferred terminal location option, but with some choices which are likely to be related to final design, detailed siting and configuration;
- **Phase 3** (in progress) – Related Component Options - Following selection of the preferred terminal location, the Applicant is considering 'component options' for the location and design of other elements of Heathrow Airport that will respond to the preferred terminal siting. The components include: alternative approaches to the alignment and design of local roads (see **Section 3.7** below), taxiways and watercourses.

During this phase, the Applicant will also be carrying out an assessment of options for associated supporting facilities, airport-related development and displaced uses as part of this evaluation of components and implications on construction planning, to the extent to which they are required to enable the Heathrow Western Hub to be compatible with the HAL DCO Project. In this regard, the Applicant will as far as possible, be seeking to ensure integration with the wider airport solution adopted by HAL and will only be including those additional components necessary to do this in its DCO application. This wider-reaching component options study is in progress and the Stage 1 consultation will be seeking responses to key issues that will inform this work;

- **Phase 4** – Masterplan Options – The Applicant will explore masterplan options that adopt the preferred terminal location and explore the preferred component option outcomes. This phase will build on the earlier masterplan framework and project objectives (Phase 1) and will also draw on Stage 1 consultation feedback to inform the options work; and
- **Phase 5** – Final Masterplan – The options process carried out at Phase 4 will be followed by the identification of a preferred masterplan for the Stage 2 consultation which will form the basis of the DCO application following consideration of consultation feedback. The selection of components within the Proposed Development will be supported by the outcome of public consultation undertaken prior to submission of the DCO application.

The HWH DCO application

- 3.5.9 The DCO application will seek permission for the construction and operation of the Proposed Development and associated development, necessary to deliver the terminal component of the NRS (for the avoidance of doubt, the DCO application will not include the new Northwest Runway or changes to the M25 to allow the Northwest Runway to cross the motorway).
- 3.5.10 'Associated development' is defined by the Act as 'development which is associated with the principal development subject to requirements' (i.e. associated with the NSIP(s)). Guidance provides that a 'direct relationship' between the associated development and the NSIP is necessary and that associated development must meet certain tests (DCLG, 2013).
- 3.5.11 It is recognised that the HWH DCO application will need to include development beyond the terminal proposals to ensure that the HWH DCO fits seamlessly into the HAL DCO Project.

At this stage, it has not yet been determined precisely how much of the Proposed Development and associated development necessary to develop, operate and maintain this component of the NRS will be included within the HWH DCO application. However, for the purposes of EIA Scoping, the Applicant has taken a reasonable worst-case approach and assumed that it will include the components which are necessary to achieve, operate, maintain and mitigate the effects of the Northwest Runway, with the exception of the Northwest Runway works themselves and the major changes required to the M25, to the extent that they are required to integrate the Heathrow Western Hub into the remainder of the NRS (see **Section 3.7** below). As described further below, it is anticipated that this will reduce as more detail of the HAL DCO Project becomes known but, in principle, the Applicant will only include enough development to ensure that the Heathrow Western Hub reconfiguration is integrated with the HAL DCO Project.

- 3.5.12 Design options for the principal components of the Proposed Development are described in **Section 3.7** onwards along with a summary of principal differences with the HAL DCO Project.
- 3.5.13 Similarly to HAL's approach, there is the potential for some components of the NRS to be consented through the local planning process, including through planning applications made by third parties. The Applicant would only be including these elements in the HWH DCO application if they are necessary to integrate its application into the HAL DCO Project.
- 3.5.14 Where such development is reasonably foreseeable and not to be consented under the DCO, it will be taken into account either in relation to the baseline for the EIA for the DCO Project, or as "other development" in the EIA through the Cumulative Effects Assessment (CEA) (as appropriate). Further details of the proposed approach to CEA is presented in **Section 4.6**.

3.6 Principal Components of the Proposed Development

- 3.6.1 This section presents the principal components that form part of the HWH DCO application, as shown in **Figure I.1**, and describes the principal differences between this and the HAL DCO Project. Where options are described, this is to explain the Applicant's current view on potential options, which are subject to review and possibly change. The intent is to develop a single option for each component for submission as part of the DCO, informed by consultation, and therefore the EIA would only assess the Proposed Development being applied for, not a range of options.

New and reconfigured terminal capacity

- 3.6.2 There is a need for new and reconfigured terminal buildings to process passengers to facilitate the required expansion of capacity identified in the ANPS, which the Applicant is proposing is delivered within Heathrow Western Hub.

Expansion of Existing Airfield

- 3.6.3 The existing airfield will need to be expanded with the addition of the Northwest Runway, however, the HWH DCO will not include the new Northwest Runway. The Applicant's solution will fit seamlessly with the Northwest Runway location and configuration in the HAL DCO Project.
- 3.6.4 There will need to be new stands for aircraft parking and circulation (apron) space.

The HWH DCO Project includes the necessary aprons and taxiways required to serve the Northwest Runway up to where they connect with the new NRS infrastructure. The HWH DCO Project will include parameters for these taxiways in order to ensure that they are compatible with the proposals being brought forward by the HAL DCO Project.

- 3.6.5 Taxiways will be required to serve the new Northwest Runway and connect it with the existing airport.

Taxiways

- 3.6.6 As explained above, the HWH DCO application will not include the Northwest Runway. It will however include taxiways to serve the new Northwest Runway and connect it with the existing Airport to the west of existing Terminal 5.
- 3.6.7 These will include an Around the End Taxiway (ATET) that avoids the need for aircraft to cross the existing northern and southern runways.
- 3.6.8 Heathrow Western Hub provides for a taxiway connection to the new Northwest Runway, which connects to the west of the new Northwest Runway (see text box below). Within this location, two options are currently being considered for parallel taxiways (either dual or triple).
- 3.6.9 The HWH DCO also includes an extension to the existing east west parallel taxiways to connect the new aprons that provide the new terminal capacity.

This is different from the HAL DCO Project which is currently considering three broad areas for new taxiways to link the proposed north satellite terminal complex to the existing taxiway system – to the north, west and east of the existing airport. HWH DCO Project's taxiway option falls within the broad area being considered by HAL to the west of T5.

M25 Motorway

- 3.6.10 The Proposed Development will include modifications or additional capacity upgrades to Junctions 14 and 14a of the M25. As explained above, it will not however include the major realignment works required to the M25, but it will tie in with the realignment to be delivered by the HAL DCO.
- 3.6.11 The principal access and egress to Heathrow Western Hub is proposed to be from J14, via the A3113 with a short sub-surface link entering Heathrow Western Hub from the south. Improvements to J14 which may include dedicated entry and exit slip roads from the M25 will improve capacity and function at J14 and will bring benefits to local traffic as well as airport traffic.

Other road diversions

- 3.6.12 There are likely to be significant changes to the distribution of the traffic around Heathrow Airport. To address this and to minimise traffic congestion impacts, a number of key junctions are proposed to be upgraded. The new amendments would broadly retain the function of the

existing road network, maintaining network resilience whilst minimising property loss and encroachment of any road alterations on existing communities.

A4 amendments

3.6.13 The Proposed Development currently anticipates that the A4 will be diverted to maintain east-west connectivity, although it can be retained on its current route for longer in the Proposed Development than under the HAL DCO Project. The realigned A4 would pass beneath the Northwest Runway taxiways to the south of the new Northwest Runway, and re-join the original alignment of the A4 to the west of the M25 and beyond the western end of the new Northwest Runway (NPR).

Northern Perimeter Road

3.6.14 The Northern Perimeter Road can be mostly retained in the Proposed Development, allowing local access to staff and long-term passenger parking to be retained. The NPR would tie into the new rationalised Western Perimeter Road. The new taxiways for the Northwest Runway will sever the NPR where it becomes the Western Perimeter Road. The NPR would be connected to the realigned A4, maintaining current connectivity. A3044 amendments

3.6.15 The existing Western Perimeter Road will be rationalised to maintain north-south connectivity while also serving potential access to the new HWH. Two options currently exist for this connectivity link: either use the existing right-of-way (ROW) of the current alignment or relocate the road to a new alignment running parallel and adjacent to the existing M25 road (NPR)

A3113 Amendments

3.6.16 Part of the A3113 will need to be relocated to the south to allow space for new taxiways. With capacity improvements proposed for J14 and a new junction to provide southern access to Heathrow Western Hub at the Stanwell Moor Junction, the realignment of the A3113 can be integrated into the proposed junction improvements.

Stanwell Moor Junction amendments

3.6.17 Stanwell Moor Junction is located to the south-west side of Heathrow Airport connecting the A3044, A3113 Airport Way (which provides direct access to M25 J14) and the Southern Perimeter Road. As a result of the NRS, the A3044 to the north will be severed. The link from the SPR to the WPR will be retained as it would connect to the new rationalised WPR, at the location of the WPR alignment options described above. This is intended to minimise significant changes to the distribution of the traffic around the Airport, although sections of the A3113 Airport Way will be used as the main access and egress to Heathrow Western Hub which will mean that the Stanwell Moor Junction will be more heavily trafficked. To address this and minimise traffic congestion impacts, the Junction is proposed to be upgraded.

3.6.18 Whilst the final solution has yet to be developed, changes to this junction are required in both the HAL DCO Project and HWH DCO Project.

Other road network changes

3.6.19 The HWH DCO Project is proposing to maintain north-south connectivity whilst minimising the impact on Poyle. The proposals also retain network resilience and provide a secondary point of access to Heathrow Western Hub from the north. This is achieved through relocating the A3044 to run to the east of the M25, providing connectivity between a re-aligned A4 in

the north to J14 in the south.

3.6.20 Other complementary changes are also proposed to the road network around Heathrow Airport as follows:

1. As part of an integrated approach to demand management, a road user charging zone is being considered for the main routes to and from Heathrow Western Hub. This could be extended to the wider airport if thought to be beneficial. The purpose of the charging zone is to discourage travel by car and would be complemented by improved public transport provision.
2. Park and ride sites are being considered for the potential to intercept traffic before it enters the airport environs. Sites would ideally be sought close to the airport which would facilitate the provision of a dedicated people mover or transit scheme to Heathrow Western Hub.
3. The existing northern tunnel, located at the southern end of the M4 Spur with additional arms to access the A4 and Northern Perimeter Road, is the only public road link into the Central Terminal Area (CTA). It is critical to the operation of the airport. This tunnel will not be affected by the proposals, as the HWH DCO Project is not proposing additional terminal capacity in the CTA.

Public transport

3.6.21 The Proposed Development includes a new public transport interchange at the Heathrow Western Hub. This will provide more capacity for buses as well as upgrading the Terminal 5 rail station to allow access to new terminal facilities, higher passenger flows and a better passenger experience. At this stage, it has not been determined precisely what upgrades are required to the public transport interchange to the CTA, or whether these will be included in the Applicant's DCO. Therefore, for the purposes of this scoping exercise, it has been assumed that public transport enhancements may be required in both areas.

The HWH DCO Project will include a new integrated rail/air interchange within the central concourse to the expanded and reconfigured T5, linking Heathrow Airport to existing and new rail networks; a key factor in enabling the Government's requirement for a step change in public transport use and environmental compliance. This is different to HAL's current proposals at T5 because the HAL DCO Project only includes upgrades to the T5 rail station. The HWH DCO Project may also include changes to the CTA public transport interchange upgrade compared to the HAL DCO Project, but at this stage, it has not yet been identified what, if any, changes are necessary.

Rivers and flood storage

3.6.22 The proposed expansion of Heathrow Airport with a preferred Northwest Runway development to the northwest of the current site will require the realignment of watercourses within the Colne River Basin.

3.6.23 Five key rivers traverse the Proposed Development site, and will be subject to realignment,

both in the case of the HAL DCO Project currently in the public domain and the Proposed Development.

- **The Rivers Colne and Wraysbury River** - currently flow south under the M4 corridor at Junction 48, cutting separate, southwest traversing paths across the Stanwell and Staines Moors', before converging and discharging into the River Thames in the town of Staines-Upon-Thames.
 - The River Colne is a tributary of the River Thames, rising perennially from a subterranean river at a spring in North Mymms Park in Hertfordshire;
 - The Wraysbury River is a branch of the River Colne watercourse near the town of West Drayton;
- **The Colne Brook** – a distributary of the Colne originating in Uxbridge Moor. The river flows south beneath the M4 and western extent of the Northwest Runway proposal, continuing through the village of Colnbrook and west of the Wraysbury Reservoir. The Colne Brook discharges into the River Thames upstream of where the River Colne discharges.
- **Duke of Northumberland's River (DNR)** - rising from the Colne, consists of two sections of waterway that were designed to increase the flow the River Crane; and
- **Longford River** – designed to provide catchment with 12km of river channel.

3.6.24 The DNR and Longford, owned and maintained by the Royal Parks, are artificial rivers skirting the western and southern perimeters of Heathrow Airport. They have been diverted more than once due to the growth and expansion of Heathrow Airport, namely during the Twin Rivers Diversion Scheme, to accommodate the construction of T5.

3.6.25 Due to the relatively flat topography, complex hydrology and hydraulics, and subsequent impact on transport and associated airport infrastructure, a potential multi-benefit, upstream flood storage system is one consideration for managing any proposed realignments of the watercourses.

3.6.26 Capturing, calibrating and validating the hydrology and hydraulics data for the Colne River Basin is critical to inform the flood management optioneering process for the Proposed Development. Work is progressing to develop a technically robust hydraulic model that will inform the flood model and proposed flood management options.

3.6.27 Critical to the flood management proposal will be not to increase flood risk, functional flood plain, and seek to mitigate impacts on the Colne Valley Park and surrounding Greenbelt area.

3.6.28 Initial considerations for flood management storage have focussed on sites to the north and in proximity of the preferred NRS. Other options will be taken into consideration and developed iteratively, at the same time as the development of the hydraulic model and further geotechnical understanding. A range of sites have been identified by HAL which could be used for flood storage north of the Airport, which would be considered alongside other options being considered by the Applicant.

3.6.29 Sustainable Natural Flood Management (NFM) options are been considered, aligned to reducing flood risk, mitigating our carbon footprint, and enhancing the natural environment for communities and wildlife, thus recognising the Environment Agency (EA) 25-Year Plan for 'A Green Future'.

- 3.6.30 A consideration and balanced approach of resilient and resistant measures will shape both flood storage and river realignment options.
- 3.6.31 The HWH DCO Project will consider eight long listed options (in addition to Do Nothing and Do Minimum), and up to three short listed options (in addition to Do Nothing and Do Minimum). Options for consideration will take into account mitigating measures outlined in the Strategic Flood Risk Assessment (SFRA) produced by Slough Borough Council.
- 3.6.32 A preferred option will then be developed, informed by consultation.
- 3.6.33 A very high-level consideration of potential river realignment options has been undertaken to date, including consideration of HAL options. These include:
- Diverting flow via an aqueduct over the M25 motorway, either to the south or north of the proposed Northwest Runway development;
 - Diverting flow under the M25;
 - Realignment of river options to the west and east of the M25; and
 - Culverts and open-channel networks through and around Heathrow Western Hub development.
- 3.6.34 The HWH DCO Project is working on the basis that it will rely on similar mitigation solutions being developed by HAL. At this stage, it is assumed that this could be included in both the HWH DCO and HAL's DCO applications for completeness.

Associated supporting facilities

- 3.6.35 As stated above, the HWH DCO Project will include any necessary airport supporting facilities to ensure integration with the HAL DCO Project. At this stage, it has not yet been determined precisely what would be required and it is likely that greater certainty will only be possible following HAL's Stage Two consultation which is currently planned for June 2019.
- 3.6.36 Associated supporting facilities includes cargo, aircraft maintenance, fuel storage, waste and water treatment facilities, diversion, relocation, protection and/or expansion of the public utilities network, generation plant to support the energy demand of the airport and consolidation of car parking.
- 3.6.37 At this stage, therefore, Scoping has been carried out on the basis that the HWH DCO Project may need to include the same level of associated supporting facilities as assumed by HAL in its DCO Scoping Report. These are set out in Chapter 3, paragraph 3.3.35 (Table 3.9) of the Heathrow Expansion EIA Scoping Report, Volume I, Main Report (May 2018) ("the HAL Scoping Report"). In addition, the HWH DCO Project will be considering the scope for consolidating associated supporting facilities closer to Heathrow Western Hub.
- 3.6.38 In addition, a second air traffic control tower similar to the existing 87m high tower will be safeguarded for within the new northern apron. (An alternative approach using digital tower technology, is being investigated, which if proven, will not require this second conventional tower). This may result in a different solution to HAL if a conventional tower is required, depending on the location of HAL's final solution, and therefore this is included within the scope of the HWH DCO Project at this stage.

Displaced commercial uses and major facilities

- 3.6.39 Certain commercial uses, infrastructure and major facilities are expected to be displaced by HALs proposed implementation of the NRS. A large proportion of these displaced uses fall under the footprint of the Northwest Runway itself and therefore would not necessarily be affected by the HWH DCO Project and are therefore not included within its scope. Others fall under the area required to connect the HWH DCO Project to the new Northwest Runway and therefore would be displaced as a result of the works required to facilitate this.
- 3.6.40 The likely displaced uses as a result of the NRS as a whole are listed in paragraph 3.3.37 of the HAL Scoping Report. Those that are also likely to fall within the HWH DCO scope are:
- Immigration Removal Centres (IRCs),
 - BT Data Centre and Maintenance Depot,
 - Other commercial uses, principally along the A4 Bath Road, although to a lesser extent than under the HAL scheme.
- 3.6.41 The remainder are likely to be displaced as a result of the NRS as a whole, but not as a direct result of the HWH DCO Project.
- 3.6.42 With the exception of the IRCs, the assessment will only consider the removal of those facilities displaced by the HWH DCO Project (so, for example, consider the effects of their demolition) as part of the HWH DCO Project and not their replacement. The replacement of these facilities would then be considered as part of the wider scheme and within the cumulative effects assessment as far as this is possible. They would then be assessed in line with the methodology described in **Chapter 4 'Approach to EIA'**. The Applicant will only include the construction and operation of the replacement IRCs within its application if necessary to ensure that the two DCO applications can be appropriately integrated.

Other airport related development

- 3.6.43 'Other Airport related development' is a term which is used to describe a range of development that is related to Heathrow Airport's operation, such as hotels, offices, and warehousing. In some cases, this is provided within the operational boundary where there is a particularly strong functional link with the Airport operation (for example terminal-linked hotels and supply chain offices), but often it is located outside but close to the Airport. Other airport related development includes hotels, cargo handling, freight forwarding and offices.
- 3.6.44 At this stage, it has not yet been determined the level of other airport related development that will be included within the Proposed Development. Therefore, Scoping has been carried out on the basis that the HWH DCO Project may need to include the same level of airport related development as assumed by HAL in the HAL Scoping Report. These are set out in Chapter 3, paragraph 3.3.39 (Table 3.9) of the HAL Scoping Report (HAL, 2018). In addition, the HWH DCO Project will be considering the scope for consolidating other airport related development.
- 3.6.45 The Applicant is carrying out its own work to determine the level of future demand, taking into account the work carried out by HAL to support its DCO. The EIA approach in relation to airport related development not included within the Proposed Development is set out in **'Chapter 4: Approach to EIA'**.
- 3.6.46 The consenting mechanism for the full quantum of airport related development has not yet

been determined. As with the replacement of displaced uses, it could come forward through the HWH DCO application, the HAL DCO Project application, through the local planning process and/or left to the market to respond to the uplift in demand. These replacement uses would be considered as appropriate through the CEA process outlined in **Chapter 4 'Approach to EIA'** of this Scoping Report.

3.7 Development Programme and Construction

3.7.1 The construction of the Proposed Development will need to fit within the expansion of the overall Heathrow Airport, which itself is a complex construction project involving temporary use of land beyond the airport for construction and logistics uses.

Construction phases and timeline

3.7.2 The Applicant is still developing the detailed approach to construction and will consult on this at an appropriate stage, although in principle the Applicant is aiming to deliver the HWH DCO Project in as efficient a way as possible, without compromising delivery of the construction of the wider growth of the airport.

3.7.3 Heathrow Western Hub is expected to be developed in phases. These will be organised such that they dovetail with the other runway and airport development works by HAL. Construction of the Heathrow Western Hub and associated infrastructure will continue beyond 2026, phased in line with demand, and is expected to be fully completed by 2030.

3.7.4 Indicative timeframes are provided in relation to each of these phases below, assuming grant of the DCO in late 2021.

Enabling works (approximately years 1 to 4)

3.7.5 Enabling works would start shortly after the DCO is granted and relevant pre-commencement DCO requirements have been discharged. In this phase, activities would include the following key activities:

- Site establishment works including logistics facilities;
- Advance mitigation works and site clearance including removal of existing structures and construction of replacement facilities for displaced users (if proposed as part of the HWH DCO application); and
- Temporary diversion/realignment of existing watercourses, utilities and roads to enable terminal construction to commence.

Heathrow Western Hub development (starting year 2 – expected to be fully developed by year 10)

3.7.6 Heathrow Western Hub would include the construction of the new and reconfigured terminal concourse. Terminal construction would start once the site for the new terminal is available for construction. Terminal construction can be phased in line with demand.

3.7.7 Construction activities would increase during the creation of the Heathrow Western Hub and would peak when the new and reconfigured terminal capacity is under construction. To reduce the number of activities happening on site at the same time, use of supporting facilities alongside careful construction management planning would be employed to minimise disruption.

- 3.7.8 Heathrow Western Hub will include a Construction Area to the west of Terminal 5. Facilities that will be located on or near the construction sites have not yet been determined but will include typical construction facilities such as; contractor compounds, control posts at site entrances, lorry parks and call forward points, batching plants for concrete and asphalt, pre-cast concrete plants and prefabrication facilities for steel and concrete products, temporary car parks and accommodation.
- 3.7.9 Borrow pits and stockpile locations may be located outside the Construction Area, but with a preference for sites within reasonable proximity to the airport, the locations of which are under consideration.

Airfield expansion (approximately years 2 to 6)

- 3.7.10 Airfield expansion would include all works to construct the new aprons and taxiways. This would include earthworks, drainage, construction of concrete pavements including associated lighting, services and airfield facilities,
- 3.7.11 It is currently anticipated that construction of subsurface tunnels for roads and airport facilities would also be carried out during this phase.

3.8 Operation of the airport and terminal

- 3.8.1 The HAL DCO Project proposes to increase operating capacity from the current 480,000 ATMs per year limit to at least 740,000 ATMs per year and from 76 MPPA to approximately 130 MPPA per year. HAL state the exact growth trajectory is still to be determined and will be in line with demand.
- 3.8.2 The HWH DCO Project will include provision of alternative component parts of the HAL DCO Project, principally the terminal to meet the above demand. These alternative works will be planned in such a way as to integrate with the construction of other developments on the airport and the new Northwest Runway.
- 3.8.3 The operation of the new Northwest Runway will be considered as part of the cumulative effects assessment (see **Chapter 4.6** of this Scoping Report).

3.9 Decommissioning

- 3.9.1 Once constructed, the expansion of Heathrow Western Hub will be a permanent addition to Heathrow Airport. Closure and decommissioning of the Proposed Development is not therefore considered as part of the EIA process. Any temporary works, e.g. construction compounds, will be removed following the period after which they are no longer required.

3.10 References

Department for Communities and Local Government (2013). Guidance on associated development applications for major infrastructure projects

4 Approach to EIA

4.1 Introduction

- 4.1.1 As set out in the introduction to this Scoping Report, the legislative underpinning of the EIA in England is the EIA Regulations. However, these EIA regulations have evolved over a much longer history of developments in EIA practice, case law and theory. The regulations only provide the overarching legal framework for the EIA, and many of the detailed methods and principles are set out in a combination of statutory and non-statutory guidance, other legislation, best practice and case law.
- 4.1.2 In summary, EIA is an iterative tool for systematically examining and assessing the likely significant effects of a proposed development on the environment. Where likely significant effects are identified, a hierarchy of mitigation methods should be considered: starting with avoiding the impact, followed by reducing the impact, and lastly by compensating for the impact. It is unlikely, particularly for an NSIP, that all impacts can be avoided entirely. Therefore, the EIA process is to enable the identification of appropriate mitigation and compensation, in accordance with the principles set out in the ANPS, and to support the Secretary of State in coming to a balanced judgement on whether the benefits of the proposed development outweigh its adverse impacts.
- 4.1.3 The EIA process seeks to be systematic and comprehensive in outlook and will initially consider all relevant topics covered under the three general areas of physical, biological and human environment for all elements of the Proposed Development. Following these initial reviews, an informed proposal regarding the appropriate scope of the EIA assessments is identified, and submitted to the relevant authorities to review and comment on the proposed scope. This Scoping Report articulates this process and the proposed scope for the assessment of the Proposed Development.

Additional sources of guidance

- 4.1.4 The approach to the EIA and the production of the resulting ES will also take account of relevant guidance including:
- National Policy Statements (e.g. ANPS (DfT, 2018) and NPSNN (DfT, 2014));
 - PINS National Infrastructure Planning Advice Notes (e.g. Advice Note 7: Environmental Impact Assessment: Preliminary Environmental Information, Screening and Scoping (PINS, 2017) and Advice Note 17: Cumulative effects assessment (PINS, 2015));
 - Relevant guidance issued by other government and non-governmental organisations (e.g. Design Manual for Roads and Bridges (DMRB) Vol 11. Section 3. Environmental Assessment Techniques. Part 1. HA207/07. Air Quality (Highways England, 2007);
 - Receptor specific guidance documents (e.g. Badgers: surveys and mitigation for development projects. Natural England Standing Advice Natural England (2015)); and
 - The Institute of Environmental Management & Assessment (IEMA) proportionate EIA strategy and best practice (e.g. Delivering Proportionate EIA (IEMA, 2017) and the EIA Guide to Shaping Quality Development (IEMA, 2015)).

4.2 Scope of the Assessment

Quality, proportionality and the focus of scoping

4.2.1 The purpose of the EIA Regulations is to implement the most recent version of the EIA Directive (2014/52/EU). The purpose of the latest EIA Directive is to drive effective EIA whilst maintaining the level of environmental protection provided by previous versions of the EIA Directive. The drive for effectiveness was to be achieved via three core aims:

4.2.2 Harmonisation between Member States;

- Efficiency to streamline multiple EU assessments & reduce burdens; and
- Quality, moving away from a purely procedural focus in EIA laws.

4.2.3 The EIA Regulations confirm that the assessment of effects should be described in light of each individual case and the ES should contain such information as is required to assess the environmental effects of the development that a developer can be reasonably required to compile.

4.2.4 The purpose of an ES is therefore to provide such information as is required to report the EIA's findings on the likely significant effects of the Proposed Development on its receiving environment. This is encapsulated in the advice given by the Department for Communities and Local Government's (DCLG's) EIA Planning Practice Guidance (DCLG, 2014):

"Whilst every Environmental Statement should provide a full factual description of the development, the emphasis of Schedule 4 is on the "main" or "significant" environmental effects to which a development is likely to give rise. The Environmental Statement should be proportionate and not be any longer than is necessary to assess properly those effects....Impacts which have little or no significance for the particular development in question will need only very brief treatment to indicate that their possible relevance has been considered".

4.2.5 PINS Advice Note Seven (PINS, 2017) also confirms that:

"ensuring that ESs are appropriately focussed on aspects and matters where a likely significant effect may occur is essential."

4.2.6 Likely significant effects are considered to be a subset of an EIA development's main effects. As set out in **Section 1.4 of Chapter 1 'Introduction'**, a key objective of the scoping process is to examine the main effects to determine those that have the potential to be significant and thus should have an expanded scope within the EIA.

4.2.7 Scoping applies the conceptual 'source-pathway-receptor' model. The model is effective in the identification of potential effects and the means by which these can manifest themselves on the receiving environment and its sensitive receptors. The aspects of this model are defined as follows:

Source - the origin of a potential impact (i.e. construction activities);

Pathway - the means by which the effect of the activity could impact a receptor (i.e. through air, water or ground); and

Receptor - the element of the receiving environment that is impacted (i.e. terrestrial habitats, archaeology and communities).

4.2.8 If the source, pathway or receptor is absent, no linkage exists and thus there will be no potential for an impact to manifest. The Proposed Development has been examined using this model to identify the likely environmental effects, which were then further refined using the methodology described below and illustrated in **Diagram 4.1**, to arrive at a preliminary scope for consideration by PINS on behalf of the Secretary of State.

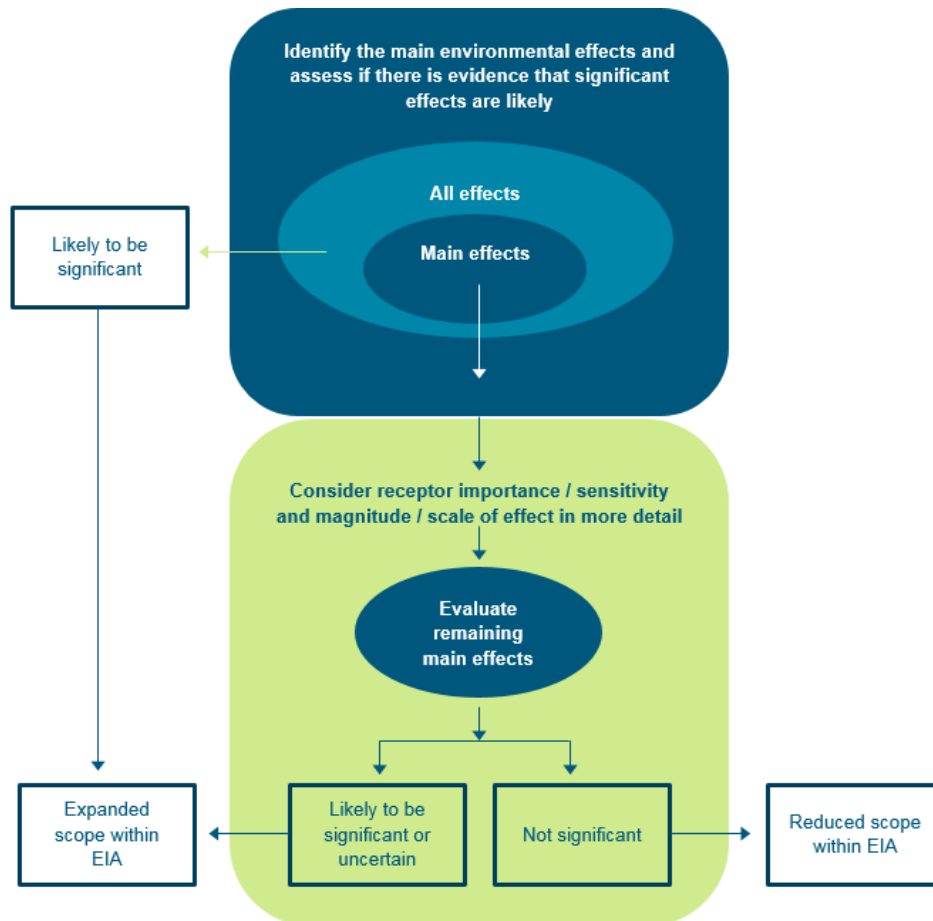


Diagram 4.1 The EIA Scoping Process

4.2.9 PINS Advice Note Seven (PINS, 2017) states that:

“The Planning Inspectorate is keen to ensure that the scoping process is used effectively, ensuring that the EIA process is proportionate. The Planning Inspectorate will agree to ‘scope out’, from the need for further assessment, aspects and matters where it is appropriate to do so”;

4.2.10 It is therefore common within EIA practice to talk about ‘scoping in’ and ‘scoping out’ topics. However, this phraseology is often misleading for stakeholders and often results in very few topics being scoped out (IEMA, 2011). The threshold of evidence currently required to justify the scoping out of a topic is very high and often reliant on a level of detail on project design and baseline conditions which is rarely available at the scoping stage. Therefore, a relatively small number of topics have been proposed to be scoped out entirely from the EIA, and are presented within the individual topic chapters, as well as summarised in the concluding section of this Scoping Report.

4.2.11 Given the difficulty in justifying the scoping out of topics, the Applicant’s approach, following the proportionate EIA strategy (IEMA, 2017), is to propose a reduced scope for topics of

lower risk of significant effects, and an expanded scope for topics of higher risk of significant effects, in each case based on available evidence. This approach avoids the problems associated with scoping topics 'in' or 'out' and provides a more nuanced and proportionate approach that focuses on an evidence based rationale to assessment.

- 4.2.12 For topics where there is sufficient evidence of a lower risk of significant effects, taking account of available information, previous studies, best practice and industry-accepted mitigation methods, we have proposed a reduced scope of assessment. The reduced scope, as a minimum, will identify potential risks and propose appropriate conditions and mitigations that have been proven to reduce those risks to a level where they do not present significant effects.
- 4.2.13 The expanded scope of the remaining 'main effects' is based on the currently available baseline data, the judgement of experienced EIA practitioners and where relevant, recommended topic specific methodologies and established practice. The proposed methodologies also take into account the PINS' response, informed by statutory stakeholders, to the Scoping Report submitted by HAL.
- 4.2.14 As illustrated by **Diagram 4.1**, where the uncertainty is such that it cannot be confirmed at the scoping stage whether a main effect is likely to be a significant effect or not, such effects warrant further consideration through the EIA process. As an iterative process, where further information, consultation and assessment provides sufficient evidence that an aspect is no longer considered to represent a significant impact, the scope of the assessment methodology relative to this topic may subsequently be reduced.

4.3 Rochdale Envelope Principle

- 4.3.1 The expansion of a major airport is complex, and much of the final design of the principal components and associated infrastructure will be refined throughout the development process. This flexibility is necessitated by factors including environmental sensitivities, other development proposals and economic considerations, the understanding and definition of which develops as more information is gathered during feasibility work and site surveys.
- 4.3.2 In order to accommodate such dynamic design considerations, it has become relatively routine practice to employ a 'Rochdale envelope' approach within EIA as a way of addressing uncertainties at the time that the EIA is conducted, where some details of the project have not been confirmed. This is a parameters-based approach to assessment, where assessments are based on maximum parameters so that the reasonable worst case is assessed in the event that precise detail is yet to be finalised. Using this approach ensures that the final scheme is accommodated within the impact assessments reported in the ES which will support the DCO application, and therefore the associated consent. This approach is acknowledged in PINS Advice Note 9: Rochdale Envelope (PINS, 2018), which provides guidance regarding the degree of flexibility that may be considered appropriate within an application for development consent under the Act.
- 4.3.3 The EIA for the Proposed Development will therefore assess the maximum likely significant effects which could realistically accrue from the Proposed Development; any impacts arising from the final development design (during construction and operation) will therefore be within the predicted 'envelope' of impacts identified within the ES such that no impacts of higher significance will occur.
- 4.3.4 Where flexibility is being requested, the EIA will provide a justification as to why this is

required, in accordance with PINS Advice Note 9 (PINS, 2018). Different approaches to flexibility in respect of the assessment approach will, where appropriate, be likely to be applied to different parts of the Proposed Development, depending on the level of certainty that exists on the design at the time of the application. For example, more information may be available on terminal design, whereas, less information will be available on form and design of ancillary development, particularly where the end user has not yet been identified.

4.4 Spatial and Temporal Scope

Spatial scope

4.4.1 The geographical or spatial scope for each topic assessment will take into account the following factors:

- The physical extent of the Proposed Development;
- The nature of the baseline environment; and
- The type, extent and characteristics of the environmental effect.

4.4.2 How the study area or spatial scope for each technical assessment will be defined is described within the approach to assessment section of each topic chapter. As the design and consultation processes progress and the design of the Proposed Development evolves, the exact geographical scope of study areas for each topic will be further refined.

Temporal scope

4.4.3 The Proposed Development would be constructed and implemented over a number of years. The approach to assessment will therefore be to assess the environmental impacts of the Proposed Development at key stages in its construction and operation.

4.4.4 Several assessment scenarios will need to be considered in the topic assessments, ranging from the current baseline year in which baseline data is collected and modelled through to the year of predicted maximum environmental effects during the operational phase. Specific detail relating to the temporal scope for each technical assessment is defined and stated in the methodology section of each of the technical chapters.

4.5 Assessment of Likely Significant Effects

4.5.1 The approach taken to making balanced assessments will be guided by both EIA specialists and technical specialists using existing and new data, experience and expert judgement. As discussed in **Section 4.8**, consultation will be a key tool in the development of the methodology for each topic.

4.5.2 In order to provide a consistent framework and system of common tools and terms, where appropriate, a matrix approach (see **Table 4.4**) is applied to frame and present the judgements made. This involves combining elements of topic specific receptor sensitivity and magnitude of effect to determine the significance of effects included in the scope of the assessment.

4.5.3 The impact assessment will consider the potential for impacts during the construction and operation of the Proposed Development. Once completed, the Proposed Development will be a permanent feature. Closure and decommissioning of the facility is not therefore

considered as part of the EIA. Should any aspect of the development be demolished or redeveloped at a future date, any future project would be required to undertake its own assessment as part of securing consent for those works, based on prevailing legislation at the time of the proposal.

- 4.5.4 The EIA will also consider the inter-relationship of impacts on individual receptors to consider any in combination effects across or within topics. For example, a landscape and visual effect and noise impact may cumulatively impact on a single receptor. A cumulative assessment will also be undertaken within each topic to consider the cumulative effect of impacts across the Proposed Development and other relevant developments. Further information on the approach to cumulative assessment is provided in **Section 4.6**.

Determining receptor sensitivity and value

- 4.5.5 The characterisation of the existing environment helps to determine the sensitivity of the receptor to assess the potential impacts upon it.
- 4.5.6 The ability of a receptor to adapt to change, tolerate, and / or recover from potential impacts will be key in assessing its sensitivity to the impact under consideration. For ecological receptors, tolerance could relate to short-term changes in the physical environment; for human environment receptors, tolerance could relate to displacement effects and therefore impacts upon economics or safety. It also follows that the time required for recovery from impacts will be a key consideration in determining the sensitivity of each receptor.
- 4.5.7 The value of receptors is also an important consideration in the EIA process, and considers whether, for example, the receptor is rare, has protected or threatened status, importance at local, regional, national or international scale, and in the case of biological receptors whether the receptor has a key role in the ecosystem function.
- 4.5.8 In addition, the value of a receptor may also be an element to add to an assessment where relevant, for instance if a receptor is designated or has economic value. Example definitions of the value levels for a generic receptor are given in **Table 4.1**.

Table 4.1 Example definitions of value levels for a generic receptor

Value	Definition
High	Internationally / nationally important (for example internationally or nationally protected site)
Medium	Regionally important / regionally protected site
Low	Locally important / rare but with high potential for mitigation
Very Low	Not considered to be important (for example common or widespread)

- 4.5.9 It is typical that the values shown in **Table 4.1** align with **Table 4.2**, however, there are often project or site-specific circumstances where a receptor may be high value but low sensitivity, or vice versa.
- 4.5.10 The overall receptor sensitivity is determined by considering a combination of value, adaptability, tolerance and recoverability. This is achieved through applying known research and information on the status and sensitivity of the feature under consideration coupled with professional judgement, experience and good practice.
- 4.5.11 Expert judgement is particularly important when determining the sensitivity of receptors. For instance, an Annex II species (under the Habitats Directive) would have a high value, but if it

was highly tolerant of an effect or had high recoverability it would follow that the receptor sensitivity in this instance should reflect this.

4.5.12 Example definitions of the different sensitivity levels for a generic receptor are given in **Table 4.2**.

Table 4.2 Example definitions of sensitivity levels for a generic receptor

Sensitivity	Definition
High	Very sensitive to most temporary or permanent changes, over the whole receptor, and / or very sensitive to alteration of key characteristics or features of the receptor's character or distinctiveness.
Medium	Sensitive to certain temporary or permanent changes, over the majority of the receptor, and / or sensitive to alteration of key characteristics or features of the receptor's character or distinctiveness.
Low	Sensitive to some specific types of change, over a minority of the receptor, and / or limited sensitivity to the alteration of key characteristics or features of the receptor's character or distinctiveness.
Very Low	Not particularly sensitive to change, with potential exception of specific aspects, over a small area of the receptor, and/or does not contain any key characteristics or features of a particularly sensitive character or distinctiveness.

4.5.13 Individual topics chapters within the ES will provide an explanation of any judgements regarding the sensitivity of specific receptors.

4.5.14 The impact assessment also defines the magnitude of the effect, from negligible change to major. Magnitude refers to the 'size' or 'amount' of an effect and is typically defined by four factors:

- Extent – the area over which an effect occurs;
- Duration – the time for which the effect occurs;
- Frequency – how often the effect occurs; and
- Severity – the degree of change relative to existing environmental conditions.

4.5.15 Example definitions of the magnitude levels for a generic receptor are given in **Table 4.3**.

Table 4.3 Example definitions of magnitude levels for a generic receptor

Magnitude	Definition
High	Fundamental, permanent / irreversible changes, over the whole receptor, and / or fundamental alteration to key characteristics or features of the particular receptor's character or distinctiveness.
Medium	Considerable, permanent / irreversible changes, over the majority of the receptor, and / or discernible alteration to key characteristics or features of the particular receptor's character or distinctiveness.
Low	Discernible, temporary (throughout project duration) change, over a minority of the receptor, and / or limited but discernible alteration to key characteristics or features of the particular receptor's character or distinctiveness.
Very Low	Discernible, temporary (for part of the project duration) change, or barely discernible change for any length of time, over a small area of the receptor, and/or slight alteration to key characteristics or features of the particular receptor's character or distinctiveness.

4.5.16 Subsequent to establishing the receptor sensitivity and magnitude of effect, the impact significance will be predicted by using quantitative or qualitative criteria, as appropriate to ensure a robust assessment. Where possible, a matrix such as the one presented in **Table 4.4** will be used to aid the assessment of impact significance based on expert judgement, latest guidance and any specific input from consultation. However, a description of the approach taken to the impact assessment and interpretation of impact significance levels (major to negligible) will be provided within each section of the ES (on a topic by topic basis). This approach will ensure that the definition of impacts is transparent and relevant to each topic under consideration.

Table 4.4 Significance of impact matrix

		Negative Magnitude				Positive Magnitude			
		High	Medium	Low	Very Low	Very Low	Low	Medium	High
Sensitivity	High	Major	Major	Moderate	Minor	Minor	Moderate	Major	Major
	Medium	Major	Moderate	Minor	Minor	Minor	Minor	Moderate	Major
	Low	Moderate	Minor	Minor	Negligible	Negligible	Minor	Minor	Moderate
	Very Low	Minor	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Minor

4.5.17 For the purposes of the EIA, major and moderate adverse impacts are normally deemed to be significant and, as such, are likely to require mitigation. Whilst minor impacts are not normally considered to be significant in their own right, these may contribute to significant impacts cumulatively or through effect interactions; consequently, minor impacts will be likewise mitigated where required, and where possible and practicable.

4.5.18 It is important to note that the above tables are provided to aid consultees, stakeholders and the public in understanding the complexity of the assessment process, by providing some generic guidelines to how impacts are determined. However, it should be stressed that these are over-simplifications, and are only illustrative of a process that requires a combination of factors that inform in the final analysis a professional judgement.

4.5.19 The following factors are taken into consideration by competent experts for each topic area when determining their assessment of significance, including:

- Site specific conditions based on primary and secondary data and information;
- Comparison with regulations and professional industry agreed standards;
- Compliance with other legislation, international conventions, policies and plans;
- Consultation with statutory consultees, key stakeholders and the public;
- Reference to professional experience of similar developments or projects; and
- Expertise from professional training, education and experience as a specialist expert.

Competent experts

- 4.5.20 Royal HaskoningDHV has been undertaking EIAs for over 25 years and have over 100 dedicated environmental experts in the UK. The company is a member of the industry's leading external verification body for EIA competence, the IEMA EIA Quality Mark. Membership of the Quality Mark includes independent audit of the ESs prepared by Royal HaskoningDHV as well as commitments to continuing professional development of EIA staff, audited by IEMA through staff interviews.
- 4.5.21 In addition to the external assurance provided by membership of the IEMA Quality Mark, Royal HaskoningDHV manages competence through a robust HR system including hiring practices, staff training programmes, mentoring and project experience. The quality management systems in place are credited in accordance with ISO 9001:2015 and ensure a robust system of review and quality control.
- 4.5.22 Individual experts within Royal HaskoningDHV's specialist teams are encouraged to seek membership of appropriate professional bodies, and this is included as a requirement in the company's internal promotion criteria to senior technical positions to ensure appropriate levels of professional competence. A full description of the experience and qualifications of individual topic experts will be provided within the ES.

Mitigation

- 4.5.23 The EIA Regulations require a description of the measures envisaged to avoid, prevent, reduce or (where possible) offset any significant adverse effects on the environment.
- 4.5.24 In broad terms, good practice in impact assessment is to follow a hierarchy of mitigations approach. This consists of starting with the first step, and then moving downwards:
- Avoidance;
 - Prevention;
 - Reduction; and
 - Compensation.
- 4.5.25 In addition to these generic steps, the EIA process allows for and encourages opportunities to incorporate remediation, enhancement and net gain where possible, not just offsetting but improving the receiving environment.
- 4.5.26 The mitigation hierarchy is delivered in practice through a suite of mitigation methods and measures, often included within conditions or requirements attached to the consent. For the purposes of this EIA, we will refer to three types of mitigation, as defined within IEMA's EIA Guide to Shaping Quality Development (IEMA, 2015):
- Primary (inherent) mitigation – 'an intrinsic part of the project design – it should be described in the design evolution narrative and included within the project description. For example, reducing the height of a development to reduce visual impact.'
 - Secondary (foreseeable) mitigation – 'requires further activity in order to achieve the anticipated outcome – typically, these will be described within the topic chapters of the ES, but often are secured through planning conditions and/or management plans. For example, description of certain lighting limits that will be subject to submission of a detailed lighting layout as a condition of approval.'

- Tertiary (inexorable) mitigation – ‘will be required regardless of any EIA assessment, as it is imposed, for example, as a result of legislative requirements and/or standard sectoral practices. For example, considerate contractor’s practices that manage activities which have potential nuisance effects.’

4.5.27 Each topic chapter of this Scoping Report includes a section entitled ‘Approach to mitigation’. These sections provide an initial consideration of topic specific mitigation measures, including how the measures are likely to be secured, taking into account the policies set out in the ANPS.

4.5.28 Where mitigation measures are proposed in the ES we will use the information available to set out:

- What is going to be done;
- When it will be done;
- Who will be responsible for implementation and management;
- How effective it is likely to be;
- How long it will take to become effective;
- How effectiveness will be monitored; and
- How such mitigation and monitoring measures will be secured through DCO requirements or otherwise.

Mitigation by design

4.5.29 As set out above in the approach to mitigation, the primary step in the hierarchy is avoidance and prevention of impacts. The most efficient way of achieving these aims is through the scheme design. However, the EIA requires a design in order to assess the project, therefore it may be too late in the design process to alter the design at the point where the EIA identifies impacts.

4.5.30 The solution to this issue is to adopt an iterative approach to design as recommended by the IEMA EIA Guide to Shaping Quality Development (IEMA, 2015). As shown below in **Diagram 4.2**, the design process should run alongside and iteratively with the EIA process, with the design informing the EIA and the EIA subsequently informing the design and so on. This process also runs in parallel with a third stream of activity, on consultation and engagement, to result in a scheme that maximises opportunities for avoidance and prevention of significant effects and maximises stakeholder engagement to result in a high-quality development, consistent with the policy requirements in the ANPS.

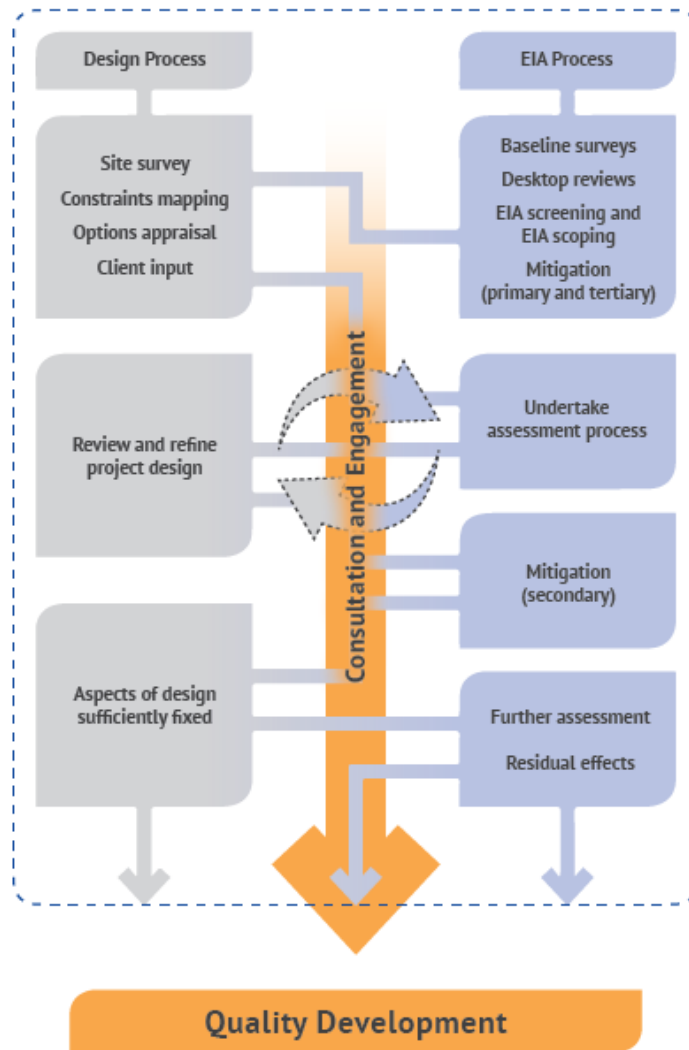


Diagram 4.2 The interaction of design and Environmental Impact Assessment processes (IEMA, 2015)

Assessing residual impacts

4.5.31 Following the identification of any secondary mitigation not already incorporated into the primary design, impacts will be re-assessed using the approach set out above and the post-mitigation or 'residual impact' will be identified. If the impact does not require additional secondary mitigation (or none is possible), a discussion and reasoned justification will explain why the impact cannot be reduced or avoided.

4.6 Cumulative Effects Assessment

4.6.1 Cumulative effects are the cumulation of effects with other existing and/or approved projects. A CEA seeks to provide information on how the Applicant's proposal would combine or interact with the effects of another development by taking into account available data on the environmental impact of these other projects at the time of the assessment.

4.6.2 Therefore, in order to take account of these other developments, it is necessary to identify and assess how any impacts from the Proposed Development relate to any impacts identified within these other projects. Where the assessment identifies that these impacts will cumulatively result in additional likely significant effects, or result in specific receptor-thresholds being exceeded, these impacts will be identified and the mitigation hierarchy applied

to avoid, reduce or mitigate the impact where possible.

4.6.3 The following sub-sections set out our approach to; cumulative effects with other developments, cumulative effects with development related to the Proposed Development; and cumulative effects with other elements of the NRS. To aid clarity on the reporting of these different elements of the CEA, the ES will report the effects of each of these three sub elements of the CEA separately, as well as presenting the overall effect in aggregate with the Proposed Development.

Cumulative effects with ‘other development’

4.6.4 PINS Advice Note 17: Cumulative Effects Assessment recommends a staged approach to identifying and assessing the potential cumulative effects of ‘other development’. This approach, as summarised in **Table 4.5** will form the basis of the CEA for the Proposed Development. The scope of the CEA (in terms of relevant issues and ‘other development’) will be established with consultees (including other developers) as the EIA is progressed.

Table 4.5 Summary of proposed approach to cumulative effects assessment

Stage	Activity
Stage 1: Establish the NSIP's ZOI and identify long list of ‘other development’	<ul style="list-style-type: none"> • Identify the likely Zone of Influence (ZOI) for each topic (e.g. air quality, biodiversity and noise). • Develop a long list of ‘other development’ using the identified ZOIs. • Group ‘other development’ into tiers, reflecting the likely degree of certainty attached to each development. For example: <ul style="list-style-type: none"> Tier 1 (most certain) <ul style="list-style-type: none"> ○ Projects under construction ○ permitted application(s), but not yet implemented ○ submitted application(s), but not yet determined Tier 2 <ul style="list-style-type: none"> ○ Projects on the Planning Inspectorate’s Programme of Projects where a scoping report has been submitted. Tier 3 (least certain) <ul style="list-style-type: none"> ○ Projects on the Planning Inspectorate’s Programme of Projects where a scoping report has not been submitted ○ Projects identified in the relevant Development Plan (and emerging Development Plans ○ Identified in other plans and programmes (as appropriate, where such development is reasonably likely to come forward) • At Stage 1 all ‘other development’ will be included in long-list, regardless of the development scale. • Where ‘other developments’ are sufficiently implemented (i.e. expected to be completed before construction of the Proposed Development) these will be considered as part of the baseline for the EIA.
Stage 2: Identify shortlist of ‘other development’ for CEA	<ul style="list-style-type: none"> • A shortlist of ‘other development’ will be developed for the CEA by applying inclusion/exclusion criteria to the Stage 1 list of ‘other development’. • Criteria will be set for each tier of ‘other development’. For example, all other DCO applications within the widest topic ZOI will be included. This will include the HAL DCO Project. • The criteria will be agreed with appropriate statutory consultees, including local authorities.

Stage	Activity
Stage 3: Information Gathering	<ul style="list-style-type: none"> • Compile detailed information on the ‘other development’ shortlisted, to inform the CEA. • Construction timescales of ‘other development’ will be sought where the information is available to inform the Applicant’s approach to assessment with respect to where cumulative impacts will fall in relation to the programme, i.e. prior to construction, during construction or during the operational phase.
Stage 4: Assessment	<ul style="list-style-type: none"> • CEA of shortlisted ‘other development’. • An assessment to be provided for all Tier 1 and Tier 2 ‘other development’, and Tier 3 at a very high level. • Topic specific justification for scoping out of developments from the CEA will be provided. • Likewise, an explanation will be provided for excluding topics from the CEA that are inherently cumulative, such as transport that uses modelled traffic data that accounts for future traffic flows. • Each topic will apply the same assessment of significance criteria as used for the core assessment. • The CEA will describe the measures proposed to mitigate significant adverse cumulative effects.

4.6.5 In line with Stage 1 of the approach set out in **Table 4.5**, the Applicant will develop a comprehensive long-list of ‘other development’ through a review of online planning applications, local development plans and the PINS website for proposed NSIPs. The ZOIs used to develop the long-list will be agreed upon with the relevant local authorities and statutory consultees.

4.6.6 At this early stage of the Proposed Development, and in the absence of agreed ZOIs, the Applicant has developed an initial list of ‘other development’. The list, provided as **Appendix 4.1** of this Scoping Report, includes:

- NSIPs for which a Scoping Report has been submitted; and
- Other major developments consisting of:
 - Residential schemes of 100+ units within the boroughs of Hillingdon, Hounslow, Slough, Spelthorne and Ealing; and
 - Industrial and warehousing schemes within 5km of the centre of Heathrow Airport.

4.6.7 The developments listed in **Appendix 4.1** are also shown on **Figure 4.1**.

4.6.8 This list has been prepared as a means of identifying the principal major developments likely to result in significant effects on the environment in the vicinity of the area which the Scoping Report relates to, in order to provide some context for the EIA. It is not a definitive list and other schemes below this threshold would still be included where they have the potential to have cumulative effects with the Proposed Development. It also provides a means of identifying new major developments, or changes in the status of major developments since the HAL Scoping Report was published in May 2018. Consultation will be carried out with relevant stakeholders on the full list of projects for the cumulative assessment at an appropriate time in the EIA process.

Cumulative effects with development related to the Proposed Development

- 4.6.9 PINS Advice Note 17 highlights the need to consider the potential for cumulative effects to arise due to the interactions between different components of the Proposed Development, as well as with 'other development'. This would include associated development for which consent is sought under a different planning regime, such as Town and Country Planning Act (TCPA) applications.
- 4.6.10 Therefore, the CEA will also consider the cumulative effects of the Proposed Development (i.e. the components that make up the DCO application) and any foreseeable associated development for which consent is sought outside of the DCO. For instance, this could include consent for some of the displaced uses which are not being re-provided as part of the Proposed Development or the HAL DCO Project, or other associated development such as offices and industrial uses for which it is most appropriate to allow the market to deliver, rather than through the Applicant's DCO.

Cumulative effects with other elements of the NRS

- 4.6.11 The Proposed Development and the HAL DCO Project are currently being developed in parallel, but they will be submitted as two separate DCO applications. We recognise that there are connections between the projects as both include components of the NRS. We have therefore derived a methodology to ensure that the Proposed Development is comprehensively assessed in EIA terms.
- 4.6.12 A robust CEA will be undertaken, and this will include identifying and describing the cumulative effects of the Proposed Development and the HAL DCO Project. The topic areas to be included in this CEA will reflect those which form part of the full assessment for the Proposed Development. The components of the HAL DCO Project which would no longer be required as a result of the Proposed Development would not be included in the cumulative assessment.
- 4.6.13 As part of this CEA, reference will be made, where possible, to the assessments, data, methodologies and reports prepared by HAL in relation to its DCO application. This approach is supported by regulation 14 of the EIA regulations, which makes it clear that reliance on existing relevant information is to be expected so as to avoid duplication of assessment, and that an ES must be prepared taking into account the results of any relevant UK environmental assessment which is reasonably available at the time.
- 4.6.14 In addition, desk-based assessments will be undertaken by the Applicant to supplement any information that is reviewed in respect of the HAL DCO Project, to specifically link it to the Proposed Development and to identify any mitigation measures and residual cumulative effects in the usual way.
- 4.6.15 At this scoping stage, it is not known whether both projects would be constructed simultaneously, sequentially or in overlapping programmes. Further information on potential timelines will be provided in subsequent reports and consultations. Therefore, at present it is envisaged that the individual topic assessments (Chapters 5-18) will initially consider two broad cumulative assessment scenarios, which are considered to represent the two alternative worst-case scenarios for construction of the airport infrastructure. These are:
- **Scenario 1** will assess the impacts of the Proposed Development and the HAL DCO Project being built simultaneously (i.e. at the same time); and

- **Scenario 2** will assess the impacts of the Proposed Development and the HAL DCO Project being built sequentially. This scenario assumes construction of the Northwest Runway followed by the construction of the Heathrow Western Hub, or vice versa.
- 4.6.16 It may be possible, depending on the level of information available at the time of the assessment for both schemes, to provide certainty on the proposed phasing, in which case the assessments will be based on this phasing. However, it may not be possible to provide the level of certainty with regard to the phasing of the two schemes at the time of assessment, in which case, by considering the potential impacts of both scenarios, each individual topic will assess if one, or both, scenarios represent a potential worst-case effect for a receptor. The identification of a worst-case scenario will then inform the subsequent topic specific assessment.
- 4.6.17 Taken together these two scenarios can be utilised on a case by case basis for each topic area to determine which of the two scenarios would result in a greater effect, to ensure that regardless of the eventual programme alignment, the worst-case scenario was assessed as part of the application.
- 4.6.18 Following this assessment, the scenario which is considered to give rise to the most significant impacts will be taken forward for further assessment of cumulative effects with other developments.
- 4.6.19 As a result, a comprehensive ES will be submitted for the Proposed Development that fully assesses the Proposed Development and provides a cumulative assessment with the remaining components of the HAL DCO Project to ensure an overarching assessment of the NRS as a whole. The combination of these assessments is exhaustive and sufficient in both technical and legal terms. It is noted that where separate consent applications are made for developments which may be linked or are components of a wider scheme or overall project, then case law at the UK and EU level makes clear that a cumulative assessment is required of those developments, and this aligns with the approach being proposed in this chapter.
- 4.6.20 There are complexities associated with separating the effects from the elements of the HAL DCO Project that would be developed as well as the Proposed Development and the elements of the HAL DCO Project which would not be required, or are superseded by the Proposed Development. The project description chapter of the ES will explicitly state in text and using figures the overlap and interrelationships of the two schemes on which the assessments will be based. It is recognised that where the Applicant is unable to clearly identify the effects related to each constituent element of the HAL DCO Project that is no longer required, this may result in the possibility of the assessment predicting likely effects that are greater than worse case.

4.7 Transboundary Effects

- 4.7.1 The United Nations Economic Commission for Europe (UNECE) Convention on Environmental Impact Assessment in a Transboundary Context (referred to as the Espoo Convention) requires that assessments are extended across borders between Parties of the Convention when a planned activity may cause significant adverse transboundary impacts.
- 4.7.2 PINS Advice Note 7: Environmental Impact Assessment: Preliminary Environmental Information, Screening and Scoping (PINS, 2017) states that within the EIA Scoping Report the applicant may wish to provide a completed transboundary screening matrix (as presented in PINS Advice Note 12: Transboundary Impacts and Process) dealing with the effect of the

Project on other European Economic Area (EEA) States.

- 4.7.3 This matrix facilitates the consideration by the Secretary of State under Regulation 32 of the EIA Regulations of whether the Proposed Development is likely to have significant effects on the environment in another EEA State. **Table 4.6** identifies where in this EIA Scoping Report the relevant information is presented to inform the transboundary screening exercise.

Table 4.6 Information to inform a decision regarding likely significant effects on another EEA State

Transboundary Screening Criteria	Commentary and location of relevant information in the EIA Scoping Report
Characteristics of the development	Information about the characteristics of the Proposed Development are described in Chapter 3 ‘The Proposed Development’ .
Location of development and geographical area	Details of the location of the Proposed Development are provided in Chapter I ‘Introduction’ and shown on Figure I.1 . The nearest EEA state is France which is approximately 160km away. The Project would not require any physical works in any area under the jurisdiction of any other EEA State. Furthermore, the proposed Northwest Runway being promoted by HAL does not form part of the Proposed Development. As such, based on the current understanding, there would be no significant environmental effects on any other EEA State as a result of the Proposed Development.
Environmental importance	All environmental resources that are identified as potentially experiencing significant environmental effects all lie within the UK. Details of relevant environmental receptors and their importance are provided in Chapters 5 to 18 of this Scoping Report.
Carrier	The pathways by which impacts could be spread are via air, land and water. Potential impact pathways are identified where relevant in Chapters 6 to 15 of this EIA Scoping Report.
Extent, magnitude, probability, duration, frequency and reversibility of impacts	Based on the information collated to date as part of the scoping exercise, no significant effects are identified that could impact on another EEA Member State. This position would be clarified as the environmental topic assessments proceed and confirmed in the ES.
Cumulative impacts	Potential cumulative impacts would be assessed within the ES in line with the approach set out in Section 4.6 .

4.8 Engagement

- 4.8.1 The Applicant, since forming its Project Board in March 2016, has undertaken informal engagement on the Proposed Development with stakeholders including the London Airlines Consultative Committee, individual airlines, and the Civil Aviation Authority. The Applicant has hosted two briefings for host and neighbouring local authorities in 2017 and 2018 as well as briefings for local MPs. In November 2018, the Applicant carried out an extensive consumer survey of airline passengers which is being used to inform design development.
- 4.8.2 The structured approach to DCO applications encourages extensive formal consultation, with multiple obligations to discharge in this context, prior to an application being submitted. Under the Act (as amended) consultation likely relating to an NSIP must be undertaken with statutory or prescribed bodies (under Section 42 of the Act), with local communities (under Section 47) and more widely through the general notification of a proposed application (under Section 48).
- 4.8.3 The Applicant’s approach to DCO consultation has been informed by the relevant legislation

and guidance. It will include:

- Ongoing engagement with technical, statutory and regulatory stakeholders during design and EIA development, which has already commenced;
- An informal Stage 1 public consultation in Q2 2019, involving the statutory consultees and the local community on Proposed Development options and commentary on preliminary impacts identified;
- Preparation of a Statement of Community Consultation (SoCC), to be agreed with local authorities. It is envisaged that both phases of public consultation will include public meetings and a dedicated website;
- A Stage 2 Statutory consultation on the Preferred Option design and the Preliminary Environmental Information Report; and
- Engagement with persons interested in the land including landowners and occupiers and those with compensatable interests impacted by CPO (“PILS”) including formal notifications.

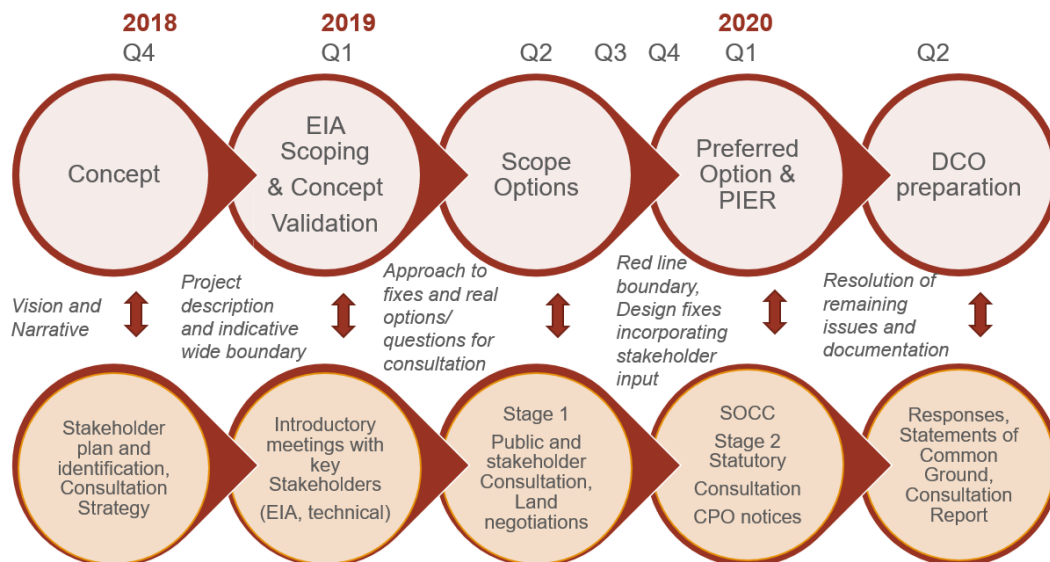


Diagram 4.3 An illustrative overview of the main consultation phases that will be undertaken and how they relate to the design and EIA process

4.8.4 **Diagram 4.3** provides an illustrative overview of the main consultation phases required under the DCO process.

4.8.5 As well as the relevant local authorities, key statutory stakeholders and the public, the Applicant intends to engage with the following key stakeholder groups commencing in early 2019:

- Members of the Heathrow Strategic Planning Group;
- Members of the Heathrow Community Engagement Board; and
- Heathrow Transport Forum

4.8.6 The Applicant will prepare a number of documents and plans showing the nature and location of the Proposed Development to inform the statutory consultation. This will include the PEIR

and the non-technical summary of the PEIR.

4.9 Outline Structure of the ES

4.9.1 In accordance with the guidance provided in PINS Advice Note 7 (PINS, 2017), **Table 4.7** provides an outline structure of the ES.

Table 4.7 Outline structure of the ES

Outline Structure of the ES	
Volume 1: Environmental Statement	
1. Introduction	
2. Planning policy and legislation	
3. Need for the Proposed Development & consideration of alternatives	
4. Existing site and surroundings	
5. Description of the Proposed Development	
6. EIA methodology	
7. Air Quality	14. Health
8. Biodiversity	15. Landscape and Visual Amenity
9. Carbon and other Greenhouse Gases	16. Land Quality and Waste
10. Climate Change	17. Major Accidents and Disasters
11. Community	18. Noise and Vibration
12. Economics and Employment	19. Traffic and Transport
13. Historic Environment	20. Water
21. Cumulative effects	
Volume 2: Technical Appendices	
Volume 2 of the ES will provide the full text of a number of technical assessments together with other relevant background information used to inform the EIA, such as the Transport Assessment.	
Volume 3: Figures	
Figures and plans to support the ES chapters including the Proposed Development description and the EIA assessments.	
Volume 4: Non-Technical Summary	
The Non-Technical Summary (NTS) will provide a summary account of the key information contained within the main ES. In accordance with the EIA Regulations, the NTS will be presented in non-technical language and be produced as a standalone document in a format suitable for the general public.	

4.10 References

Airports Commission (2015) Airports Commission: Final Report [Accessed:13/11/18] Available at: <https://www.gov.uk/government/publications/airports-commission-final-report>

Department for Communities and Local Government's (2014) EIA Planning Practice Guidance: Preparing an Environmental Statement [Accessed 15/11/18] Available at: <https://www.gov.uk/guidance/environmental-impact-assessment#Preparing-an-Environmental-Statement>

IEMA (2017) Delivering Proportionate EIA: A Collaborative Strategy for Enhancing UK Environmental Impact Assessment Practice [Accessed 29/11/18] Available at: <https://www.iema.net/policy/ia/proportionate-eia-guidance-2017.pdf>

IEMA (2012) The State of Environmental Impact Assessment Practice in the UK [Accessed 28/11/18]
Available at: <https://www.iema.net/assets/uploads/Special%20Reports/iema20special20report20web.pdf>

The Planning Inspectorate (2018) Advice Note Nine: Rochdale Envelope [Accessed: 22/11/18]
Available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/>

The Planning Inspectorate (2018) Advice Note Twelve: Transboundary Impacts and Process
[Accessed: 22/11/18] Available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/>

The Planning Inspectorate (2015) Advice Note Seventeen: Cumulative effects [Accessed: 22/11/18]
Available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/>

5 Air Quality and Odour

5.1 Introduction

5.1.1 This chapter details the proposed scope of the assessment of potential impacts arising from the Proposed Development on air quality and odour. This chapter considers impacts associated with the construction and operational phases.

5.1.2 The chapter includes:

- A description of policy and legislation with relevance to air quality and odour;
- A summary of ongoing and planned stakeholder engagement;
- An overview of the approach that has been adopted to inform this Scoping Report;
- A concise summary of baseline air quality and odour conditions;
- A description of the potential likely significant effects of the Proposed Development on air quality and odour, to be included in the scope of the assessment;
- A summary of any potential effects that are proposed to be scoped out of the assessment;
- A proposed approach to the EIA and the CEA with regards air quality and odour;
- An overview of the proposed approach to mitigation; and
- A summary of the Scoping Report chapter including a summary of impacts table.

5.1.3 The Proposed Development is a component of the Government's preferred NRS as set out in the ANPS. It does not include the Northwest Runway itself, or the major M25 realignment works required to accommodate the Northwest Runway. Therefore, potential air quality and odour effects associated with these components of the NRS are excluded from the scope of the primary assessment. Potential air quality and odour effects associated with the Northwest Runway and M25 realignment works will however be considered as part of the CEA, as set out in **Section 4.6 of Chapter 4 'Approach to EIA'**.

5.2 Policy and Legislation

5.2.1 **Table 5.1** provides a summary of the key topic-specific policy and legislation which has informed the scope of the assessment. Further information on policies relevant to the EIA and their status is set out in **Chapter 1 'Introduction'**. Due regard will also be given to local policies and the Government's 25 Year Environment Plan where they are relevant.

5.2.2 These documents are proposed to form the framework for detailed assessment post-scoping and will be taken into account in the assessment of the air quality and odour impacts during PEI and ES stages, with the relevant criteria followed throughout.

Table 5.1 Policy and legislation relevant to air quality and odour assessment

Relevant policy / legislation	Relevance to assessment
Policy	
Airports National Policy Statement (ANPS) (2018)	The ANPS states that the UK Government considers that the expansion of Heathrow airport can be delivered without impact on the UK's compliance with air

Relevant policy / legislation	Relevance to assessment
	<p>quality limit values as set out in the Ambient Air Quality Directive (2008/50/EC), subject to the implementation of mitigation measures.</p> <p>The ANPS states that the Applicant's assessment should demonstrate that the construction and operation of the Northwest Runway will not affect UK compliance with air quality limit values. The Environmental Statement must include assessment of:</p> <ul style="list-style-type: none"> • Existing air quality levels for all relevant pollutants referred to in the Air Quality Standards Regulations 2010 and the National Emission Ceilings Regulations 2002 (as amended) or referred to in any successor regulations; • Forecasts of levels for all relevant air quality pollutants at the time of opening, (a) assuming that the scheme is not built (the 'future baseline'), and (b) taking account of the impact of the scheme, including when at full capacity; and • Any likely significant air quality effects of the scheme, their mitigation and any residual likely significant effects, distinguishing between those applicable to the construction and operation of the scheme including any interaction between construction and operational changes and taking account of the impact that the scheme is likely to cause on air quality arising from road and other surface access traffic. <p>The assessment should also be based on the latest air quality projections issued by Defra.</p> <p>Air quality will be of particular relevance where the proposed scheme:</p> <ul style="list-style-type: none"> • is within or adjacent to Air Quality Management Areas, roads identified as being above limit values, or nature conservation sites (including Natura 2000 sites and Sites of Special Scientific Interest); • would have effects sufficient to bring about the need for new Air Quality Management Areas or change the size of an existing Air Quality Management Area, or bring about changes to exceedances of the limit values, or have the potential to have an impact on nature conservation sites; and • after taking into account mitigation, would lead to a significant air quality impact in relation to Environmental Impact Assessment and / or to a deterioration in air quality in a zone or agglomeration. <p>Heathrow Airport should also continue to meet its pledge to ensure that landside airport-related traffic movements would be no greater than current levels. Plans to improve road freight impacts should also be developed.</p>
<p>National Policy Statement for National Networks (NPS NN) (2014)</p>	<p>The Proposed Development includes modifications to national road and rail networks to facilitate the Heathrow Western Hub. With regard to air quality, the ES should include a description of:</p> <ul style="list-style-type: none"> • existing air quality levels; • forecasts of air quality at the time of opening, assuming that the scheme is not built (the future baseline) and taking account of the impact of the scheme; and • any significant air quality effects, their mitigation and any residual effects, distinguishing between the construction and operation stages and taking account of the impact of road traffic generated by the Proposed Development. <p>The assessment should also be based on the latest air quality projections issued by Defra.</p>

Relevant policy / legislation	Relevance to assessment
	<p>The air quality assessment must also include a judgement on whether the UK's compliance with air quality limit values can be achieved.</p> <p>Air quality will be of particular relevance where the scheme:</p> <ul style="list-style-type: none"> • is located within or adjacent to Air Quality Management Areas (AQMA); roads identified as being above Limit Values or nature conservation sites (including Natura 2000 sites and SSSIs, including those outside England); and • results in changes which are sufficient to bring about the need for a new AQMA or change the size of an existing AQMA; or bring about changes to exceedances of the Limit Values, or where they may have the potential to impact on nature conservation sites. <p>The NPS states that the Secretary of State should refuse consent for a scheme where the impacts will:</p> <ul style="list-style-type: none"> • result in a zone/agglomeration which is currently reported as being compliant with the Air Quality Directive becoming non-compliant; or • affect the ability of a non-compliant area to achieve compliance within the most recent timescales reported to the European Commission at the time of the decision.
National Planning Policy Framework (NPPF) (2018)	<p>The Revised NPPF refers to the Local Air Quality Management process by recognising that:</p> <p><i>“Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas”</i></p> <p>The NPPF identifies that local planning authorities should maintain consistency within the Local Air Quality Management process and states that:</p> <p><i>“Planning decisions should ensure that any new development within Air Quality Management Areas and clean air zones is consistent with the local Air Quality Action Plan.”</i></p> <p>The Local Air Quality Management process is considered at section 5.5 of this chapter.</p>
The Air Quality Strategy (AQS) (2007)	<p>The 1995 Environment Act required the preparation of a national AQS which sets air quality standards for specified pollutants. The strategy is based on air quality standards derived from health-based studies and set at levels at which no significant effects would be expected in the general population. The air quality Objectives are policy targets which restrict ambient concentrations of pollutants in air and state that they either cannot be exceeded, or a permitted number of exceedances are permitted, and must be achieved within a specified timeframe.</p>
Aviation Policy Framework (2013)	<p>The Aviation Policy Framework states that the most important pollutants relating to aircraft emissions and airports are oxides of nitrogen (NOx) and particulate matter (PM). Cumulative impacts arising from different individual sites can exacerbate existing air quality issues in sensitive areas such as AQMA or areas of poor air quality.</p> <p>It is acknowledged that airports generate large numbers of surface transport trips and therefore there is a responsibility to minimise the associated air quality impacts.</p>

Relevant policy / legislation	Relevance to assessment
UK Plan for Tackling Roadside Nitrogen Dioxide Concentrations (2017)	This document details the UK's strategy to reduce concentrations of nitrogen dioxide (NO ₂) to achieve compliance with the EU Limit Value.
Clean Air Strategy 2019	This document complements the 25 Year Environment Plan and details the actions to be taken to achieve reductions in emissions and pollutant exposure. The specific requirements of the Clean Air Strategy 2019 will be taken into account in the approach to the EIA.
The London Plan	<p>Policy 6.6 of the London Plan relates to aviation and states that the Mayor:</p> <p><i>a) strongly opposes any further expansion at Heathrow involving an increase in the number of aircraft movements there, due to the adverse noise and air quality impacts already being experienced by residents and others in the vicinity of Heathrow and its environs</i></p> <p><i>b) supports improvements of the facilities for passengers at Heathrow and other London airports in ways other than increasing the number of aircraft movements, particularly to optimise efficiency and sustainability, enhance the user experience, and to ensure the availability of viable and attractive public transport options to access them.</i></p> <p>[...]</p> <p><i>Development proposals affecting airport operations or patterns of air traffic (particularly those involving increases in the number of aircraft movements) should:</i></p> <p><i>a) give a high priority to sustainability and take full account of environmental impacts (particularly noise and air quality)</i></p> <p><i>b) promote access to airports by travellers and staff by sustainable means, particularly by public transport."</i></p>
Legislation	
The Ambient Air Quality Directive 2008/50/EC	<p>The Ambient Air Quality Directive sets out legally-binding Limit Values for pollutants.</p> <p>The Defra Pollution Climate Mapping (PCM) model is used to assess compliance with the EU Limit Values.</p> <p>The Directive was transposed into UK law through the Air Quality Standards Regulations 2010.</p>
Environment Act 1995, Part IV	Part IV of the Environment Act 1995 requires Local Authorities to regularly review and assess air quality within their areas of jurisdiction relative to the UK Government's air quality Objectives. They must declare a statutory AQMA where there are likely exceedances of the air quality Objectives.
The Air Quality Standards Regulations 2010	The EU Limit Values were transposed into UK law via the Air Quality Standards Regulations 2010, which set out the combined Daughter Directive Limit Values and interim targets for Member State compliance.
National Emission Ceilings Regulations 2018	These Regulations implement EU Directive 2016/2284/EU into UK Law, and relate to national emissions ceilings for certain air pollutants.

5.2.3 Planning policies of additional local authorities within the study area will be taken into account in the EIA once the spatial extent of the study area is fully defined.

5.3 Stakeholder Consultation

5.3.1 A detailed Stakeholder Engagement Plan (SEP) is currently being developed. Care will be taken to ensure all key stakeholders with views and concerns regarding air quality and odour are

provided with sufficient information on the Proposed Development to discuss and agree the details of the assessment in a meaningful and inclusive manner.

5.3.2 The stakeholders listed below were contacted in November 2018 to make them aware of the Proposed Development and timescales for further consultation. The following stakeholders were provided with a presentation providing an overview of the Proposed Development and inviting initial comments on the scope of the assessment for air quality and odour:

- Environment Agency;
- London Borough of Hillingdon;
- London Borough of Hounslow;
- Spelthorne Borough Council;
- Slough Borough Council; and
- South Bucks District Council.

5.3.3 The HAL DCO Project has received a Scoping Opinion from PINS (the “HAL Scoping Opinion”), which is a useful source of stakeholder feedback, and has been used to inform this Scoping Report.

5.3.4 Further formal and informal consultations will be arranged to discuss and agree the details of the methodology for the assessment of potential air quality impacts arising from the Proposed Development.

5.4 Approach to Scoping

Study area

5.4.1 This section sets out how the study areas will be defined for the consideration of potential air quality effects at the assessment stage.

5.4.2 Where possible, the same approach has been used to define the study areas for scoping, which have been used to enable the identification of air quality receptors with the potential to be affected by the Proposed Development.

5.4.3 The study areas at the scoping stage have been based on the Proposed Development, as shown in **Figure 1.1**. As the design of the Proposed Development is still in its early development, the study areas currently defined will be kept under review as the design and consultation processes progress, and related topic assessment study areas are confirmed. Therefore, the study areas at the assessment stage may evolve as appropriate.

5.4.4 As described in paragraph 5.1.3 emissions from aircraft in flight and during the Landing / Take-off (LTO) cycle are not included in this Chapter. Impacts associated with the LTO cycle will be assessed as part of the CEA, as detailed in **Section 4.6** of **Chapter 4 ‘Approach to EIA’**.

Construction phase dust and fine particulate matter assessment

5.4.5 The study area relating to the assessment of construction phase dust and fine particulate matter will be defined using guidance provided by the Greater London Authority (GLA) (GLA, 2014) and the Institute of Air Quality Management (IAQM) (IAQM, 2014a). The GLA and IAQM guidance documents specify that the study area in which an assessment should be

carried out is defined as:

- Human receptors within 350m of any boundary of construction works and within 50m of routes used by construction vehicles, up to 500m from the site entrance(s); and
- Ecological receptors within 50m of any boundary of construction works and within 50m of routes used by construction vehicles, up to 500m from the site entrance(s).

Air quality impact assessment

5.4.6 The study area for the assessment of impacts on air quality will be defined based on the location of sensitive human and ecological receptors relative to emission sources. With increased distance from sources of air pollutants, the effect of dilution and dispersion in the atmosphere reduces pollutant concentrations.

5.4.7 The spatial extent of the study area will be defined principally by the affected road traffic network, which will experience modifications to highway infrastructure and potential for changes in traffic flows as a result of the Proposed Development. This will be informed by modelling carried out for the traffic and transport assessment as detailed in **Chapter 13 'Traffic and Transport'**.

5.4.8 Non-road-based impacts of the Proposed Development may occur in the vicinity of Heathrow Western Hub area, and also in the vicinity of the area of ancillary and related infrastructure works and supporting facilities, as shown in **Figure 1.1**. Heathrow Western Hub and related infrastructure and supporting facilities covers a spatial area of approximately 11 km². The full spatial extent of the non-road study area will be defined once the design of the Proposed Development has evolved and all potential pollution sources are identified. The final study area will be fully defined and presented in the ES that will accompany the application.

5.4.9 The criteria for determining strategic roads which are affected by the Proposed Development are detailed in Highways Agency guidance 'Design Manual for Roads and Bridges (DMRB) HA207/07' (Highways Agency, 2007) as follows:

- Road alignment will change by 5m or more;
- Daily traffic flows will change by 1,000 Annual Average Daily Traffic (AADT) or more;
- Heavy Duty Vehicle (HDV) flows will change by 200 AADT or more;
- Daily average speed will change by 10km/hr or more; or
- Peak hour speed will change by 20km/hr or more.

5.4.10 The DMRB (Highways Agency, 2007) states that human or ecological receptors within 200m of affected roads, as defined by the above criteria, require consideration. Therefore, all strategic road links which meet the above criteria will be included in the assessment study area.

- The requirement for the assessment of traffic movements on the urban road network will be considered using the methodology detailed in IAQM and EPUK guidance (IAQM and EPUK, 2017). Road links which exceed the following criteria will be considered in the assessment:
- A change in Light Duty Vehicle (LDV) flows of 100 AADT within or adjacent to an AQMA, or 500 AADT elsewhere;

- A change in HDV flows of 25 AADT within or adjacent to an AQMA or 100 AADT elsewhere;
- A change in road alignment of 5m or more where the road is within an AQMA;
- Introduction of a new junction or removal of an existing junction near to relevant receptors; or
- Introduction or change to a bus station, where bus flows will change by more than 25 AADT within or adjacent to an AQMA, or more than 100 AADT elsewhere.

5.4.11 All urban roads which meet the above criteria will be included in the assessment study area.

EU limit value compliance assessment

5.4.12 Defra's Pollution Climate Mapping (PCM) model includes a number of road links which are used to assess compliance with EU Directive 2008/50/EC (European Parliament, 2008). All relevant PCM road links will be considered in the assessment.

Odour assessment

5.4.13 The study area in relation to the odour assessment will be defined by the location of activities which may give rise to odorous emissions. The perception of odour impact is subjective; however, across an increased distance from an odour source, dilution and dispersion reduces exposure. Impacts will therefore be considered in the vicinity of all odour sources of sufficient strength and with a relevant pathway to receptors which could give rise to significant impacts, as described in IAQM guidance (IAQM, 2014b).

Sources of baseline data

5.4.14 Baseline air quality and odour conditions were determined using publicly-available data from the following sources:

- Heathrow Airwatch¹;
- London Borough of Hillingdon²;
- Defra background pollution mapping (Defra, 2018a)³; and
- Defra PCM model outputs⁴.

5.4.15 Air quality monitoring in and around Heathrow Airport has been carried out since 1993; as such, a large air quality dataset is available.

5.4.16 No specific air quality or odour monitoring surveys were undertaken to inform this Scoping Report, as it is considered that the spatial and temporal coverage of the above datasets are sufficient to provide a robust baseline.

¹ Heathrow Airwatch is a website funded by Heathrow Airport Ltd, London Borough of Hillingdon, London Borough of Hounslow, Slough Borough Council, Spelthorne Borough Council and British Airways which includes all air quality information within the Heathrow area. The 2017 Annual Report of Air Quality at Heathrow Airport (Ricardo-AEA, 2018) was obtained from the Heathrow Airwatch website which presents the results of air quality monitoring carried out on behalf of HAL.

² The 'London Borough of Hillingdon 2017 Air Quality Annual Status Report' (London Borough of Hillingdon, 2018) contains the results of monitoring data collected across the borough in 2017.

³ The Defra background pollution mapping data provides background pollutant concentrations in 1km x 1km grid squares across the UK

⁴ The Defra PCM model outputs provides modelled pollutant concentrations across the UK which are used to assess compliance with EU Limit Values

5.5 Baseline Conditions

Local air quality management

5.5.1 Part IV of the Environment Act 1995 requires Local Authorities to regularly review and assess air quality within their areas of jurisdiction relative to the UK Government's air quality Objectives. The standards and Objectives relevant to the LAQM framework are prescribed through the Air Quality (England) Regulations (HMSO, 2000), and the Air Quality (England) (Amendment) Regulations (HMSO, 2002). The UK air quality Objectives of relevance to LAQM are detailed in **Table 5.2**.

Table 5.2 Air quality strategy objectives (England) for the purpose of local air quality management

Pollutant	Air Quality Objective	Assessment Period
Benzene	5µg.m ⁻³	Annual mean
1,3 Butadiene	2.25µg.m ⁻³	Running annual mean
Carbon monoxide	10mg.m ⁻³	Maximum daily running 8-hour mean
Lead	0.25µg.m ⁻³	Annual mean
Nitrogen dioxide (NO ₂)	200µg.m ⁻³	1 hour mean not to be exceeded more than 18 times per year
	40µg.m ⁻³	Annual mean
Particles (PM ₁₀)	50µg.m ⁻³	24-hour mean not to be exceeded more than 35 times per year
	40µg.m ⁻³	Annual mean
Particles (PM _{2.5})	25µg.m ⁻³	Annual mean (target)
	15% cut in annual mean (urban background exposure)	2010 - 2020
Sulphur Dioxide (SO ₂)	350µg.m ⁻³	1-hour mean not to be exceeded more than 24 times a year
	125µg.m ⁻³	24-hour mean not to be exceeded more than 3 times a year
	266µg.m ⁻³	15-minute mean not to be exceeded more than 35 times a year
Ozone (O ₃)	100µg.m ⁻³	8-hour mean not to be exceeded more than 10 times a year

5.5.2 Heathrow Airport is located within a statutory designated AQMA, declared by London Borough of Hillingdon for exceedances of the annual mean NO₂ Objective. The land being considered for associated works (as shown in **Figure I.1**) is also covered by the following AQMAs:

- South Buckinghamshire District Council AQMA no. 2;
- Spelthorne Borough Council borough-wide AQMA; and
- London Borough of Hounslow borough-wide AQMA.

5.5.3 The above AQMAs were all declared due to exceedances of the annual mean NO₂ Objective, particularly in areas along major road networks as a result of emissions from traffic movements.

Air quality monitoring

- 5.5.4 The Heathrow Airwatch website (Heathrow Airwatch Partnership, 2018) includes annual reports which summarise air quality data collected by HAL over the preceding calendar year and include consideration of air quality trends. Data collected by the London Borough of Hillingdon was obtained from the Council website (London Borough of Hillingdon, 2018).
- 5.5.5 There are four continuous airport air quality monitoring stations operated by HAL, located in and around Heathrow Airport. The HAL stations all monitor NO_x, PM₁₀ and PM_{2.5}; ozone and black carbon are each monitored at one location. The London Borough of Hillingdon also carries out continuous monitoring at five other locations in the vicinity of Heathrow Airport, which include measurements of NO₂, PM₁₀, PM_{2.5} and ozone. These monitoring stations are classified as either urban background or roadside locations, and are considered to be representative of these localities.
- 5.5.6 Whilst it is recognised that the Proposed Development will cover a spatial area which spans several local authorities, for the purposes of this Scoping Report only baseline air quality monitoring carried out on behalf of HAL and by London Borough of Hillingdon closest to the Airport was considered. A full review of baseline air quality data across the study area will be carried out at the PEI stage once the spatial extent is fully defined.
- 5.5.7 The 2017 Annual Report of Air Quality at Heathrow Airport (Ricardo-AEA, 2018) and the London Borough of Hillingdon 2017 Air Quality Annual Status Report (London Borough of Hillingdon, 2018) were reviewed to determine baseline air quality in the immediate vicinity of Heathrow Airport. Air quality monitoring locations discussed in this section are shown in **Figure 5.1**.

Nitrogen Dioxide (NO₂)

- 5.5.8 The 2017 Heathrow Annual Report (Ricardo-AEA, 2018) states that the annual mean and 1-hour mean Objectives for NO₂ were met at all monitoring locations where there is relevant public exposure. One monitoring location (LHR2), which is a continuous analyser situated on the northern apron of the Airport, experienced annual mean concentrations of 48µg.m⁻³ which is in exceedance of the 40µg.m⁻³ Objective. However, as this monitor is located within the Airport boundary, it is not representative of long-term public exposure.
- 5.5.9 Annual mean NO₂ concentrations monitored by London Borough of Hillingdon close to major roads were in exceedance of the air quality Objective in 2017; the highest concentrations were recorded at the London Hillingdon station which, whilst categorised as an urban background site, is located 30m from the M4 motorway. Therefore, emissions from road traffic are expected to be the dominant source of pollution in this area. The short-term NO₂ Objective was met at all Hillingdon monitoring stations.
- 5.5.10 The 2017 NO₂ annual mean recorded at LHR2 was higher than concentrations recorded in 2015 and 2016; similar datasets were observed within other parts of London and the south-east. Concentrations of NO₂ at Heathrow over the last decade have not shown a consistent trend.

Particulate Matter (PM₁₀ and PM_{2.5})

- 5.5.11 The long and short-term Objectives for PM₁₀ and PM_{2.5} were met at all HAL and London Borough of Hillingdon monitoring locations.

Ozone (O₃)

- 5.5.12 Ozone is not required to be assessed under the LAQM regime; however, there is an EU Target Value and Objective for this pollutant as set out in the Air Quality Standards (England) Regulations 2010 (HMSO, 2010). Ozone monitoring is carried out at the Harlington station operated by HAL, and the London Hillingdon station, located approximately 900m and 1.7km north of Heathrow Western Hub boundary, respectively. Concentrations of ozone in 2017 were below the air quality Objective at London Hillingdon.
- 5.5.13 The ozone Objective was exceeded over 44 days in 2017 at the HAL site; of these 44 exceedances, 42 occurred between 14th June and 6th July. Elevated ozone concentrations were experienced across England during this period, coinciding with hot weather and sunshine which increase the rate of ozone production in the atmosphere.

Concentrations of other pollutants

- 5.5.14 There is no monitoring of carbon monoxide (CO), sulphur dioxide (SO₂), benzene, lead or 1,3 butadiene at monitoring stations around Heathrow.
- 5.5.15 The London Borough of Hillingdon concluded in Stage I of its review and assessment process that the Objectives for 1,3 butadiene, benzene and lead would be met in all areas of the borough, and additional more detailed assessment was therefore not required. Monitoring of these pollutants is therefore not carried out in the Heathrow area.
- 5.5.16 Monitoring of CO and SO₂ was carried out by London Borough of Hillingdon until 2008 and 2009 respectively, when it was confirmed that the Objectives had been achieved and monitoring was discontinued.

Dust deposition

- 5.5.17 There is no dust deposition monitoring undertaken in the vicinity of Heathrow. Dust deposition monitoring is generally undertaken on a site-specific basis, often in the vicinity of construction sites, to determine the potential for complaints to occur. Given the nature of the Heathrow area, it is unlikely that there are any significant continuous sources of dust; therefore, baseline dust deposition levels are expected to be well below those at which a loss of amenity or impacts on vegetation could occur.

Odour

- 5.5.18 As for dust deposition monitoring, odour monitoring is not routinely undertaken. Prior to commencement of the air quality assessment, any data on previous odour complaints relating to Heathrow Airport will be obtained from the relevant authorities.

5.6 Scoping of Potential Effects

Effects scoped into the assessment

- 5.6.1 The potential likely significant effects to be scoped into the air quality and odour assessment are displayed in **Table 5.3**.

Table 5.3 Potential likely significant air quality and odour effects

Activity	Effect	Receptor
Construction		

Activity	Effect	Receptor
Land preparation works, demolition, earthworks and construction activities and movement of construction site vehicles onto the public highway	Emissions of dust and fine particulate matter leading to loss of amenity at human receptors and impacts on designated habitats and / or species	Sensitive human receptors (residential dwellings, schools, hospitals and care homes), places of work and other dust-sensitive commercial receptors Designated ecological sites of local, national or international importance
	Emissions of odours leading to loss of amenity	Sensitive human receptors (residential dwellings, schools, hospitals and care homes), public open spaces and places of work
	Exhaust emissions associated with on-site construction vehicles and plant which may lead to impacts on human health and designated habitats and / or species	Sensitive human receptors (residential dwellings, schools, hospitals and care homes) and locations where people may be present for periods of one hour or more Designated ecological sites of local, national or international importance
Construction-generated vehicle movements	Exhaust emissions associated with construction-generated traffic on the public road network which may lead to impacts on human health and designated habitats and / or species	Sensitive human receptors (residential dwellings, schools, hospitals and care homes) and locations where people may be present for periods of one hour or more Designated ecological sites of local, national or international importance
Construction-generated rail movements	Exhaust emissions associated with construction-generated freight rail movements which may lead to impacts on human health and designated habitats and / or species	Sensitive human receptors (residential dwellings, schools, hospitals and care homes) and locations where people may be present for periods of one hour or more Designated ecological sites of local, national or international importance
Removal of displaced uses	Local reduction in emissions which may lead to benefits for human health and at designated habitats	Sensitive human receptors (residential dwellings, schools, hospitals and care homes) and locations where people may be present for periods of one hour or more Designated ecological sites of local, national or international importance
Operation		

Activity	Effect	Receptor
Movements of aircraft on taxiways	Exhaust emissions of air pollutants ⁵ associated with aircraft movements which may lead to impacts on human health and designated habitats and / or species	Sensitive human receptors (residential dwellings, schools, hospitals and care homes) and locations where people may be present for periods of one hour or more Designated ecological sites of local, national or international importance
Operation of on-airport plant and vehicles	Exhaust emissions of air pollutants ² from plant and vehicles within the airport itself, including car parking, which may give rise to impacts on human health and designated habitats and / or species	Sensitive human receptors (residential dwellings, schools, hospitals and care homes) and locations where people may be present for periods of one hour or more Designated ecological sites of local, national or international importance
	Increases in concentrations of ozone (O ₃) as a result of fuel combustion which may lead to impacts on human health	Sensitive human receptors (residential dwellings, schools, hospitals and care homes)
Operation of associated supporting facilities	Emissions of air pollutants ⁵ arising from fuel combustion associated with plant and vehicle movements which may lead to impacts on human health and designated habitats and / or species	Sensitive human receptors (residential dwellings, schools, hospitals and care homes) and locations where people may be present for periods of one hour or more Designated ecological sites of local, national or international importance
	Increases in concentrations of ozone (O ₃) as a result of fuel combustion which may lead to impacts on human health	Sensitive human receptors (residential dwellings, schools, hospitals and care homes)
Operational phase road traffic on the public road network and rail movements	Exhaust emissions (NO ₂ , PM ₁₀ and PM _{2.5}) associated with operational phase traffic on the public road network and emissions from rail movements (NO ₂ , PM ₁₀ , PM _{2.5} and SO ₂) which may lead to impacts on human health and designated habitats and / or species	Sensitive human receptors (residential dwellings, schools, hospitals and care homes) and locations where people may be present for periods of one hour or more Designated ecological sites of local, national or international importance
Upgraded and / or new wastewater treatment facilities	Odour emissions which may lead to loss of amenity at receptors	Sensitive human receptors (residential dwellings, schools, hospitals and care homes), public open spaces and places of work

⁵ Air pollutants includes those compounds as described in the Air Quality Standards Regulations 2010 and the National Emissions Ceiling Regulations 2018

Effects scoped out of the assessment

5.6.2 The effects proposed to be scoped out of the air quality and odour assessment are displayed in **Table 5.4**.

Table 5.4 Effects to be scoped out of the air quality and odour assessment

Activity	Effect	Receptor	Justification for scoping out
Operation			
Combustion of fuel as a result of movement of aircraft on taxiways	Increases in concentrations of ozone (O ₃) resulting from combustion of aviation fuel which may lead to impacts on human health	Sensitive human receptors (residential dwellings, schools, hospitals and care homes)	As part of the Project for the Sustainable Development of Heathrow (PSDH), three panels of air quality experts reviewed the air quality issues associated with a third runway. The panels concluded that impacts on ozone concentrations as a result of Heathrow emissions did not require consideration in dispersion modelling, but ozone monitoring data should be collated for consideration in the context of atmospheric chemistry. As such, it is proposed to scope out the impact of taxiing aircraft associated with the Proposed Development on ozone concentrations.
Operational phase combustion activities	Emissions of pollutants (NO _x , SO ₂ , and Volatile Organic Compounds (VOCs)) which can form secondary particles which may lead to impacts on human health	Sensitive human receptors (residential dwellings, schools, hospitals and care homes)	Defra published a report in 2005 by the Air Quality Expert Group (AQEG, 2005) on Particulate Matter in the United Kingdom, which states that secondary particulates comprise sulphate, nitrate and water, formed from chemical reactions in the atmosphere of secondary particulate precursors, which include SO ₂ , NO _x , ammonia and VOCs. The report states that the formation of secondary particulate takes hours or days, over which time the polluted air can travel large distances. It is therefore considered that the impact of secondary particulate formation at sensitive receptors within the Proposed Development's study area would not be significant. Furthermore, gaseous emissions of NO _x , converted to NO ₂ in the atmosphere, are considered to

Activity	Effect	Receptor	Justification for scoping out
			be of greater significance with regard to human health, as this pollutant is close to or in exceedance of the air quality Objectives in the Heathrow area, and consideration of this pollutant is scoped in. It is therefore proposed to scope the assessment of secondary particulate out of the assessment.

5.7 Approach to Assessment

Study areas

- 5.7.1 The proposed study areas for air quality receptors are set out in **Section 5.4**. These will be refined at the assessment stage as the design and consultation processes progress, and as related topic assessments are progressed (e.g. Traffic and Transport). Refinement of the study area will also be informed by locations of pollution sources and the area over which pollutant emissions from these sources may lead to impacts at receptors.
- 5.7.2 The study areas for the assessment will be identified to ensure that the impact of the Proposed Development on air quality can be fully assessed. A likely ZOI for potential cumulative air quality effects with other development will be defined separately as part of the CEA, as described in **Section 4.6 of Chapter 4 ‘Approach to EIA’**.

Additional baseline data collection

- 5.7.3 The latest full calendar year of pollutant monitoring data collected across the study area will be obtained for use in the assessment once published by the relevant local authorities and HAL, following ratification and adjustment.
- 5.7.4 Should existing monitoring carried out by local authorities not cover the study area once it has been fully defined, additional baseline monitoring will be undertaken as required and the scope and design of any monitoring surveys will be agreed with relevant stakeholders prior to commencement.
- 5.7.5 To establish the odour and dust baseline, the relevant complaints history will be obtained from the relevant local authorities for review. In addition, baseline dust deposition monitoring (or real-time particulate monitoring) will be carried out prior to commencement of and during construction, and details will be included in a draft Code of Construction Practice submitted with the DCO application.

Assessment methodology

Construction phase dust and fine particulate matter

- 5.7.6 An assessment of potential impacts associated with land preparation works, demolition, earthworks and construction activities and movement of construction site vehicles onto the public highway will be undertaken in accordance with the IAQM (IAQM, 2014a) and GLA (GLA, 2014) guidance.

5.7.7 The assessment process outlined in the guidance is qualitative in nature, and requires determination of the level of risk of dust-related impacts occurring as a result of the Proposed Development, based on certain construction activities. The assessment considers impacts both in terms of the potential loss of amenity arising from dust soiling, and with respect to human health in the context of the likelihood of exceedances of the relevant PM10 and PM2.5⁶ air quality Objectives. Impacts on designated ecological sites are also considered.

5.7.8 A summary of the stages of the assessment process is provided below:

1. Screen the need for a more detailed assessment;
2. Separately for demolition, earthworks, construction and trackout⁶:
 - a. determine potential dust emission magnitude;
 - b. determine sensitivity of the area; and
 - c. establish the risk of dust impacts.
3. Determine site specific mitigation; and
4. Examine the residual effects to determine whether or not additional mitigation is required.

5.7.9 The IAQM and GLA guidance will be used to consider potential impacts associated with all areas of construction works. Human and ecological receptors and their sensitivity will be defined within the relevant distance boundaries as specified in the guidance.

Magnitude of effects

5.7.10 The definitions of the dust emission magnitudes for each activity are detailed in **Table 5.5**.

Table 5.5 Definitions of the different magnitudes of construction phase dust emissions

Activity	Criteria used to Determine Dust Emission Class		
	Small	Medium	Large
Demolition	Total building volume <20,000 m ³ , construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <10m above ground, demolition during wetter months.	Total building volume 20,000m ³ – 50,000m ³ , potentially dusty construction material, demolition activities 10-20m above ground level	Total building volume >50,000m ³ , potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities >20m above ground level
Earthworks	Total site area <2,500m ²	Total site area 2,500 – 10,000m ²	Total site area >10,000m ²
Construction	Total building volume <25,000m ³	Total building volume 25,000 – 100,000m ³	Total building volume >100,000m ³
Trackout	<10 outward HDV trips in any one day. Unpaved road length <50m	10-50 outward HDV trips in any one day. Unpaved road length 50-100m	>50 outward HDV trips in any one day. Unpaved road length >100m

5.7.11 As detailed in **Table 5.6**, the IAQM and GLA guidance documents provide broad ranges of

⁶ Trackout is defined as the transport of dust and dirt from the construction site onto the public road network

the area of a site, the total building volume and the number of outward vehicle trips which will be used to determine the dust emission magnitude.

Receptor sensitivity and value

5.7.12 Definitions of the different sensitivity levels for human and ecological receptors to dust are given in **Table 5.6**. Sensitivity levels were obtained from the IAQM guidance (IAQM, 2014).

Table 5.6 Definition of the different sensitivity levels for receptors to construction dust

Sensitivity	Sensitivity of people to dust soiling	Sensitivity of people to the health effects of PM10	Sensitivity of ecological receptors
High	Dwellings, museums and other culturally important collections, medium and long-term car parks and car showrooms.	Residential properties, hospitals, schools and residential care homes.	International or national designation and features affected by dust soiling or locations with dust-sensitive species.
Medium	Parks, places of work.	Office and shop workers not occupationally exposed to PM10.	Locations with important plant species or national designation with features affected by dust soiling.
Low	Playing fields, farmland, footpaths, short-term car parks and roads.	Public footpaths, playing fields, parks and shopping streets.	Local designation where features may be affected by dust deposition.

5.7.13 The magnitude of construction phase dust emissions will be defined for each type of activity. These are divided into four categories: demolition, earthworks, construction and trackout. The dust emission magnitudes can either be small, medium or large and are dependent on the methods of work undertaken and the scale of the activity.

5.7.14 The dust emission magnitude will be combined with the sensitivity of the area to determine the risk of impacts prior to mitigation. The assessment methodology states that, once appropriate mitigation measures have been identified, the significance of construction phase impacts can be determined. The aim is to prevent significant effects at receptors due to the implementation of effective mitigation.

Evaluation of significance

5.7.15 A matrix is not provided in the IAQM or GLA guidance to determine significance as it is considered that, with the implementation of effective mitigation measures, the residual impacts can be considered to be 'not significant' in accordance with the guidance.

Construction and operational phase odour emissions

5.7.16 Potential impacts associated with odour emissions from construction phase land preparation works and operational phase upgraded and / or new wastewater treatment facilities will be considered in accordance with guidance provided by the IAQM (IAQM, 2014b). The appropriate method for assessment (i.e. qualitative or quantitative) will be determined and justified once the potential sources and nature of any odours are defined.

5.7.17 There are no specific statutory regulations or guidance documents that provide information on the level of odour which constitutes a nuisance or annoyance, as odour is generally considered in terms of offensiveness to the human sense of smell which is, by nature, difficult to define.

- 5.7.18 Guidance provided by the IAQM (2014b) and the Environment Agency (2011) on the assessment of impacts from odour will be utilised in the assessment.
- 5.7.19 The method of determination of the significance of impact will be dependent on the methods of assessment used, which will be defined as the Proposed Development evolves and will be detailed in the impact assessment.

Construction and operational phase plant, combustion source, rail and vehicle emissions

- 5.7.20 The methodology detailed below will be used to consider impacts associated with construction and operational phase road, rail and on-airport plant emissions, the removal of displaced uses, movement of aircraft on taxiways and the operation of associated supporting facilities.
- 5.7.21 At this stage, there is not sufficient information regarding potential sources of CO, lead, benzene, 1,3 butadiene, arsenic, cadmium, nickel, mercury, benzo(a)pyrene, benzo(b)fluoranthene, indeno(1,2,3-cd)pyrene, dioxins / furans, PCBs, HCB and ozone) as a result of combustion. As such, it is proposed to carry out a detailed screening assessment once the details of the Proposed Development are confirmed, to consider the potential for emissions of these pollutants and their requirement for detailed assessment.
- 5.7.22 Dispersion modelling will be carried out to consider the relevant assessment scenarios (as discussed in later sections) and assess the potential for impacts as a result of the Proposed Development.
- 5.7.23 The Atmospheric Dispersion Modelling System (ADMS) Airport model will be used for all sources associated with the Airport. ADMS-Roads will be used in the assessment of road-based sources, including both vehicle movements on the public road network and within the Airport itself. The ADMS-5 dispersion model will be used to consider stationary items of plant and combustion sources. The above dispersion models are provided by Cambridge Environmental Research Consultants (CERC) and are fully validated dispersion models frequently used for assessments of this nature.
- 5.7.24 It is proposed to compile an emissions inventory for each scenario to be considered, which will include all pollution sources, and include background pollutant concentrations for the relevant assessment years, as provided by Defra. The model will consider the effect of atmospheric dispersion conditions using a five-year dataset of hourly sequential meteorological data recorded at the Heathrow Airport station.
- 5.7.25 Pollutant sources which may require the issue of an Environmental Permit under the Environmental Permitting (England and Wales) Regulations 2016 (as amended) will be considered in accordance with guidance provided by Defra and the Environment Agency (Defra and the Environment Agency, 2016).
- 5.7.26 The technical approach to the assessment will be carried out in accordance with Defra technical guidance document LAQM.TG(16) (Defra, 2016).
- 5.7.27 Predicted pollutant concentrations in the baseline scenario will be compared to monitored pollutant concentrations within the study area for the purposes of model verification.
- 5.7.28 The dispersion modelling will be used to predict pollutant concentrations at human and ecological receptors for comparison with the relevant air quality Objectives, in addition to the relevant PCM locations to determine UK compliance with EU Limit Values, for all scenarios

considered.

Receptor sensitivity and value

5.7.29 The sensitivity of a receptor is not considered in the assessment of air quality impacts; the air quality Objectives detailed in **Table 5.2**, which are health-based, apply only at locations where there is relevant public exposure as detailed in **Table 5.7**.

Table 5.7 Examples of where the air quality Objectives should/should not apply magnitude and significance of effects

Averaging period	Objectives should apply at:	Objectives should generally not apply at:
Annual Mean	All locations where members of the public might be regularly exposed. Building facades of residential properties, schools, hospitals, care homes etc.	Building facades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties. Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
24-Hour Mean and 8-Hour Mean	All locations where the annual mean Objective would apply, together with hotels and gardens of residential properties.	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
1-Hour Mean	All locations where the annual mean and 24 and 8-hour mean Objectives apply. Kerbside sites (for example, pavements of busy shopping streets). Those parts of car parks, bus stations and railway stations etc which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more. Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer.	Kerbside sites where the public would not be expected to have regular access.

Magnitude and significance of effects

5.7.30 The determination of the significance of air quality impacts should be determined using a combination of both the magnitude of change in air quality at receptors and the overall pollutant concentrations relative to the air quality Objectives. The DMRB (Highways Agency, 2007), IAQM and EPUK (IAQM and EPUK, 2017) documents both provide guidance on the assessment of significance at individual receptors, and detail a number of considerations which should influence the determination of the overall significance of effect, including the magnitude of change, which is also dependent on professional judgement.

5.7.31 The DMRB states that an assessment of significance of air quality impact relating to the strategic road network should be made based on existing air quality and forecast pollution levels, and the populations affected. The following criteria are detailed in Interim Advice Note (IAN) 174/13 and will be used to consider the significance of an air quality impact:

- Is there a risk that environmental standards will be breached?
- Is there a high probability of the effect occurring?
- Will there be a large change in environmental conditions?
- Will the effect continue for a long time?
- Will many people be affected?
- Is there a risk that protected sites, areas, or features will be affected?
- Will it be difficult to avoid, or reduce or repair or compensate for the effect?

5.7.32 IAQM and EPUK guidance (IAQM and EPUK, 2017) provides a matrix for assessment of impacts at individual receptors, which will also be used in the assessment. The impact descriptors take account of the magnitude of changes in pollutant concentrations, and the concentration in relation to the air quality Objectives, as detailed in **Table 5.8**.

Table 5.8 Impact descriptors for individual receptors

Long Term Average Concentration at Receptor in Assessment Year	% Change in Concentration relative to the Air Quality Assessment Level (AQAL)			
	1-2	2-5	6-10	>10
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76-94% of AQAL	Negligible	Slight	Moderate	Moderate
95-102% of AQAL	Slight	Moderate	Moderate	Substantial
103-109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

Note: Figures are to be rounded up to the nearest round number. Any value less than 1% after rounding (effectively less than 0.5%) will be described as "Negligible".

5.7.33 The IAQM and EPUK guidance recommends that the assessment of significance of effect should account the following factors which will be considered in the assessment:

- The existing and future air quality in the absence of the development;
- The extent of current and future population exposure to the impacts; and
- The influence and validity of any assumptions adopted when undertaking the prediction of impacts.

5.7.34 The assessment will also utilise guidance on the significance of impacts from industrial sources of emissions, which would be regulated by an Environmental Permit, as provided by Defra and the Environment Agency (Defra and Environment Agency, 2016). These criteria determine the significance of an impact based on the percentage of increase in pollutant concentrations as a result of the Proposed Development, relative to the relevant assessment threshold, e.g. the air quality Objectives or Critical Loads or Levels for designated ecological sites. All such regulated industrial activities will need to be operated in accordance with Best Available

Techniques, so as to prevent or minimise emissions.

UK Compliance with EU Limit Values Assessment

5.7.35 Concentrations of NO₂ will be predicted at relevant PCM locations in the study area to consider compliance with the EU Limit Value for each assessment scenario. Only NO₂ is considered as this is the pollutant of particular concern with regard to compliance at the national level. The increase in NO₂ concentrations as a result of the Proposed Development will be added to the modelled PCM value; this total concentration will be compared to the highest concentration across the Greater London agglomeration for each assessment year to consider whether the Proposed Development will affect compliance.

Assessment scenarios

5.7.36 The Proposed Development will be implemented across an anticipated timeframe of 2022 – 2030. The air quality and odour assessment will consider a number of different assessment scenarios which will consider the construction and operational phases, and the activities which would give rise to the most significant air quality impacts as a result of the Proposed Development.

5.7.37 Pollutant concentrations associated to the Proposed Development are expected to reduce over time, due to improved vehicle and emission reduction technologies. These emissions improvements will also reduce background pollutant concentrations in the future.

5.7.38 Air quality impacts are considered both as a change in pollutant concentrations resulting from the construction or operation of a project (or both where the phases overlap), and as the comparison of total pollutant concentrations relative to the air quality Objectives. As such, impacts occurring in later years of the Proposed Development may result in a lower significance than smaller impacts which occur earlier in the programme when higher overall pollutant concentrations are experienced.

5.7.39 The Proposed Development assessment years will be defined once additional details of the nature of the emission sources are known, so that the worst-case air quality impacts are considered.

Cumulative effects

5.7.40 Cumulative air quality effects resulting from the combination of effects from the Proposed Development and other developments will be assessed in accordance with the guidance and methodologies set out in **Section 4.6 of Chapter 4 ‘Approach to EIA’**. The assessment will be dependent on the availability and accessibility of information for other developments.

5.7.41 The Proposed Development does not include the new Northwest Runway and M25 realignment components of the NRS proposed by HAL. However, the Proposed Development is designed to be operated alongside these components of the NRS that are being progressed by the HAL DCO Project. Therefore, the total cumulative air quality effects will be considered together to ensure an overarching assessment of the NRS as a whole.

5.7.42 Any components of the HAL DCO Project which would no longer be required as a result of the Proposed Development would not be included in the CEA.

5.8 Approach to Mitigation

5.8.1 Minimisation of air quality and odour impacts will be embedded into the design of the

Proposed Development where possible following the application of the hierarchy of mitigation as described in **Chapter 4 'Approach to EIA'**. The assessment of impacts will be made with these embedded mitigation measures in place.

5.8.2 The type and level of mitigation measures required will be informed by the expected level of impact. The ANPS lists a number of mitigation measures relevant to the construction and operational phases which could be put forward to minimise impacts associated with the Proposed Development. Mitigation identified by the ANPS that is relevant to the air quality assessment is outlined below:

Construction Phase

- Development of a construction traffic management plan (which may include the possible use of rail and consolidation sites or waterways);
- The use of low emission construction plant / fleet, fitting of diesel particulate filters, and use of cleaner engines;
- The use of freight consolidation sites;
- Active workforce management / a worker transport scheme;
- Construction site connection to grid electricity to avoid use of mobile generation; and
- Selection of construction material to minimise distance of transport and increase recycling percentages of the material where appropriate.

Operational Phase

- Zero- or low-emission hybrid or electric vehicle use (ultra-low emission vehicles) charging and fuel facilities;
- Reduced or single engine taxiing (improved taxiing efficiency);
- Reducing emissions from aircraft at the gate (for example installation of fixed electrical ground power and preconditioned air to aircraft stands to reduce the use of auxiliary power unit);
- Modernised heating supplies in airport buildings;
- Changes to the layout of surface access arrangements;
- Traffic restrictions and / or traffic relocation around sensitive areas;
- An emissions-based access charge; and
- Physical means, including barriers to trap or better disperse emissions and speed control on roads

5.9 Summary

5.9.1 The scope of the air quality and odour assessment described above is summarised in **Table 5.9**.

Table 5.9 Summary of Air Quality Assessment Impacts

Potential Impacts	Construction	Operation
Emissions of dust and fine particulate matter, odours and exhaust emissions from on-site construction vehicles and plant associated with land preparation works	✓	X
Exhaust emissions from vehicles on the public road network and emissions from freight rail movements	✓	✓
Local reductions in emissions associated with the removal of displaced uses	X	✓
Exhaust emissions resulting from movements of aircraft on taxiways	X	✓
Operation of on-airport plant and vehicles and associated supporting facilities which will give rise to emissions of air pollutants and increases in ozone concentrations	X	✓
Odour emissions from upgraded and/or new wastewater treatment facilities	X	✓
Increases in ozone concentrations resulting from fuel combustion associated with the movement of aircraft on taxiways	X	X
Increases in emissions of pollutants from combustion activities which may form secondary particles	X	X

Scoped in (✓) and scoped out (X)

5.9.2 Production of the ES chapter will be undertaken in consultation with all relevant stakeholders, including topic expert panel meetings, as appropriate. Similarly, the requirements of the ANPS will be at the forefront; principally that the Proposed Development design will aim to make a positive contribution to air quality. Proposals for mitigation will be considered with improvements in air quality at the forefront.

5.10 References

AQEG (2005) Particulate Matter in the UK: Summary. Defra, London.

Department for the Environment Food and Rural Affairs (Defra) (2007) The Air Quality Strategy for England, Scotland, Wales and Northern Ireland. London: HMSO

Department for the Environment Food and Rural Affairs (Defra) (2016) Local Air Quality Management Technical Guidance Document Local Air Quality Management.TG (16) London: Defra

Defra, UK plan for tackling roadside nitrogen dioxide concentrations, 2017

Department for Transport, National Policy Statement for National Networks, 2014

Department for Transport, Revised draft Airports National Policy Statement, October 2017

Defra, UK plan for tackling roadside nitrogen dioxide concentrations, 2017

Defra and the Environment Agency (2016) Air Emissions Risk Assessment for your Environmental Permit <https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit>

Environment Agency (2011) H4 Odour Management

European Parliament (2008) Council Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe

Greater London Authority (2014) The Control of Dust and Emissions During Demolition and Construction

Heathrow Airwatch Partnership (2018) Heathrow Airwatch <http://www.heathrowairwatch.org.uk/>

Her Majesty's Stationary Office (HMSO) (1995) The Environment Act 1995 (c.25) London: TSO

HMSO (2000) Statutory Instrument 2000 No. 928, The Air Quality (England) Regulations 2000, London:HMSO.

HMSO (2002) Statutory Instrument 2002 No. 3043, The Air Quality (England) (Amendment) Regulations 2002, London:HMSO.

HMSO (2010) 'Statutory Instrument 2010 No. 1001, Air Quality Standards (England) Regulations, 2010'. London:HMSO.

HMSO (2018) Statutory Instrument 2018 No. 129 The National Emission Ceilings Regulations 2018, London:HMSO.

Highways Agency (2007) Design Manual for Roads and Bridges Volume II Environmental Assessment Section 3 Environmental Assessment Techniques Part I HA207/07 Air Quality

Institute of Air Quality Management (IAQM) (2014a) Guidance on the Assessment of Odour for Planning

Institute of Air Quality Management (IAQM) (2014b) Guidance on the Assessment Dust from Demolition and Construction

Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK) (2017). Land-Use Planning & Development Control: Planning for Air Quality

London Borough of Hillingdon (2018) Air Quality Annual Status Report 2017

Ministry of Housing, Communities and Local Government (2018) National Planning Policy Framework. London: HMSO

Ricardo-AEA (2018) Air Quality at Heathrow Airport 2017
http://www.heathrowairwatch.org.uk/documents/Heathrow_2017_Annual_Report_IssueI.html

Secretary of State for Transport (2013) Aviation Policy Framework

6 Biodiversity

6.1 Introduction

6.1.1 This chapter details the proposed scope of the assessment of the potential impacts arising from the Proposed Development on biodiversity, including terrestrial and freshwater components. The chapter considers impacts associated with the construction and operational phases.

6.1.2 This chapter includes:

- A description of policy and legislation with relevance to the biodiversity;
- A summary of ongoing and planned future stakeholder engagement;
- An overview of the approach that has been adopted to inform this Scoping Report;
- A summary of the baseline biodiversity information;
- A description of the potential effects of the Proposed Development on biodiversity, including summaries of impacts scoped in and out of subsequent stages of the assessment;
- A description of the proposed approach to the Ecological Impact Assessment (EclA);
- A description of the proposed approach to the Habitats Regulations Assessment (HRA);
- A summary of the proposed approach to mitigation; and
- A summary of the Scoping Report chapter including a summary of impacts table

6.1.3 The Proposed Development is a component of the Government's preferred NRS as set out in the ANPS. It does not include the Northwest Runway itself, or the major M25 realignment works required to accommodate the Northwest Runway. Therefore, potential biodiversity effects associated with these components of the NRS are excluded from the scope of the primary assessment. Potential biodiversity effects associated with the Northwest Runway and M25 realignment works will however be considered as part of the CEA, as set out in **Section 4.6 of Chapter 4 'Approach to EIA'**.

6.2 Policy and Legislation

6.2.1 **Table 6.1** provides a summary of the key topic specific policy and legislation which has informed the scope of the assessment. Further information on policies relevant to the EIA and their status is set out in **Chapter 1 'Introduction'**. Due regard will also be given to local policies and the Government's 25 Year Environment Plan where they are relevant.

6.2.2 These documents are proposed to form the framework for detailed assessment post-scoping and will be taken into account in the assessment of biodiversity impacts during PEI and ES stages, with the relevant criteria followed throughout.

Table 6.1 Policy and legislation relevant to the biodiversity assessment

Relevant policy / legislation	Relevance to assessment
Policy	

Relevant policy / legislation	Relevance to assessment
Airports National Policy Statement (ANPS) (2018)	Section 4.19 states that prior to granting development consent, the Secretary of State as competent authority must comply with the duties under the Conservation of Habitats and Species Regulations 2017. It also recommends that the applicant should also refer to the Airports NPS sections on biodiversity, land use, and air quality. The competent authority must consult Natural England to ensure that impacts on European sites are adequately considered.
National Policy Statement for National Networks (NPS NN) (2014)	The “Biodiversity and Ecological Conservation” section summaries the UK Governments’ biodiversity strategy at paragraph 5.20 with reference to the Natural Environment White Paper. The strategy is summarised as “a vision of moving progressively from net biodiversity loss to net gain, by supporting healthy, well-functioning ecosystems and establishing more coherent ecological networks that are more resilient to current and future pressures.”
National Planning Policy Framework (NPPF) (2018)	The NPPF, updated in 2018, replaces the former series of Planning Policy Statements. From its outset the document makes plain that it is concerned with Sustainable Development, and paragraph 6 states that there are three dimensions to sustainable development: economic, social and environmental, and that all three are mutually dependent and gains for all should be sought jointly and simultaneously through the planning system.
Natural Environment White Paper 2011	The paper was the first White Paper produced by the government in 20 years. The paper contains plans to reconnect nature, connect people and nature for better quality of life and capture and improve the value of nature.
Biodiversity 2020: A Strategy for England’s wildlife and ecosystem services	The Strategy sets out how England will implement the 2010 Aichi Biodiversity Targets, European Commission’s 2011 EU Biodiversity Strategy and the recommendations of the 2011 Natural Environment White Paper.
Legislation	
Habitats Directive - Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora	This Directive provides protection for specific habitats listed in Annex I and species listed in Annex II of the Directive. The Directive sets out decision making procedures for the protection of Special Areas of Conservation (SAC) and Special Protection Areas (SPA), implemented in the UK through The Conservation of Habitats and Species Regulations 2017.
Birds Directive - Council Directive 79/409/EEC on the Conservation of Wild	This Directive provides a framework for the conservation and management of wild birds in Europe. The most relevant provisions of the Directive are the identification and classification of SPAs for rare or vulnerable species listed in Annex I of the Directive and for all regularly occurring migratory species (required by Article 4). It also establishes a general scheme of protection for all wild birds (required by Article 5).
Wildlife and Countryside Act 1981 (as amended)	This Act makes it an offence to intentionally: kill, injure, or take any wild bird; take, damage or destroy the nest of any wild bird while that nest is in use or being built; and take or destroy an egg of any wild bird. The Act makes it an offence to intentionally kill, injure or take any animal listed in Schedule 5 of the act and protects occupied and unoccupied places used for shelter or protection. The Act makes it an offence (subject to exceptions) to intentionally pick, uproot or destroy any wild plant listed in Schedule 8 of the Act and to plant or otherwise cause to grow any non-native, invasive species listed under Schedule 9 of the Act. The Act makes provision for the notification and confirmation of Sites of Special Scientific Interest (SSSI).

Relevant policy / legislation	Relevance to assessment
The Conservation of Habitats and Species Regulations 2017 (as amended)	The Regulations transpose the Council Directive 92 / 43 / EEC the 'Habitats Directive' in to national law (in respect of England and Wales) and requires the state to designate SACs. The Regulations make it an offence (subject to exceptions) to deliberately capture, kill, disturb, or trade in the animals listed in Schedule 2, or pick, collect, cut, uproot, destroy, or trade in the plants listed in Schedule 4. The Regulations require competent authorities to consider or review planning permission, applied for or granted, affecting a European site, and, subject to certain exceptions, restrict or revoke permission where the integrity of the site would be adversely affected.
The Protection of Badgers Act 1992	The Act makes it an offence to wilfully kill, injure or take, or attempt to kill, injure or take a badger <i>Meles meles</i> ; and to cruelly ill-treat a badger. The Act makes it an offence to intentionally or recklessly damage, destroy or obstruct a badger sett, or to disturb a badger whilst in a sett.
Natural Environment and Rural Communities (NERC) Act 2006	Section 41 of the Act requires the Secretary of State to compile a list of habitats and species of principal importance for the conservation of biodiversity in England (herein 'S41 species'). Decision makers of public bodies, in the execution of their duties, must have regard to the conservation of biodiversity in England, and the list is intended to guide them.
The Hedgerow Regulations 1997	The Regulations make it an offence to remove or destroy certain hedgerows without permission from the local planning authority and the local planning authority is the enforcement body for such offences.
The Commons Act 2006	The Act aims to protect areas of common land, in a sustainable manner delivering benefits for farming, public access and biodiversity (Department for Environment, Food and Rural Affairs (Defra), 2013).

6.3 Stakeholder Consultation

- 6.3.1 A detailed stakeholder engagement plan is currently being developed. Care will be taken to ensure all key stakeholders with views and concerns regarding biodiversity have the evidence and opportunity to discuss and agree the details of the assessment in a meaningful and inclusive manner.
- 6.3.2 The stakeholders listed below were contacted in November 2018 to make them aware of the Proposed Development and outline the timescales for further consultation. The following stakeholders were provided with a presentation providing an overview of the Proposed Development and inviting initial comments on the scope of the assessment for biodiversity:
- Natural England;
 - London Wildlife Trust;
 - Environment Agency;
 - London Borough of Hillingdon;
 - London Borough of Hounslow;
 - Spelthorne Borough Council;
 - Slough Borough Council; and
 - South Bucks District Council.

- 6.3.3 The HAL Scoping Opinion is a useful source of stakeholder feedback, and has been used to inform this Scoping Report.
- 6.3.4 Further formal and informal consultations and meetings will be arranged to discuss and agree the details of the methodology for the assessment of potential biodiversity impacts arising from the Proposed Development.

6.4 Approach to Scoping

Study area

- 6.4.1 This section sets out the study areas that have been defined for the consideration of potential biodiversity effects at the scoping stage. The study areas for specific biodiversity receptors used in this Scoping Report are provided in **Table 6.2** and presented on **Figure 6.1**. The Proposed Development area is described in **Chapter 3 ‘The Proposed Development’**.
- 6.4.2 Different study areas have been used for different receptors depending on their sensitivity and on their habitat preferences. These study areas were selected according to appropriate Chartered Institute of Ecology and Environmental Management (CIEEM) guidance and professional judgement.

Table 6.2 Study areas for different onshore ecology receptors used for this Scoping Report

Data / survey	Study area
Statutory designated sites	Within and up to 2km of the Proposed Development area.
Non-statutory designated sites	Within and up to 2km of the Proposed Development area.
UKHPI and LBAP Habitats	Within and up to 50m of the Proposed Development area.
Protected and notable species (except Great Crested Newts)	Within and up to 50m of the Proposed Development area.
Great crested newts	Within 500m of the Proposed Development area.
Bats	Within 5 km of the Proposed Development area.

- 6.4.3 As the design of the Proposed Development is still in its early development, the study areas set out above will be kept under review as the design and consultation processes progress, and related topic assessment study areas are confirmed. Therefore, the study areas at the assessment stage may evolve as appropriate.

Sources of baseline data

- 6.4.4 This Scoping Report has been informed by the findings from a desk-based exercise and review of the HAL Scoping Report (HAL, 2018). This data has been collected for different study areas depending on the receptor concerned and upon the project information available at the time of collection.
- 6.4.5 The key data sources used to inform the Scoping Report are summarised in **Table 6.3**.
- 6.4.6 A field survey programme, to be outlined in the Biodiversity Method Statement, will commence in spring 2019. The Biodiversity Method Statement will be issued and agreed prior to the commencement of the 2019 surveys with the appropriate stakeholders listed in **Section 6.3**.

Table 6.3 Sources of baseline data

Data source	Date	Data contents
Joint Nature Conservation Committee (JNCC)	November 2018	European designated sites (SPA, SAC, Ramsar sites)
JNCC Natural England	November 2018	UK designated sites (SSSI, NNR, LNR, Ancient Woodland) UK Habitats of Principal Importance
Biodiversity Information Service (BIS): Greenspace Information for Greater London, Buckinghamshire & Milton Keynes Environmental Records Centre, Thames Valley Environmental Records Centre, and Surrey Biodiversity Information Centre	December 2018	Locally designated sites (CWS, RNR): Protected and notable species records including: <ul style="list-style-type: none"> • Wildlife & Countryside Act 1981 Schedules 1,5, 8 & 9; • The Conservation of Habitats & Species Regulations 2017 Schedules 2 & 5; • Protection of Badgers Act 1992; • Bonn Convention Appendix 1 & 2; • Bern Convention Annex 1 & 2; • Habitats Directive Annex 2, 4 & 5; • NERC Act 2006 Section 41 species; • UK BAP species (both local and national); • Veteran trees; IUCN Red List Species; • Nationally Notable species; and • Locally Rare species.
HAL Scoping Report	May 2018	Extended Phase I habitat survey results.

6.5 Baseline Conditions

Statutory designated sites

6.5.1 A total of 13 statutory designated sites for nature conservation are located within the study area, as presented in **Table 6.4**. The table also provides a summary of the qualifying features/reasons for notification of these designated sites. The legislation underpinning statutory designated sites is discussed in **Section 6.2**. The locations of these statutory designated sites are also shown in **Figure 6.2**.

Table 6.4 Designated sites for nature conservation of relevance to biodiversity

Name	Designation	Description and qualifying features/reasons for notification
South-West London waterbodies	SPA	The South West London Waterbodies SPA comprises a series of embanked water supply reservoirs and former gravel pits which support a range of man-made and semi-natural still, open-water habitats. The complex is situated to the west of London on the broad floodplain of the River Thames. During the non-breeding season the SPA regularly supports internationally important numbers of gadwall <i>Anas strepera</i> . When classified, the SPA supported 710 individuals (5 year peak mean 1993/94 1997/98 based on WeBS data supplied by BTO) which represents 2.4% of the North West European population.
South-West London waterbodies	Ramsar site	The South West London Waterbodies site comprises a series of reservoirs and former gravel pits that support internationally important numbers of wintering gadwall <i>Anas strepera</i> and Northern shoveler <i>Anas clypeata</i> .

Name	Designation	Description and qualifying features/reasons for notification
Staines Moor	SSSI	<p>The site chiefly consists of Staines Moor, a semi-natural stretch of the River Colne which flows through it, and three adjacent reservoirs. Staines Moor represents the largest area of alluvial meadows in Surrey and supports a rich flora while the reservoirs hold nationally important populations of wintering wildfowl. A pond at the site carries an aquatic flora which is of national importance; this flora includes one plant (brown galingale <i>Cyperus fuscus</i>) which is extremely rare in Britain.</p> <p>The reservoirs carry over 1% of the total British wintering populations of tufted duck <i>Aythya fuligula</i>, pochard <i>Aythya ferina</i>, goosander <i>Mergus merganser</i> and shoveler; the numbers of shoveler are also internationally significant.</p>
Wraysbury Reservoir	SSSI	<p>Wraysbury Reservoir is an artificially embanked reservoir constructed around 1970. The reservoir also supports notable numbers of wintering gadwall.</p> <p>Wraysbury reservoir regularly supports nationally important numbers of wintering cormorant <i>Phalacrocorax carbo</i>, great crested grebe <i>Podiceps cristatus</i> and shoveler.</p>
Wraysbury No. 1 Gravel Pit	SSSI	<p>Wraysbury No 1 Gravel Pit is of national importance for wintering gadwall. Shoveler, goldeneye <i>Bucephala clangula</i> and smew <i>Mergus albellus</i> are regular winter visitors in small but significant numbers. The site is also locally important for other wintering bird species including great crested grebe, cormorant, carbo pochard <i>Aythya farina</i> tufted duck and coot <i>Fulica atra</i>.</p>
Wraysbury and Hythe End	SSSI	<p>Wraysbury and Hythe End Gravel Pits comprise a mosaic of open water, islands, grassland, scrub and woodland within an area of former gravel extraction. The site supports nationally important numbers of three species of wintering wildfowl together with an important assemblage of breeding birds associated with open waters and wetland habitats. In addition, the site supports two nationally scarce invertebrates and a number of locally uncommon plants. Wintering aggregations of gadwall, goosander, tufted duck.</p>
Langham Pond	SSSI	<p>Langham Pond and its surrounding alluvial meadows lie on the Thames flood plain and represent a habitat of a type and quality unknown elsewhere in Southern England. The combination of alluvial soils and the calcareous influence of the chalk parent rock has led to the development of rich aquatic, marginal and meadow floras. The pond supports several nationally scarce invertebrates. Woodland on adjacent higher ground above the flood plain lies on London Clay and supports a rich community of breeding birds.</p>
Windsor Forest and Great Park	SSSI	<p>Windsor Forest and Great Park farms part of the largest continuous tract of woodland and parkland in Berkshire. The site provides habitat for a range of rare species of invertebrate which include the internationally important violet click beetle <i>Limonicus wolaceus</i> and stag beetle <i>Lucanus cervus</i> and a rich assemblage of other Red Data book beetles and flies.</p>
Bedfont Lakes	LNR	<p>Bedfont Lakes consists of a number of habitats—open water, reed beds, shallow ponds, unimproved sown grassland, exposed sand and gravel, scrub and wet woodland. The nationally scarce round leaved cranesbill <i>Geranium rotundifolium</i> occurs on the site, and both skylarks <i>Alauda Arvensis</i> and meadow pipits <i>Anthus pratensis</i> have bred on the site. The site is most important for its wintering waterfowl including national important populations of smew and gadwall. The site is also important for its diversity of nationally notable invertebrate species. Five species of bat have been recorded at the site.</p>

Name	Designation	Description and qualifying features/reasons for notification
Cranebank	LNR	Cranebank is a remnant of traditional riverside grazing land. Until 1999 the site was leased for horse pasture but its current usage is for nature conservation and recreation. A number of locally uncommon species are present—cuckooflower <i>Cardamine pratensis</i> , bugle <i>Ajuga reptans</i> , ragged robin <i>Lychnis flos-cuculi</i> and dropwort <i>Filipendula vulgaris</i> . There are also mature trees on the site occurring along the river course and a mainly oak avenue running along the eastern boundary.
Hounslow Heath	LNR	Hounslow Heath consists of areas of woodland, neutral grassland, acidic grassland communities and several small ponds. Several local rarities are present in the acidic grassland such as pretty whin, small furze and heath bedstraw. A total of 102 bird species have been recorded, of which 28 species are breeding. The site is also important for slow worms <i>Anguis fragilis</i> , viviparous lizard <i>Zootoca vivipara</i> and grass snake <i>Natrix natrix</i> .
Pevensey Road	LNR	This site supports a remarkably diverse range of fauna and flora for an urban location. It supports a wide range of breeding birds especially warblers, and locally important populations of Lepidoptera, Orthoptera, Odonata, Reptilia and riparian/aquatic flora. It forms an important link in the Crane Valley Green Chain.
Arthur Jacob	LNR	This site has been created from a series of derelict sewage sludge lagoons, that are being transformed into important wetland habitats.

Non-statutory designated sites

6.5.2 There are 57 non-statutory designated sites including Sites of Importance for Nature Conservation (SINCs), Biological Notification Sites (BNS) and Local Wildlife Sites (LWS) within the study area, as shown in **Figure 6.3** and listed in **Table 6.5** below:

Table 6.5 Non- statutory designated sites for nature conservation of relevance to biodiversity

Name	Designation	Description
London's Canals	SINC	London's canals support a wide range of aquatic flora, amongst which are found a number of locally uncommon species. These include narrow-leaved water plantain <i>Alisma lanceolatum</i> , rigid hornwort <i>Ceratophyllum demersum</i> and shining pondweed <i>Potamogeton lucens</i> , all species of clean, clear waters.
Feltham Marshalling Yards	SINC	An extensive wasteland with a good range of habitats, from ruderal and tall herb communities, through acid grassland and scrub to mature birch woodland. The site also has well-developed lichen communities more typical of heathland.
Little Britain	SINC	This area of the Colne valley has a remarkable variety of habitats including lakes, rivers, scrub, areas of wasteland, woodland and neutral grassland. The Colne and Frays rivers are clean, fast flowing and support an interesting range of marginal habitats, including valuable areas of wet woodland.
Carp Ponds and Broads Dock	SINC	A series of lakes and ponds, teeming with plant life, including a number of species which are unusual in London.
Lower Colne	SINC	One of the finest river systems in London, including sections of the rivers Colne, Wraysbury and Frays. These originate as chalk streams and collectively support a diverse aquatic and marginal flora, including several plants with a restricted London distribution.
Crane Corridor	SINC	For a length of over 5km, the River Crane is bordered by habitats of remarkable diversity, including woodland, pasture, heathland and areas of open water. Throughout, the width of the river corridor is exceptional by London standards.

Name	Designation	Description
Bedfont Lakes Country Park	SINC	A restored gravel extraction and land-fill site, now managed as a country park. The two former gravel pits, Bedfont Lake and Princes Lake, are of considerable ornithological interest. Bedfont Lake supports large populations of breeding reed warblers in its extensive reed beds, common tern and pochard.
Hounslow Heath	SINC	An extensive area of acid and neutral grassland, with developing heathland where restoration has encouraged natural regeneration of heather <i>Calluna vulgaris</i> . Rare plants of heathland and acid grassland include bell heather <i>Erica cinerea</i> , dwarf gorse <i>Ulex minor</i> , petty whin <i>Genista anglica</i> , dyer's greenweed <i>Genista tinctoria</i> , heath rush <i>Juncus squarrosus</i> , heath-grass <i>Danthonia decumbens</i> and mat-grass <i>Nardus stricta</i> .
Duke of Northumberland's River at Bedfont	SINC	This section of the Duke of Northumberland's River has good water quality, and supports an excellent assemblage of aquatic invertebrates. An assessment by the Environment Agency places the river in the top 6% of rivers in the UK for macro-invertebrates.
Frays River at Uxbridge Moor	SINC	This section of the Fray's River flows through urban Uxbridge and Cowley; those parts adjacent to open spaces such as Rockingham Recreation Ground hold a reasonable diversity of wetland plants and waterfowl, which are appreciated by local people.
Yeading Brook, Minet Country Park and Hitherbroom Park	SINC	Minet Country Park partly comprises reclaimed derelict land; it was opened in 2003 and includes an information and education centre with classroom facilities run by A Rocha UK, who warden the site. Much of the country park is recently-created rough grassland, with areas of older, more natural meadow.
Cranford Countryside Park and Open Space	SINC	Cranford Countryside Park is managed for nature conservation, amenity and education, with a staffed interpretation centre. The Hillingdon Trail passes through the site. The improved management has significantly increased its nature conservation value in recent years.
Lake Farm Country Park	SINC	This site was acquired by Hillingdon Council in the mid-1990s, and opened as a Country Park in 2002. It is an extensive formerly agricultural area managed principally for nature conservation, integrated with its amenity roles. Rotational grass-cutting is utilised to encourage and maintain grassland diversity and habitat continuity.
Wall Garden Farm Sand Heaps	SINC	A series of large sand heaps associated with adjacent active gravel workings. These support a breeding colony of sand martins, and are said to have been left in situ by the contractors for this reason. The extensive reseeded grassland and ruderal areas to the north and east, along with included operational silt pits, provide habitats likely to give rise to a large biomass of invertebrate aerial plankton, and are included as likely feeding grounds for the sand martins.
Bedfont Pits	SINC	This former gravel pit is now an attractive lake, fringed with reeds <i>Phragmites australis</i> , with areas of willow <i>Salix spp.</i> woodland. The site supports a good range of birds, including common waterfowl and kingfisher on the lake, and several species of warblers in the reeds and woodland.
Lower Feltham Rough	SINC	This is a sizeable site with a mosaic of habitats, supporting a good diversity of plants and animals. Different stages of succession, from flowery grassland to scrub, provide habitats for birds, small mammals and invertebrates.
Hanworth Park and the Longford River	SINC	Hanworth Park contains a small willow wood, acid grassland and a section of the Longford River.

Name	Designation	Description
Longford River at Feltham	SINC	This section of the Longford River runs from the A30, through Feltham town centre and beyond to Browells Lane. The river is narrow with steep banks. Emergent vegetation includes water dock <i>Rumex hydrolapathum</i> and floating sweet-grass <i>Glyceria fluitans</i> .
Hatton Meadows	SINC	The site comprises wide expanses of acid and semi improved grassland, which are cut for hay in the autumn months. The site is good for winter bird flocks including skylark, reed bunting <i>Emberiza schoeniclus</i> , chaffinch <i>Fringilla coelebs</i> , bullfinch <i>Pyrrhula pyrrhula</i> and meadow pipit.
Mayfield Farm and the Water Treatment Works	SINC	Mayfield Farm and the Water Treatment Works is located just within the borough boundary north of the A30. The site contains a complex of natural and manmade habitats which include one of the largest reedbeds in Hounslow (approximately 3ha in size), open water reservoirs, wetland communities, herb rich grasslands and species rich ponds.
Havelock Cemetery	SINC	Despite the cemetery being in full use and the grass being mown frequently, the grasslands here are very flower-rich.
River Pinn and Manor Farm Pastures	SINC	This stretch of the River Pinn is bordered on both sides by open grassland, much of which comprises rank grasses and tall herbs with scattered scrub, although some of it is managed as sports fields.
Iron Bridge Road Railsides (formerly The Piggeries)	SINC	The site is on an area of railway lineside that used to be grazed. The lack of grazing has resulted in the development of dense scrub.
The Grove	SINC	A sequence of shaded ponds, providing homes for frogs and toads, runs the length of this nature reserve, surrounded by lush grassland and woodland. The reserve is managed by London Wildlife Trust.
Stockley Park Country Park	SINC	This large, hilly country park contains extensive grassland and other habitats including tall herbs, scrub, trees and hedgerows, much of which has been planted.
St George's Meadows, Southlands Arts Centre	SINC	This small site near West Drayton is the grounds of Southlands Arts Centre and comprises a range of habitats.
Uxbridge and Hillingdon Cemeteries	SINC	These two cemeteries contain flower-rich grassland with mouse-ear hawkweed <i>Pilosella officinarum</i> , burnet saxifrage <i>Pimpinella saxifraga</i> , germander speedwell <i>Veronica chamaedrys</i> and yarrow <i>Achillea millefolium</i> within a sward dominated by red fescue <i>Festuca rubra</i> .
Bolingbroke Way Sunken Pasture	SINC	This lightly horse-grazed meadow is surrounded on all sides by roads. The meadow is sunken below the level of the adjacent trunk road and has good vegetation diversity and structure, with open scrub and some decaying timber near its south end.
Cranford Lane Gravel Workings	SINC	The spoil area comprises extensive flat-topped and vegetated mounds to the east, and flat and rutted spoil material with seasonally wet ditches and depressions to the west. The heaps are blanketed with wild flowers and developing scrub.
Stockley Business Park Lakes & Meadows	SINC	This site consists of well-managed habitats in the grounds of a business park, which could serve as an exemplar of landscaped habitat creation and management around new commercial premises. The undulating landscape includes extensive areas of patchwork-cut meadow, soft-margined lakes with emergent vegetation and tall belts of scrub.

Name	Designation	Description
Piccadilly Line Railsides in Hounslow	SINC	The railsides along the Piccadilly Line running through Hounslow Borough are defined by three or four main vegetation types. There are large areas of secondary woodland and deciduous scrub, which are coppiced quite regularly.
Hounslow Loop Railsides	SINC	This long section of railside line runs throughout most of Hounslow Borough from Chiswick to Hounslow Heath. The railsides are quite uniform in vegetation structure throughout their length.
Feltham Railsides	SINC	The railsides run through several important habitats at Hounslow Heath, Feltham Marshalling Yards and Bedfont Lakes Country Park, making this one of the most important green corridors in Hounslow Borough, especially for invertebrates.
Hounslow, Feltham and Whitton junctions	SINC	This triangle of railway land includes three railway junctions and the land immediately on either side. The land in the centre of the triangle is now occupied by housing. The site includes a large area of wildlife habitat which, unusually for railside land, is not dominated by woodland.
Hortus Cemetery	SINC	The grasslands on this cemetery site are mown relatively frequently but have not been damaged by herbicide treatment. There are no very unusual species in the grasslands but they contain very abundant populations of some colourful common herbs.
Stockley Road Rough	SINC	This sliver of roughland is squeezed between Stockley Road (A408), Heath Park Golf Course and a development area. The site is a mixture of scrub, tall herbs and grasses.
Field Close Open Space roughs	SINC	This area, set aside for wildlife, links Field Close Open Space with Bolton's Lane Open Space. The rough grassland is dominated by false oat-grass <i>Arrhenatherum elatius</i> with scattered native scrub and trees.
Thornccliffe Rough	SINC	An area of disused land with a mosaic of habitats, providing a colourful and diverse flora in a part of the borough with little accessible natural greenspace. The mix of rough grassland and tall herbs is likely to support a diverse invertebrate fauna, while scrub and developing woodland provides habitat for birds.
Hartlands Wood and Lower Park Farm	SINC	Lower Park Farm is a large open field of mainly species-poor grassland, which has been highly grazed in parts.
Cains Lane	SINC	Situated just on the edge of Heathrow Airport, this is a sizeable area of hawthorn <i>Crataegus monogyna</i> scrub with rough grassland and scattered trees.
Raleigh Park	SINC	Raleigh Park was landscaped in the early 1990s. Its reseeded grassland has a wide range of wild flowers, such as wild carrot <i>Daucus carota</i> , clovers <i>Trifolium spp.</i> , vetches <i>Vicia spp.</i> , crane's-bills <i>Geranium spp.</i> and composites.
Airlinks Ponds	SINC	This site comprises two ponds located within a highly managed golf course with very tightly mown grassland.
Lampton Park	SINC	This large park surrounds the Civic Centre in the middle of urban Hounslow. In addition to the formal lawns, flower beds and shrubberies, there are wilder areas which increase its value for wildlife, and offer access to nature in an area lacking in accessible wildlife sites. These include planted copses of native trees and shrubs, which attract good numbers of common birds.
London Diocesan Lands	SINC	Not available.

Name	Designation	Description
Opposite Iver Station	BNS	Former gravel pit, largely undisturbed grassland grazed by a few horses. Footpaths, scattered bushes and denser scrub, mainly willow and hawthorn. Two colonies of bee orchid recorded.
Watergate Farm, River Colne	BNS	Large River with associated habitats. Some semi-improved meadows adjoining
Grand Union Canal, near Iver North	BNS	Short stretch of canal with marginal plants.
Grand Union Canal, Slough Branch	BNS	Silted area of canal with rich selection of submerged and emergent plants. Not very polluted but silted up.
Datchet Common and Gravel Pits	LWS	This site consists of three flooded gravel pits with landscaped trees, improved grassland and a maize and sunflower crop surrounding the lakes. The site has previously been identified for its ornithological interest. According to the surveys reed warblers have been recorded along the reedbed fringes.
Wraysbury II Gravel Pits	LWS	These are area adjacent to the SSSI including additional pits and a thin area of peripheral land. The boundary results from the removal of the SSSI from the Wildlife Site boundary. There are gravel pits in the east and an area of open land in the west. The gravel pits are part of the complex of pits in the area that are important for bids.
Colne Brook	LWS	The Colne Brook forms an important wildlife corridor in this intensively farmed and urban fringe landscape. The stream flows from the Horton Trading Estate at its upstream extent to Whitehall Lane at the downstream limit, a distance of approximately 1.5 miles.
Horton and Kingsmead Lakes	LWS	A group of old gravel pits and silt pits lying within a large complex of gravel pits and reservoirs at the east edge of Berkshire and west edge of London. These pits lie in a central position between Wraysbury Reservoir SSSI, Queen Mothers Reservoir Local Wildlife Site, Wraysbury & Hythe End Gravel Pits SSSI and Wraysbury No. 1 Gravel Pit SSSI.
Wraysbury No. 1 Gravel Pit	LWS	This site is an area adjacent to the SSSI consisting additional pits and other land. The boundary results from the removal of the SSSI from the Wildlife Site boundary. The gravel pits in the south east are part of the complex of pits in the area that are important for bids.
Queen Mother Reservoir	LWS	Queen Mother Reservoir is a large waterbody with a track around the top of the reservoir and seeded grassland banks. The site provides refuge for storm driven species and overland passage migrants. It supports a variety of passage waders and winter wildfowl.
Old Slade Lake	LWS	The site consists of a complex of flooded gravel pits fringed by secondary woodland, scrub, ruderal grassland, tree planting and a stretch of the Colne Brook. Although the site is called Old Slade Lake it consists of Old Slade, Ortlitts Lake and at the southern end Colnbrook West. The site is also known as South Iver Gravel Pits.

Habitats

6.5.3 Field surveys of the Proposed Development are scheduled to be undertaken in spring 2019. However, in the absence of these up-to-date surveys, information from the HAL 2017 field surveys (HAL, 2018) and review of satellite imagery have been used to understand the key habitats within the Proposed Development scoping area.

Woodland

6.5.4 The broad woodland types within the study area include areas of semi-natural woodland and plantation woodland. Within the areas of semi-natural woodland, several woodland habitats are UK Habitats of Principal Importance (HPI), including the following two habitat types:

- Lowland mixed deciduous woodland (W8 *Fraxinus excelsior* - *Acer campestre* - *Mercurialis perennis*); and
- Lowland mixed deciduous woodland (W6 *Alnus glutinosa* - *Urtica dioica*).

Hedgerows

6.5.5 Hedgerows are UKHPI priority habitats. There are a large number of hedgerows across the study area, ranging from species poor and defunct hedgerows to species-rich intact hedgerows.

Grassland

6.5.6 Grassland types within the study include semi-improved neutral grassland, poor semi-improved grassland, marshy grassland, improved grassland and amenity grassland.

Protected, notable and invasive species

Protected flora

6.5.7 BISs returned records of notable plant species (UKBAP and UK Red Listed) including wild asparagus *Asparagus prostrates*, caraway *Carum carvi*, least lettuce *Lactuca saligna*, spreading hedge-parsley *Torilis arvensis* that have been recorded within the study area.

6.5.8 BISs returned records of plants listed on Schedule 8 of the Wildlife and Countryside Act 1981 (as amended) or Schedule 5 of the Conservation of Habitats and Species Regulations 2017. These species included: green hound's-tongue *Cynoglossum germanicum*, bluebell *Hyacinthoides non-scripta*, least lettuce *Lactuca saligna*, water germander *Teucrium scordium*.

Birds

6.5.9 BISs returned records of the following Schedule I birds within the study area: kingfisher *Alcedo atthis*, garganey *Anas querquedula*, greylag goose *Anser anser*, scaup *Aythya marila*, pintail *Anas acuta*, bittern *Botaurus stellaris*, goldeneye *Bucephala clangula*, Lapland bunting *Calcarius lapponicus*, snow bunting *Plectrophenax nivalis*, Cetti's warbler *Cettia cetti*, purple sandpiper *Calidris maritima*, ruff *Calidris pugnax*, temminck's stint *Calidris temminckii*, kentish plover *Charadrius alexandrinus*, little ringed plover *Charadrius dubius*, long-tailed duck *Clangula hyemalis*, peregrine *Falco peregrinus*, hobby *Falco Subbuteo*, black tern *Chlidonias niger*, roseate tern *Sterna dougallii*, marsh harrier *Circus aeruginosus*, Hen Harrier *Circus cyaneus*, Bewick's swan *Cygnus columbianus* subsp. *Bewickii*, whooper swan *Cygnus Cygnus*, merlin *Falco columbarius*, brambling *Fringilla montifringilla*, red-throated diver *Gavia stellate*, black-throated diver *Gavia arctica*, great northern diver *Gavia immer*, black-winged stilt *Himantopus himantopus*, little gull *Hydrocoloeus minutus*, wryneck *Jynx torquilla*, red-backed shrike *Lanius collurio*, Mediterranean gull *Larus melanocephalus*, black-tailed godwit *Limosa limosa*, common crossbill *Loxia curvirostra*, velvet scoter *Melanitta fusca*, common scoter *Melanitta nigra*, red kite *Milvus milvus*, whimbrel *Numenius phaeopus*, leach's petrel *Oceanodroma leucorhoa*, Bearded Tit osprey *Pandion haliaetus*, honey-buzzard *Pernis apivorus*, red-necked phalarope *Phalaropus lobatus*, black redstart *Phoenicurus ochruros*, spoonbill *Platalea leucorodia*, Slavonian grebe *Podiceps auritus*, black-necked

grebe *Podiceps nigricollis*, spotted crane *Porzana porzana*, firecrest *Regulus ignicapilla*, avocet *Recurvirostra avosetta*, serin *Serinus serinus*, wood sandpiper *Tringa glareola*, woodlark *Lullula arborea*, greenshank *Tringa nebularia*, green sandpiper *Tringa ochropus*, barn owl *Tyto alba*, redwing *Turdus iliacus*, fieldfare *Turdus pilaris* and hoopoe *Upupa epops*.

- 6.5.10 Schedule I bird species are protected under the Wildlife and Countryside Act 1981 (as amended).

Badgers

- 6.5.11 There are several badger records within the study area, the latest of which is dated from 2004.

- 6.5.12 Badgers are protected under the Protection of Badgers Act 1992.

Bats

- 6.5.13 The following bat species have been recorded within the study area: serotine *Eptesicus serotinus*, Daubenton's bat *Myotis daubentoniid*, Natterer's bat *Myotis nattereri*, lesser noctule *Nyctalus leisleri*, noctule bat *Nyctalus noctula*, common pipistrelle *Pipistrellus pipistrellus*, Nathusius's pipistrelle *Pipistrellus nathusii*, soprano pipistrelle *Pipistrellus pygmaeus*, brown long-eared bat *Plecotus auritus*, grey long-eared bat *Plecotus austriacus*.

- 6.5.14 The Little Britain SINC has three bat species listed on its citation namely noctule, Daubenton's bat and soprano pipistrelle.

- 6.5.15 All bat species are protected under the Conservation of Habitats and Species Regulations 2017 (as amended) Reg. 41 and Wildlife and Countryside Act 1981 (as amended).

Water vole

- 6.5.16 There are over 200 records of water voles within the study area, the most recent record is dated 2016. The Little Britain SINC, Lower Colne SINC, Crane Corridor SINC, Bedfont Lakes Country Park SINC, Duke of Northumberland's River at Bedfont SINC, Longford River at Feltham SINC all have water vole listed on their citation.

- 6.5.17 Water vole is protected under the Wildlife and Countryside Act 1981 (as amended).

Otter

- 6.5.18 There are five records of otter within the study area, the most recent record is dated from 2016. The Little Britain SINC includes otter in its citation.

- 6.5.19 Otters are protected under the Conservation of Habitats and Species Regulations 2017 (as amended) Reg. 41 and Wildlife and Countryside Act 1981 (as amended) S.9.

Hazel dormouse

- 6.5.20 No records of hazel dormouse have been returned within 2km of the study area. This species will not be kept under review pending 2019 surveys.

Great crested newt

- 6.5.21 There are several records of the great crested newt in the study area, the most recent of which is dated from 2017.

- 6.5.22 Great crested newt is protected under the Wildlife and Countryside Act 1981 (as amended).

Reptiles

- 6.5.23 The following reptile species have been recorded within the study area: adder *Vipera berus*,

slow-worm *Anguis fragilis*, grass snake *Natrix Helvetica* and common lizard *Zootoca vivipara*.

6.5.24 Reptiles are protected under the under the Wildlife and Countryside Act 1981 (as amended).

White-clawed crayfish

6.5.25 There are several records of the white-clawed crayfish within the study area, the most recent of which is dated from 2010.

6.5.26 White-clawed crayfish is protected under the Wildlife and Countryside Act 1981 (as amended).

Other invertebrates

6.5.27 The following notable invertebrate species have been recorded within the study area stag beetle *Lucanus cervus*, purple emperor *Apatura iris* and white-letter hairstreak *Satyrrium w-album*.

Invasive non-native species

6.5.28 BISs returned the following invasive non-native species within the study area, namely:

- Japanese knotweed *Fallopia japonica*;
- Giant Hogweed *Heracleum mantegazzianum*;
- Himalayan balsam *Impatiens glandulifer*; and
- Signal Crayfish *Pacifastacus leniusculus*.

6.6 Scoping of Potential Effects

Effects scoped into the assessment

6.6.1 The potential likely significant effects to be scoped into the assessment are shown in **Table 6.6**.

Table 6.6 Potential likely significant biodiversity effects

Activity	Potential effect	Receptor
Construction		
Ground and vegetation clearance for construction sites, earthworks and excavations.	Degradation and/or loss of habitat through compaction and/or introduction of hardstanding areas. Killing or injury of fauna through the removal of occupied resting or breeding sites. Loss of potential foraging and breeding areas for protected species or species of local importance. Loss of ecological connectivity through habitat fragmentation. Introduction or spread of invasive species.	Protected species and habitats. Habitats and species of national and local importance. Statutory and non-statutory designated sites.
Usage of and temporary construction lighting during construction	Disturbance of commuting bats using the study area. Disturbance and displacement of other species sensitive to lighting, noise, vibration and/or dust. Loss of ecological connectivity through severance (due to introduction of light) of habitats resulting in fragmentation.	Bats, birds, badgers, otters, water voles and fish species.

Activity	Potential effect	Receptor
Noise and vibration from construction activities such as plant movements or piling.	Disturbance and displacement of protected species or species of local importance.	Protected species and species of national and local importance.
River, drainage and channels realignments and flood storage reservoirs	Changes to local surface and groundwater regime impacting on quality of habitats and species they support.	Protected species and habitats. Habitats and species of national and local importance. Statutory and non-statutory designated sites.
Dust emission from the construction activities.	Disturbance and displacement of protected species or species of local importance. Damage to the local habitats and designated sites.	Protected species and habitats. Habitats and species of national and local importance. Statutory and non-statutory designated sites.
Accidental pollution (e.g. fuels, solvents etc.) during the construction works.	Loss or damage to terrestrial or freshwater environments and the species they support.	Protected species and habitats. Habitats and species of national and local importance. Statutory and non-statutory designated sites.
Operation		
Increased noise and vibration due to airport operation.	Disturbance and displacement of protected species or species of local importance.	Protected species and species of national and local importance.
Usage of and lighting operation	Disturbance of commuting bats using the study area. Disturbance and displacement of other species sensitive to lighting. Loss of ecological connectivity through severance (due to introduction of light) of habitats resulting in fragmentation.	Bats, birds, badgers, otters, water voles and fish species.
Accidental pollution (e.g. fuels, solvents etc.) during the construction works.	Loss or damage to terrestrial or freshwater environments and the species they support.	Protected species and habitats. Habitats and species of national and local importance. Statutory and non-statutory designated sites.

Effects scoped out of the assessment

6.6.2 At this stage of the Proposed Development, no effects have been scoped out of the assessment, however some potential effects only relate to construction and not operation. Once the findings from all surveys is available, and in consultation with stakeholders, if any impacts on habitats or species are determined to be absent, these aspects may be proposed for later agreement with PINS to be scoped out of the assessment.

6.7 Approach to Assessment

- 6.7.1 The EclA methodology will be based on the Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal (3rd Ed.) (CIEEM, 2018). These guidelines aim to predict the residual impacts on important ecological features affected, either directly or indirectly by a development, once all the appropriate mitigation has been implemented.
- 6.7.2 The approach to determining the significance of an impact follows a systematic process for all impacts. This involves identifying, qualifying and, where possible, quantifying the sensitivity, value and magnitude of all ecological receptors which have been scoped into this assessment. Using this information, a significance of each potential impact has been determined. Each of these steps is set out in the remainder of this section.
- 6.7.3 The EclA uses professional judgement to ensure the assessed significance level is appropriate for each individual receptor, taking account of local values for biodiversity to avoid a subjective assessment wherever possible as per the CIEEM guidelines. As a result, the assessed significance level may not always be directly attributed to the guidance matrix detailed below.

Importance

- 6.7.4 The first stage of an EclA is determining the ‘importance’ of ecological features or ‘receptors’. CIEEM identifies the important ecological features as those key sites, habitats and species which have been identified by European, national and local governments and specialist organisations as a key focus for biodiversity conservation in the UK. These include:
- Statutory and non-statutory designated sites for nature conservation;
 - Species occurring on national biodiversity lists;
 - UK Habitats of Principal Importance; and
 - Red listed, rare or legally protected species.
- 6.7.5 Importance is also qualified by the geographic context of an ecological receptor, i.e. a species which may be not recognised on a national biodiversity list may be locally in decline, and therefore its local importance is greater than its national importance.
- 6.7.6 For this EclA, the guidelines outlined in **Table 6.7** will be followed to provide the relative importance of different ecological features.

Table 6.7 Definition of importance levels for biodiversity.

Importance	Definition
High	<ul style="list-style-type: none"> • An internationally designated site or candidate site or an area which the statutory nature conservation organisation has determined meets the published selection criteria for such designation, irrespective of whether or not it has yet been notified; • A nationally designated site or a discrete area, including ancient woodlands, which the statutory nature conservation organisation has determined meets the published selection criteria for national designation (e.g. SSSI selection guidelines) irrespective of whether or not it has yet been notified; • A viable area of a habitat type listed in Annex I of the Habitats Directive, or smaller areas of such habitat which are essential to maintain the viability of a larger whole; • A viable area of a UK Habitat of Principal Importance or smaller areas of such habitat which are essential to maintain the viability of a larger whole;

Importance	Definition
	<ul style="list-style-type: none"> • A European protected species listed in The Conservation of Habitats and Species Regulations 2010; or • A regularly occurring, nationally significant population / number of any internationally important species.
Medium	<ul style="list-style-type: none"> • County Council / Unitary Authority designated sites and other sites which the designating authority has determined meet the published ecological selection criteria for designation, including Local Nature Reserves selected on defined ecological criteria and Wildlife Trust sites; • Viable areas of habitat identified in a Local Biodiversity Action Plan (LBAP); • Semi-natural woodland greater than 0.5 hectares (ha) which is considered to be in 'good condition'. • Any regularly occurring population of a nationally important species which is threatened or rare in the region; or • A regularly occurring, locally significant number of a species identified as important on a regional basis.
Low	<ul style="list-style-type: none"> • Semi-natural woodland greater than 0.25ha which is considered to be in 'good condition' or greater than 0.5ha in unfavourable condition; • Network of inter-connected hedgerows including some species-rich hedgerows; • Individual Important hedgerows or other ancient-countryside linear features; • Viable areas of habitat identified in a sub-county (District / Borough) BAP; • Any regularly occurring population of a nationally important species which is not threatened or rare in the region or county; • Sites / features that are scarce within the District / Borough or which appreciably enrich the District / Borough habitat resource; or • Other features identified as wildlife corridors or migration routes.
Negligible	<ul style="list-style-type: none"> • Features of value to the immediate area only e.g. within the site.

Magnitude

6.7.7 The magnitude of the impact is assessed according to:

- The extent of the area subject to a predicted impact;
- The duration the impact is expected to last prior to recovery or replacement of the resource or feature;
- Whether the impact is reversible, with recovery through natural or spontaneous regeneration, or through the implementation of mitigation measures or irreversible, when no recovery is possible within a reasonable timescale or there is no intention to reverse the impact; and
- The timing and frequency of the impact, i.e. conflicting with critical seasons or increasing impact through repetition.

6.7.8 **Table 6.8** summarises the definitions of magnitude that have been used for the ecological receptors.

Table 6.8 Definitions of magnitude levels for biodiversity

Magnitude	Definition
High	Major impacts on the feature / population, which would have a sufficient effect to alter the nature of the feature in the short to long term and affect its long-term viability. For example, more than 20% habitat loss or damage.

Magnitude	Definition
Medium	Impacts that are detectable in short and long-term, but which should not alter the long-term viability of the feature / population. For example, between 10 - 20% habitat loss or damage.
Low	Minor impacts, either of sufficiently small-scale or of short duration to cause no long-term harm to the feature / population. For example, less than 10% habitat loss or damage.
Negligible / No impact	A potential impact that is not expected to affect the feature / population in any way, therefore no effects are predicted.

Duration

6.7.9 The definitions of duration used within this EclA are dependent on the individual ecological receptor, and how sensitive it is to effects over different timescales. However, in general terms the following definitions have been used:

- **Short term** – effects which at most occur over a part of – or over a part of a key period of – a species’ active season or a habitat’s growing season, i.e. typically effects which occur over a matter of days or weeks;
- **Medium term** – effects which occur over the full duration of a species’ active season or a habitat’s growing season, i.e. typically effects which occur over a matter of months or one year; and
- **Long term** – effects which occur over the multiple active or growing seasons, i.e. typically effects which occur over more than one year.

Impact significance

6.7.10 Following the identification of receptor importance and magnitude of the effect, it is possible to determine the significance of the impact.

6.7.11 Ecologically significant impacts are defined as:

*‘...impacts on structure and function of defined sites, habitats or ecosystems and the conservation status of habitats and species (including extent, abundance and distribution)’
(CIEEM, 2016a).*

6.7.12 Impacts are unlikely to be significant where features of low importance are subject to small scale or short-term effects. If an impact is found not to be significant at the level at which the resource or feature has been valued, it may be significant at a more local level.

6.7.13 CIEEM recommend that the following factors are taken into account when determining significance for selected ecological receptors.

Designated/defined sites and ecosystems

- **Designated sites** – is the Proposed Development and associated activities likely to undermine the site’s conservation objectives, or positively or negatively affect the conservation status of species or habitats for which the site is designated, or may it have positive or negative effects on the condition of the site or its interest/qualifying features?
- **Ecosystems** – is the project likely to result in a change in ecosystem structure and function?

Habitats and species

- **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.
- **Species** – 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. (CIEEM, 2016a)

6.7.14 Following the identification of receptor importance and magnitude of effect, the significance of the impact has been considered using the matrix presented in **Table 6.9** below and knowledge of the ecological features affected.

6.7.15 The assessment of potential impacts has been undertaken assuming implementation of embedded mitigation and commitments for the project. Residual impacts include any additional mitigation measures required. An assessment of residual impacts is then made, after assuming implementation of additional mitigation measures where required, i.e. the significance of the effects that are predicted to remain after the implementation of all committed mitigation measures.

Table 6.9 Significance of impact matrix

		Negative Magnitude				Positive Magnitude			
		High	Medium	Low	Negligible	Negligible	Low	Medium	High
Importance	High	Major	Major	Moderate	Minor	Minor	Moderate	Major	Major
	Medium	Major	Moderate	Minor	Minor	Minor	Minor	Moderate	Major
	Low	Moderate	Minor	Negligible	Negligible	Negligible	Negligible	Minor	Moderate
	Negligible	Minor	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Minor

6.7.16 The impact significance categories are defined as shown in **Table 6.10**.

Table 6.10 Impact significance categories

Impact Significance	Definition
Major	Very large or large change in receptor condition, both adverse or beneficial, which are likely to be important considerations at a regional or district level because they contribute to achieving national, regional or local objectives, or, could result in exceedance of statutory objectives and / or breaches of legislation.
Moderate	Intermediate change in receptor condition, which are likely to be important considerations at a local level.
Minor	Small change in receptor condition, which may be raised as local issues but are unlikely to be important in the decision-making process.
Negligible	No discernible change in receptor condition.

Impact Significance	Definition
No change	No impact, therefore no change in receptor condition.

6.7.17 For the purposes of the EclA, major and moderate impacts are deemed to be significant. In addition, whilst minor impacts are not considered significant in their own right, it is important to distinguish these from other non-significant impacts as they may contribute to significant impacts cumulatively or through interactions and in-combination effects.

Study area

6.7.18 The proposed study areas for biodiversity receptors are set out in **Section 6.4**. These will be refined at the assessment stage as the design and consultation processes progress, and as related topic assessments are progressed.

6.7.19 The study areas for the assessment will be defined to ensure that the impact of the Proposed Development on the biodiversity can be fully assessed. A likely ZOI for potential cumulative biodiversity effects with other development will be defined separately as part of the CEA, as described in **Section 4.6 of Chapter 4 ‘Approach to EIA’**.

Additional baseline data collection

6.7.20 Subject to landowner approval, a field survey will commence in spring 2019 to both check the HAL 2017 findings as well as surveying those areas which had not been covered by the HAL Scoping surveys.

6.7.21 The 2019 survey will follow the ‘Extended Phase I Habitat Survey’ methodology as set out in Guidelines for Baseline Ecological Assessment (Institute of Environmental Assessment, 1995) and the Handbook for Phase I Habitat Survey (Joint Nature Conservation Committee (JNCC), 2010). This method of survey provides information on the habitats in the survey area and assesses the potential for legally protected species to occur on or adjacent to it.

6.7.22 Preliminary investigations will be undertaken in respect of the presence of the following legally protected species within the survey area:

- Great crested newts. Searching for suitable aquatic habitats for breeding populations within the survey area and up to 250m from its boundary. Also, searching for suitable terrestrial habitat within the survey area;
- Badger *Meles meles*. Searching for signs of activity including setts, tracks, snuffle holes and latrines within the survey area and up to 30m from its boundary;
- Water voles, otters and white clawed crayfish. Searching for suitable habitat in water bodies within or immediately adjacent to the survey area;
- Bats. Preliminary daytime inspection of potential bat roosting sites, particularly within trees/buildings within the survey area, from the ground level and using binoculars;
- Reptiles. Searching for suitable habitats within the survey area;
- Birds (nesting/breeding). Searching for signs of nests and identifying any suitable nesting habitats within the survey area;
- Invertebrates. Assessing the suitability of habitats to provide appropriate habitat for rare and notable aquatic and terrestrial invertebrate species.

- Other protected species (e.g. dormice *Muscardinus avellanarius*). Searching for suitable habitat within the survey area; and
- Invasive species. Assessing their presence within, and up to 10m from, the survey area boundary. The list of invasive plant species included on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) is extensive and these plants are found in a range of different habitats. The 2018 survey assessed, in particular, the presence of Japanese knotweed *Fallopia japonica*, giant knotweed *Fallopia sachalinensis*, hybrid knotweed, giant hogweed *Heracleum mantegazzianum*, Himalayan balsam *Impatiens glandulifera*, rhododendron *Rhododendron ponticum* and cotoneaster.

6.7.23 The field survey programme and Method Statement will be shared with the stakeholders for consultation in advance of the surveys.

Cumulative effects

6.7.24 Cumulative biodiversity effects resulting from the combination of effects from the Proposed Development and other developments will be assessed in accordance with the guidance and methodologies set out in **Section 4.6 of Chapter 4 ‘Approach to EIA’**. The assessment will be dependent on the availability and accessibility of information for other developments.

6.7.25 The Proposed Development does not include the new Northwest Runway and M25 realignment components of the NRS proposed by HAL. However, the Proposed Development is designed to be operated alongside these components of the NRS that are being progressed by the HAL DCO Project. Therefore, the total cumulative biodiversity effects will be considered together to ensure an overarching assessment of the NRS as a whole. Particular attention will be given to impacts on bird species due to increased noise, lighting and traffic.

6.7.26 Any components of the HAL DCO Project which would no longer be required as a result of the Proposed Development would not be included in the CEA.

6.8 Approach to Mitigation

6.8.1 Minimisation of biodiversity impacts will be embedded into the design of the Proposed Development where possible following the application of the hierarchy of mitigation as described in **Chapter 4 ‘Approach to EIA’**. The assessment of impacts will be made with these embedded mitigation measures in place.

6.8.2 The type and level of mitigation measures required will be informed by the expected level of impact. The ANPS lists compensation considerations relevant to the construction and operational phases which could be put forward to minimise impacts associated with the Proposed Development. Compensation considerations identified by the ANPS that is relevant to the biodiversity assessment is outlined below

“Compensation ratios relating to the effects of the preferred scheme should be considered in more detail during the design. The application of 2:1 compensation ratio is considered to represent the minimum requirement. However, there are other mechanisms for establishing compensation ratios, such as Defra’s biodiversity offsetting metric. Equally, it is important to note that habitat ratios form only one part of potential compensation which should be considered, and the location and quality of any compensation land is of key importance. In this regard, habitat creation, where required, should be focused on areas where the most ecological and ecosystems services benefits can be realised”.

6.9 Habitats Regulations Assessment (HRA)

- 6.9.1 It is noted that the ultimate responsibility for preparing a HRA for a Proposed Development lies with the Competent Authority responsible for the decision as to whether that development would proceed. In the case of the Proposed Development this would be the Secretary of State for Transport, who makes the final decision on a DCO application to the Planning Inspectorate.
- 6.9.2 It is customary for a DCO applicant to provide information for the Competent Authority to undertake a HRA in the form of a 'shadow HRA'. The shadow HRA for the Proposed Development would therefore comprise two reports – a 'Screening Report' and a final 'Report to inform the HRA' comprising an Appropriate Assessment for European Sites and qualifying interests for which Likely Significant Effect (LSE) has been identified during the screening process.
- 6.9.3 The HRA will be dealt with in parallel to the EIA. The HRA will flow naturally from the EIA assessment with methodology applied to the EIA being taken a step further to satisfy the tests of the HRA, as will also include assessment of cumulative impacts.
- 6.9.4 The HRA for the Proposed Development will be prepared in accordance with PINS Advice Note 10: Habitat Regulations Assessment relevant to Nationally Significant Infrastructure Projects (PINS, 2017), and would consider all European Sites and qualifying interests where there is a potential for LSE.
- 6.9.5 At this stage, it is considered that the focus of the HRA Screening Report will be on potential effects to qualifying features of the South West London Waterbodies SPA. The Screening Report will conclude with a list of SPAs and qualifying bird species where there is potential for LSE (or where LSE cannot be ruled out).
- 6.9.6 The screening exercise will be undertaken as soon as practically possible in order to focus this aspect of the work on the key issues and to ensure that non-relevant sites and qualifying features are excluded from Appropriate Assessment. Screening will be based on a conceptual 'source-pathway-receptor' approach.
- 6.9.7 Embedded mitigation will form part of the Proposed Development for the purposes of screening but specific mitigation will not be taken account of at screening stage.
- 6.9.8 Where there is a potential for LSE, these sites would be considered in detail as part of the Report to inform the HRA with each potential effect clearly described and assessed. The Applicant will seek to include any relevant correspondence from the regulators or advisors confirming that there is agreement on the sites and effects considered.
- 6.9.9 It is anticipated that a complete draft of the Report to inform the HRA would be submitted alongside the ES. The process would be undertaken to consider impacts from the Proposed Development alone and in-combination with other developments that are predicted to have impacts on the relevant qualifying features of the European sites.

6.10 Summary

- 6.10.1 The scope of the biodiversity assessment described above is summarised in **Table 6.11**.

Table 6.11 Summary of potential biodiversity impacts

Potential impacts	Construction	Operation
Degradation and/or loss of habitat through compaction and/or introduction of hardstanding areas.	✓	✓
Killing or injury of fauna through the removal of occupied resting or breeding sites.	✓	X
Loss of potential foraging and breeding areas for protected species or species of local importance.	✓	✓
Loss of ecological connectivity through habitat fragmentation.	✓	✓
Introduction or spread of invasive species.	✓	X
Disturbance of commuting bats using the study area.	✓	✓
Disturbance and displacement of other species sensitive to lighting, noise, vibration and/or dust.	✓	✓
Disturbance and displacement of protected species or species of local importance.	✓	✓
Changes to local surface and groundwater regime impacting on quality of habitats and species they support.	✓	✓
Damage to the local habitats and designated sites.	✓	✓
Loss or damage to terrestrial or freshwater environments and the species they support.	✓	✓
Cumulative impacts	✓	✓

Scoped in (✓) and scoped out (X)

6.10.2 Production of the ES chapter will be undertaken in consultation with all relevant stakeholders, including topic expert panel meetings, as appropriate. Similarly, the requirements of the ANPS will be at the forefront; principally that the Proposed Development design will aim to make a positive contribution to biodiversity. Proposals for mitigation will be considered with improvements in biodiversity at the forefront.

6.11 References

- Bat Conservation Trust (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edition).
- Chartered Institute of Ecology and Environmental Management (CIEEM), 2017. Guidelines on Ecological Report Writing. Updated December 2017. Chartered Institute of Ecology and Environmental Management, Winchester.
- Cresswell, W. and Whitworth, R. (2004) An assessment of the efficiency of capture techniques and the value of different habitats for great crested newt *Triturus cristatus*, ENRR Number 576.
- English Nature, 2001. Great crested newt mitigation guidelines. Peterborough.
- Heathrow Airport Limited (2018) Heathrow Expansion: EIA Scoping Report. May 2018.
- Institute of Environmental Assessment (1995) Guidelines for Baseline Ecological Assessment. E & FN Spon, London.

Institute of Lighting Engineers (ILE) (2007). Bats and Lighting in the UK. ILE and the Bat Conservation Trust. Available at URL: <http://www.ile.org.uk/index.php?page=pollution>.

Institute of Lighting Professionals (ILP) (2011). Guidance Notes for the Reduction of Obtrusive Light. Available at URL: <https://www.theilp.org.uk/documents/obtrusive-light/>.

Kent Local Biodiversity Action Plan (2018). Available at URL: <http://www.kentbap.org.uk/>

Strachen, R; Moorhouse, T and Gelling, M (2012) Water Vole Conservation Handbook 3rd Edition

7 Carbon and Greenhouse Gases

7.1 Introduction

- 7.1.1 This chapter details the proposed scope of the assessment of potential impacts arising from the Proposed Development on 'carbon' and Greenhouse Gases (GHGs). The chapter also considers potential impacts associated with the construction and operational phases.
- 7.1.2 In this report, 'carbon' is defined as carbon dioxide (CO₂) to align with relevant guidance and supporting documents specific to the UK aviation sector. The term 'GHG' in this chapter and in the assessment, will encompass the six gases referenced in the Kyoto Protocol, and described in **Table 7.1**. Where practicable, the results in this assessment will be expressed in carbon dioxide equivalent (CO₂eq) which recognises that different gases have notably different global warming potential⁷.
- 7.1.3 The chapter includes:
- A description of key policy and legislation with relevance to carbon and GHGs;
 - A summary of ongoing and planned stakeholder engagement;
 - An overview of the approach that has been adopted to inform this Scoping Report;
 - A concise summary of the baseline carbon and GHG emissions;
 - A description of the potential likely significant effects of the Proposed Development on the carbon and GHGs, to be included in the scope of the assessment;
 - A summary of any potential effects that are proposed to be scoped out of the assessment;
 - A proposed approach to the EIA and the CEA with regards to carbon and GHGs;
 - An overview of the proposed approach to mitigation; and
 - A summary of the Scoping Report chapter.
- 7.1.4 The carbon and GHG assessment will consider direct and indirect emissions within the Proposed Development area, as detailed in **Section 7.4** and **Figure 1.1**.
- 7.1.5 The Proposed Development is a component of the Government's preferred NRS as set out in the ANPS. It does not include the Northwest Runway itself, or the major M25 realignment works required to accommodate the Northwest Runway. Therefore, potential carbon and GHG effects associated with these components of the NRS are excluded from the scope of the primary assessment. Potential carbon and GHG effects associated with the Northwest Runway and M25 realignment works will however be considered as part of the CEA, as set out in **Section 4.6** of **Chapter 4 'Approach to EIA'**.

7.2 Policy and Legislation

- 7.2.1 **Table 7.1** provides a summary of the key topic specific policy and legislation which has informed the scope of the assessment. Further information on policies relevant to the EIA and

⁷ Global Warming Potential of a GHG is a measure of how much heat is trapped by a certain amount of gas in the atmosphere relative to carbon dioxide.

their status is set out in **Chapter I ‘Introduction’**. Due regard will also be given to local policies and the Government’s 25 Year Environment Plan where they are relevant.

7.2.2 These documents are proposed to form the framework for detailed assessment post-scoping and will be taken into account in the assessment of carbon and GHGs impacts during PEI and ES stages, with the relevant criteria followed throughout.

Table 7.1 Policy and legislation relevant to the carbon and GHG assessment

Relevant policy and legislation	Relevance to assessment
Policy	
Airports National Policy Statement (ANPS) (2018)	<p>The ANPS outlines the planning policy for airport NSIP applications in the south-east of England. The ANPS states that the UK government considers that the expansion of Heathrow airport, through the preferred NRS, can be delivered without breaching the UKs carbon obligations. The ANPS also states that under the Act, emissions from projects, in both the construction and operational phases, will be important for the UK to meet its international and domestic obligations to limit carbon emissions.</p> <p>The ANPS states that the applicant’s assessment, in accordance with the Environmental Impact Assessment Regulations 2017, should include:</p> <ul style="list-style-type: none"> • evidence of projects construction and operation carbon impact (including embodied carbon); • the quantification of greenhouse gas impacts (inclusive and exclusive of mitigation, thus demonstrating the impacts of the proposed mitigation); • a split of emissions between traded and non-traded sector emissions; and a distinction between emissions from international and domestic aviation.
Appraisal of Sustainability: ANPS (2018)	<p>The Appraisal of Sustainability was undertaken to consider the impacts of expansion without the benefits of mitigation that will be implemented by the Applicant. Objective 14 of the Sustainability Appraisal was to “<i>minimise carbon emissions in airport construction and operations</i>”.</p>
National Planning Policy Framework (NPPF) (2018)	<p>The revised NPPF was adopted in July 2018 and advises that the planning system should support the transition to a low carbon future. In line with the objectives and provisions of the Climate Change Act 2008, the NPPF states that:</p> <p><i>“Plans should take a proactive approach to mitigating and adapting to climate change, taking into account the long-term implications for flood risk, coastal change, water supply, biodiversity and landscapes, and the risk of overheating from rising temperatures”.</i></p> <p>It also states that:</p> <p><i>“New development should be planned for in ways that: can help to reduce greenhouse gas emissions, such as through its location, orientation and design. Any local requirements for the sustainability of buildings should reflect the Government’s policy for national technical standards.”</i></p>
National Policy Statement for National Networks (NPS NN) (2014)	<p>The NN NPS outlines the necessity for, and the government’s policies to deliver, nationally significant road, rail and strategic freight NSIPs in England. The Government’s vision and strategic objectives for national networks include:</p> <p><i>“Networks which support the delivery of environmental goals and the move to a low carbon economy”</i></p>
Aviation Policy Framework (2013)	<p>The Aviation Policy Framework outlines the UK governments policy’s for allowing the aviation sector to continue to contribute significantly to the economic growth of</p>

Relevant policy and legislation	Relevance to assessment
	<p>the UK. One of the main objectives of the Framework is to continue to make the UK one of the best-connected countries globally through the UKs air links.</p> <p>One of the main focuses of the government’s action is to target aviation’s significant contribution to climate change, from CO₂ emissions. The Framework has an objective specifically to ensure significant and cost-effective efforts are made by the aviation sector towards reducing global emissions.</p>
EU Emission Trading System (EU ETS)	<p>The EU ETS is a carbon trading market and the foundation of the EU’s policy for combating climate change. The EU ETS works on the ‘cap and trade’ principle and provides an important tool for the cost-efficient reduction of greenhouse gases. Under the EU ETS, flight (covered by the EU ETS) ‘net’ emissions cannot increase above the emissions ‘cap’ level.</p>
Legislation	
United National Framework Convention on Climate Change (UNFCCC) 1992	<p>The UNFCCC is an intergovernmental environmental treaty and entered into force on 21 March 1994. The main objective is the “<i>stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.</i>”</p>
Kyoto Protocol 1997 (enacted 16 February 2005)	<p>The Kyoto Protocol is an international agreement adopted in 1997 and was enacted in 2005. The Protocol is linked to the UNFCCC objective to reduce atmospheric concentrations of GHG to reduce the rate and extent of global warming. The Protocol applies to the reduction of six greenhouse gases: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆).</p> <p>The Protocol acknowledges that the economic development of a country is an important factor in the country’s ability to combat climate change. Therefore, countries have an obligation to reduce their current emissions, as they are historically responsible for the current concentrations of atmospheric greenhouse gases</p>
Climate Change Act (2008)	<p>The Climate Change Act 2008 provides the framework for the UK’s approach to achieving its long-term goals of reducing GHG emissions by 34%, relative to a 1990 baseline, by 2020 and by 80% in 2050. The Climate Change Act was enacted as part of the UK’s responsibilities and obligations as a signatory to the Kyoto Protocol 1997.</p> <p>The UK Government is required under the Climate Change Act to set legally-binding ‘carbon budgets’ that provide constraints of GHG emissions in a given time period. Carbon budgets are caps on the quantity of GHG emissions emitted in the UK over a five-year period. The first five carbon budgets have been placed into legislation and will run up to 2032. These budgets are identified in Table 7.4.</p>
Programmes	
National Adaptation Programme (NAP), Climate Change Risk Assessment (2017)	<p>The NAP outlines the actions that will be undertaken within the UK, by the government and others, to adapt to climate change challenges. The NAP addresses the risks identified as a priority in the Climate Change Risk Assessment (CCRA), which is produced every 5-years under the Climate Change Act 2008.</p> <p>The NAP details the range of climate risks which may affect the natural environmental, infrastructure, communities, buildings and services. Key actions are set out in the NAP which aim to address the identified high-risk areas, which include:</p>

Relevant policy and legislation	Relevance to assessment
	<ul style="list-style-type: none"> • Risks to health, well-being and productivity from high temperatures; • Risks in shortages in the public water supply for agriculture, energy generation and industry; • Risks to natural capital; and Risks to domestic and international food production and trade.
Carbon Offsetting Reduction Scheme for International Aviation (ICAO CORSIA)	CORSIA was developed by the International Civil Aviation Organisation (ICAO) for the international civil aviation industry “to achieve the global aspirational goal of carbon-neutral growth from 2020 onwards” through the use of alternative fuels, technology, operations and economic instruments.

7.3 Stakeholder Consultation

- 7.3.1 A detailed stakeholder engagement plan is currently being developed. Care will be taken to ensure all key stakeholders with views and concerns regarding carbon and GHGs are provided with sufficient information on the Proposed Development to discuss and agree the details of the assessment in a meaningful and inclusive manner.
- 7.3.2 The stakeholders listed below were contacted in November 2018 to make them aware of the Proposed Development and timescales for further consultation. The following stakeholders were provided with a presentation providing an overview of the Proposed Development and inviting initial comments on the scope of the assessment for carbon and GHGs:
- Environment Agency;
 - Committee on Climate Change;
 - Natural England;
 - London Borough of Hounslow;
 - Spelthorne Borough Council;
 - Slough Borough Council;
 - South Bucks District Council; and
 - London Borough of Hillingdon.
- 7.3.3 The HAL Scoping Opinion is a useful source of stakeholder feedback, and has been used to inform this Scoping Report.
- 7.3.4 Further formal and informal consultations will be arranged to discuss and agree the details of the methodology for the assessment of potential carbon and GHGs impacts arising from the Proposed Development.

7.4 Approach to Scoping

Study area

- 7.4.1 This section sets out how the study area will be defined for the consideration of potential carbon and GHG effects at the assessment stage.
- 7.4.2 Where possible, the same approach has been used to define the study area for scoping, used to enable the identification of carbon and GHG receptors with the potential to be affected by

the Proposed Development.

- 7.4.3 The study areas at the scoping stage have been based on the Proposed Development, as shown in **Figure 1.1**. As the design of the Proposed Development is still in its early development, the study area currently defined will be kept under review as the design and consultation processes progress, and related topic assessment study areas are confirmed. Therefore, the study areas at the assessment stage may evolve as appropriate.
- 7.4.4 The study area for the assessment will be determined in accordance with the approach detailed in the GHG Protocol (WRI and WBCSD, 2015), IEMA guidance (IEMA 2017) and relevant sector specific documents such as the ANPS (DfT, 2018). The study area will encompass the activities which are likely to result in carbon and GHG emissions, and include a physical geographical and temporal boundary for the Proposed Development.
- 7.4.5 Paragraph 3.62 of the ANPS (DfT, 2018) identifies that carbon emissions associated with the expansion of Heathrow Airport are likely to arise in four areas:
- *A net increase in air travel;*
 - *Airside ground movements and airport operations;*
 - *Changes in travel patterns as a result of the scheme's surface access arrangements; and*
 - *Construction of new infrastructure.*
- 7.4.6 The ANPS also identifies in paragraph 5.77 that:
- “As far as possible, the applicant's assessment should also seek to quantify impacts including:*
- *Emissions from surface access due to construction staff;*
 - *Emissions from surface access due to freight and retail operations and construction site traffic;*
 - *Emissions from surface access due to airport passengers / visitors; and*
 - *Emissions from airport operations including energy and fuel use.*
- “This should be undertaken in both a ‘do minimum’ and also in the ‘do something’ scenario for the opening, peak operation and worst-case scenarios” (DfT, 2018).*
- 7.4.7 The study area for the carbon and GHG assessment will therefore take into consideration emissions from these sources. This may involve direct or indirect carbon and GHG emissions outside of the Proposed Development area defined for EIA (IEMA, 2017).
- 7.4.8 The ANPS identifies that emissions from air travel, specifically international flights will have the largest contribution to the carbon and GHG footprint of Heathrow Airport expansion (DfT, 2018). As detailed in **Section 4.6 of Chapter 4 ‘Approach to EIA’**, all activities associated with the construction and operation of the Northwest Runway will be considered as part of the CEA, for which a separate study area will be defined. This includes all construction activities, aircraft movements (i.e. take-off and landing), major realignment works to the M25, and displaced uses associated with the proposed new Northwest Runway. The number of aircraft movements will align with the HAL DCO Project to present a consistent scenario.

Sources of baseline data

7.4.9 The baseline section (**Section 7.5**) was informed by the data or guidance listed in **Table 7.1** and those listed below. Other relevant information if identified will inform the baseline study.

- Aviation Policy Framework, 2013 (DfT, 2013);
- Committee on Climate Change (CCC), Meeting the UK aviation target – options for reducing emissions to 2050, December 2009 (CCC, 2009);
- Heathrow 2.0, Our Plan for Sustainable Growth, 2017 (HAL, 2017a); and
- Heathrow Carbon Footprint 2017 (HAL, 2017b).

7.5 Baseline Conditions

7.5.1 Aviation accounts for approximately 6% of the UK's current GHG emissions. This is likely to increase over time as other sectors decarbonise more quickly (DfT, 2013). There are however anticipated to be improvements in efficiency and in technology, and the future fleet is expected to be less carbon intensive.

7.5.2 GHG emissions from existing Heathrow Airport operations, reported in the Heathrow 2.0 Our Plan for Sustainable Growth and the Heathrow Carbon Footprint 2017 Plan (HAL, 2017a & b) are provided in **Table 7.2**.

Table 7.2 Existing Heathrow Airport GHG Emissions – Obtained from Heathrow Carbon Footprint 2017 (HAL, 2017)

Scope 1 Emissions			
Emission Source	Greenhouse Gas Emissions (tCO ₂ eq)		
Year	2015	2016	2017
Fuel Consumption – utilities ¹	29,014	27,290	23,250
Operational vehicles	1,711	1,889	1,749
LPG for fire training	51	28	9
Refrigerants	840	1,031	153
Scope 2 Emissions			
Emission Source	Greenhouse Gas Emissions (tCO ₂ eq)		
Grid electricity consumption – market based ²	78,841	63,393	15,680
Grid electricity consumption – location based	145,041	121,049	97,408
Scope 3 Emissions ³			
Emission Source	Greenhouse Gas Emissions (tCO ₂ eq)		
Aircraft in landing or take off mode	1,263,702	1,303,238	1,321,566
Passenger surface access	569,865	547,370	514,313 ⁴
Staff surface access	149,829	148,816	120,164
Business travel	1,056	992	839

Third part fuel consumption – utilities ⁵	235	306	297
Third party grid electricity consumption – market based ⁶	49,055	41,580	10,563
Third party grid electricity consumption – location based	91,625	79,337	67,223
Third party operational vehicles	39,064	38,584	36,495
Waste	767	664	799
Water	1,795	1,926	1,752
Scope 1	31,616	30,238	25,161
Scope 2	78,841	63,393	15,680
Scope 3	2,075,368	2,083,076	2,006,787
Total	2,185,825	2,176,708	2,047,628

¹Includes utilities

²Market based emissions for grid electricity have been used to calculate total emissions.

³This footprint does not currently include supply chain emissions, specifically from freight and logistics activity. However, these emissions are currently being mapped out as part of Heathrow's carbon trust supply chain accreditation. When we report out 2018 activities are reported, historic years including 2017 will also be included.

⁴The passenger km distances used in calculating the 2017 GHG emissions from Passenger Surface Access to Heathrow is representative of the year 2017. The passenger km distance calculations were based on a 2016 dataset (2016 CAA data) then scaled up to represent 2017 using 2017 Heathrow Airport Limited passenger throughput data. The 2016 CAA data was used as this was the latest processed data set available at the outset of the analysis.

⁵Includes HEX depot

⁶Market based emissions for grid electricity have been used to calculate total emissions; includes HEX depot

7.5.3 The results in **Table 7.3** highlight that the largest contribution towards GHG emissions at Heathrow Airport are from the take-off and landing of aircraft. Total GHG emissions arising from Heathrow Airport have reduced by approximately 6% from 2015 to 2017, which has been mainly influenced by a reduction in Scope 2 GHG emissions (HAL, 2017b).

7.5.4 As noted in **Section 7.2**, the UK has set a series of carbon budgets to meet the targets set in the UK Climate Change Act 2008 (an 80% reduction on 1990 levels by 2050). The five existing carbon budgets are set out in **Table 7.3**.

Table 7.3 UK Carbon Budgets

Budget	Carbon Budget Level (MtCO ₂ eq)	Reduction Below 1990 Levels
1st Carbon Budget (2008 to 2012)	3,018	25%
2nd Carbon Budget (2013 to 2017)	2,782	31%
3rd Carbon Budget (2018 to 2022)	2,544	37% by 2020
4th Carbon Budget (2023 to 2027)	1,950	51% by 2025
5th Carbon Budget (2028 to 2032)	1,725	57% by 2030

7.5.5 UK GHG emissions were 43% below 1990 levels in 2017. The first carbon budget was met, and the UK is set to outperform on the second and third budgets. However, current projections suggest that the fourth carbon budget will not be met (CCC, 2018).

7.5.6 There is no defined pathway for how the UK will meet its future carbon budgets, or the commitments set out in the 2008 UK Climate Act for 2050 emissions (CCC, 2018). It is

anticipated that technology to decarbonise power generation, buildings and road transport will significantly reduce GHG emissions in the 2020s. Beyond 2030, emissions from other sectors such as industry and aviation will need to be addressed with future solutions (CCC, 2018).

7.6 Scoping of Potential Effects

Effects scoped into the assessment

- 7.6.1 The assessment will consider activities which are likely to release GHG emissions for both the construction and operational phases.
- 7.6.2 GHG emissions during the construction phase will encompass 'cradle to completed construction' for raw materials used in the Proposed Development. This will include the extraction of materials, manufacturing and transportation.
- 7.6.3 The scope of the assessment will be in accordance with the requirements detailed in the ANPS and other sector specific guidance.
- 7.6.4 The potential likely significant effects to be considered in the GHG assessment are displayed in **Table 7.4**.

Table 7.4 Potential likely significant sources of GHG emissions

Activity	Effect	Receptor
Construction		
Embodied GHGs within construction materials	There will be embodied GHGs associated with material extraction, manufacturing and transportation to the site.	Global Atmosphere
Construction vehicle movements	Development-generated vehicle movements associated with the construction phase (excluding those related to the delivery of materials, as covered above) will result in GHG emissions. This will include the movement of construction staff and plant delivery.	
Construction site activities	GHG emissions are likely to be released from fuel consumption by on-site construction plant and equipment. In addition, GHG emissions will be released from the consumption of electricity, water consumption and the production of waste.	
Operation		
Airport building and ground operations	GHG emissions from consumption of electricity within the Proposed Development and the movement of vehicles which contribute to ground operations within Heathrow Airport. In addition, GHG emissions will also arise from water consumption, waste production and the use of materials.	Global Atmosphere
Surface transport movements	Transport movements associated with passengers, staff and freight vehicles will contribute to the GHG footprint of the Proposed Development. In addition, any rail movements will also result in GHG emissions.	
Air Transport	GHG emissions will arise from the consumption of fuel during taxiing to and from the runway.	
Land use change	A change in land use may result in changes in GHG emissions due to alterations in carbon flux' and carbon sinks associated with	

Activity	Effect	Receptor
	natural and built environments.	

7.6.5 Some of these activities will take place outside of the Proposed Development scoping area, detailed in **Section Error! Reference source not found.**, and therefore will be considered as part of the cumulative assessment. The approach that will be undertaken to assess the release of GHG emissions are described further in **Section Error! Reference source not found.**

Effects scoped out of the assessment

7.6.6 At this stage of the Proposed Development, no effects have been scoped out of the assessment.

7.7 Approach to Assessment

7.7.1 The carbon and GHG assessment will account for policy and legislation listed in **Section 7.2**, and the guidance documents and databases listed in **Table 7.5**.

Table 7.5 Guidance documents for the GHG Assessment

Guidance	Application
EMEP / EEA Air Pollutant Emission Inventory Guidebook: 2016 (CORINAIR)	Consideration of emissions from aircraft
GHG Protocol (WRI and WBCSD, 2015)	A global standard for preparing and undertaking GHG emissions assessment, including details for the three emission scopes.
IEMA Guide to Assessment Greenhouse Gas Emissions and Evaluating their Significance (2017)	Approach to assessment and indication of significance. IEMA has prepared a guidance document to determine an informed approach to the consideration of GHG emissions within an EIA (IEMA, 2017). The guidance sets out the areas for consideration at all stages of the assessment, and provides a guideline and requirements for an assessment.
PAS 2080:2016 Carbon Management in Infrastructure and BS EN 15978:2011 Sustainability of construction works, Assessment of environmental performance of buildings.	Estimation of emissions for non-aircraft parameters
Royal Institute of Chartered Surveyors (RICS) professional standards and guidance, UK, Whole life carbon assessment for the built environment, 1 st edition, November, 2017	Guidance for embodied carbon
The Inventory of Carbon and Energy (ICE) Database	Embodied carbon emission factors
Department for Business, Energy & Industrial Strategy (BEIS), Government emission conversion factors for greenhouse gas company reporting	GHG emission factors for a range of activities.

7.7.2 The approach proposed for the carbon and GHG assessment for the HAL DCO Project was largely accepted by PINS (PINS, 2018). References are therefore made to the HAL Scoping Opinion, and updates to the methodology are detailed where appropriate. The approach to the assessment will be carried out in accordance with the ANPS, which states:

“The applicant should provide evidence of the carbon impact of the project (including embodied carbon), both from construction and operation, such that it can be assessed against the Government’s carbon obligations, including, but not limited to carbon budgets.

The applicant should quantify the greenhouse gas impacts before and after mitigation to show the impacts of the proposed mitigation. This will require emissions to be split into traded sector and non-traded sector emissions, and for a distinction to be made between international and domestic aviation emissions” (DfT, 2018)

- 7.7.3 GHG emissions will be undertaken for ‘do minimum’ and ‘do something’ scenarios, and in accordance with the requirements detailed within the ANPS. The assessment will quantify all emissions with all construction and operational activities associated with the Proposed Development for the identified timescales in paragraph 7.7.14.
- 7.7.4 The assessment will be undertaken in accordance with the procedure set out in the GHG Protocol, which is a framework developed by the World Resources Institute and World Business Council on Sustainable Development to measure GHG emissions from operations (WRI and WBCSD, 2015). The most recent GHG Protocol Corporate Standard was released in 2015, and will be used as a basis for this assessment.
- 7.7.5 GHG emissions are categorised within three scopes, as defined by the GHG Protocol, which are defined below:
- Scope 1 emissions: “direct” GHG emissions arising from a project, such as those associated with fossil fuel consumption by vehicles and plant directly owned by Heathrow Airport;
 - Scope 2 emissions: account for “indirect” GHG emissions from the production of electricity and gas (i.e. off site and usually by third parties) consumed by plant and equipment at Heathrow Airport; and
 - Scope 3 emissions: are “indirect emissions arising from supporting activities” (e.g. work upstream and/or downstream, the activities of sub-contractors and ancillary travel) associated with Heathrow Airport.
- 7.7.6 The assessment will consider all three GHG emission scopes defined by the GHG Protocol (WRI and WBCSD, 2015).

Study area

- 7.7.7 The proposed study area for carbon and GHG receptors is set out in **Section 7.4**. As described, the assessment study area will be based on the Proposed Development area, and defined in accordance with the GHG Protocol (WRI and WBCSD, 2015), IEMA guidance (IEMA, 2017) and the ANPS (PINS, 2018).
- 7.7.8 The assessment study area will be identified to ensure that the impact of the Proposed Development on carbon and GHG can be fully assessed. GHGs will be calculated from the boundary of the Proposed Development area. A likely ZOI for potential cumulative carbon and GHG effects with other development will be defined separately as part of the CEA, as described in **Section 4.6 of Chapter 4 ‘Approach to EIA’**. This will include GHG emissions associated with the HAL components of the NRS, including:
- Aircraft take-off and landing;
 - Realignment and tunnelling of the M25; and
 - Displaced uses and land use change resulting from the proposed Northwest Runway.

Assessment scenarios

- 7.7.9 The Proposed Development will be implemented across an anticipated timeframe of 2022 – 2030. The carbon and GHG assessment will consider a number of different assessment scenarios which will consider the construction and operational phases, and the activities which would give rise to the most significant carbon and GHG impacts as a result of the Proposed Development.
- 7.7.10 The ANPS advises that a ‘carbon’ assessment for both a ‘do minimum’ and also a ‘do something’ scenario is required for the opening, peak operation and worst-case scenarios (DfT, 2018). Therefore, the following assessments will be undertaken:
- Future baseline (‘do nothing’) – where the current Heathrow Airport configuration and its two runways continue to operate;
 - With development ‘do minimum’ scenario – this will be carried out for the Proposed Development itself;
 - With development ‘do something’ scenario – where additional mitigation measures, such as those listed in the ANPS are considered and applied to the Proposed Development; and
 - With development ‘cumulative’ scenario – where emissions from the ancillary development, including the proposed new Northwest Runway and M25 realignment are added to the ‘do something’ scenario to provide an overall project footprint.
- 7.7.11 There is anticipated to be an improvement in the efficiency of aircraft and road transport fleet over the temporal scope of the assessment, which is likely to result in a reduction in GHG emissions associated with specific activities. These improvements will be included as part of the assessment, based on approved guidance and databases.
- 7.7.12 The HAL Scoping Opinion advises that the assumptions and uncertainties regarding future improvement scenarios, including any sensitivity analysis should be clearly set out in the ES (PINS, 2018). This will enhance the understanding of the reliance placed on such measures in assessing likely significant effects, and will be incorporated into the assessment.

Assessment timescales

- 7.7.13 To determine the GHG emissions for the opening, peak operation and worst-case scenarios, emissions will be estimated for each year considered in the assessment.
- 7.7.14 The scope of the assessment will be from 2022, the start of construction, to 2100 where projections of the future fleet make up, traffic flows and energy emissions factors are available. 2050 will also provide a major milestone in the assessment, as it represents the end date of the government’s commitment in the Climate Change Act 2008 to reduce GHG emissions by at least 80% of 1990 levels. Appropriate assumptions will be justified and clearly stated as to improvements in the efficiency of aircraft, the UKs future road fleet mix and the rate that the UKs energy mix will be decarbonised. The scenarios will draw on published and credible future projections, and where appropriate will be agreed with key stakeholders.
- 7.7.15 With consideration to the assessment scenarios and timescales, GHG emissions for the following milestones will be identified:

- Construction phase emissions – the predicted GHG emissions for the duration of the construction phase will be calculated. The year of peak construction will be calculated in accordance with best available information at the time of the assessment;
- Opening year – Operational phase emissions from the opening year of the Proposed Development.
- Peak operation – this scenario will consider the year of peak operation, which could be in terms of passenger numbers or aircraft movements; and
- Worst-case scenario – this will be the year of highest annual GHG emissions from the Proposed Development, which may not coincide with the peak operation year due to improvements in vehicle fleet of other factors such as the make-up of the UK electricity generation mix.

7.7.16 Each of these scenarios will be considered for the Proposed Development alone, and in combination for the HAL DCO Project as part of the cumulative assessment. The same assumptions for aircraft movements and passenger numbers as the HAL DCO Project will be used in the cumulative assessment.

7.7.17 There is likely to be an overlap in terms of the construction phases and operation of the Proposed Development. GHG emissions during this period will be calculated for both phases, and will be reported if they form the worst-case scenario over the duration of the assessment to ensure consistency and a credible 'joint' scenario.

Additional baseline data collection

7.7.18 Data used in the assessment will be the most up to date and relevant to the Proposed Development. Data will be obtained from relevant teams, such as the design and transportation teams. The most up to date baseline GHG emissions arising from Heathrow Airport's current activities will be used in the ES. In addition, relevant stakeholders such as the local authorities will be contacted to determine if there is any additional relevant baseline information that can be used in the assessment.

Assessment methodology

Construction phase

7.7.19 The assessment will use information available at the time of assessment to determine carbon and GHG emissions during the construction phase of the development. An assessment will be carried out for activities taking place within defined construction periods for the project, as detailed in the Project Description.

7.7.20 The calculation of embodied GHG emissions associated with construction materials will be carried out using best practice guidance, such as the Royal Institute of Chartered Surveyors (RICS), and use an approved database such as the Inventory of Carbon and Energy (ICE). Information regarding the mass and volume of construction materials will be obtained from the project design team.

7.7.21 The anticipated traffic movements, fuel use by equipment and details of onsite activities which have the potential to release GHG emissions will be obtained from the project team. Emission factors will be obtained from the most representative data sources, such as those provided by the Department for Business, Energy and Industrial Strategy (BEIS).

7.7.22 Construction activities carried out for the HAL DCO Project, including the proposed new Northwest Runway, the M25 realignment and associated displaced uses will be included as part of a cumulative assessment for the construction phase.

Operational phase

7.7.23 The operational phase GHG assessment will be carried out in accordance with the principles outlined in the GHG Protocol (WRI and WBCSD, 2015). The approach for each of the parameters detailed in **Table 7.3** is detailed below.

Airport Building and Ground Operations

7.7.24 The assessment will use predictions for the consumption of electricity and water, and the production of waste from the terminal buildings to determine GHG emissions. The number of internal surface transport movements will be obtained from the project team. Emission factors will be derived from the most appropriate data source at the time of assessment, such as those provided by BEIS. Future predictions in terms of the future energy mix in the UK will be incorporated into the calculations.

Surface Vehicle Transport Movements

7.7.25 Surface vehicle transport movements associated with the Proposed Development will be obtained from the transportation team for the project. The boundary and spatial scope for external transport movements will be considered following the outcomes of the Transport Assessment, but this will be clearly defined within the ES Chapter. Emission factors will be derived from the most appropriate data source at the time of assessment, and will account for future changes to the UK transport fleet and travel mode.

Air Transport

7.7.26 Emissions from aircraft taxiing within the defined project boundary will be included as part of the GHG assessment for the Proposed Development. Emissions associated with the take-off and landing of aircraft on the proposed new Northwest Runway will be considered as part of the cumulative assessment. For all air transport movements, emissions of CO₂ only will be calculated, in accordance with advice from the CCC (CCC, 2012).

7.7.27 The calculation of CO₂ emissions from aircraft will use emission factors provided in the European Monitoring and Evaluation Programme (EMEP) guidebook, which will account for future aircraft improvements. There are anticipated to be efficiency improvements in surface-based aircraft movements, which will be considered in the assessment. In addition, the use of aviation biofuel within the fleet and airspace will be considered in the future scenarios.

7.7.28 The same aircraft movement and passenger numbers associated with the proposed new Northwest Runway in the HAL DCO Project will be used in the assessment. Emission factors associated with the consumption of fuel aircraft taxiing towards the Northwest Runway will be obtained from appropriate sources.

7.7.29 For the take-off and landing emissions calculations, it is acknowledged that the HAL Scoping Opinion recommends that emissions from landing aircraft as well as those taking off are calculated (PINS, 2018). This is to ensure that the assessment reflects that the provision of the new Northwest Runway will affect arriving traffic, and to ensure consistency with the CAPI61a requirements. Emissions from landing aircraft from a defined starting point will therefore be considered in the assessment.

Land Use Change

- 7.7.30 PINS recommended to include land use change in the HAL Scoping Opinion, and will therefore be considered as part of the assessment (PINS, 2018). Land uses within the Proposed Development will be considered in the assessment but are expected to be minor. The main land use change associated with the NRS will be at the area where the new Northwest Runway will be located, which is currently made up of a mixture of open agricultural land, industrial and built environment uses, which will be considered as part of the cumulative assessment.
- 7.7.31 The assessment will be carried out in accordance with best practice guidance, such as IPCC guidelines (IPCC, 2008) and the National Atmospheric Emissions Inventory (BEIS, 2017).

Evaluation of impact significance

- 7.7.32 There is no single preferred method to evaluate the significance of GHG emissions arising from a 'project'. IEMA guidance advises that all releases of GHGs might be considered to be significant, but professional judgement should be used to contextualise a project's GHG budget (IEMA, 2017). The approach that will be taken to determine the significance of GHG emissions arising from the construction and operational phases is provided below.
- 7.7.33 The Climate Change Act 2008 specifies that UK carbon emissions are reduced by at least 80% when compared to 1990 baseline levels by 2050. The Act also details the requirement for carbon budgets, which set out the reduction in emissions required to meet the 2050 target.
- 7.7.34 The CCC sets the climate change budgets, but does not provide a prescriptive route for which the UK can reach its target reduction in emissions by 2050 (CCC, 2018). GHG emissions calculated for each aspect in the assessment will be compared to the relevant sector within the CCC's central scenario to meeting the requirements under the Climate Change Act 2008.
- 7.7.35 The absolute and relative emissions for the Proposed Development and the cumulative scenarios will therefore be reported.

Construction Phase

- 7.7.36 GHG emissions from the construction phase will be compared to the UK Green Construction Board Low Carbon Routemap (Green Construction Board, 2012), a tool that highlights the requirements to meet the 80% reduction in UK GHG emissions. The results from the construction phase assessment will be compared to the infrastructure sector within the Routemap, as this encompasses embodied GHG emissions and the transport of materials and people. It also included emissions from on-site activities for the construction and demolition of buildings and infrastructure.

Operational Phase

- 7.7.37 The approach to determining the significance of GHG emissions from the operational phase of the Proposed Development is provided below:
- The difference between the 'do nothing' and 'do something' emissions assessments for the year of peak operation at Proposed Development will be discussed;
 - The contribution of the Proposed Development to the 'cumulative' assessment scenario emissions; and
 - EIA significance criteria will be used to determine the potential effects and the temporal scope of the effects (e.g. short-term or long-term etc).

7.7.38 The results from the ‘cumulative’ assessment scenario in 2050 will be compared to the latest available UK carbon budget to determine if the GHGs from the Proposed Development could materially affect the ability of the UK to meet its targets under the Climate Change Act 2008. The approach to determining the significance of the airport buildings and transport GHG emissions will be compared to the relevant sector within the CCC’s central scenario.

Cumulative effects

7.7.39 Cumulative carbon and GHG effects resulting from the combination of effects from the Proposed Development and other developments will be assessed in accordance with the guidance and methodologies set out in **Section 4.6 of Chapter 4 ‘Approach to EIA’**. The assessment will be dependent on the availability and accessibility of information for other developments.

7.7.40 The Proposed Development does not include the new Northwest Runway and M25 realignment components of the NRS proposed by HAL. However, the Proposed Development is designed to be operated alongside these components of the NRS that are being progressed by the HAL DCO Project. Therefore, the total cumulative carbon and GHG effects will be considered together to ensure an overarching assessment of the NRS as a whole.

7.7.41 Any components of the HAL DCO Project which would no longer be required as a result of the Proposed Development would not be included in the CEA.

7.7.42 The scope of GHG emissions and significance of effects is related to the aviation sector and in accordance with the methodology detailed in the ANPS. Therefore, cumulative carbon and GHG effects arising from other developments outside of the NRS are not proposed to be considered as part of the assessment.

7.8 Approach to Mitigation

7.8.1 Minimisation of carbon and GHG releases will be embedded into the design of the Proposed Development where possible following the application of the hierarchy of mitigation as described in **Chapter 4 ‘Approach to EIA’**. The assessment of impacts will be made with these embedded mitigation measures in place.

7.8.2 The type and level of mitigation measures required will be informed by the expected level of impact. The ANPS lists a number of mitigation measures relevant to the construction and operational phases which could be put forward to minimise impacts associated with the Proposed Development.

7.8.3 The ANPS states:

“the Secretary of State will need to be satisfied that the mitigation measures put forward by the applicant are acceptable, even at the construction phase” (DfT, 2018).

7.8.4 It also advises that measures to limit the carbon impact of the project will be considered as part of the ‘do something’ emission scenarios for the operational phase. In addition, the ANPS recommended that mitigation measures during the construction phase should be provided (DfT, 2018).

7.8.5 In addition, best practice mitigation measures that would be expected for a Proposed Development of this size and nature will also be included. These will consider guidance documents specific to Heathrow Airport as well as best practice guidance documents.

7.8.6 It is expected that mitigation measures will be secured through proposed management plans, standards and commitments for both the construction phase and operational phase.

7.9 Summary

7.9.1 A carbon and GHG assessment will be undertaken to predict emissions over the lifecycle of the Proposed Development, combined with the relevant elements of the HAL DCO Project through a cumulative assessment. The assessment will consider emissions associated with the following components of the Proposed Development, within a defined Proposed Development area:

- New and reconfigured terminal facilities;
- Expansion of the existing airfield, including taxiways to service the new Northwest Runway, and to provide aprons and stands for the Heathrow Western Hub and to connect to the new Northwest Runway;
- Changes to the existing road and rail surface access infrastructure, including local road changes and alterations to junction I4 and I4A of the M25;
- Public transport upgrades;
- Changes to river alignments and flood storage;
- Associated supporting facilities;
- Changes to the river and flood storage network; and
- Associated supporting facilities.

7.9.2 The assessment will be carried out in accordance with the requirements of the ANPS (DfT, 2018), and will include emissions from a range of construction and operational scenarios.

7.9.3 Production of the ES chapter will be undertaken in consultation with all relevant stakeholders, including topic expert panel meetings, as appropriate.

7.10 References

BEIS (2017), Mapping Carbon Emissions & Removals for the Land Use, Land Use Change & Forestry Sector, Report based on the 1990 – 2015 Inventory, Prepared by the Centre for Ecology & Hydrology for the Department for Business, Energy & Industrial Strategy.

Committee on Climate Change (2018), Reducing UK emissions, 2018 Progress Report to Parliament, Committee on Climate Change, 2018.

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IPCC (2008), 2006 IPCC Guidelines for National Greenhouse Gas Inventories – A primer, Prepared by the National Greenhouse Gas Inventories Programme, Eggleston H.S., Miwa K., Srivastava N. and Tanabe K. (eds). Published: IGES, Japan.

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<https://infrastructure.planninginspectorate.gov.uk/wpcontent/ipc/uploads/projects/TR020003/TR020003-000451-HTHR%20-%20Scoping%20Opinion.pdf>

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8 Climate Change

8.1 Introduction

8.1.1 This chapter details the proposed scope of the assessment of the resilience of the Proposed Development to climate change, and the impact of climate change on effects identified elsewhere in the ES. This chapter considers the impacts associated with both the construction and operational phases.

8.1.2 This chapter includes:

- A description of policy and legislation with relevance to climate change;
- A summary of ongoing and planned future stakeholder engagement;
- An overview of the approach adopted to inform this Scoping Report;
- A summary of baseline climate conditions and future climate risks;
- A description of the effects of climate change on the other identified effects in other technical chapters, and the effects of climate change on the resilience of the Proposed Development;
- A description of the proposed approach to the EIA; and
- A summary of the proposed approach to mitigation.

8.1.3 The climate change chapter will consist of two principal assessments. Firstly, an In-combination Climate Change Impact Assessment will consider the influence of climate change on identified effects of the Proposed Development in relation to other chapters of the ES. Secondly, a Climate Change Resilience (CCR) Assessment will be undertaken to confirm the resilience of the Proposed Development to the effects of projected climate change over its lifespan.

8.2 Policy and Legislation

8.2.1 **Table 8.1** provides a summary of the key topic specific policy and legislation which has informed the scope of the climate change assessments. Further information on policies relevant to the EIA and their status is set out in **Chapter I ‘Introduction’**. Due regard will also be given to local policies and the Government’s 25 Year Environment Plan where they are relevant.

8.2.2 These documents are proposed to form the framework for detailed assessment post-scoping and will be taken into account in the climate change assessment during PEI and ES stages, with the relevant criteria followed throughout.

Table 8.1 Policy and legislation relevant to the climate change assessment

Relevant policy / legislation	Relevance to assessment
Policy	
Airports National Policy Statement (ANPS) (2018)	The ANPS outlines the planning policy for airport NSIP applications in the south east of England. The document advises that new airport infrastructure will be a long-term investment, and will remain in operation when the predicted effects of climate change will take place. The ANPS therefore recommends that the impacts of climate

Relevant policy / legislation	Relevance to assessment
	<p>change are considered during planning design, build and operation, and the ES should include how the proposal will account for the projected impacts of climate change.</p> <p>The ANPS also provides a set of requirements that should be considered in the assessment, including emission scenarios and where adaptation measures are required.</p>
National Policy Statement for National Networks (NPS NN) (2014)	<p>The NN NPS outlines the necessity for, and the government’s policies to deliver, nationally significant road, rail and strategic freight NSIPs in England. The NN NPS recommends that:</p> <p><i>“there are no critical features of the design of new national networks infrastructure which may be seriously affected by more radical changes to the climate beyond that projected in the latest set of UK climate projections”.</i></p>
National Planning Policy Framework (NPPF) (2018)	<p>The Revised NPPF was adopted in July 2018 and advises that the planning system should support the transition to a low carbon future. In line with the objectives and provisions of the Climate Change Act 2008, the NPPF states:</p> <p><i>“Plans should take a proactive approach to mitigating and adapting to climate change, taking into account the long-term implications for flood risk, coastal change, water supply, biodiversity and landscapes, and the risk of overheating from rising temperatures”</i></p> <p>It also states new development should be planned for in ways that:</p> <p><i>“avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the planning of green infrastructure”.</i></p>
Aviation Policy Framework (APF) (2013)	<p>The APF outlines the UK government’s policies for allowing the aviation sector to continue to contribute significantly to the economic growth of the UK. One of the main objectives of the Framework is to continue to make the UK one of the best-connected countries globally, through the UKs air links.</p>
Legislation	
UK Climate Change Act, 2008	<p>As well as setting carbon reduction budgets (see Chapter 7 ‘Carbon and Greenhouse Gas’), the Climate Change Act also requires the UK Government to produce a Climate Change Risk Assessment (CCRA) every five years. The CCRA assesses current and future risks to, and opportunities for, the UK from climate change.</p> <p>In response to the CCRA, the Climate Change Act also requires the UK government to produce a National Adaptation Programme (NAP). The most recent NAP was published in 2018.</p>
UK Climate Change Risk Assessment, 2017	<p>The Government produced its latest CCRA in 2017, the second assessment to be produced for the UK following the first release in 2012. The report concludes that among the most urgent risks for the UK resulting from these changes are flooding and coastal change risks to communities, businesses and infrastructure. It identifies suggestions for mitigation, including the consideration of climate change in new infrastructure.</p>
Second National Adaptation Programme (NAP), 2018	<p>The NAP sets the actions that the UK government will undertake to adapt to the challenges of climate change in the UK as identified in the CCRA. The NAP details the range of climate risks which may affect the natural environment, infrastructure,</p>

Relevant policy / legislation	Relevance to assessment
	<p>communities, buildings and services. Key actions are set out in the NAP which aim to address the identified high-risk areas, which include:</p> <ul style="list-style-type: none"> • Flooding and coastal change risks to communities, businesses and infrastructure; • Risks to health, well-being and productivity from high temperatures; • Risks in shortages in the public water supply for agriculture, energy generation and industry; • Risks to natural capital; and • Risks to domestic and international food production and trade.

8.3 Stakeholder Consultation

- 8.3.1 A detailed stakeholder engagement plan is currently being developed. Care will be taken to ensure all key stakeholders with views and concerns regarding climate change have the evidence and opportunity to discuss and agree the details of the assessment in a meaningful and inclusive manner.
- 8.3.2 The stakeholders listed below were contacted in November 2018 to make them aware of the Proposed Development and outline the timescales for further consultation. The following stakeholders were provided with a presentation providing an overview of the Proposed Development and inviting initial comments on the scope of the assessment for climate change:
- Environment Agency;
 - Committee on Climate Change;
 - Natural England;
 - London Borough of Hounslow;
 - Spelthorne Borough Council;
 - Slough Borough Council;
 - South Bucks District Council; and
 - London Borough of Hillingdon.
- 8.3.3 The HAL Scoping Opinion is a useful source of stakeholder feedback, and has been used to inform this Scoping Report.
- 8.3.4 Further formal and informal consultations and meetings will be arranged to discuss and agree the details of the methodology for the assessment of climate change related effects.

8.4 Approach to Scoping

Study area

- 8.4.1 This section sets out how the study areas will be defined for the climate change assessments.
- 8.4.2 The study areas at the scoping stage have been based on the Proposed Development, as shown in **Figure I.1**. As the design of the Proposed Development is still in its early development, the study areas currently defined will be kept under review as the design and consultation processes progress, and related topic assessment study areas are confirmed. Therefore, the study areas at the assessment stage may evolve as appropriate.

- 8.4.3 The study area for the In-combination Climate Change Impact Assessment will incorporate the areas where effects are predicted in the other topics considered in the ES. The 25km² UK Climate Projections 2018 (Met Office, 2018) grid square which encompasses the site will promote the data for the In-combination Climate Change Impact Assessment. If effects are predicted at receptors outside the 25km² UKCPI8 grid square, particularly in the cumulative assessment, these will also be incorporated into the climate change study area.
- 8.4.4 The study area for the CCR Assessment will be determined by the location of infrastructure associated with the Proposed Development. The study area for the assessment will therefore incorporate the following areas:
- New and reconfigured terminal facilities;
 - Expansion of the existing airfield, including taxiways to service the new Northwest Runway, and to provide aprons and stands for Heathrow Western Hub and to connect to the new Northwest Runway;
 - Changes to the existing road and rail surface access infrastructure, including local road changes and alterations to junction I4 and I4A of the M25;
 - Public transport upgrades;
 - Changes to river alignments and flood storage;
 - Associated supporting facilities;
 - Changes to the river and flood storage network; and
 - Associated supporting facilities.

Sources of baseline data

- 8.4.5 Data used in both assessments will be obtained from the following sources:
- Heathrow Climate Change Adaptation and Resilience Progress Report (HAL, 2016);
 - UKCPI8 database and UKCP09, where relevant (Met Office, 2018);
 - ANPS (DfT, 2018); and
 - NN NPS (DfT, 2014).
- 8.4.6 The CCR Assessment will also draw on design data for the Proposed Development. Any relevant climate baseline data will be requested from key stakeholders such as the relevant local authorities.

8.5 Baseline Conditions

- 8.5.1 The existing climate at Heathrow Airport is described as a temperate marine climate, with a relatively narrow annual temperature range. The main climate extremes in the region are extended cold periods in winter and, heat and drought conditions in the summer. During autumn and winter, Heathrow Airport can experience episodes of fog due to its low-lying position near the River Thames.
- 8.5.2 The NN NPS identifies that;

“Climate change is likely to mean that the UK will experience hotter, drier summers and warmer, wetter winters. There is an increased risk of flooding, drought, heatwaves, intense rainfall events and other extreme events such as storms and wildfires, as well as rising sea levels” (DfT, 2014).

- 8.5.3 There are a range of climate projections within the UKCPI8 database, which are dependent on emission scenarios over the 21st century. It is anticipated that temperatures in the UK will increase, with a range of warming from 0.7°C to 4.2°C in winter, and 0.9°C to 5.4°C in summer (Met Office, 2018). For precipitation, ranges of UK average changes are -1% to +35% during winter, and -47% to +2% during summer relative to a 1981 – 2000 baseline (Met Office, 2018). The south-east is predicted to experience the latest increases in temperature, and reductions in summer rainfall.
- 8.5.4 HAL produced its second Climate Change Adaptation and Resilience Progress Report in 2016 (HAL, 2016). The report summarises HAL’s ongoing approach to climate change resilience at Heathrow Airport, and outlines period specific activities which are undertaken to ensure that operational resilience is adequately considered. One of the largest identified challenges is that the current airfield operates near capacity, which results in impacts to Heathrow Airport’s operations when there are issues and disruptions. These could be exacerbated by climate change related effects. The Climate Change Adaptation and Resilience Progress Reports identify that the addition of the NRS will improve Heathrow Airport’s resilience to weather and unforeseen events. The report also identifies the main climate change risks to Heathrow Airport, which are summarised below:
- Higher temperatures, particularly in summer and autumn, resulting in overheating of buildings and assets;
 - Changes to the precipitation profile, with more rainfall in winter (up to 20%) and less rainfall in the rest of the year (up to 40%);
 - An increase in the intensity of precipitation, increasing the risk of surface water flooding. Low summer rainfall may result in drought conditions and water shortages;
 - An increase in winter temperatures potentially reducing the number snow events;
 - More fog days are predicted in winter, but less in the rest of the year;
 - An increase in the frequency and severity of low pressure storms may disrupt aircraft travel; and
 - An increased frequency of storms and lightning, particularly in the autumn.
- 8.5.5 In addition, the Heathrow Climate Change Adaptation and Resilience Progress Report (HAL, 2016) identifies a series of key commitments that are proposed to be adopted as part of the HAL DCO Project for a third runway proposal. These will be considered as part of the CCR Assessment.

8.6 Scoping of Potential Effects

Effects scoped into the assessment

- 8.6.1 The effects and receptors for the In-combination Climate Change Impact Assessment will be derived from those identified in other chapters in the ES.

8.6.2 The potential likely significant effects to be scoped into the CCR Assessment are displayed in **Table 8.2**. Additional activities and effects may be included as part of the assessment, which will be identified after the two-stage approach, detailed in **Section 8.7**, is carried out.

Table 8.2 Potential likely significant effects in the climate change impact and CCR assessments

Activity / Element	Effect	Receptor
Construction		
Construction site activities and access	Extreme weather events such as heatwaves, heavy rainfall or storms (high winds) causing disruptions to construction activities and a delay to the programme. Increased risk to construction staff from extreme weather events.	Construction equipment and staff, access to the construction site
Health and safety for onsite staff	Extreme weather events such as intense precipitation events, strong winds, heatwaves and droughts increasing health and safety risks and impacts associated with construction.	Construction site staff.
Operation		
Airport operations and infrastructure	Extreme weather events such as heavy precipitation events causing surface water flooding of surface infrastructure. High temperatures and heatwaves causing overheating of airport terminals and infrastructure such as operations equipment and ground surfaces. An increase in winter temperatures will reduce the number of days of snow causing disruption. Storms may increase in frequency and magnitude which could damage airport infrastructure.	Airport infrastructure and new road schemes associated with the Proposed Development.
Access to the airport (road and rail network)	Extreme weather events such as storms causing surface water flooding of airport site and local roads, and inundating the drainage system.	Airport customers.
Aircraft movements to and from the airport	High temperatures and heatwaves causing restrictions in aircraft movement, such as heat damage to ground surfaces. An increase in winter temperatures will reduce the number of days of snow. An increase in winter temperatures will reduce the number of days of snow causing disruption. Increased storms can cause disruptions to flights.	Aircraft and airport reputation.
Terminal buildings	Overheating of buildings, causing increase in health and safety incidents	Health and safety risks, increased costs.

Activity / Element	Effect	Receptor
	and increased demand for air conditioning.	
Utilities associated with the Proposed Development	Extreme weather events, strong winds, heatwaves, intense precipitation events, resilience of utilities servicing the airport	Infrastructure systems

Effects scoped out of the assessment

8.6.3 At this stage of the Proposed Development, no climate change related effects have been scoped out of either assessment.

8.7 Approach to Assessment

Study area

8.7.1 The proposed study areas for the climate change assessments set out in **Section 8.4**. The proposed study area for the In-combination Climate Change Impact Assessment will be defined by the areas identified in other chapters and assessment, whereas the study area for the CCR Assessment will be determined by the location of infrastructure associated with the Proposed Development.

Additional baseline data collection

8.7.2 The main source of projected climate change data at the sensitive receptors will be from the UKCPI8 database (Met Office, 2018). Data will be obtained for the 25km² grid squares which encompass the site and identified receptors. Where the design life of the asset is 60 years or greater, the UKCPI8 high emissions scenario will be considered at the 10%, 50% and 90% probability levels in accordance with the requirements in the ANPS (DfT, 2018). The assumptions and uncertainties in the projections will be listed in the ES, in accordance with the HAL Scoping Opinion (PINS, 2018).

8.7.3 The UKCPI8 H++ and L-- scenarios, which are outside of the 10th to 90th percentile ranges, will also be considered as part of sensitivity testing of the scenarios (Met Office, 2018). Where either suggest that significant effect would occur, further investigations would be carried out.

Assessment Years

8.7.4 The temporal scope of the climate change assessment will encompass both the construction and operational phases. The construction phase is anticipated to be 2022 – 2030, therefore projected data for the 2020's which considers data from 2010 – 2039 will be obtained from the UKCPI8 database (Met Office, 2018).

8.7.5 For the operational phase, the time-period used in the UKCPI8 database will be the 2080's, unless the design life of infrastructure or specific asset expires before then. This approach will be clearly identified in the ES and is in accordance with the ANPS (DfT, 2018).

Assessment methodology - In-combination Climate Change Impact Assessment

8.7.6 The In-combination Climate Change Impact Assessment will consider if an impact identified within other environmental topics in the ES will be affected by projected climate change. The

methodology for the assessment will be undertaken in accordance with the following guidance and documents:

- European Commission Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report;
- European Commission Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment;
- Institute of Environmental Management and Assessment (IEMA) Environmental Impact Assessment Guide to Climate Change Resilience and Adaptation;
- IPCC Fifth Assessment Report (AR5); and
- Strengthening Health Resilience to Climate Change: Technical Briefing for the World Health Organization - Conference on Health and Climate.

8.7.7 The In-combination Climate Change Impact assessment will comprise two stages:

- Stage 1 is an initial assessment to screen for potentially significant effects; and
- Stage 2 is a detailed assessment which concentrates on the identified topics from Stage 1.

Stage 1 In-combination Climate Change Impact Assessment

8.7.8 The Stage 1 assessment will summarise the potential climate change effects for the receptors considered within each topic of the ES. The assessment will also consider if the level of embedded or additional mitigation measures address the potential effects of climate change over the lifespan of the Proposed Development. This process will identify if any further mitigation may be required to mitigate the effects of projected climate change. The assessment will include detailed discussions with topic leads to avoid duplication and ensure that the effects are identified.

8.7.9 For any environmental topic where there is potential for climate change to impact, the identified effect will be considered further in Stage 2 of the assessment.

8.7.10 The assessment will clearly define the 'emerging baseline' for which the predictions of climate change effects have been based on. The sensitivity of the identified receptors for each environmental topic will then be assessed.

Stage 2 Climate Change Impact Assessment

8.7.11 The Stage 2 assessment will comprise a detailed assessment of the identified topics from Stage 1. It will consider the likelihood and consequence of climate change on the identified effects.

8.7.12 UKCPI8 data will be used to determine the likelihood of a climate hazard occurring, using probability values obtained from the UKCPI8 projections (Met Office, 2018). The UKCPI8 projections high emissions scenario for the 10%, 50% and 90% probability levels will be considered in the assessment, in accordance with the requirements in the ANPS (DfT, 2018). In addition, the UKCP H++ and L-- scenarios will also be considered.

8.7.13 Available data and appropriate guidance will be used to determine the likelihood of climate change impacting the identified receptors for the specific environmental topics. Discussions will be held with the relevant topic leads to determine the likely impacts on climate change on the sensitive receptors.

Assessment methodology - Climate Change Resilience Assessment

8.7.14 The ANPS sets out the requirements for infrastructure to be resilient to projected climate change over the lifespan of the Proposed Development. The CCR Assessment will be undertaken to determine the resilience of the Proposed Development to climate change, and will be carried out in accordance with the following guidance and documents:

- Airports Cooperative Research Programme (ACRP): Climate Change Adaptation Planning: Risk Assessments for Airports;
- Cabinet Office. Keeping the Country Running: Natural Hazards and Infrastructure;
- European Commission Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report;
- European Commission Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment;
- European Commission: Guidelines for Project Managers: Making vulnerable investments climate resilient;
- Heathrow Airport: Climate Change Adaptation Reporting Power Report 2011 and 2016 progress report;
- IEMA Environmental Impact Assessment Guide to Climate Change Resilience and Adaptation;
- International Civil Aviation Organization (ICAO): Environmental Report 2010. Chapter 6: Adaptation; and
- IPCC Fifth Assessment Report (AR5).

8.7.15 The NN NPS states:

“The applicant should demonstrate that there are no critical features of the design of new national networks infrastructure which may be seriously affected by more radical changes to the climate beyond that projected in the latest set of UK climate projections” (DfT, 2018).

8.7.16 The CCR Assessment will be carried out in two stages, as identified below.

Stage 1 Climate hazard assessment

8.7.17 Stage 1 of the CCR Assessment will identify the likelihood of climate hazards occurring within the defined study area over the lifespan of the Proposed Development. The assessment will use the UKCPI8 projections database and utilise the scenarios detailed in paragraph 8.7.3.

8.7.18 The potential climate hazards to the Proposed Development and the associated risks and consequences are detailed in **Table 8.3**.

Table 8.3 Potential climate change variables, and associated risks and consequences to the Proposed Development

Climate change variable	Potential impact	Potential consequence
Temperature		
Increase	Overheating (i.e. of aircraft and buildings)	Increase in fire risk Increased health and safety incidents / accidents

Climate change variable	Potential impact	Potential consequence
		Operation disruptions
	Increase in demand on air conditioning systems	Increased GHG emissions, costs
	Fracture risk to above- and underground infrastructure	Operational disruption Increased health and safety incidents / accidents
	Increase in disease vectors	Introduction of new diseases / epidemics into the UK More pest control / checks
Decrease	Snow	Operational disruptions Freeze-thaw action damage to surfaces
	Ice	Financial costs Increased maintenance Increased health and safety incidents / accidents
	Increase in demand on energy supplies, air conditioning systems	Increased GHG emissions and associated costs
Precipitation		
Increase	Flooding	Release of contaminated surface water Pollution of surface- and groundwater Operational disruptions
Decrease	Drought / water shortages	Increased demand on water supplies Less water for operational activities
Other		
Fog	Less visibility	Operational disruption Increased health and safety incidents / accidents
Wind	Increased speed of headwind / crosswind	Damage to airport infrastructure Operational disruption Noise
	Change in direction of prevailing wind	
Lightning	Increase in lightning events	Operational disruption Increased likelihood of fires
Storms (including electrical storms)	Increase occurrence / magnitude of storm events	Operational disruption Disruption to control systems and electricity supplies Increased health and safety incidents / accidents Flooding

8.7.19 The UKCP18 climate probability scenarios will be used to determine the likelihood of future climate hazards at Heathrow Airport. In addition, Stage I of the assessment will identify the infrastructure, assets and operations that could be sensitive to climate change associated with the Proposed Development.

8.7.20 The outcomes of Stage I of the CCR Assessment will contain information regarding the likelihood of climate hazards occurring, and a list of potentially sensitive infrastructure, assets and operations.

Stage 2 Climate change risk assessment

8.7.21 Stage 2 of the assessment will determine the likelihood of an impact on the identified

infrastructure, assets and operations arising from the climate hazards predicted as part of Stage 1, and the consequences of the impact. Following this, the risks to the resilience of the Proposed Development from the identified climate hazards will be highlighted.

- 8.7.22 The climate change resilience measures that are integrated into the design of each aspect or component of the Proposed Development will be evaluated. The CCR Assessment will then report the remaining ‘vulnerabilities’, which will be fed into a Climate Action Plan.
- 8.7.23 Discussions with the relevant project teams will be held in a series of design workshops, ensuring the climate change is factored into the masterplan. A review of the design of the different infrastructure components will be carried out, and commitments to design standards or mitigation measures will be made and incorporated into the design of the Proposed Development.
- 8.7.24 The risk of an impact to the resilience of the Proposed Development to climate change will be considered using a risk matrix which will be aligned with Heathrow Airport’s Climate Change Adaptation Reporting Report and the Operational Resilience Plan (HAL, 2011, 2015).
- 8.7.25 The likelihood of an impact occurring will be informed by the probability of occurrence of a climate hazard and the resilience of the relevant components of the Proposed Development. The consequences of these impacts will be inferred from a range of criteria including safety, security, environment, financial and reputation and legal factors.
- 8.7.26 The criteria for determining the likelihood and consequences of climate hazards to the Proposed Development are provided in **Table 8.4** and **Table 8.5**.

Table 8.4 Definitions of likelihood for the assessment (HAL, 2011).

Level of likelihood	Probability of occurrence
1 – Improbable	<10%
2 – Unlikely	10% - 30%
3 – Less than likely	30% - 50%
4 – More than likely	50% - 80%
5 – Probable	>80%

Table 8.5 Consequence categories that will be considered in the assessment (HAL, 2011)

Level of consequence	Area of Impact				
	Safety	Security	Environment	Financial	Reputation and legal
1 – Minor	Minor injuries	Minor breach of regulations	Short term local damage	<£1m	Improvement notice, minor local reputation damage
2 – Moderate	Major injuries	Reportable breach of regulations	Short term regional damage	>£1m - £25m	Prohibition notice, major reputation damage
3 – Significant	Single fatalities	Prosecution	Long term local damage	£25m - £50m<	Prosecution with fine, national adverse media coverage
4 – Substantial	Multiple fatalities (<100)	Short term closure of the Airport	Long term widespread damage	>£50m - £100m<	Directors charged with corporate killings, fraud etc; International media coverage short term
5 – Grave	Multiple fatalities (>100)	Sustained Airport closure	Widespread permanent damage	>£100m	Directors convicted of corporate killing, fraud etc; International adverse media coverage >1 year.

8.7.27 The risk of potential climate change effects at the Proposed Development will be determined by combining the likelihood and consequence of an impact to provide a resulting risk level. A 5x5 matrix will be used, which will be consistent with the Heathrow Airport Climate Change Adaptation Report, as shown in **Table 8.6** (HAL, 2011).

Table 8.6 Climate risk scoring system

Likelihood	Probable (5)	Medium	High	High	High	High
	More than likely (4)	Medium	Medium	High	High	High
	3 – Less than likely	Low	Medium	Medium	High	High
	2 – Unlikely	Low	Low	Medium	Medium	High
	1 – Improbable	Low	Low	Low	Medium	High
		1 – Minor	2 – Moderate	3 - Significant	4 – Substantial	5 – Grave
	Consequence					

8.7.28 Risks which are predicted to be high will be considered to have significant climate change resilience effects, for which additional mitigation will be fed back into the design process. Any residual impacts will be reported.

Cumulative effects

- 8.7.29 Cumulative climate change related effects resulting from the combination of effects from the Proposed Development and other developments will be assessed in accordance with the guidance and methodologies set out in **Section 4.6 of Chapter 4 ‘Approach to EIA’**. The assessment will be dependent on the availability and accessibility of information for other developments.
- 8.7.30 The Proposed Development does not include the new Northwest Runway and M25 realignment components of the NRS proposed by HAL. However, the Proposed Development is designed to be operated alongside these components of the NRS that are being progressed by the HAL DCO Project. Therefore, the total cumulative effects for both the climate change impact and CCR Assessments will be considered together to ensure an overarching assessment of the NRS as a whole.
- 8.7.31 Any components of the HAL DCO Project which would no longer be required as a result of the Proposed Development would not be included in the CEA.

8.8 Approach to Mitigation

- 8.8.1 The potential impacts of climate change will be considered in the design of the Proposed Development, using the latest available UKCPI8 climate projection in accordance with NN NPS and ANPS. Mitigation to minimise the potential impacts of climate change will be embedded into the design of the Proposed Development. The assessment of impacts will be made with these primary mitigation measures in place, as detailed in **Section 4.5 of Chapter 4 ‘Approach to EIA’**.
- 8.8.2 The ANPS lists a number of requirements relevant to climate change adaptation, which are outlined below:
- “New development should be planned to avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the provision of green infrastructure.”*
- “New airports infrastructure will typically be a long-term investment which will need to remain operational over many decades, in the face of a changing climate. Consequently, the applicant must consider the impacts of climate change when planning design, build and operation.”*
- 8.8.3 Additional mitigation measures will be recommended for any significant effects predicted in the In-combination Climate Change Impact Assessment. These measures will be defined and may be cross referenced with other topics in the ES where appropriate.
- 8.8.4 Additional mitigation measures will be recommended where appropriate if significant effects are predicted in the CCR Assessment. The additional mitigation measures will be based on the latest UK Climate Projections and the most recent UK Climate Change Risk Assessment, in accordance with the ANPS.
- 8.8.5 The mitigation measures that are recommended from the In-combination Climate Change Impact Assessment and the CCR Assessment will account for projected climate change effects over the lifespan of the project to ensure that there is continued resilience of receptors in the

vicinity of the airport. The predicted impacts will be re-assessed, and the residual effects will be reported.

- 8.8.6 Adaption measures will be incorporated into a Climate Change Adaptation Plan. The plan will include the requirements for an ongoing review of climate hazards and risks over the lifespan of the project, and will be incorporated within the existing Heathrow adaptation reporting processes.

8.9 Summary

- 8.9.1 The climate change chapter of the ES will encompass two studies. An In-combination Climate Change Assessment will be undertaken which will consider the influence of climate change on other identified effects within the ES. In addition, a CCR Assessment will consider the resilience of the design and infrastructure of the Proposed Development to climate change.
- 8.9.2 Both assessments comprise a two-stage approach, which will define the climate hazards and infrastructure which will be considered in further detail. Any climate change adaptation measures or appropriate mitigation will be identified in the ES.
- 8.9.3 The production of the ES chapter will be undertaken in consultation with all relevant stakeholders, including topic expert panel meetings, as appropriate.

8.10 References

Department for Energy and Climate Change (2008), The Climate Change Act 2008.

Department for Environment, Food & Rural Affairs (2017), UK Climate Change Risk Assessment 2017, January 2017.

Department for Environment, Food & Rural Affairs (2018), The National Adaptation programme and the Third Strategy for Climate Adaptation Reporting, Making the country resilient to a changing climate, July 2018.

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Heathrow Airport Limited, (2011), Heathrow Airport Climate Change Adaptation Reporting Power Report, May 2011

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Institute of Environmental Management and Assessment (2015), Environmental Impact Assessment Guide to Climate Change Resilience and Adaptation

Met Office, (2018) UKCPI8, United Kingdom Climate Projections, available from URL: <https://www.metoffice.gov.uk/research/collaboration/ukcp>

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<https://infrastructure.planninginspectorate.gov.uk/wpcontent/ipc/uploads/projects/TR020003/TR020003-000451-HTHR%20-%20Scoping%20Opinion.pdf>

9 Community

9.1 Introduction

- 9.1.1 Heathrow Airport is surrounded by communities who may experience positive and negative impacts due to the Proposed Development. This chapter considers the scope of potential impacts on communities. It is one of three chapters that considers the scope of impacts to population groups together with **Chapter 10 ‘Economics and Employment’** and **Chapter 12 ‘Health’** (herein referred to as the population assessments). The nature of impacts across the population assessments are often interrelated and therefore necessitate commonalities between the assessments.
- 9.1.2 The community assessment will identify potential effects from the Proposed Development on communities, their supporting infrastructure and the users of this infrastructure, including; people, their homes, community facilities/public services, public open space and recreational routes.
- 9.1.3 This chapter includes:
- A description of key policy and legislation relating to communities;
 - A summary of ongoing and planned stakeholder engagement;
 - An overview of the approach that has been adopted to inform this Scoping Report;
 - A concise summary of the baseline conditions;
 - A description of the potential likely significant effects of the Proposed Development on communities, to be included in the scope of the assessment;
 - A proposed approach to the EIA and the CEA with regards to community effects;
 - An overview of the proposed approach to mitigation; and
 - A summary of the Scoping Report chapter including a summary of impacts table.
- 9.1.4 This assessment considers how these may affect community receptors and aims to identify the approach to avoid, minimise or mitigate the significance of the effects. Other environmental topics which inform the community assessment apply standard thresholds and criteria to identify the significance of environmental effects. These are described fully in the relevant sections of this Scoping Report. Residual impacts on community receptors following the proportionate and reasonable attempts at technical mitigation identified by other assessments will be assessed in this chapter, and further mitigation proposed if required.
- 9.1.5 The Proposed Development is a component of the Government's preferred NRS as set out in the ANPS. It does not include the Northwest Runway itself, or the major M25 realignment works required to accommodate the Northwest Runway. Therefore, potential community effects associated with these components of the NRS are excluded from the scope of the primary assessment. Potential community effects associated with the Northwest Runway and M25 realignment works will however be considered as part of the CEA, as set out in **Section 4.6 of Chapter 4 ‘Approach to EIA’**.

9.2 Policy and Legislation

9.2.1 **Table 9.1** provides a summary of the key topic specific policy which has informed the scope of the assessment. Further information on policies relevant to the EIA and their status is set out in **Chapter 1 ‘Introduction’**. Due regard will also be given to local policies and the Government’s 25 Year Environment Plan where they are relevant.

9.2.2 These documents are proposed to form the framework for detailed assessment post-scoping and will be taken into account in the assessment of community impacts during PEI and ES stages, with the relevant criteria followed throughout.

Table 9.1 Policy and legislation relevant to the community assessment

Relevant policy / legislation	Relevance to assessment
Policy	
Airports National Policy Statement (ANPS) (2018)	<p>The ANPS revised in June 2018 lays out the general principles of assessment and the statutory framework for deciding applications for development consent for the airport related development in the Act (paragraph 4.1).</p> <p>The Applicant is required to assess potential effects on communities and people. The ANPS clarifies the approach to any associated community engagement, compensation and mitigation measures:</p> <ul style="list-style-type: none"> • “a number of mitigation measures will need to be applied to reduce the impacts of the Heathrow Northwest Runway scheme felt by the local community” (paragraph 3.73). • “measures to avoid, reduce or compensate for any adverse impacts will be weighed up by the Secretary of State” (paragraph 4.4). • The Airports Commission’s stated objective on equalities was “to reduce or avoid disproportionate impacts on any social group” (paragraph 4.23). • “The construction and use of airports infrastructure has the potential to affect people’s health, wellbeing and quality of life. Infrastructure can have direct impacts on health because of traffic, noise, vibration, air quality and emissions, light pollution, community severance, dust, odour, polluting water, hazardous waste and pests” (paragraph 4.70). • The Strategic Road Network and the delivery of sustainable development (or prevailing policy), and the National Networks NPS set out “the way in which the highway authority for the strategic road network will engage with communities and the development industry to deliver sustainable development and economic growth, whilst safeguarding the primary function and purpose of the network” (paragraph 5.13). • “For airport development, landscape and visual effects also include tranquillity effects, which would affect people’s enjoyment of the natural environment and recreational facilities. In this context, references to landscape should be taken as covering local landscape, waterscape and townscape character and quality, where appropriate” (paragraph 5.213). • “The Government wishes to maximise local stakeholder engagement with the expansion process, and it wishes to encourage any applicant and local stakeholders to strengthen the way in which the airport and local stakeholders work together to make engagement effective” (paragraph 5.256). • “The Government expects the applicant to maximise the employment and skills opportunities for local residents, including apprenticeships” (paragraph 5.266). • Compensation measures will also be required (paragraphs 5.237 to 5.251). • The Government “expects to see arrangements being made for the community compensation schemes which Heathrow Airport has publicly stated would be provided, and for a community compensation fund” (paragraph 5.247).

Relevant policy / legislation	Relevance to assessment
National Policy Statement for National Networks (NPS NN) (2014)	<p>The NN NPS sets out the framework for decision making on development consent applications relating to national road and rail networks in England. Additionally, the NN NPS describes the Government's vision and strategic objectives:</p> <ul style="list-style-type: none"> • <i>Networks with the capacity and connectivity and resilience to support national and local economic activity and facilitate growth and create jobs.</i> • <i>Networks which support and improve journey quality, reliability and safety.</i> • <i>Networks which support the delivery of environmental goals and the move to a low carbon economy.</i> • <i>Networks which join up our communities and link effectively to each other (page 9).</i> • <i>The NN NPS requires the applicant to assess effects on community amenity and severance.</i> <p>The NN NPS also states that:</p> <p><i>The Government is committed to creating a more accessible and inclusive transport network that provides a range of opportunities and choices for people to connect with jobs, services and friends and family (paragraph 3.19).</i></p>
National Planning Policy Framework (NPPF) (2018)	<p>The purpose of the planning system is to contribute to the achievement of sustainable development, through three overarching objectives:</p> <ul style="list-style-type: none"> • Economic. • Social. • Environmental. <p>The NPPF provides policy on the provision of local services and community facilities throughout, with focussed details on:</p> <ul style="list-style-type: none"> • <i>the importance of vitality in town centres,</i> • <i>healthy and safe communities,</i> • <i>sustainable transport,</i> • <i>social interaction,</i> • <i>accessibility,</i> • <i>community cohesion,</i> • <i>the promotion of healthy lifestyles.</i> <p>Working to meet the challenge of climate change and flooding are also included within the NPPF and will be considered throughout Proposed Development design.</p>
The UK Industrial Strategy: a leading destination to invest and grow (2017)	<p>The UK Industrial strategy aims to set out ways in which to help businesses and the UK economy thrive, through developing a skilled workforce and by improving infrastructure.</p> <p>There are five foundations on which the Industrial strategy is built:</p> <ol style="list-style-type: none"> 1. Ideas: the world's most innovative economy. 2. People: good jobs and greater earning power for all. 3. Infrastructure: a major upgrade to the UK's infrastructure. 4. Business Environment: the best place to start and grow a business. 5. Places: prosperous communities across the UK. <p>Provision of training to create a skilled workforce, jobs and essential infrastructure helps to create prosperous and cohesive communities.</p>
The London Plan (2016)	<p>The London Plan sets out the framework for development across London. There is currently a new draft London plan which makes several updates to the current Plan. Both plans highlight the characteristics of London, and its boroughs and sub-regions. The expectations for development in London, and the essential provision of facilities for communities are detailed in both:</p> <ul style="list-style-type: none"> • <i>building strong and inclusive communities (section 1.1.1).</i>

Relevant policy / legislation	Relevance to assessment
	<ul style="list-style-type: none"> • <i>efficient land use and making neighbourhoods work in a space efficient manner (section 1.2.2) and aims to deliver more green cover across London.</i> • <i>provision of social infrastructure, healthcare facilities, education, childcare, sport and recreation facilities and space for burial grounds within local communities (Chapter 5).</i>

9.3 Stakeholder Consultation

9.3.1 A detailed stakeholder engagement plan is currently being developed. Care will be taken to ensure all key stakeholders with views and concerns regarding community have the evidence and opportunity to discuss and agree the details of the assessment in a meaningful and inclusive manner.

9.3.2 The stakeholders listed below were contacted in November 2018 to make them aware of the Proposed Development and timescales for further consultation. The following stakeholders were provided with a presentation providing an overview of the Proposed Development and inviting initial comments on the scope of the community assessment:

- London Borough of Hounslow;
- London Borough of Hillingdon;
- Spelthorne Borough Council;
- Slough Borough Council; and
- South Bucks District Council.

9.3.3 The Applicant plans to establish a consultation group that includes all members of the Heathrow Strategic Planning Group (HSPG), as well as any other relevant stakeholders who are potentially affected by the Proposed Development. HSPG was previously established by HAL in relation to the HAL DCO Project. The HAL DCO Project has received a Scoping Opinion from PINS and is a useful source of stakeholder feedback, which has been used to inform this Scoping Report and the Applicant's approach to consultation.

9.3.4 Other stakeholders will be identified based on their location and the effects they are likely to experience, with input from the consultation group to ensure there is a thorough and robust approach to stakeholder engagement. User surveys will also be drawn upon where published by local authorities, and undertaken with regard to users of recreational facilities, spaces and routes as detailed later in this chapter.

9.4 Approach to Scoping

9.4.1 The assessment of potential effects on population groups are covered in this chapter, in **Chapter 10 'Economics and Employment'** and **Chapter 12 'Health'**. Effects on people, the communities they live in, the businesses they work in and their health have many interlinked determinants that are described by a similar source-pathway-receptor model. Therefore, the approach to scoping of these interrelated elements will be undertaken in a similar way.

Study areas

9.4.2 This section sets out the study areas that have been defined for the consideration of potential

community effects at the scoping stage.

9.4.3 The study areas for the community assessment are based on those developed for the HAL DCO Project, and further informed by the HAL Scoping Opinion received from PINS. The study areas may be refined at the assessment stage to focus on the comparatively smaller scale of the Proposed Development. The study areas used in other EIA topics are also of relevance and will be used throughout this assessment to inform the likelihood of effects on people. For example, the assessment will be informed by the study areas used for the traffic and transport, landscape and visual amenity, noise and vibration, and air quality and odour assessments to understand how these potential effects may translate to community effects.

9.4.4 As shown in **Figure 9.1**, the study area has two components, as recommended by Chadwick and Glasson (2018). The inner study area broadly relates to the direct effects of the Proposed Development and is developed using data at a small scale. The wider study areas (regional and sub-regional) relates to indirect effects and the catchments of elements that may be directly affected. The wider study areas include the inner study areas as shown in **Diagram 9.1**.

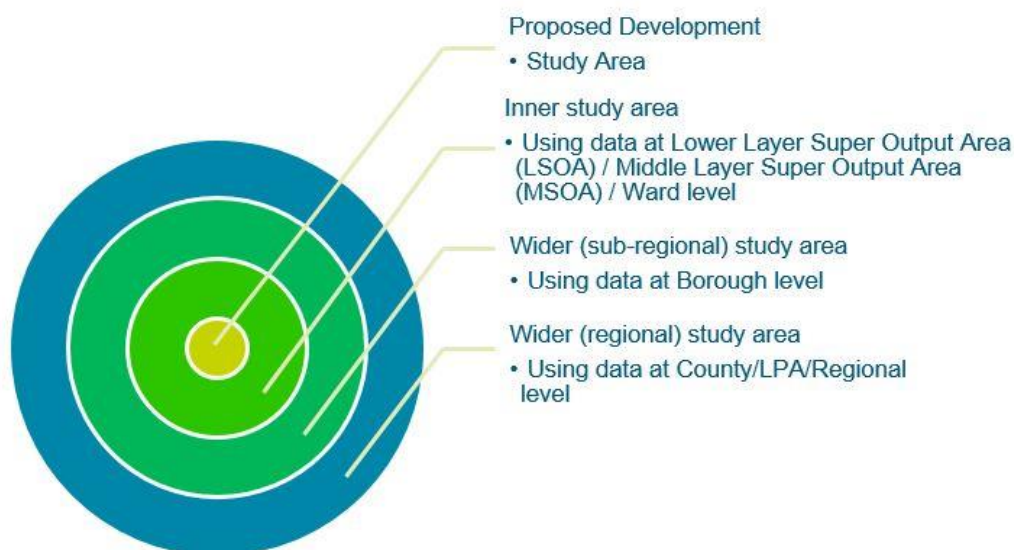


Diagram 9.1 Concept of cumulative study areas and outline of data used for the baseline at each study area

Inner study area

9.4.5 The inner study area comprises a number of specific community areas, which are outlined in **Table 9.2** and shown in **Figure 9.2** and recreational areas outlined in **Figure 9.3**.

9.4.6 Potential impacts of the Proposed Development on communities could affect homes, businesses, community facilities (including sports and leisure facilities) and publicly open recreational spaces and routes in the following way:

- Displacement due to land requirements;
- Changes to access; and
- Disturbance due to other environmental effects (noise and vibration, air (dust), traffic, and visual change).

9.4.7 The inner study area for communities has been defined based on the likelihood of these local effects occurring. The study area is made up of 'community areas' using publicly available data

at Lower Layer Super Output Area (LSOA) scale. This is the small output area that the Office for National Statistics (ONS) produces and is primarily based on Census data from 2011. Details of the LSOAs used to determine the inner study area are provided in **Appendix 9.1**.

9.4.8 The study area for the assessment of effects on public spaces, recreational spaces and routes is defined by the extent of:

- Recreational spaces (such as the Colne Valley Regional Park, the Crane Valley and Hounslow Heath); and
- Established networks and connectivity like Public Rights of Way (PRoW) (such as the London Loop long distance footpath).

9.4.9 These may be affected in terms of displacement, loss, severance, access, or amenity (e.g. by increased noise, vibration or dust) due to the Proposed Development. The recreational study area includes adjacent areas to which directly impacted areas may have a physical or functional connection. Where appropriate, the recreational study area uses physical demarcations such as the River Thames or railway lines. The boundary also reflects potential opportunities for new linkages / recreational routes.

Wider study area

9.4.10 Where appropriate, the wider study area will be used to assess effects on the provision of public services. Potential indirect effects on communities as a result of the Proposed Development also include:

- The effects on the users of community facilities directly affected;
- Effects on the providers and guardians of community facilities and public services (for example, local planning and regulatory authorities and other public bodies).

Table 9.2 Study areas for the assessment of community effects

Study Area	Areas	Community effects at this scale																
Inner	Community Areas	Indentation of loss, displacement and other changes (such as severance and access changes) to homes and their owners or tenants, community facilities, and public recreational spaces and routes. Potential effects for communities or recreational space due to change in noise, air quality or traffic levels.																
	<table border="0"> <tr> <td>Bedfont</td> <td>Heston</td> </tr> <tr> <td>Brandshill</td> <td>Hounslow (C+S)</td> </tr> <tr> <td>Colnbrook</td> <td>Hounslow (W+H)</td> </tr> <tr> <td>Cranford</td> <td>Iver & Richings Park</td> </tr> <tr> <td>Cranford Cross</td> <td>Longford</td> </tr> <tr> <td>Feltham North</td> <td>Poyle</td> </tr> <tr> <td>Harlington</td> <td>Sipson</td> </tr> <tr> <td>Harmondsworth</td> <td>Stanwell & Stanwell Moor</td> </tr> <tr> <td>Hayes</td> <td>West Drayton</td> </tr> </table>		Bedfont	Heston	Brandshill	Hounslow (C+S)	Colnbrook	Hounslow (W+H)	Cranford	Iver & Richings Park	Cranford Cross	Longford	Feltham North	Poyle	Harlington	Sipson	Harmondsworth	Stanwell & Stanwell Moor
Bedfont	Heston																	
Brandshill	Hounslow (C+S)																	
Colnbrook	Hounslow (W+H)																	
Cranford	Iver & Richings Park																	
Cranford Cross	Longford																	
Feltham North	Poyle																	
Harlington	Sipson																	
Harmondsworth	Stanwell & Stanwell Moor																	
Hayes	West Drayton																	
Wider (sub-regional)	Boroughs / Districts	Effects on the catchments of affected community facilities, wider effects on public service provision.																
Wider (regional)	<table border="0"> <tr> <td>Hillingdon</td> <td>South Bucks</td> </tr> <tr> <td>Hounslow</td> <td>Spelthorne</td> </tr> <tr> <td>Richmond-upon-Thames</td> <td>Wandsworth</td> </tr> <tr> <td>Runnymede</td> <td>Windsor and Maidenhead</td> </tr> <tr> <td>Slough</td> <td></td> </tr> </table>	Hillingdon	South Bucks	Hounslow	Spelthorne	Richmond-upon-Thames	Wandsworth	Runnymede	Windsor and Maidenhead	Slough		Wider effects due to increased population in the commuter zone and potential for increased demand on local services.						
Hillingdon	South Bucks																	
Hounslow	Spelthorne																	
Richmond-upon-Thames	Wandsworth																	
Runnymede	Windsor and Maidenhead																	
Slough																		

9.4.11 As the design of the Proposed Development is still in its early development, the study areas set out above will be kept under review as the design and consultation processes progress,

and the Proposed Development is refined and related topic assessment study areas are confirmed. Therefore, the study areas at the assessment stage may evolve as appropriate.

9.5 Baseline Conditions

Desk based review

9.5.1 **Table 9.3** provides a summary of the data used to inform the scope of assessment. **Appendix 9.1** provides detailed baseline economic information for the inner and wider study areas.

Table 9.3 Data sources used for scoping

Source	Data
Office for National Statistics (Accessed via:www.nomisweb.co.uk)	Census data (2011). Department for Work and Pensions (DWP) data. Annual Population Survey (2017). Business Register and Employment Survey (BRES). Inter-Departmental Business Register (IDBR).
Valuation Office Agency (https://www.gov.uk/government/organisations/valuation-officeagency)	Business rates data.
Land Registry (https://eservices.landregistry.gov.uk)	Community-facing businesses.
Local authorities	Published research and sector-specific data on skills, business, inward investment.
Local Enterprise Partnerships	Published research and sector-specific data on skills, business, inward investment.
Heathrow Airport Limited (www.heathrow.com)	Data held on employment, skills and training and business support. Employee Survey (latest 2012/13). Feedback from ongoing activities including skills interventions and business support.

Population and demographics

9.5.2 The inner study area comprises of 18 communities: Bedfont, Brandshill, Colnbrook, Cranford, Cranford Coss, Feltham Nrth, Harlington, Harmondsworth, Hayes, Heston, Hounslow (Central and South), Hounslow (West and Heath), Iver & Richings Park, Longford, Poyle, Sipson, Stanwell & Stanwell Moor, and West Drayton. Further details on the specific baseline and variations between each community can be seen in **Appendix 9.1**.

9.5.3 The following figures summarise the overall baseline characteristics of the inner study area. The data presented is from the ONS and full details can be found in **Appendix 9.1**.

Inner study area baseline

9.5.4 The inner study area has a population of 185,115 (as of the last Census, 2011). The demographics on this region are presented in **Diagram 9.2** below.



Diagram 9.2 Summary of inner study area demographic baseline statistics (Source: ONS)

Wider study area baseline

9.5.5 The wider study area has a population of 1,923,344 (as of the last Census, 2011). The demographics of this area as a whole are presented below in **Diagram 9.3**.

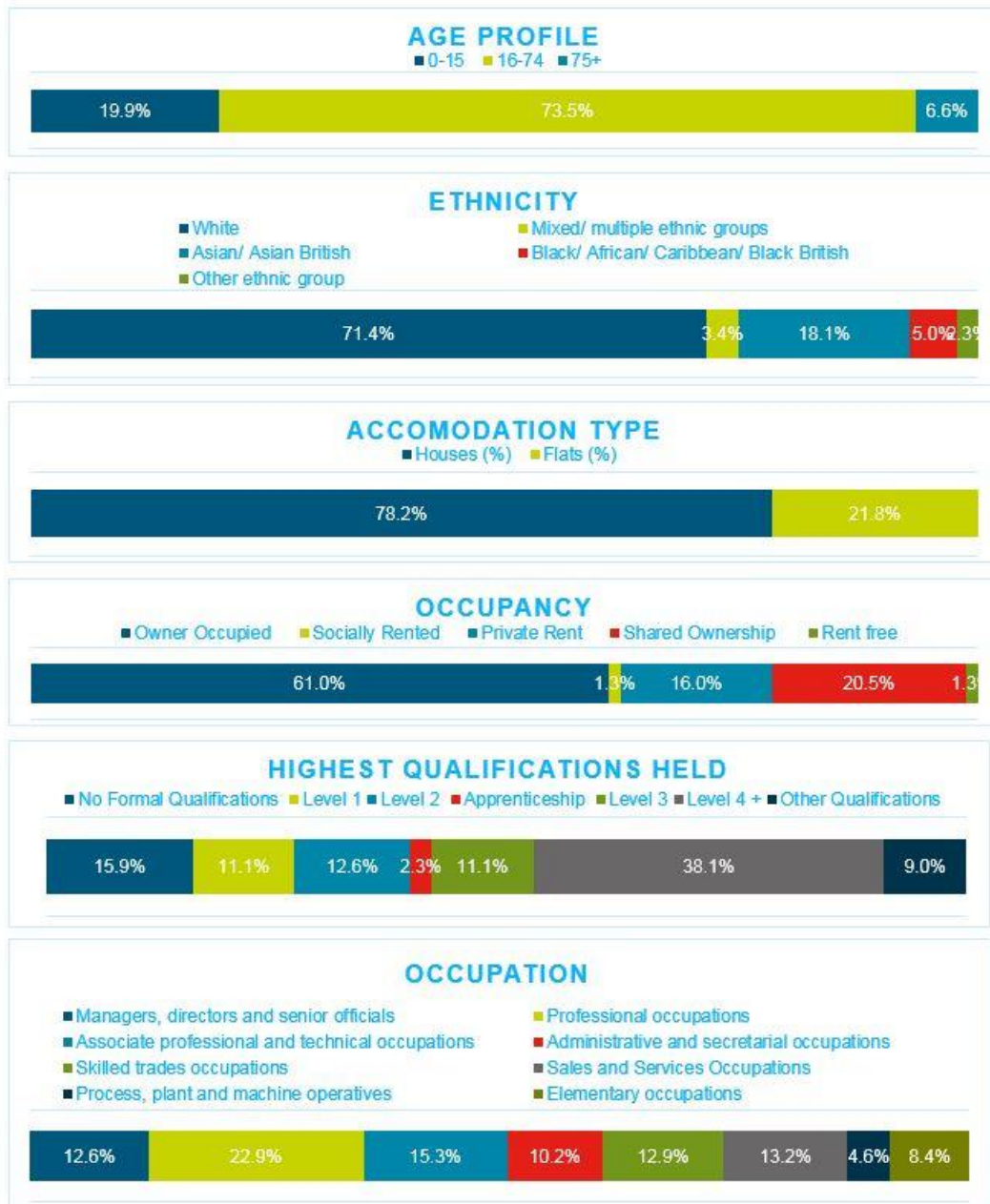


Diagram 9.3 Wider study area demographic baseline (Source: ONS)

Community assets

- 9.5.6 A desk study has been undertaken to identify baseline receptors and community resources in the community areas (inner study area).
- 9.5.7 Community assets are shown in **Figure 9.2** and **Figure 9.3**. These will be refined as part of the assessment and include:
- Schools, nurseries, children’s centres and other children’s facilities;
 - Adult education centres, libraries and other education facilities;
 - Community centres and halls;
 - Social care facilities such as care homes and hospices;

- Healthcare facilities including GPs, dentists and pharmacies;
- Community-facing businesses such as post offices and pubs;
- Places of worship; and
- Sport and leisure facilities (indoor and outdoor sports facilities and playing pitches, allotments, private angling clubs and equipped play areas including those located within wider recreational spaces).

Recreational assets

9.5.8 A desk study has been undertaken to identify baseline receptors and recreational assets in the recreational areas (inner study area shown in **Figure 9.3**). Consideration will also be given to:

- networks of green infrastructure (e.g. as identified in the All London Green Grid and other relevant green infrastructure policy documents); and
- the extent to which the resources are publicised/promoted.

9.5.9 Users of recreational assets include:

- Businesses who may use recreational space;
- Recreational walkers (including dog walkers), runners and joggers;
- Recreational cyclists;
- Children and young people using play facilities;
- Horse riders and other equestrian users;
- Anglers (those using publicly accessible areas);
- Bird watchers;
- Canoeists, paddlers, swimmers and divers (those using publicly accessible areas);
- People involved in contemplation at churchyards, cemeteries, etc; and
- Any other people using public open spaces for recreational purposes e.g. reading, eating, meditation, etc.

9.5.10 The desk study identified a number of different typologies of recreational spaces and routes. These typologies are based on the good practice and guidance defined in the Planning Policy Guidance 17 (DCLG, 2006) which was then taken forward to the National Planning Policy Framework (MoH, 2018), and these typologies will be used in the EIA. The typologies of the resources identified within the study area are set out below.

- Parks and gardens;
- Natural and semi-natural green spaces;
- Green corridors;
- Amenity green spaces with or without play facilities;
- Outdoor play provision for children and teenagers;

- Cemeteries and churchyards;
- Open access land; and
- Waterbodies.

9.5.11 Spaces with a restricted access (i.e. access through payment of a fee such as a registered park or garden) will be included in the recreational assessment. Spaces that are not available for use by the general public (such as private sports facilities and allotments) and have no public access have not been included in the recreational spaces and routes baseline but are instead considered in the assessment of community facilities.

Recreational routes

9.5.12 The different types of recreational routes identified in the baseline include:

- PRow which will include footpaths, bridleways and byways;
- Permissive Routes;
- Public highways identified as forming part of a promoted recreational route; and
- Natural and semi-natural green spaces.

9.5.13 The above routes include both nationally, regionally and locally promoted walking routes and nationally, regionally and locally promoted recreational cycle routes.

9.5.14 Cycle routes that are promoted for use by commuters have not been included in the baseline and are excluded from the assessment. Effects on cyclists in terms of delay and amenity will be considered as part of the Traffic and Transport assessment (see **Chapter 17**).

9.6 Scoping of Potential Effects

The EIA Regulations require significant effects on population and human health to be considered (Regulation 5(2)) and the NPPF (2018) requires assessment of socio-economic impacts at local or regional level.

9.6.1 Socio-economic and human health are closely interlinked but should be considered as separate elements, as shown in **Diagram 9.4**. Community wellbeing is affected by the health of the people in the community and vice versa. Similarly, the productivity of a population is affected by the wellbeing of communities within it and vice versa.

9.6.2 **Diagram 9.4** describes the general structure of impacts within the chapters of an ES based on Royal HaskoningDHV's experience in delivering assessments under the EIA Regulations.

Interconnection between population assessments

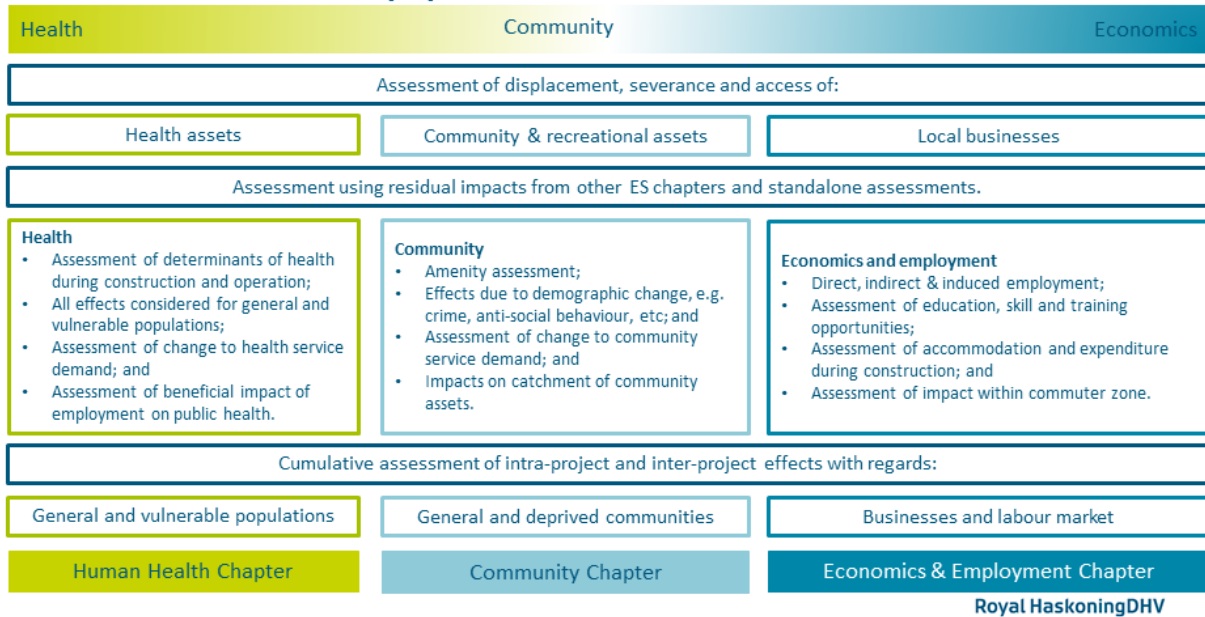


Diagram 9.4 General structure of population and human health assessment under the EIA Regulations.

Potential effects scoped into the assessment

- 9.6.3 The potential likely significant effects scoped in to the assessment are described in **Table 9.4** below. This includes the source of the impact, how it may affect communities and the receptors that may experience the effect.
- 9.6.4 Potential impacts have been split based on whether they are likely to be temporary and only experienced during construction or permanent and experienced beyond construction. Although many of the permanent effects may be experienced during construction first (such as relocation of residents) they have been included as part of the operational phase of the Proposed Development as there will potentially be a permanent effect.

Table 9.4 Potential likely significant community effects

Potential impact	Source	Pathway	Receptor
Construction			
Changes to community facilities.	Temporary land required by the Proposed Development	Displacement and change of access to community facilities, and community-facing businesses.	Community facilities and their users.
Changes to recreational and public space	Temporary residual environmental effects.	Displacement and change of access to recreational and public spaces.	Users of public and recreational space.
Changes to community cohesion, the nature and character of communities.	Temporary construction workforce, compared with today and future baseline scenarios.	Temporary population and demographic change	Communities and community facilities and public services
Pressures on the provision of public services		Potential temporary effects on the provision of public services	Users and providers of public services.
Operation			

Potential impact	Source	Pathway	Receptor
Relocation of residents.	Permanent land required by the Proposed Development	Displacement of tenants and owners of residential property across all tenures. Including transitional effects	Tenants and owners of residential property.
Changes to community facilities.	Permanent residual environmental effects.	Displacement of community facilities, and community-facing businesses.	Community facilities and their users.
Changes to recreational and public space		Displacement of recreational and public spaces.	Users of public and recreational space.
Changes to community cohesion, the nature and character of communities.	Displacement/loss of homes including Wider Property Offer uptake Permanent operational phase workforce compared with today and future baseline scenarios.	Permanent population and demographic change	Communities and community facilities and public services
Pressures on the provision of public services	Temporary construction workforce, and at the operational phase compared with today and future baseline scenarios.	Potential permanent transitional effects on the provision of public services including regulatory and planning services (where relevant) across the wider study area.	Users and providers of public services.

Effects scoped out of the assessment

9.6.5 At this stage of the Proposed Development, no effects have been scoped out of the assessment.

9.7 Approach to Assessment

9.7.1 Once the Proposed Development construction and operational details are available and initial or draft assessments undertaken, there will be a need to engage with local groups to disseminate key findings;

9.7.2 Engagement will be undertaken to identify:

- The receptors potentially affected by the Proposed Development;
- The key sensitivities for each receptor (for example loss, obstruction, congestion, seasonal access, noise, air, visual, etc); and
- Changes in individual communities, in the context of national, regional and local standards for access to facilities and local standards/deficits.

9.7.3 The likelihood that there is a source-pathway-receptor model for the potential impact will then be assessed. When considering environmental effects (such as changes to noise levels) this is a function of the location of the receptor in relation to the source of the impact. When considering less tangible effects (such as demographic change) the pathway will be a function of multiple factors specific to the type of effect;

9.7.4 Assess the sensitivity of the receptor undertaken in the context of current and future baselines for both population and facilities. When considering social impacts, sensitivity is a function of

the receptor's ability to withstand change and how interconnected it is with other community elements;

9.7.5 Assess the magnitude of effect:

- For environmental effects, this will be based on the residual environmental impact assessed in relevant chapters combined with the duration and extent of the change;
- When considering social impacts, magnitude relates to the size of the change in comparison to the baseline, combined with the duration and extent of the change; and
- As communities are dynamic, the assessment will need to account for uncertainty in the magnitude of effect or how receptors will respond to change. This will be accomplished by applying scenarios to the impacts being assessed where appropriate.

9.7.6 Determine the impact significance by comparing the magnitude of effect to the sensitivity of the receptor. A matrix approach will be used to initially determine significance and then professional judgement is applied using a range of guidance questions to determine if there is an aspect that reduces or increases significance; and

9.7.7 Where potential impacts are assessed to be moderate or major adverse, appropriate mitigation measures will be proposed. Following mitigation, the residual impact will be assessed. However, due to the long duration of the Proposed Development's construction and operation the effects will need to be monitored on a regular basis to adapt the Proposed Development to community responses.

9.7.8 The assessment will draw on information from:

- Other EIA topic assessments;
- The Transport Assessment and resulting Surface Access Strategy;
- The physical parameters of the Proposed Development;
- Construction phasing and workforce requirements;
- Population and demographic change;
- Investigation of the sensitivity of those receptors to change by analysis of metadata – this will be influenced by desk-study, stakeholder engagement, public datasets and survey work; and
- Review of policy, standards and guidance relevant to potential changes that may occur.

9.7.9 The assessment will have regard to the potential inequity of effects and their significance to groups with protected characteristics as identified by the Equality Act 2010. This will include:

- Current local standards and quantity, quality and adequacy of provision of community facilities, recreational routes and spaces, and public services;
- Catchments of Community Assets; and
- Local demographics.

9.7.10 An assessment of effects on groups with protected characteristics (and other characteristics of socio-economic inequality as identified by the Equality Impact Assessment that accompanies the ANPS) will be in the Equality Impact Assessment which is separate to the EIA.

Study area

9.7.11 In line with the approach taken to develop the baseline for scoping (see **Section 9.4**), the following geographic area classifications will be used to undertake the assessment (as recommended by Chadwick and Glasson, 2017):

- Inner study area – within the vicinity of the Proposed Development area (relevant Community areas such as Bedfont, Longford, and West Drayton); and
- Wider study area – (e.g. London Boroughs, Windsor and Maidenhead etc).

9.7.12 The inner study area considers localised effects with reference to routine statistics collected for LSOAs and geographic location of community assets. LSOAs are a geographic hierarchy designed by the ONS to improve the reporting of small area statistics in England and Wales following the 2001 Census. These are built from groups of contiguous Output Areas and have been automatically generated by the ONS.

9.7.13 The study areas will be refined at the assessment stage as the design and consultation processes progress, and as related topic assessments are progressed. For example, the Proposed Development area assessment will use the ranges of effect from the landscape and visual amenity, noise and vibration and air quality and odour assessments to inform the way these translate in socio-economic effects.

9.7.14 The study areas for the assessment will be identified to ensure that the impact of the Proposed Development on the communities can be fully assessed. A likely ZOI for potential cumulative effects with other development will be defined separately as part of the CEA, as described in **Section 4.6 of Chapter 4 ‘Approach to EIA’**.

Temporal scope

9.7.15 The temporal scope of impacts will be determined using the following definition:

- ‘very short term’ relates to effects measured in hours, days or weeks (e.g. effects associated with cable laying activity past a particular dwelling);
- ‘short term’ relates to effects measured in months (e.g. requirements of the overall construction stage, such as workforce use of accommodation);
- ‘medium term’ relates to effects measured in years (e.g. the maturing of screening); and
- ‘long term’ relates to effects measured in decades (e.g. the operational stage).

Additional baseline data collection

9.7.16 Additional information relating to community assets and receptors will be sought from stakeholders including Local Planning Authorities, governmental and non-governmental organisations, and specific interest groups.

9.7.17 Any data collected to inform the assessment will be sense checked with Local Planning Authorities and individual operator contacts.

9.7.18 Additional baseline information required to undertake the community assessment, may include:

- Identification of the community groups, organisations and support networks that operate in communities experiencing effects;

- Data related to the function, users, catchments, operational requirements and pre-existing constraints of community facilities;
- Data related to the sensitivity and context in terms of regional and national provision;
- Business information and sensitivities related to commercial property in (or closely bordering) any areas or required for compulsory purchase, including commercial tenants;
- Information regarding existing sensitivities and important community receptors within each community, gained through liaison with community groups; and
- Emerging standards, research and policy related to community facilities and public services.

9.7.19 Walkover surveys of the recreational spaces and routes within the agreed study area. The walkover surveys will seek to:

- Verify the assets identified via the desk studies;
- Identify any additional assets not apparent from desk research;
- Assess the condition and context of the resources; and
- Allow informed estimates to be made about likely levels and nature of use of the resources, where possible.

9.7.20 It is proposed that a Recreation Asset Survey (RAS) of users of recreation facilities will be undertaken for users of key recreational assets within the agreed study area. The will collect usage data including:

- Frequency of use of recreational space / route;
- Distance travelled by user;
- Mode of travel of user; and
- Whether the space / route is the primary space / route that the user visits (if not, where is their primary space/ route and what others do they visit).

9.7.21 The surveys range from term-time to holiday periods and include all times of the day (07:00 to 21:00) and cover weekdays and weekends. The research will also contribute to the greater understanding of the baseline in relation to the demographics of users and the nature of activities undertaken.

9.7.22 An Open Space Assessment (OSA) detailing the quantity and quality of open space provision will be undertaken (outside of the EIA). This study will primarily inform the design process and overall green infrastructure strategy, but will also inform a part of the recreation and amenity assessment. The OSA will establish the level of existing provision (sufficiency or deficiency) and will be used to aid the identification and evaluation of potential mitigation measures. The OSA will draw upon existing studies undertaken by authorities within an agreed study area where available. Common standards for provision of all types of open space (i.e. allotments, natural and semi- natural greenspace) and indoor sports space throughout the agreed study area will be developed in consultation with the HSPG.

Baseline data limitations

9.7.23 The assessment of baseline conditions will be limited to the availability of data. Some datasets, like the 2011 Census, provide detailed spatial information and represent a reliable sample size,

but by the time of assessment will be dated. Where possible, other National Statistics and public datasets will be used to update 2011 Census data, but in some cases, this remains the most reliable and spatially detailed source.

- 9.7.24 This assessment will also consider a future baseline based on projections of population change and demographic change, to consider the effects of the Proposed Development on communities in the future compared to the characteristics of communities today. Projections of populations at interim assessment years across the study areas will be procured by the Applicant from reputable industry standard providers and the spatial scale, methodology and assumptions will be agreed with HSPG through regular engagement to ensure they are fit for purpose for this assessment, and consistent with future baseline assumptions for other assessments.

Assessment methodology

Construction phase

- 9.7.25 The ES will set out the anticipated construction programme to establish the intensity, scale, location and timing of construction activity. The assessment of construction effects will then relate to the programme described.

- 9.7.26 The key aspects during the construction phase are anticipated to be related to:

- Environmental effects during construction, taken from the peak of residual adverse effects identified by other assessments (noise, air quality, landscape and visual amenity etc);
- Potential requirement for temporary worker accommodation during construction, its phasing and peak occupancy;
- Phasing of demolition, re-provision (where appropriate) and construction activities; and
- Interim periods where environmental effects have the greatest potential to lead to community effects.

Operation phase

- 9.7.27 The key aspects during the operational phase are anticipated to be related to:

- Potential changes to housing, population and demography as an indirect effect of the uptake of any compensation and other changes to homes and population as a result of economic change; and
- Interim periods during the operational phase where environmental effects have the greatest potential to lead to community effects (i.e. maximum environmental effects).

Defining impact significance

- 9.7.28 There is no UK legislation or guidance that specifies the detailed content required for socio-economic assessments or provides appropriate standards and thresholds for the assessment of significance of impacts.

- 9.7.29 A determination of significance is required for compliance with the EIA regulations when a potential effect of the Proposed Development is likely. The determination of significance has two stages. Firstly, an assessment is made on the likelihood of an effect occurring, and then the significance of the effect is determined by comparing receptor sensitivity with the magnitude of effect.

Likelihood

9.7.30 The first issue to consider in assessment is the likelihood of the Proposed Development having an effect. A likely effect should be both plausible and probable.

- Plausible relates to their being a relevant source, pathway and receptor (see discussion of health pathways below); and
- Probable relates to a qualitative judgement to exclude those effects that could only occur under certain very rare conditions, except where these relate to the projects vulnerability to major accidents or disasters (as required by regulation 5(4) of the EIA Regulations).

9.7.31 The source-pathway-receptor model describes how a specific activity of the Proposed Development could change a community capital stock and potentially result in a change in socio-economic outcomes (an effect), namely:

- A 'source' represents an activity or factor that could affect community capital stock;
- A 'pathway' describes the method or route by which the 'source' could affect the 'receptor' (either causation or association); and
- A 'receptor' is the stock receiving an effect from the 'source', via the 'pathway'.

Receptor sensitivity

9.7.32 Firstly, the sensitivity of the receptor affected, and the magnitude of the effect upon it are characterised. This establishes whether there is a relevant population and a relevant change in socio-economic outcomes to consider.

9.7.33 Sensitivity will be identified using a combination of stakeholder feedback and professional judgement, to allocate a score of high, medium, low, or negligible sensitivity to the sensitivity of the population being considered. Guidance will be taken from the research and experience of Chadwick and Glasson (2018).

Magnitude of effect

9.7.34 In addition to determining the likelihood of the effect occurring and the sensitivity of the receptor, a professional judgement is made as to magnitude of the change on community receptor. This judgement is based on the collection and presentation of data to evidence reasoned conclusions.

9.7.35 The magnitude of the effect will be assessed against:

- Severity – based on the findings of assessments from inter related chapters, and the economic assessment;
- Extent – the geographic area and types of community capital stocks that may be affected;
- Frequency – how often it is likely to happen; and
- Reversibility – whether the effect will be completely reversed at the end of the Proposed Development programme or whether there will be residual effects.

Evaluation of impact significance

9.7.36 Following the identification of receptor sensitivity and the magnitude of the effect, an illustrative matrix table indicating the relationship between sensitivity and magnitude is

presented in **Table 9.5**.

9.7.37 Assessment of impact significance is qualitative and reliant on professional experience, interpretation and judgement. The matrix should therefore be viewed as a framework to aid understanding of how a judgement has been reached, rather than as a prescriptive, formulaic tool.

Table 9.5 Significance of impact matrix

		Negative Magnitude				Positive Magnitude			
		High	Medium	Low	Very Low	Very Low	Low	Medium	High
Sensitivity	High	Major	Major	Moderate	Minor	Minor	Moderate	Major	Major
	Medium	Major	Moderate	Minor	Minor	Minor	Minor	Moderate	Major
	Low	Moderate	Minor	Minor	Negligible	Negligible	Minor	Minor	Moderate
	Very Low	Minor	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Minor

9.7.38 **Table 9.6** outlines the impact significance definition. For the purposes of the EIA, major and moderate adverse impacts are deemed to be significant, and, as such, may require mitigation. Whilst minor impacts are not significant in their own right, these may contribute to significant impacts cumulatively, or through interactions or combination with other impacts, and are therefore also mitigated where possible.

Table 9.6 Impact significance definitions

Impact Significance	Definition
Major	Very large or large change in receptor condition, both adverse or beneficial, which are likely to be important considerations at a regional or district level because they contribute to achieving national, regional or local objectives, or, could result in exceedance of statutory objectives and / or breaches of legislation.
Moderate	Intermediate change in receptor condition, which are likely to be important considerations at a local level.
Minor	Small change in receptor condition, which may be raised as local issues but are unlikely to be important in the decision-making process.
Negligible	No discernible change in receptor condition.
No change	No impact, therefore no change in receptor condition.

Cumulative effects

9.7.39 Cumulative community effects resulting from the combination of effects from the Proposed Development and other developments will be assessed in accordance with the guidance and methodologies set out in **Section 4.6 of Chapter 4 'Approach to EIA'**. The assessment will be dependent on the availability and accessibility of information for other developments.

9.7.40 The Proposed Development is a component of the Government's preferred NRS as set out in the ANPS. It does not include the Northwest Runway itself, or the major M25 realignment

works required to accommodate the Northwest Runway. Therefore, potential community effects associated with these components of the NRS are excluded from the scope of the primary assessment. Potential community effects associated with the Northwest Runway and M25 realignment works will however be considered as part of the CEA, as set out in **Section 4.6 of Chapter 4 ‘Approach to EIA’**.

- 9.7.41 Any components of the HAL DCO Project which would no longer be required as a result of the Proposed Development would not be included in the CEA.

9.8 Approach to Mitigation

- 9.8.1 Minimisation of community impacts will be embedded into the design of the Proposed Development where possible following the application of the hierarchy of mitigation as described in **Chapter 4 ‘Approach to EIA’**. The assessment of impacts will be made with these embedded mitigation measures in place.
- 9.8.2 The primary means of mitigation impacts to populations is through proactive engagement and inclusion of stakeholder’s views in the design and development of the Proposed Development. Measures such as a best practice to minimise dust, emissions and noise (as detailed in **Chapter 5 ‘Air Quality’** and **Chapter 16 ‘Noise and Vibration’**) as well as managed plans such as the Surface Access Strategy (as detailed in **Chapter 17 ‘Traffic and Transport’**) will also be crucial in mitigating population impacts.

9.9 Summary

- 9.9.1 Based on the above findings it is proposed that the community assessment focusses on effects for local and regional communities. Potential impacts are primarily due to the displacement or severance of community facilities and how this will catalyse other effects. The potential impacts scoped in to the assessment are shown in **Table 9.7**. No impacts are proposed to be scoped out at this stage.

Table 9.7 Summary of potential impacts scoped in to the assessment

Potential Impacts	Construction	Operation
Changes to community facilities.	✓	✓
Changes to recreational and public space	✓	✓
Changes to community cohesion, the nature and character of communities.	✓	✓
Pressures on the provision of public services	✓	✓
Relocation of residents.	✓	X

Scoped in (✓) and scoped out (X)

- 9.9.2 Production of the ES chapter will be undertaken under consultation with all relevant stakeholders, including topic expert panel meetings. Similarly, the requirements of the ANPS will be at the forefront; principally that the Proposed Development will seek to deliver beneficial outcomes for the local community and economy, not merely mitigate adverse effects; be a good neighbour and deliver and catalyse improvement in the local communities, nearby London Boroughs and West London more generally.

9.10 References

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- Planning Inspectorate (PINS), 2018, SCOPING OPINION: Proposed Expansion of Heathrow Airport (Third Runway). Available at: <https://infrastructure.planninginspectorate.gov.uk/projects/london/expansion-of-heathrow-airport-third-runway/?ipcsection=docs>

10 Economics and Employment

10.1 Introduction

10.1.1 This chapter details the proposed scope of the assessment of potential impacts arising from the Proposed Development on economics and employment. The chapter considers impacts associated with the construction and operational phases.

10.1.2 Heathrow Airport is an important driver of the national economy but in creating this it is important to understand what potential beneficial and adverse impacts will be felt in the local and regional economies. This chapter is one of three chapters that considers the scope of effects to population groups together with **Chapter 9 ‘Community’** and **Chapter 12 ‘Health’** (herein referred to as population assessments). The nature of effects across the population assessments are often interrelated and therefore necessitate commonalities between the assessments.

10.1.3 The economics and employment assessment will identify potential effects from the Proposed Development on business, employment, skills and the labour market, and the wider economy.

10.1.4 This chapter includes:

- A description of key policy and legislation relating to economics and employment;
- A summary of ongoing and planned stakeholder engagement;
- An overview of the approach that has been adopted to inform this Scoping Report;
- A concise summary of the baseline conditions;
- A description of the potential likely significant effects of the Proposed Development on economics and employment, to be included in the scope of the assessment;
- A summary of any potential effects that are proposed to be scoped out of the assessment;
- A proposed approach to the EIA and the CEA with regards to economics and employment effects;
- An overview of the proposed approach to mitigation; and
- A summary of the Scoping Report chapter including a summary of impacts table.

10.1.5 The three population assessments draw on the outputs of other environmental topics such as **Chapter 5 ‘Air Quality and Odour’**, **Chapter 13 ‘Landscape and Visual Amenity’**, and **Chapter 16 ‘Noise and Vibration’**, based on the location of the receptor population in relation to the source of effect. They are also informed by separate assessments such as the Equality Impact Assessment where they have the same sensitive receptors.

10.1.6 This assessment considers how these may affect economic receptors and aims to identify the approach to avoid, minimise or mitigate the significance of the impacts. Other environmental topics which inform the economics and employment assessment apply standard thresholds and criteria to identify the significance of environmental impacts. These are described fully in the relevant sections of this Scoping Report. Residual impacts on economic receptors following the proportionate and reasonable attempts at technical mitigation identified by other assessments will be assessed in this chapter and further mitigation proposed if required.

10.1.7 This assessment will also include measures to secure and enhance positive impacts of the Proposed Development related to:

- Employment and the labour market;
- Education, training and skills; and
- Commercial activity including businesses, business rates, supply chain opportunities, and inward investment.

10.1.8 The Proposed Development is a component of the Government's preferred NRS as set out in the ANPS. It does not include the Northwest Runway itself, or the major M25 realignment works required to accommodate the Northwest Runway. Therefore, potential economic and employment effects associated with these components of the NRS are excluded from the scope of the primary assessment. Potential economic and employment effects associated with the Northwest Runway and M25 realignment works will however be considered as part of the CEA, as set out in **Section 4.6 of Chapter 4 'Approach to EIA'**.

10.2 Policy and Legislation

10.2.1 **Table 10.1** provides a summary of the key topic specific policy and legislation which has informed the scope of the assessment. Further information on policies relevant to the EIA and their status is set out in **Chapter 1 'Introduction'**. Due regard will also be given to local policies and the Government's 25 Year Environment Plan where they are relevant.

10.2.2 These documents are proposed to form the framework for detailed assessment post-scoping and will be taken into account in the economics and employment assessment during PEI and ES stages, with the relevant criteria followed throughout.

Table 10.1 Policy and legislation relevant to the economics and employment assessment

Relevant policy / legislation	Relevance to assessment
Policy	
Airports National Policy Statement (ANPS) (2018)	<p>The ANPS sets out planning policy in relation to applications for any nationally significant airport infrastructure project in the South East of England. As detailed below, the ANPS states the economic case for the Proposed Development in terms of gross domestic product (GDP) and employment generation. The ANPS also states the current value which the aviation sector brings to the UK economy and expresses future benefits associated with the NRS:</p> <ul style="list-style-type: none"> • "The proposed Northwest Runway at Heathrow Airport presented the strongest case for expansion and would offer the greatest strategic and economic benefits to the UK." (Paragraph 2.27) • "the Department for Transport published Transport Skills Strategy: building sustainable skills in January 2016, setting out its skills strategy for transport, including aviation, and an additional 30,000 apprenticeships by 2020 across the road and rail sectors" (Paragraph 5.261) • "The Heathrow Academy, established in 2004, supports recruitment and retention of local residents across the retail, construction, aviation and logistics sectors, and includes apprenticeships as a part of the package" (Paragraph 5.262) • "with expansion, Heathrow Airport has publicly committed to ensuring 10,000 apprenticeships before 2030, thereby doubling the number currently available at the airport and in its supply chain and airport-related businesses" (Paragraph 5.263) • "The Heathrow Northwest Runway scheme represents an opportunity to grow the number of jobs and apprenticeships supported by the applicant and its supply chain

Relevant policy / legislation	Relevance to assessment
	<p><i>and airport-related businesses, particularly in neighbouring communities.” (Paragraph 5.265)</i></p>
<p>National Policy Statement for National Networks (NPS NN) (2014)</p>	<p>The NN NPS sets out the policy used by PINS and the Secretary of State to make a decision on all major road projects. The NN NPS describes the Government’s economic vision and strategic objectives in relation to these types of projects:</p> <ul style="list-style-type: none"> • <i>Networks with the capacity and connectivity and resilience to support national and local economic activity and facilitate growth and create jobs.</i> • <i>Networks which support and improve journey quality, reliability and safety.</i> • <i>Networks which support the delivery of environmental goals and the move to a low carbon economy.</i> • <i>Networks which join up our communities and link effectively to each other.</i> <p>The NN NPS states the importance of the national network to both economics and employment:</p> <ul style="list-style-type: none"> • <i>Well-connected and high-performing networks with sufficient capacity are vital to meet the country’s long-term needs and support a prosperous economy (Paragraph 2.1).</i> • <i>There is a critical need...to provide a transport network that is capable of stimulating and supporting economic growth. Improvements may also be required to address the impact of the national networks on quality of life and environmental factors (Paragraph 2.2).</i> • <i>There is also a need for development on the national networks to support national and local economic growth and regeneration, particularly in the most disadvantaged areas. Improved and new transport links can facilitate economic growth by bringing businesses closer to their workers, their markets and each other. This can help rebalance the economy (Paragraph 2.6).</i> • <i>“Without improving the road network, including its performance, it will be difficult to support further economic development, employment and housing and this will impede economic growth and reduce people’s quality of life.” (Paragraph 2.22).</i>
<p>National Planning Policy Framework (NPPF) (2018)</p>	<p>The purpose of the planning system is to contribute to the achievement of sustainable development, through three overarching objectives:</p> <ul style="list-style-type: none"> • Environmental; • Social; and • Economic. <p>The economic objective aims to build “<i>a strong, responsive and competitive economy, by ensuring that sufficient land of the right type is available in the right places and at the right time to support growth and innovation; and by identifying and coordinating development requirements, including the provision of infrastructure.</i>”</p> <p>The Government’s commitment to creating jobs and prosperity through continued economic growth is defined within the NPPF, which sets out the importance of:</p> <ul style="list-style-type: none"> • local and regional economic market business needs (paragraphs 80, 84); • setting out a clear economic vision and planning for economic development (paragraph 81); and • provision and accessibility of new jobs. (paragraph 82). <p>A draft revised NPPF is currently being consulted upon, and any revisions relevant to the scope of this impact assessment will be given due regard. The revised NPPF is likely to continue to support the social and economic role of development as set out above.</p>

Relevant policy / legislation	Relevance to assessment
The London Plan (2016) and The London Plan (Draft for Consultation) (2017)	<p>The London Plan sets out the framework for development across London. There is currently a new draft London Plan which makes several updates to the current Plan.</p> <p>Both plans highlight the characteristics of London, and its boroughs and sub-regions. The expectations for development and economic growth in London are detailed in both. The functional economic areas used in this report are detailed within the current London Plan.</p>
UK Industrial Strategy: a leading destination to invest and grow (2017)	<p>The UK Industrial strategy aims to set out ways in which to help businesses and the UK economy thrive, through developing a skilled workforce and by improving infrastructure.</p> <p><i>“Every successful free market economy needs firm foundations: the skills of its workers, the quality of the infrastructure, and a fair and predictable business environment”</i> (Prime Minister’s Foreword).</p> <p>There are five foundations on which the Industrial strategy is built:</p> <ul style="list-style-type: none"> • <i>Ideas: the world’s most innovative economy;</i> • <i>People: good jobs and greater earning power for all;</i> • <i>Infrastructure: a major upgrade to the UK’s infrastructure;</i> • <i>Business Environment: the best place to start and grow a business; and</i> • <i>Places: prosperous communities across the UK.</i>
Non-statutory policy produced by Local Enterprise Partnerships (LEPs)	<p>LEPs produce Strategic Economic Plans to describe aims for business growth, skills development and investment. These voluntary partnerships between local authorities and businesses lead economic growth and job creation within an area by specifying local economic priorities.</p> <p>The extent of these areas relative to Heathrow’s estimated functional economic market area has been used to define the study areas used in this Scoping Report:</p> <ul style="list-style-type: none"> • Thames Valley Berkshire; • Buckinghamshire Thames Valley; and • Enterprise M3.

10.3 Stakeholder Consultation

10.3.1 A detailed stakeholder engagement plan is currently being developed. Care will be taken to ensure all key stakeholders with views and concerns regarding economics and employment have the evidence and opportunity to discuss and agree the details of the assessment in a meaningful and inclusive manner.

10.3.2 The stakeholders listed below were contacted in November 2018 to make them aware of the Proposed Development and timescales for further consultation. The following stakeholders were provided with a presentation providing an overview of the Proposed Development and inviting initial comments on the scope of the economics and employments assessment:

- London Borough of Hounslow;
- London Borough of Hillingdon;
- Spelthorne Borough Council;
- Slough Borough Council; and
- South Bucks District Council.

- 10.3.3 The HAL Scoping Opinion is a useful source of stakeholder feedback and has been used to inform this Scoping Report and the Applicant's approach to consultation.
- 10.3.4 Further formal and informal consultations and meetings will be arranged to discuss and agree the details of the methodology for the assessment of potential economics and employment effects arising from the Proposed Development.

10.4 Approach to Scoping

- 10.4.1 The assessment of potential effects on population groups are covered in this chapter, in **Chapter 9 'Community'** and **Chapter 12 'Health'**. Effects on people, the communities they live in, the businesses they work in and their health have many interlinked determinants that are described by a similar source-pathway-receptor model. Therefore, the approach to scoping of these interrelated elements will be undertaken in a similar way.

Study areas

- 10.4.2 This section sets out the study areas that have been defined for the consideration of potential effects to economics and employment at the scoping stage.
- 10.4.3 The study areas for the economics and employment assessment are based on those developed for the HAL DCO Project, and further informed by the HAL Scoping Opinion received from PINS. The study areas may be refined at the assessment stage to focus on the comparatively smaller scale of the Proposed Development during assessment. The study areas used in other EIA topics are also of relevance and will be used throughout this assessment to inform the likelihood of effects on people. For example, the assessment will be informed by the study areas used for traffic and transport, landscape and visual, noise and vibration, and air quality and odour assessments to understand how these potential effects may translate to economic and employment effects.
- 10.4.4 As shown in **Figure 9.1**, the study area has two components. The inner study area broadly relates to the direct effects of the Proposed Development and is developed using data at a local scale. The wider study areas (regional and sub-regional) relate to indirect effects and the catchments of elements that may be directly affected. The wider study areas include the inner study areas as shown in **Diagram 10.1**.

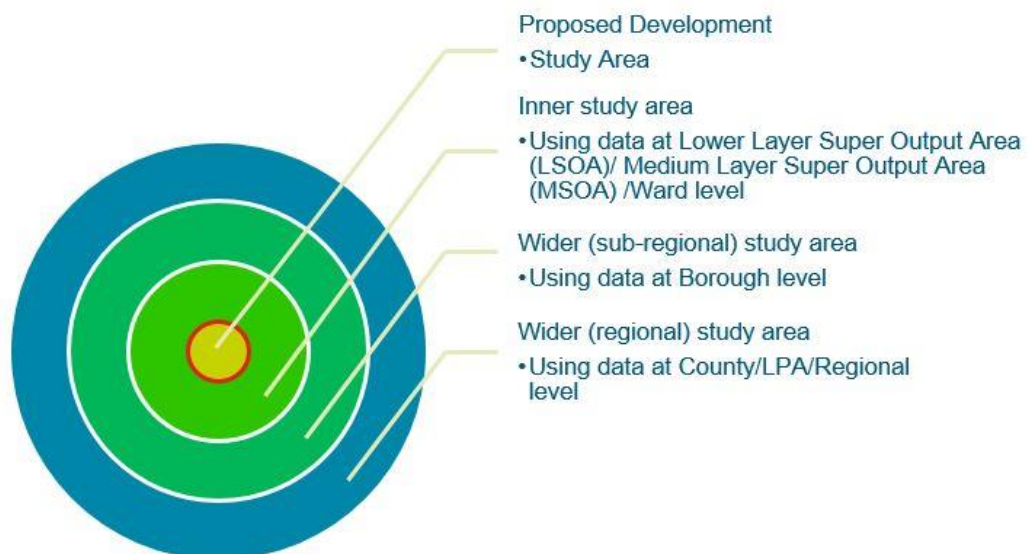


Diagram 10.1 Concept of cumulative study areas and outline of data used for the baseline at each study area

Inner study area

10.4.5 The inner study area is defined by the extent of land potentially required for the Proposed Development, and therefore the direct and indirect impacts on businesses and commercial interests, land or property, and impacts on the catchments of, or access to, businesses which are not lost or displaced.

10.4.6 The inner study area (see **Figure 9.1**) comprises a number of specific community areas (as listed in **Table 10.2**), and these are used to create a demographic baseline (see **Diagram 10.2**)

Wider study areas

10.4.7 Wider study areas (see **Figure 9.1** and **Table 10.2**) have been identified to capture the impacts on Heathrow Airport's current and future commuting area and the labour market in general as a result of the employment generated by the Proposed Development (direct impacts), along with any indirect, induced and potential catalytic employment impacts. Subsequent potential effects on business, skills and education are also included.

10.4.8 The wider study areas have been informed by MHCLG Planning Practice Guidance⁸, which recommends assessment via 'Functional Economic Market Areas' (FEMAs). FEMAs are areas within which there is a relatively self-contained labour market, business market or local economy and may be in part determined by administrative areas and travel-to-work patterns. They are often comprised of LEPs (groups of public bodies and business representatives in a spatial area), administrative boundaries like local authorities, travel to work areas (ONS defined areas with a relatively self-contained workforce), catchments of facilities, and flows of goods, services and information.

10.4.9 The wider study areas are also influenced by potential workforce recruitment during the construction phase (the area within which construction workers are likely to commute from home to work on the Proposed Development), and the scale of skills and training effects (likely

⁸ Ministry of Housing, Communities & Local Government, *Planning Practice Guidance: Housing and Economic Development Needs Assessments, 2015*

to be assessed at a local authority scale).

Table 10.2 Communities and Boroughs/Districts included in inner study area and wider study areas

Study Area	Areas	Community impacts at this scale																
Inner	Community Areas	<p>Loss, displacement and other changes (such as severance and access changes) to businesses, commercial interests, land or property.</p> <p>Potential impacts to businesses due to change in noise, air quality and odour or traffic levels.</p> <p>Local employment and skills development during both construction and operation.</p>																
	<table border="0"> <tr> <td>Bedfont</td> <td>Heston</td> </tr> <tr> <td>Brandshill</td> <td>Hounslow (C+S)</td> </tr> <tr> <td>Colnbrook</td> <td>Hounslow (W+H)</td> </tr> <tr> <td>Cranford</td> <td>Iver & Richings Park</td> </tr> <tr> <td>Cranford Cross</td> <td>Longford</td> </tr> <tr> <td>Feltham North</td> <td>Poyle</td> </tr> <tr> <td>Harlington</td> <td>Sipson</td> </tr> <tr> <td>Harmondsworth</td> <td>Stanwell & Stanwell Moor</td> </tr> <tr> <td>Hayes</td> <td>West Drayton</td> </tr> </table>		Bedfont	Heston	Brandshill	Hounslow (C+S)	Colnbrook	Hounslow (W+H)	Cranford	Iver & Richings Park	Cranford Cross	Longford	Feltham North	Poyle	Harlington	Sipson	Harmondsworth	Stanwell & Stanwell Moor
Bedfont	Heston																	
Brandshill	Hounslow (C+S)																	
Colnbrook	Hounslow (W+H)																	
Cranford	Iver & Richings Park																	
Cranford Cross	Longford																	
Feltham North	Poyle																	
Harlington	Sipson																	
Harmondsworth	Stanwell & Stanwell Moor																	
Hayes	West Drayton																	
Wider (sub-regional)	Boroughs/ Districts	<p>Effects on the catchments of affected businesses.</p>																
	<table border="0"> <tr> <td>Hillingdon</td> <td>South Bucks</td> </tr> <tr> <td>Hounslow</td> <td>Spelthorne</td> </tr> <tr> <td>Richmond upon Thames</td> <td>Wandsworth</td> </tr> <tr> <td>Runnymede</td> <td>Windsor and Maidenhead</td> </tr> <tr> <td>Slough</td> <td></td> </tr> </table>		Hillingdon	South Bucks	Hounslow	Spelthorne	Richmond upon Thames	Wandsworth	Runnymede	Windsor and Maidenhead	Slough							
Hillingdon	South Bucks																	
Hounslow	Spelthorne																	
Richmond upon Thames	Wandsworth																	
Runnymede	Windsor and Maidenhead																	
Slough																		
Wider (regional)		<p>Effects of new economic activity on the labour market, employment and skills. Including the commuting zone and expenditure by employees.</p>																

10.4.10 As the design of the Proposed Development is still in its early development, the study areas set out above will be kept under review as the design and consultation processes progress, and the Proposed Development is refined and related topic assessment study areas are confirmed. Therefore, the study areas at the assessment stage may evolve as appropriate.

10.5 Baseline Conditions

Desk based review

10.5.1 **Table 10.3** provides a summary of the data used to inform the scope of assessment. **Appendix 9.1** provides detailed baseline economic information for the inner and wider study areas.

Table 10.3 Data sources used for scoping

Source	Data
Office for National Statistics (Accessed via: www.nomisweb.co.uk)	Census data (2011). Department for Work and Pensions (DWP) data. Annual Population Survey (2017). Business Register and Employment Survey (BRES). Inter-Departmental Business Register (IDBR).
Valuation Office Agency (https://www.gov.uk/government/organisations/valuation-officeagency)	Business rates data.
Land Registry (https://eservices.landregistry.gov.uk)	Community-facing businesses.
Local authorities	Published research and sector-specific data on skills, business, inward investment.

Source	Data
Local Enterprise Partnerships	Published research and sector-specific data on skills, business, inward investment.
Heathrow Airport Limited (www.heathrow.com)	Data held on employment, skills and training and business support. Employee Survey (latest 2012/13). Feedback from ongoing activities including skills interventions and business support.

Economic characteristics of inner study area

10.5.2 The following figures summarise the overall baseline characteristics of the inner study area (**Figure 9.1**). Full details can be found in **Appendix 9.1**.

10.5.3 **Figure 10.1, Figure 10.2, Figure 10.3** and **Figure 10.4** also show levels of deprivation indicators and unemployment levels in the inner study area. The data presented below in **Diagram 10.2** is from the ONS.

10.5.4 As of the last census (2011), the inner study area has a population of 185,115, 139,205 of which are of a working age.

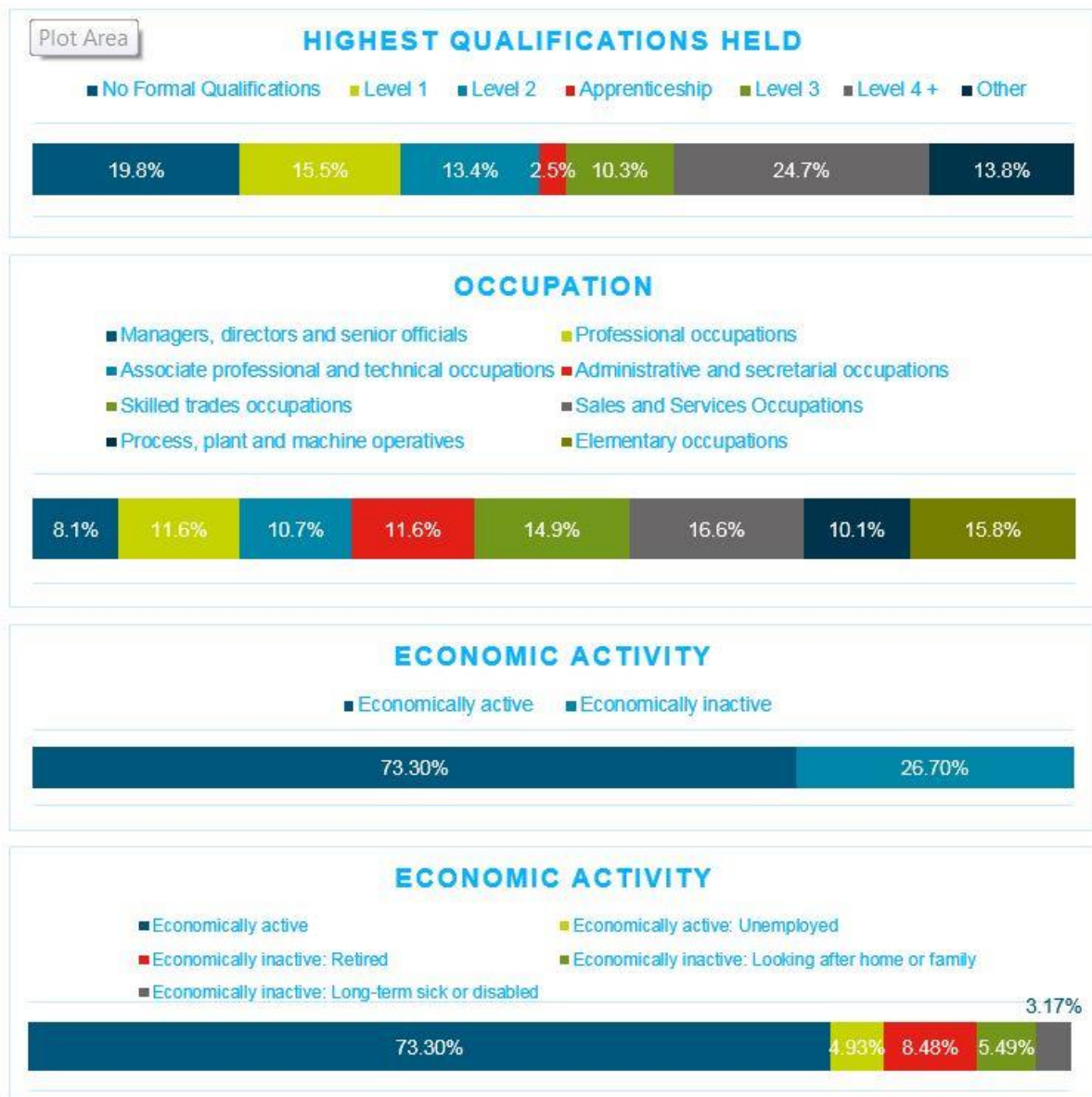


Diagram 10.2 Economic characterisation of inner study area

Economic characterisation of wider study areas

10.5.5 As of the last census (2011) the wider study areas (**Figure 9.1**) have a population of 1,923,344, of which 1,414,409 are working age. General characterisation is shown below in **Diagram 10.3**. All data is from the 2011 census provided by ONS.

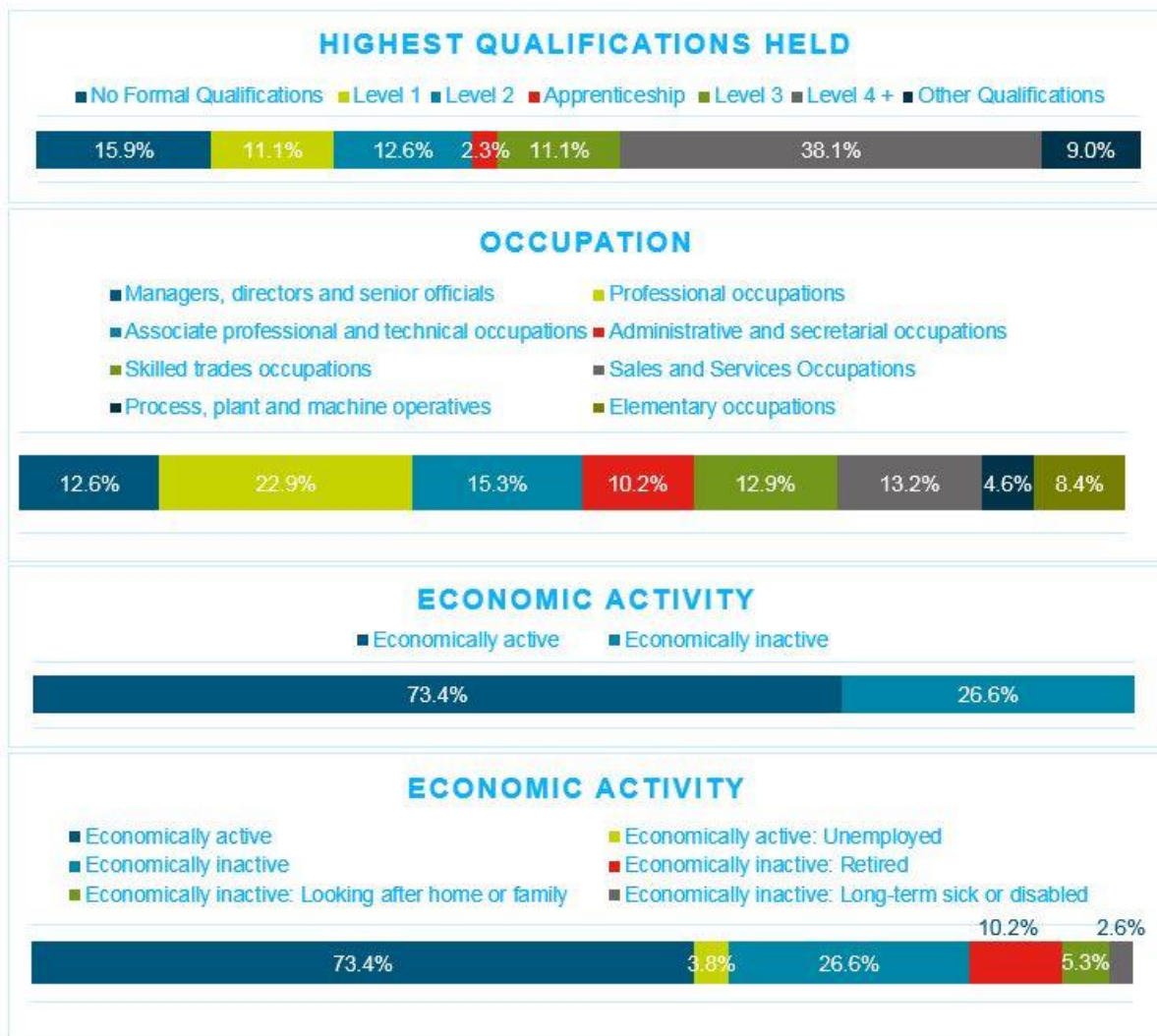


Diagram 10.3 Economic characterisation of wider study area

Commercial property

10.5.6 A number of commercial interests will be directly affected by the land required for expansion and by other changes that are required (e.g. to road access). The extent of these will depend on the spatial scale of the Proposed Development. Further engagement with stakeholders will be necessary to determine the location of business receptors and key sensitivities for each receptor.

10.6 Scoping of Potential Effects

10.6.1 The EIA Regulations require significant impacts on population and human health to be considered (Regulation 5(2)) and the NPPF (2018) requires assessment of socio-economic impacts at local or regional level.

10.6.2 Economics, communities and health are closely interlinked but can be considered as separate elements, as shown in **Diagram 10.4**. For example, economic productivity of a population is effected by the wellbeing of communities within it and vice versa. Similarly, community wellbeing is effected by the health of the people in the community and vice versa.

Interconnection between population assessments

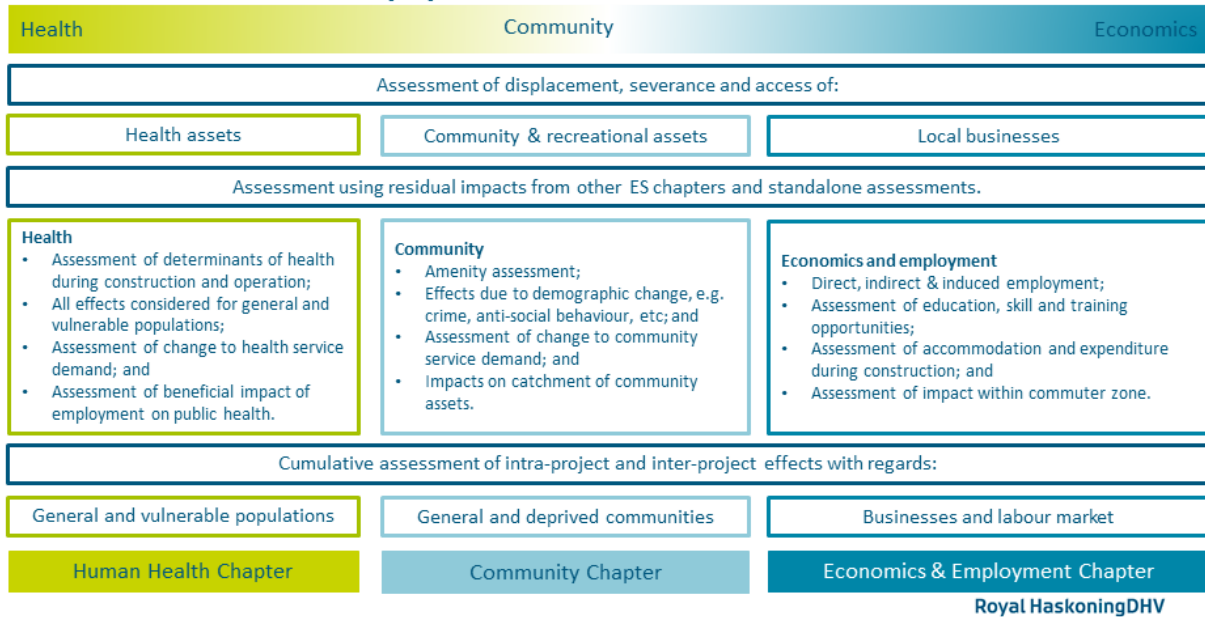


Diagram 10.4 General structure of population and human health assessment under EIA Reg 2017

Potential effects scoped into the assessment

10.6.3 The potential likely significant effects to be scoped into the economics and employment assessment are displayed in **Table 10.4**. This includes the source of the effect, how it may affect communities and the receptors that may experience the effect.

10.6.4 Potential effects have been split based on whether they are likely to be temporary and only experienced during construction or permanent and experienced beyond construction. Although many permanent effects may be first experienced during the construction phase (such as relocation of residents) they have been scoped in to the operation assessment as there will potentially be a permanent effect.

Table 10.4 Potential likely significant effects, impact sources and pathways scoped in to the assessment

Potential impact	Source	Pathway	Receptor
Construction			
Short term viability of businesses	Temporary land take, demographic change and/or environmental change	Temporary displacement or severance of businesses leading to a loss in earnings. Environmental factors leading to a reduction in customers	Local businesses and commercial activity
Temporary effects on businesses in the construction supply chain	Business generated by the Proposed Development	Effects on businesses in the construction supply chain	Local economy and businesses
Temporary employment, skills and training	Temporary construction workforce demand	New employment, skills and training (e.g. apprenticeships)	People, local economy

Potential impact	Source	Pathway	Receptor
Temporary change to labour and housing market	Effect of employment generation and construction activity	Changes to labour market and subsequently changes to housing market	Labour market, housing market, providers of regulatory/planning services
Disruption to residents and their economic activity	Environmental change and change to access	Displacement of recreational and public spaces.	Users of public and recreational space.
Operation			
Displacement of businesses	Permanent land required by the Proposed Development Permanent residual environmental effects.	Permanent displacement of businesses or commercial activity.	Local businesses and commercial activity
Long term viability of local businesses	Demographic and/or environmental change.	Permanent loss of catchment population, change in environment, or severance as a result of changes to access	Local businesses and commercial activity
Wider effects on employment and the economy	Business generated by the Proposed Development	Direct influence (e.g. jobs and businesses supported directly related to the operation of the Airport), indirect influence (growth in business and jobs supported in the Airport's supply chain) and induced influence (jobs and businesses supported as a result of expenditure on goods and services) of proposed development.	People, local and wider economy
Permanent employment, skills and training	Permanent operation workforce demand.	New employment, skills and training (e.g. apprenticeships)	People, local economy
Potential additional effects on employment and the economy	Improved connectivity	Additional trade, foreign direct investment and tourism leading to catalytic effects at the regional scale	Regional economy
Potential for wider economic effects	Policy changes and changes to the local economy and business community as a direct result of the Proposed Development	Inward investment, local retention of business rates, spending and supply chain effects	Business community, Local Planning Authorities
Potential additional effects to the housing market	Operational employment generation	Changes to labour market and subsequently changes to housing market	Labour market, housing market, providers of regulatory/planning services
Environmental change	Permanent residual environmental effects	Potential for economic consequences of environmental change	Business community

Potential impact	Source	Pathway	Receptor
	which have the (including transport/traffic effects)		

Effects scoped out of the assessment

10.6.5 The impacts to be scoped out are included in **Table 10.5**.

Table 10.5 Effects to be scoped out of the economics and employment assessment

Source	Impact	Receptor	Justification for scoping out
Increased trade, Foreign Direct Investment (FDI) and tourism to the UK as a result of improved connectivity and aviation capacity	National scale Gross Domestic Product (GDP) benefits associated with this scale of expansion	National economy	The scale of national benefit generated has been assessed through the ANPS and will therefore not be assessed in the EIA. The scale of local and regional economic change will be assessed as set out in Table 10.
Effect on property value and availability	Effect on property value as a result of loss/displacement, environmental changes, or pressure on developable land and property	Local and wider housing and commercial property market	Property value is dynamic and subject to change. Therefore, it is not possible to isolate and empirically estimate the quantitative effect of the Proposed Development alone on the wider property market. Given the temporal scope, the scale of other influences, and background changes. The Applicant recognises that there will be impacts on property. To mitigate this, compensation will be available to eligible parties. The assessment will include a description of the combined mitigation by compensation as far as practicable so as to maintain individual property owner's privacy.

10.7 Approach to Assessment

10.7.1 Once the construction and operational details for the Proposed Development are available and initial or draft assessments undertaken, there will be a need to engage with local groups in order to disseminate key findings.

10.7.2 Engagement will be undertaken to identify:

- The receptors potentially affected by the Proposed Development;
- The key sensitivities for each receptor (for example loss, obstruction, congestion, seasonal access, noise, air, visual, etc); and
- Changes for individual businesses, in the context of national, regional and local standards for access and local standards/deficits.

10.7.3 The likelihood that there is a source-pathway-receptor model for the potential impact will then be assessed. When considering environmental effects (such as changes to noise levels) this is a function of the location of the receptor in relation to the source of the impact. When

considering less tangible effects (such as demographic change) the pathway will be a function of multiple factors specific to the type of effect;

10.7.4 Assess the sensitivity of the receptor undertaken in the context of current and future baselines for both operation and employment. When considering economic impacts, sensitivity is a function of the commercial receptor's ability to withstand change;

10.7.5 Assess the magnitude of effect:

- For environmental effects, this will be based on the residual environmental impact assessed in relevant chapters combined with the duration and extent of the change;
- When considering economic impacts, magnitude relates to the size of the economic change (e.g. employment demand) in comparison to the baseline, combined with the duration and extent of the change; and
- As labour markets are dynamic the assessment will need to account for uncertainty in the magnitude of effect or how receptors will respond to change. This will be accomplished by applying scenarios to the impacts being assessed where appropriate.

10.7.6 Determine the impact significance by comparing the magnitude of effect to the sensitivity of the receptor. A matrix approach will be used to initially determine significance and then professional judgement is applied using a range of guidance questions to determine if there is an aspect that reduces or increases significance; and

10.7.7 Where potential impacts are assessed to be moderate or major adverse appropriate mitigation measures will be proposed. Following mitigation, the residual impact will be assessed. However, due to the long duration of the Proposed Development's construction and operation the effects will need to be monitored on a regular basis to adapt the project to community responses.

10.7.8 The assessment will draw on information from:

- Other environmental impact assessment topic assessments;
- Transport Assessment and resulting Surface Access Strategy;
- The physical parameters of the Proposed Development;
- Construction phasing and workforce requirements;
- Population and demographic change;
- Investigation of the sensitivity of those receptors to change by analysis of metadata – this will be influenced by desk-study, stakeholder engagement, public datasets and survey work; and
- Review of policy, standards and guidance relevant to potential changes that may occur.

10.7.9 The assessment will have regard to the potential inequity of effects and their significance to groups with protected characteristics as identified by the Equality Act 2010. This will include:

- Current local standards and quantity, quality and adequacy of provision of community facilities, recreational routes and spaces, and public services;
- Catchments of Community Assets; and

- Local demographics.

10.7.10 The assessment will have regard to the potential inequity of impacts and their significance to groups with protected characteristics as identified by the Equality Act 2010. This will include:

- Current local standards and quantity, quality and adequacy of provision of community facilities, recreational routes and spaces, and public services;
- Catchments of businesses; and
- Local demographics.

10.7.11 A full assessment of impacts on groups with protected characteristics (and other characteristics of socio-economic inequality as identified by the Equality Impact Assessment (DfT (2017) Revised Draft Airports National Policy Statement: Equality Assessment) that accompanies the revised draft ANPS) will be in the Equality Impact Assessment which is separate to the EIA.

Study areas

10.7.12 This section sets out the study areas that have been defined for the consideration of potential economics and employment effects at the scoping stage.

10.7.13 In line with the approach taken to develop the baseline for scoping, the following geographic area classifications will be used to undertake the assessment:

- Inner – within the vicinity of the proposed development area (relevant Community areas such as Bedfont, Longford, and West Drayton); and
- Wider – (e.g. London Boroughs, Windsor and Maidenhead etc.).

10.7.14 The inner study area considers localised impacts with reference to routine statistics collected for LSOAs and geographic location of community assets. LSOAs are a geographic hierarchy designed by the ONS to improve the reporting of small area statistics in England and Wales following the 2001 Census. These are built from groups of contiguous Output Areas and have been automatically generated by the ONS.

10.7.15 The study areas will be refined at the assessment stage as the design and consultation processes progress, and as related topic assessments are progressed. For example, the Proposed Development area assessment will use the ranges of effect from the landscape and visual amenity, noise and vibration and air quality and odour assessments to inform the way these translate in socio-economic effects.

10.7.16 The study areas for the assessment will be identified to ensure that the impact of the Proposed Development on economics and employment can be fully assessed. A likely ZOI for potential cumulative effects with other development will be defined separately as part of the CEA, as described in **Section 4.6 of Chapter 4 ‘Approach to EIA’**.

Temporal scope

10.7.17 The temporal scope has been defined as follows:

- ‘very short term’ relates to impacts measured in hours, days or;
- ‘short term’ relates to impacts measured in months;
- ‘medium term’ relates to impacts measured in years; and

- 'long term' relates to impacts measured in decades.

Additional baseline data collection

10.7.18 Additional information relating to businesses and receptors will be sought from stakeholders including Local Planning Authorities, governmental and non-governmental organisations, and specific interest groups.

10.7.19 Any data collected to inform the assessment will be sense checked with Local Planning Authorities and individual operator contacts.

10.7.20 Additional baseline information required to undertake the economic and employment assessment, may include:

- Identification of the businesses and industry groups that operate in areas experiencing impacts;
- Data related to the function, supply chain, operational requirements and pre-existing constraints of businesses;
- Business information and sensitivities related to commercial property in (or closely bordering) any areas or required for compulsory purchase, including commercial tenants;
- Information regarding existing sensitivities gained through liaison with stakeholders; and
- Emerging standards, research and policy related to economic effects of large infrastructure development.

Baseline data limitations

10.7.21 The assessment of baseline conditions will be limited to the availability of data. Some datasets, like the 2011 Census, provide detailed spatial information and represent a reliable sample size, but by the time of assessment will be dated. Where possible other National Statistics and public datasets will be used to update 2011 Census data, but in some cases, this remains the most reliable and spatially detailed source.

10.7.22 This assessment will also consider a future baseline based on projections of population change and demographic change, to consider the impacts of the Proposed Development on communities in the future compared to the characteristics of communities today. Projections of populations at interim assessment years across the study areas will be procured by the Applicant from reputable industry standard providers and the spatial scale, methodology and assumptions will be agreed with HSPG through regular engagement to ensure they are fit for purpose for this assessment, and consistent with future baseline assumptions for other assessments.

Assessment methodology

Construction phase

10.7.23 The ES will set out the anticipated construction programme to establish the intensity, scale, location and timing of construction activity. The assessment of construction impacts will then relate to the programme described.

10.7.24 The key aspects during the construction phase are anticipated to be related to:

- Environmental impacts during construction, taken from the peak of residual adverse impacts identified by other assessments (noise, air quality and odour, landscape and visual amenity etc);
- The Labour Curve defined from the construction programme showing the level and duration of employment opportunities;
- The location of residential workers and distance that they are likely to commute to the construction site from;
- The location of businesses within the supply chain;
- How much the Proposed Development would contribute to employment;
- Potential requirement for temporary worker accommodation during construction, its phasing and peak occupancy;
- Phasing of demolition, re-provision (where appropriate) and construction activities; and
- Interim periods where environmental impacts have the greatest potential to lead to community impacts.

Operation phase

10.7.25 The key aspects during the operational phase are anticipated to be related to:

- Employment and business generation as a result of expansion; and
- Interim periods during the operational phase where environmental impacts have the greatest potential to lead to business impacts (i.e. maximum environmental impacts).

Defining impact significance

10.7.26 There is no UK legislation or guidance that specifies the detailed content required for socio-economic assessments or provides appropriate standards and thresholds for the assessment of significance of impacts.

10.7.27 A determination of significance is required for compliance with the EIA regulations when a potential effect of the Proposed Development is likely. The determination of significance has two stages. Firstly, an assessment is made on the likelihood of an effect occurring, and then the significance of the effect is determined by comparing receptor sensitivity with the magnitude of effect.

Likelihood

10.7.28 The first issue to consider in assessment is the likelihood of the Proposed Development having an effect. A likely effect should be both plausible and probable.

10.7.29 Plausible relates to their being a relevant source, pathway and receptor (see discussion of health pathways below).

10.7.30 Probable relates to a qualitative judgement to exclude those impacts that could only occur under certain very rare conditions, except where these relate to the Proposed Development's vulnerability to major accidents or disasters (as required by Part 1, paragraph 4(4) EIA Regulation 2017)

10.7.31 The source-pathway-receptor model describes how a specific activity of the Proposed

Development could change a community capital stock and potentially result in a change in socio-economic outcomes (an effect).

- A 'source' represents an activity or factor that could affect a receptor;
- A 'pathway' describes the method or route by which the 'source' could affect the 'receptor' (either causation or association); and
- A 'receptor' is the asset or group effected from the 'source', via the 'pathway'.

Receptor sensitivity

10.7.32 Firstly, the sensitivity of the receptor affected, and the magnitude of the effect upon it are characterised. This establishes whether there is a relevant population and a relevant change in socio-economic outcomes to consider before considering the magnitude of effect.

10.7.33 The main sensitive receptors are businesses, residents, communities, labour markets and housing markets within the local and regional economy. Receptors can be sensitive at any spatial scale and sensitivity differs between types of receptors depending on the spatial scale. There will therefore be a focus on the sensitivity of each receptor and in particular on their ability to respond to change.

Magnitude of effect

10.7.34 In addition to determining the likelihood of the effect occurring and the sensitivity of the receptor, a professional judgement is made as to whether or not the socio-economic change in a population is significant. This judgement is based on the collection and presentation of data to evidence reasoned conclusions.

10.7.35 The magnitude of effect will be assessed against:

- Severity -based on the findings of assessments from inter related chapters, and the economic assessment;
- Extent – the geographic area and types of community capital stocks that may be affected;
- Frequency – how often it is likely to happen; and
- Reversibility – whether the effect will be completely reversed at the end of the project programme or whether there will be residual impacts.

Evaluation of impact significance

10.7.36 Following the identification of receptor sensitivity and the magnitude of the effect, an illustrative matrix table indicating the relationship between sensitivity and magnitude is presented in **Table 10.6**.

10.7.37 Assessment of impact significance is qualitative and reliant on professional experience, interpretation and judgement. The matrix should therefore be viewed as a framework to aid understanding of how a judgement has been reached, rather than as a prescriptive, formulaic tool.

Table 10.6 Significance of impact matrix

		Negative Magnitude				Positive Magnitude			
		High	Medium	Low	Very Low	Very Low	Low	Medium	High
Sensitivity	High	Major	Major	Moderate	Minor	Minor	Moderate	Major	Major
	Medium	Major	Moderate	Minor	Minor	Minor	Minor	Moderate	Major
	Low	Moderate	Minor	Minor	Negligible	Negligible	Minor	Minor	Moderate
	Very Low	Minor	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Minor

10.7.38 **Table 10.7** outlines the impact significance definition. For the purposes of the EIA, major and moderate adverse impacts are deemed to be significant, and, as such, may require mitigation. Whilst minor impacts are not significant in their own right, minor impacts may contribute to significant impacts cumulatively or through interactions or combination with other impacts, and are therefore also mitigated where possible.

Table 10.7 Impact Significance Definitions

Impact Significance	Definition
Major	Very large or large change in receptor condition, both adverse or beneficial, which are likely to be important considerations at a regional or district level because they contribute to achieving national, regional or local objectives, or, could result in exceedance of statutory objectives and / or breaches of legislation.
Moderate	Intermediate change in receptor condition, which are likely to be important considerations at a local level.
Minor	Small change in receptor condition, which may be raised as local issues but are unlikely to be important in the decision-making process.
Negligible	No discernible change in receptor condition.
No change	No impact, therefore no change in receptor condition.

Cumulative effects

10.7.39 Cumulative economic and employment effects resulting from the combination of effects from the Proposed Development and other developments will be assessed in accordance with the guidance and methodologies set out in **Section 4.6 of Chapter 4 ‘Approach to EIA’**. The assessment will be dependent on the availability and accessibility of information for other developments.

10.7.40 The Proposed Development does not include the new Northwest Runway and M25 realignment components of the NRS proposed by HAL. However, the Proposed Development is designed to be operated alongside these components of the NRS that are being progressed by the HAL DCO Project. Therefore the total cumulative economic and employment effects will be considered together to ensure an overarching assessment of the NRS as a whole.

10.7.41 Any components of the HAL DCO Project which would no longer be required as a result of the Proposed Development would not be included in the CEA.

10.8 Approach to Mitigation

10.8.1 Minimisation of economic and employment impacts will be embedded into the design of the Proposed Development where possible following the application of the hierarchy of mitigation as described in **Chapter 4 ‘Approach to EIA’**. The assessment of impacts will be made with these embedded mitigation measures in place.

10.8.2 The primary means of mitigation impacts to populations is through proactive engagement and inclusion of stakeholder’s views in the design and development of the Proposed Development. In addition, ensuring that there is an employment pipeline that people in local and regional communities can access combined with skills development is essential to realising economic benefits. Measures such as a best practice to minimise dust, emissions and noise (as detailed in **Chapter 5 ‘Air Quality and Odour’** and **Chapter ‘16 Noise and Vibration’**) as well as managed plans such as the Surface Access Strategy (as detailed in **Chapter 17 ‘Traffic and Transport’**) will also be crucial in mitigating population impacts.

10.9 Summary

10.9.1 The scope of the economics and employment assessment described above is summarised in **Table 10.8**.

Table 10.8 Summary of Economics and Employment Assessment Impacts

Potential effects	Construction	Operation
Short term and long term viability of local businesses and commercial activity	✓	✓
Effects on businesses in the construction supply chain	✓	X
Employment, skills and training for people in the local economy	✓	✓
Temporary change to labour and housing market	✓	X
Disruption to residents and their economic activity including users of public and recreational space	✓	X
Permanent displacement of local businesses and commercial activity	X	✓
Wider effects on employment and the economy	X	✓
Potential additional effects on employment in the regional economy	X	✓
Potential additional effects to the housing market	X	✓
Environmental change affecting the business community	X	✓

Scoped in (✓) and scoped out (X)

10.9.2 Production of the ES chapter will be undertaken under consultation with all relevant stakeholders, including topic expert panel meetings. Similarly, the requirements of the ANPS will be at the forefront; principally that the Proposed Development will seek to deliver beneficial outcomes for the local community and economy, not merely mitigate adverse effects; be a good neighbour and deliver and catalyse improvement in the local communities, nearby London Boroughs and West London more generally.

10.10 References

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11 Historic Environment

11.1 Introduction

11.1.1 This chapter details the proposed scope of the assessment of potential impacts arising from the Proposed Development on the historic environment. This chapter considers impacts associated with the construction and operational phases.

11.1.2 This chapter includes:

- A description of key policy and legislation with relevance to the historic environment;
- A summary of ongoing and planned stakeholder engagement;
- An overview of the approach that has been adopted to inform this Scoping Report;
- A concise summary of the baseline historic environment;
- A description of the potential likely significant effects of the Proposed Development on the historic environment, to be included in the scope of the assessment;
- A proposed approach to the EIA and the CEA with regards to the historic environment;
- An overview of the proposed approach to mitigation; and
- A summary of the Scoping Report chapter including a summary of impacts table.

11.1.3 The Proposed Development is a component of the Government's preferred NRS as set out in the ANPS. It does not include the Northwest Runway itself, or the major M25 realignment works required to accommodate the Northwest Runway. Therefore, potential historic environment effects associated with these components of the NRS are excluded from the scope of the primary assessment. Potential historic environment effects associated with the Northwest Runway and M25 realignment works will however be considered as part of the CEA, as set out in **Section 4.6 of Chapter 4 'Approach to EIA'**.

11.2 Policy and Legislation

11.2.1 **Table 11.1** provides a summary of the key topic specific legislation and policy which has informed the scope of the assessment. Further information on policies relevant to the EIA and their status is set out in **Chapter 1 'Introduction'**. Due regard will also be given to local policies and the Government's 25 Year Environment Plan where they are relevant.

11.2.2 These documents are proposed to form the framework for detailed assessment post-scoping and will be taken into account in the assessment of the historic environment during PEI and ES stages, with the relevant criteria followed throughout.

Table 11.1 Policy and legislation relevant to the historic environment assessment

Relevant policy / legislation	Relevance to assessment
Policy	
Airports National Policy Statement (ANPS) (2018)	The historic environment is identified as being an important consideration due to the impacts that could be made upon its various elements both above- and below-ground by any airport expansion (paragraphs 5.187 – 5.212).

Relevant policy / legislation	Relevance to assessment
	<p>These sections of the ANPS confirm that the Secretary of State must comply with legislation relating to listed buildings, conservation areas and scheduled monuments as set out in the Infrastructure Planning (Decisions) Regulations 2010 (Section 5.197). They also outline the need for a thorough understanding of the significance of each heritage asset that may be affected, its setting, surroundings and landscape context, to define how heritage assets are currently experienced and identify any potential harm as a result of the Proposed Development and how this harm may be mitigated, or opportunities for a new development to enhance and better reveal the significance of heritage assets (paragraphs 5.198 – 5.200 and 5.208).</p> <p>The policy also states how the Secretary of State will seek to identify and assess the significance of heritage assets that may be affected, using decision making criteria set out in Section 16 of the NPPF (2018). Weight is given towards conservation of heritage assets and any loss or harm will require clear and convincing justification. Substantial loss or harm to Grade II listed buildings or registered parks and gardens should be exceptional and higher designations (i.e. Grade II* and I listed buildings or registered parks and gardens, Scheduled Monuments and World Heritage Sites) should be wholly exceptional. The harm should be weighed against the public benefit of a development, recognising that the greater the harm, the greater the justification required.</p> <p>Where loss of heritage significance is identified as being justified on the merits of the new development, the Secretary of State will consider imposing a requirement on consent or requiring the applicant to enter into an obligation that will prevent the loss occurring until it is certain the relevant part of the development is to progress.</p> <p>The ability to record evidence of an asset should not be a factor in deciding whether consent is granted, as a documentary record of our past is not as valuable as retaining a heritage asset itself. Where loss of an asset's significance is justified, however, the Secretary of State will require the applicant to record the asset and advance understanding of it and its significance before it is lost. This recording will be imposed as a requirement on the DCO to ensure the work is undertaken in accordance with a written scheme of investigation that complies with the policy and is agreed in writing with the local authority.</p> <p>Finally, where there is a high probability of a development site including as yet unknown heritage assets of archaeological interest, requirements can be imposed to ensure appropriate procedures are in place for identification and treatment of the potential assets prior to construction.</p>
National Policy Statement for National Networks (NPS NN) (2014)	<p>The policy includes a section on the Historic Environment (Section 5.120 to 5.142), the contents of which are reflected within the ANPS, including the same decision-making criteria as set out in Section 16 of the NPPF (defined below). The ANPS states that if there is a conflict between the ANPS and NPS NN, the conflict should be resolved in favour of the NPS that has most recently been designated, in this case, the ANPS.</p> <p>The policy states that, where a development is subject to an Environmental Impact Assessment, the applicant is required to assess any likely significant heritage impacts of the proposed projects and describe the significance of any heritage assets affected, including any contribution of their setting. Where the site has, or has potential for, buried remains of archaeological interest, the applicant should</p>

Relevant policy / legislation	Relevance to assessment
	include a desk-based assessment and where appropriate field evaluation, e.g. trial trenching.
National Planning Policy Framework (NPPF) (2018)	Section 16 of the revised NPPF (2018) concerns 'Conserving and Enhancing the Historic Environment'. This section forms the basis for much of the requirements detailed in the APS and NPS policies, above, and is not repeated.
Scheduled Monuments Policy Statement (2013)	<p>The policies set out in this statement relate to the identification, protection, conservation and investigation of England's foremost archaeological sites under the provisions of the Ancient Monuments and Archaeological Areas Act 1979, including through:</p> <ul style="list-style-type: none"> • the designation of scheduled monuments; and • the determination of applications for scheduled monument consent.
Legislation	
Infrastructure Planning (Decisions) Regulations, 2010	<p>Regulation 3 states how decision-makers must ensure due regard for the historic environment is given, stating that when deciding an application:</p> <ul style="list-style-type: none"> • which affects a listed building or its setting, they must have regard to the desirability for preserving the listed building or its setting or any features of special architectural or historic interest which it possesses. • relating to a conservation area, they must have regard to the desirability of preserving or enhancing the character or appearance of that area. • for development consent which affects or is likely to affect a scheduled monument or its setting, they must have regard to the desirability of preserving the scheduled monument or its setting.
Ancient Monuments and Archaeological Areas Act, 1979	<p>Under the terms of the Act, an archaeological site or historic building of national importance can be designated as a Scheduled Monument and is registered with the Department of Culture, Media and Sport (DCMS). Any development that might physically affect a Scheduled Monument is subject to the granting of Scheduled Monument Consent. Historic England advises the government on individual cases for consent and offers advice on the management of Scheduled Monuments.</p> <p>Separate Scheduled Monument Consent is not specifically required where a DCO is secured because, if Development Consent is granted, the order will contain consent / requirements that will supersede the requirement for a separate Scheduled Monument Consent.</p>
Planning (Listed Buildings and Conservation Areas) Act (1990)	<p>Statutory protection for listed buildings and conservation areas, and their settings, is provided under the Planning (Listed Buildings and Conservation Areas) Act 1990. A Listed Building is that which is seen to be of special architectural or historic interest, and a Conservation Area comprises an area of special architectural or historic interest, the character or appearance of which is desirable to preserve or enhance.</p> <p>A listed building may not be demolished, altered or extended in any manner which would affect its character without listed building consent being granted. There are three grades of listing (in descending order):</p> <ul style="list-style-type: none"> • Grade I: buildings of exceptional interest; • Grade II*: particularly important buildings of more than special interest; and • Grade II: buildings of special interest, warranting every effort to preserve them. <p>The requirement to obtain conservation area consent was abolished under the Enterprise and Regulatory Reform Act 2013, instead requiring local planning consent for demolition within a conservation area.</p>

Relevant policy / legislation	Relevance to assessment
	Again, separate listed building consent or planning permission for demolition within a conservation area is not required if a DCO is granted, as the DCO will contain the consent and associated requirements, where relevant.
The Hedgerows Regulations 1997, as amended by The Hedgerows (England) (Amendment) Regulations 2002	<p>Important hedgerows, as defined by the Hedgerows Regulations 1997, enjoy statutory protection against removal and various works. Various criteria specified in the regulations are used to identify important hedgerows for wildlife, landscape or historical reasons.</p> <p>These criteria contain a number that are specific to heritage: i.e. if the hedgerow forms part of a historic parish or township boundary; the hedgerow incorporates an archaeological feature which is a Scheduled Monument; the hedgerow is wholly or partly within a site which is scheduled, or is associated with any feature of the site; or if the hedgerow is recorded as part of a field system pre-dating the Enclosure Acts; or is part of a field system forming part of a key landscape characteristic.</p> <p>Removal of hedgerows considered 'important' is permitted where planning permission or Development Consent has been granted which would require removal of said hedgerows.</p>

11.3 Stakeholder Consultation

- 11.3.1 A detailed stakeholder engagement plan is currently being developed. Care will be taken to ensure all key stakeholders with views and concerns regarding the historic environment are provided with sufficient information on the Proposed Development to discuss and agree the details of the assessment in a meaningful and inclusive manner.
- 11.3.2 **Table 11.2** details which stakeholders have already been contacted to make them aware of the Proposed Development and timescales for further consultation. Stakeholders were provided with a presentation in November 2018 providing an overview of the Proposed Development and inviting initial comments on the scope of the assessment for the historic environment effects.
- 11.3.3 The overview included the proposed approach for obtaining baseline data on the historic environment and how any likely significant effects arising from the Proposed Development would be identified. Responses received from the stakeholders have been used to inform this Scoping Report. A summary of key stakeholder responses is outlined in **Table 11.2**.

Table 11.2 Stakeholder consultation undertaken and proposed for post-scoping

Consultee	Stakeholder response
Historic England	<p>Responded 17/12/18. Historic England encourage an approach to EIA that focuses on how the proposals in question may affect the significance of the historic environment.</p> <p>Current level of detail is minimal at this stage, with the result that effects on historic environment are difficult to discern with certainty.</p> <p>Setting is a key consideration and should be considered in assessing the significance of heritage assets.</p>

Consultee	Stakeholder response
	It is critical that the assessment considers cumulative impacts from all nearby developments, including the HAL DCO Project.
Greater London Archaeological Advisory Service (GLAAS)	Responded 04/12/18 stating that GLAAS will compile a joint response with Historic England (see above).
Greater London Historic Environment Record (GLHER)	Historic Environment Record (HER) data received 08/01/2019.

11.3.4 The HAL Scoping Opinion is a useful source of stakeholder feedback, and has been used to inform this Scoping Report.

11.3.5 Further formal and informal consultations will be arranged to discuss and agree the details of the methodology for the assessment of potential historic environmental impacts arising from the Proposed Development. This is expected to involve setting up an Expert Topic Group (Heritage Steering Group) with technical specialists from all relevant stakeholder organisations to discuss:

- Access to HER search data from relevant local authorities
- Identification of key heritage assets for assessment;
- Identification of key historic landscapes that require Historic Landscape Characterisation/Historic Area Assessment;
- Emerging results of PEI and subsequent ES;
- Ascertaining likely effects of the Proposed Development;
- Approach to surveys and evaluation;
- Initial mitigation strategy concepts and approaches; and
- Drafting of the Archaeological Investigation & Research Strategy.

11.4 Approach to Scoping

Study area

11.4.1 This section sets out how the study areas will be defined for the consideration of potential air quality effects at the assessment stage.

11.4.2 The same approach has been used to define the study areas for scoping (see **Figure 11.1**), which have been used to identify historic environment receptors with the potential to be affected by the Proposed Development.

11.4.3 The study areas at the scoping stage have been based on the Proposed Development, as shown in **Figure 11.1**. As the design of the Proposed Development is still in its early development, the study areas currently defined will be kept under review as the design and consultation processes progress, and related topic assessment study areas are confirmed. Therefore, the study areas at the assessment stage may evolve as appropriate.

11.4.4 Firstly, all known heritage assets within the Proposed Development area will be collated and assessed, including land where any potential ancillary and related infrastructure work will take

place.

- 11.4.5 Further to this, a core study area of 1km around the Proposed Development itself will be employed (see **Figure 11.1**). All designated and non-designated heritage assets within this core study area will be identified and collated. This data will then form the baseline used to assess what potential direct and indirect effects may occur to the heritage assets and their settings as a result of the Proposed Development.
- 11.4.6 Further to this, a wider study area of 3km from the Proposed Development will be established to identify key designated assets which are located within the wider landscape, whose setting could be affected by construction and operational effects of the Proposed Development (see **Figure 11.1**). This search will initially consider scheduled monuments, listed buildings and registered parks and gardens. Conservation area information will also be obtained to feed into the PEIR and subsequent ES.
- 11.4.7 These study areas have been decided upon using professional judgement and previous experience on significant infrastructure projects. It will allow a bespoke assessment of potential impacts to the historic environment from the Proposed Development. The core study area will allow for the assessment of any direct or indirect impacts to all known and potential heritage assets and their setting (designated and non-designated) by the Proposed Development. The wider 3km search area will allow assessment of any potential impacts to the setting of key designated heritage assets.
- 11.4.8 As the design of the Proposed Development is still in its early development, the study areas set out above will be kept under review as the design and consultation processes progress, and related topic assessment study areas are confirmed. Therefore, the study areas at the assessment stage may evolve as appropriate. The development of the wider study area in particular will evolve through collaborative working with the Landscape and Visual Impact Assessment (LVIA), and associated tool kits, such as Zones of Theoretical Visibility (ZTVs) and following the guidance within Historic England's Aviation Noise Metric (Temple Group, 2014) and Planning Notes 2 and 3 (Historic England, 2015b & 2017), along with consultation with, and requests and requirements from, key stakeholders
- 11.4.9 When the study areas are refined, all collected data will be reviewed and updated to ensure all relevant data forms part of the assessment, and to ensure any gaps are identified, acknowledged and addressed, wherever possible.

Sources of baseline data

- 11.4.10 Baseline data collection is ongoing, with the data sources to be reviewed and consulted tabulated below (**Table 11.3**). An initial data-set has been acquired at this stage of the project through a commercial search of the GLHER. Other relevant county Historic Environment Records searches with respect to the core study area will be undertaken during the PEI stage. The National Heritage List for England (NHLE) has also been searched at this stage specific to designated heritage assets, along with informal reviews of other data sources (**Table 11.3**).
- 11.4.11 These searches have resulted in a data-set of non-designated and designated heritage assets within the core study area and designated assets within the wider study area which has been used to present the initial baseline conditions in **Section 11.5** for scoping purposes only. Following the GLHER search request and other data acquisition, data has been compiled into a gazetteer (**Appendix 11.1**) and search results have been plotted within a Geographic

Information System (GIS) along with mapping data, allowing for rigorous analysis and scrutiny of the data, which will be undertaken post-scoping. All designated assets within the study area have been reproduced on **Figure 11.2** and **Figure 11.4a – 11.4aj** to allow an initial review of results.

Table 11.3 Sources of Historic Environment Information and Data

Data Source	Details
British Geological Survey (BGS)	Online geology & borehole data viewer (accessed: http://mapapps.bgs.ac.uk/geologyofbritain/home.html).
National Heritage List for England (NHLE)	List of designated heritage assets and GIS shapefiles for scheduled monuments, listed buildings, protected wreck sites, registers parks and gardens, battlefields, World Heritage Sites, Buildings with Building Preservation Notices, Buildings with Certificate of Immunity.
Greater London HER (GLHER)	Initial search buffer of 1km around Proposed Development used for a search of the GLHER, producing datasets for non-designated heritage assets within the study area that falls within the Greater London Boroughs
Natural England Ancient Woodlands	GIS data for woodland identified as ancient (woodland established since AD1600). Accessible at https://naturalengland-defra.opendata.arcgis.com/datasets/ancient-woodlands-england
Ordnance Survey (OS)	OS modern mapping, OS County Series & other historic maps
Various local authorities' conservation area appraisals & maps	Conservation Area boundaries and descriptions for Berkshire, Buckinghamshire, Greater London Authority and Surrey. Accessed through: Ealing Borough Council https://www.ealing.gov.uk/info/201158/conservation_areas London Borough of Hillingdon https://www.hillingdon.gov.uk/article/22670/Conservation-areasin-Hillingdon London Borough of Hounslow https://www.hounslow.gov.uk/downloads/download/118/conservation_area_appraisals_and_maps Royal Borough of Windsor and Maidenhead https://www3.rbwm.gov.uk/info/200207/conservation/666/conservation_areas/1 Runnymede Borough Council https://www.runnymede.gov.uk/article/15530/Conservation-Areas-and-Listed-Buildings-policy-documents-and-guidance Slough Borough Council http://www.slough.gov.uk/council/strategies-plans-and-policies/conservation-areas-and-listed-buildings.aspx South Bucks Borough Council http://www.southbucks.gov.uk/conservationareas Spelthorne Borough Council https://www.spelthorne.gov.uk/article/602/Trees-Conservation-Areas-and-Listed-Buildings
Hillingdon Borough Archaeology Priority Areas	Assessment of the Borough's identified Archaeology Priority Areas and Zones. https://www.hillingdon.gov.uk/article/22673/Archaeology
County Historic Environment Records	Searches are to be undertaken of the following county HER's: <ul style="list-style-type: none"> • Slough Borough Council • South Buckinghamshire District Council • Surrey

Data Source	Details
	Visits in-person to review and assess any cartographic and historical sources within the HER to assist in the development of the historic environment baseline for the study areas will also be undertaken post-scoping.

11.4.12 A high-level walkover survey of the core study area and assets identified as being key to the assessment will be undertaken, where possible and where access is facilitated, as an initial priority task post-scoping. The purposes of this initial walkover survey will be to identify any potential non-designated assets within the Proposed Development and to assess key designated assets and how their setting affects their significance.

11.5 Baseline Conditions

11.5.1 The initial collated baseline data for the purposes of this scoping are contained within **Appendix 11.1**. The collection of baseline data is ongoing; the below section is an early, high-level review only, of non-designated and designated assets within the core study area and designated assets (scheduled monuments, listed buildings and registered parks and gardens) within the wider study area. This data will be reviewed and updated as the EIA process progresses but does currently allow for identification of the initial key issues regarding potential impacts upon the historic environment and aids in producing a programme for continued data collection and analysis, which is required to produce a robust baseline for the PEIR and subsequent ES.

11.5.2 Baseline data and any site survey work required and possible will be identified in the relevant chapters of the full PEIR and ES to identify the significance of any affected heritage assets and their settings, will allow for a full assessment of what impact the Proposed Development will have upon them, will set out any initial informative stages of mitigation and subsequent mitigation approaches available.

Geology and topography

11.5.3 The Proposed Development is situated upon a geology of London Clay formation, overlain with superficial deposits of alluvium and various river terrace gravel deposits (e.g. Taplow and Sheperton Gravels) (British Geological Survey 2019).

11.5.4 The majority of the Proposed Development consists of the extant airport and its associated infrastructure, along with numerous areas of urban and suburban settlement. To the west of the airport, between the M25 and Heathrow Terminal 5, the site is currently private land lain to grass, with moderate tree and shrub cover located within the centre, whilst the western third of the area has been heavily landscaped following the area forming a temporary works area for major roadworks associated with the expansion of Heathrow Airport (Terminal 5) in the late 1990's, and is noted as being a historic landfill prior to this. A sand and gravel extraction pit was also within the southern-most section of this area.

11.5.5 The land is situated at approximately 22m to 25m aOD (above Ordnance Datum). Water courses pass through the Proposed Development, with the River Colne, Wrysbury River and Longford River located within the western limits of the Proposed Development. Longford River, directly west of the current Heathrow Airport boundary, is a canalised section of the river, located between the A3044 and Heathrow Airport's western perimeter road. The Colne River valley flood plain forms the significant topographic feature of the project area, located within the western limits.

- 11.5.6 The Proposed Development is located within the southern limits of Hillingdon Borough, which is located within the Thames Valley National Character Area (Natural England, 2015), a component of the Greater London metropolitan south-west fringe. This heavily populated area is a variable landscape of urban and suburban settlement, significant infrastructure networks, small parcels of agricultural land and numerous historic parks, gardens, common land, woodland and historic and modern mineral extraction areas.
- 11.5.7 Further details on landscape considerations and conditions can be found in **Chapter 13 ‘Landscape and Visual Amenity’**, and information on ground conditions can be found in **Chapter 14 ‘Land Quality and Waste’**.

Historic Landscape Character

- 11.5.8 The Historic Landscape Character of the area has been assessed as part of the Colne Valley Park Historic Landscape Characterisation project, carried out by Buckinghamshire County Council and Groundwork Thames Valley (Beckley, 2007). This project’s scope encompassed the Colne Valley, which spans parts of Hertfordshire, Buckinghamshire, Berkshire, Surrey and the eastern limits of Hillingdon Borough, including the western third of the Proposed Development.
- 11.5.9 Historic Landscape characterisation identified the area west of Heathrow as the Horton – Poyle Industrial local historic landscape zone. This area is defined by the high industrialisation and development undertaken within it, bordered to the south and west by large reservoirs and lakes, to the north by Colnbrook settlement and to the east by Heathrow Airport. The project concludes that this local historic landscape zone has little historic landscape significance, but that previous archaeological records suggest the area has been in use since the Middle Palaeolithic period (c.100,000 – 30,000BC), with moderate potential for further discoveries, particularly in the western part of the zone, where previous development may not have affected below ground deposits. The area of Heathrow Airport forming part of the study is characterised as purely ‘Industrial (post-1885)’ within the figure (ibid., fig. 109), presumably due to the evidence of historic landfill and mineral extraction within large portions of the south-western portion of the development area.

Initial review of Historic Environment Record data

- 11.5.10 Data held on the GLHER and other County HER’s forms the primary data source for non-designated heritage assets, which are sometimes considered to be of likely lower significance than those that are designated (i.e. scheduled monuments, listed buildings etc.). These assets can be nationally significant however and still form a major part of a local area’s historic environment and character and will be given due merit and consideration as part of any planning decisions. These records are primarily of findspots, monuments, buried remains, archaeological surveys and buildings listed at a local level. This data can be used to identify the likelihood of currently unknown heritage assets to be located within a proposed development area.
- 11.5.11 A search of the GLHER has been undertaken at this stage, which covers the majority of the study areas, excluding the western-most quarter, which falls within either Surrey, Slough or South Bucks HER. These further HER search requests and associated data collation are ongoing (and will continue to be post-scoping through PEI and into ES stages), but a high-level assessment of the Greater London HER search data has been undertaken as part of this initial scoping-related baseline data collation section, summarised below. This data is included as

Appendix A1. This allows for a broad view of the surrounding landscape's archaeological potential. A fully detailed assessment of all HER data within the study area will form part of the baseline data within the PEI and subsequent ES.

- 11.5.12 A total of 910 non-designated heritage assets and 61 HER events (archaeological works) are recorded within the core study area (**Appendix A11.1, Figure 11.3**). The monument records relate to findspots, locally listed buildings, documentary evidence for historic buildings or activity and archaeological features excavated during the HER events. The HER events record archaeological works undertaken prior to development and range from borehole surveys, watching briefs, trial trench evaluations and open area excavations.
- 11.5.13 Evidence held within the GLHER indicates that there is early prehistoric hunter-gatherer activity within the core study area (also evidenced within the Terminal 5 archaeological excavation findings, see below). Palaeolithic worked flints have been found within the river terrace gravels, whilst Mesolithic remains are known within the Colne River Valley, along with the significant evidence for Neolithic and Early Bronze Age ceremonial activity in the form of cursus monuments, causewayed enclosures and round barrows.
- 11.5.14 Late prehistoric activity is also prevalent in the landscape, with mass land division taking place from the Middle Bronze Age onwards in the region, and a continuity of this division into the Iron Age and Romano-British periods, when evidence for small farmsteads is also found. Following the fall of Roman Britain, Anglo-Saxon settlements can be identified through place-names, and evidence for late Saxon estates are seen in the HER, located around Hounslow Heath and the Colne Valley.
- 11.5.15 Continuation of nucleated settlement throughout the medieval and post-medieval periods results in the landscape today; with a number of small historic villages located around Heathrow Airport, such as Stanwell and Longford. Urbanisation of the area began in the mid-20th century, with the development of Heathrow Airport, built on the location of an earlier aerodrome. This urbanisation and industrialisation of the area resulted in further large-scale impacts upon the rural landscape, with numerous mineral extraction quarries being excavated, resulting in the large reservoirs that are found across the landscape, particularly to the south-west of Heathrow Airport. Similarly, a large number (88) of records relate to historic landfill sites within the area, indicative of the dense urbanisation of the local area throughout the early modern period.

Previous archaeological investigations

- 11.5.16 A high-level review of GLHER event data and available archaeological reports indicates a large number of previous archaeological surveys, evaluations and excavations have taken place within the vicinity of the Proposed Development. The largest, and most significant work was conducted by Framework Archaeology between 1996 and 2007, within the Proposed Development itself. This work was undertaken as part of the Heathrow Terminal 5 enabling works. A significant amount of archaeological excavations (totalling 75ha) was undertaken across the area, revealing evidence for human habitation spanning 9000 years. This densely settled landscape revealed evidence for Mesolithic pits, dug in the 7th or 6th millennium BC, prehistoric and Romano-British farmsteads and field systems, through to an early Saxon settlement. Some of the most significant evidence uncovered was that of at least four Neolithic cursus monuments, evidence of the landscape being a major ceremonial centre during the 4th millennium BC (Framework Archaeology, 2010).

11.5.17 Of particular relevance to the Proposed Development is an archaeological evaluation, consisting of 70 trenches and 210 test pits, undertaken across the western limits of the Proposed Development area, within the Colne River valley (land known as Bedfont Court - forming the largest current green space within the Proposed Development). Archaeological features consisted largely of tree-throws, pits, postholes and ditches. Many of the ditches are likely to be continuations of Bronze Age and medieval to post-medieval field systems identified to the east within the Heathrow Terminal 5 excavation. A series of stakeholes were also recorded, with one containing the remnants of a wooden stake radiocarbon dated to the Mesolithic period. Potential Bronze Age settlement was also identified within the eastern part of the area of evaluation. Several small archaeological excavations were also undertaken within the northern limits of this area, where the new M25 slip road was to be placed. Due to the rest of the land not being developed for Terminal 5, it is likely that there are areas of archaeological potential that will require identification and further excavation prior to development.

11.5.18 Overall, these evaluations and excavations confirm that there is a high archaeological potential within the Proposed Development, specifically in places where later development has not already impacted upon buried remains.

Initial consideration of geotechnical data

11.5.19 A limited review of geotechnical data held by the British Geological Survey (BGS) has been undertaken at this stage and will be updated throughout production of the PEIR and subsequent ES. Currently, the area reviewed consists of the Colne River Valley, within the western limits of the Proposed Development. The records held by the BGS indicate that at least 24 boreholes have been undertaken in the past within this area. These boreholes were mostly confined to the western and southern areas of the site where historical landfill has taken place. This past land-use was confirmed in the borehole logs, which indicate at least 4 to 5m of made or contaminated ground overlying the geology. This landfill material was dated by plastic remains within it to the 1970's.

11.5.20 Boreholes adjacent to the River Colne did reveal layers of alluvial deposits, up to 1.5m thick, which overlay the river terrace gravel deposits. The water table was reached at between 2.2m to 3m, where recorded. Many of the recorded boreholes outside of the landfill area contain limited information of use in producing a deposit model for the area. This will be further investigated, and an approach established post-scoping, moving into PEIR and subsequent ES stages.

Designated assets

11.5.21 There are no registered parks, gardens or battlefields within the Proposed Development area. Two scheduled monuments are, however, along with three conservation areas (Colnbrook, Harmondsworth and Longford) and 78 Listed Buildings (one Grade I, two Grade II* listed and the rest Grade II). One section of ancient woodland is also located within the boundary.

11.5.22 Within the core 1km study area there are a total of 247 further listed buildings, two more scheduled monuments and 8 further conservation areas.

11.5.23 Within the 3km wider study area there are another 651 listed buildings, nine scheduled monuments, eight registered parks and gardens and 15 further sections of ancient woodland.

11.5.24 In summary, there are currently 13 scheduled monuments, 977 listed buildings, eight

registered parks and gardens, 11 conservation areas and 16 sections of ancient woodland within the greatest extent of the project study areas and which are currently under consideration.

- 11.5.25 All of these heritage assets are detailed within the Heritage data gazetteer (**Appendix 11.1**). The below summary details highlight the assets of highest designation (scheduled monuments, Grade I and II* listed buildings) within the core (1km) study area.

Scheduled monuments

- 11.5.26 The scheduled monuments within the Proposed Development area are located adjacent to each other, directly south of the current Heathrow Airport boundary (NHLE 1002042 & 1002043). Both are within large arable fields, bounded by Stanwell road to the north. The western-most monument (NHLE 1002042) is described as a 'Roman-British site 900m west of East Bedfont Parish Church'. No other details of the monument are available online, as it is a legacy record which has not been updated since initial creation in 1970. The eastern monument (NHLE 1002043) is part of a causewayed enclosure, visible as cropmarks within the field. Both monuments could be considered part of the same 'site', forming a complex of multi-period cropmarks spread across the fields.
- 11.5.27 A third scheduled monument is located just outside of the core study area; Lord Knyvett's Adult Education Centre (NHLE 1005920). This was scheduled in 1946. It is also a Grade II* listed building (NHLE 1204896), listed in 1952. It is a fine example of a 17th century school, associated with Lord Knyvett, an early 17th century courtier, whose Will provided the foundation of the free-school, which adds to its historic interest. The building is a two-storey-high brick structure with significant alterations since its original construction. At the centre of the western front of the building is a tablet with the coat of arms commemorating Lord Knyvett.
- 11.5.28 Another nearby scheduled monument within the core study area (NHLE 1006944) is the remains of two concentric ditches identified in cropmarks at Thorney, scheduled in 1963. No further information is held on the monument online, although the outer ditch is faintly visible on modern satellite imagery. It is located in an area currently laid to grassland, directly west of the M25.

Listed buildings

- 11.5.29 All of the 78 listed buildings within the Proposed Development are Grade II listed apart from three, two Grade II* (King John's Palace, Colnbrook with Poyle & Church of St Mary, Harmondsworth) and one Grade I (The Great Barn, Harmondsworth). The Great Barn (NHLE 1194332) is a recently restored, very fine and well-preserved example of a medieval barn and one of the largest medieval barns known to have been built in England. It was built during the mid-15th century by Winchester College and was described by the poet Sir John Betjeman as the "Cathedral of Middlesex".
- 11.5.30 The majority of the Grade II listed buildings are post-medieval vernacular structures (public houses, cottages etc.) of historic and architectural interest and are mostly located within conservation areas. Some of these assets are located within the footprint of the proposed Northwest Runway rather than on land directly associated with the Proposed Development; principally the southern-most listed buildings located within the Harmondsworth Conservation Area, with the Grade I listed Great Barn located just north (see **Figure 11.4**).

11.5.31 Of the further 247 listed buildings within the core study area, 224 are Grade II listed, located within the historic cores of the smaller villages now subsumed into larger modern settlements. A total of six are Grade I listed (four of which are parish churches) and 17 are Grade II*.

11.5.32 Within the wider 3km study area, the 661 listed buildings are again mostly Grade II listed, located within the historic cores of settlement that have been subsumed by modern developments. A total of 44 are Grade II* listed and seven are Grade I, including Windsor Castle, Eton College, Runnymede Park and the Royal Mausoleum.

Conservation areas

11.5.33 A total of 11 conservation areas have been identified within the core study area (**Table 11.4**). Harmondsworth and Longford Conservation Areas have both been subject to conservation area appraisals (Hillingdon Planning & Community Services 2007 a & b), which identify both as having extant medieval and post-medieval buildings of historic and architectural interest. Similarly, both appraisals identify the expansion of Heathrow Airport as a pressure for change upon both locations, with local planning officers particularly mindful of the construction of any proposed new Northwest Runway, which will be sited nearby to Harmondsworth's Conservation Area. In the proceeding decade, this siting has changed, with both Harmondsworth and Longford Conservation Areas being located where they will be directly (physically) impacted by the proposed new Northwest Runway.

Table 11.4 Conservation Areas within the core study area

Conservation Area	Local authority
Botwell Nestle's Conservation Area	London Borough of Hillingdon
Botwell Thorn EMI Conservation Area	London Borough of Hillingdon
Cranford Park Conservation Area (Hillingdon)	London Borough of Hillingdon
Harlington Village Conservation Area	London Borough of Hillingdon
Harmondsworth Village Conservation Area	London Borough of Hillingdon
Longford Village Conservation Area	London Borough of Hillingdon
West Drayton Green Conservation Area	London Borough of Hillingdon
Bedfont Green Conservation Area	London Borough of Hounslow
Cranford Park Conservation Area (Hounslow)	London Borough of Hounslow
Cavalry Barracks Conservation Area	London Borough of Hounslow
Old Windsor Conservation Area	Royal Borough of Windsor and Maidenhead
Colnbrook Conservation Area	Slough Borough Council
Staines Conservation Area	Spelthorne Borough Council
Stanwell Conservation Area	Spelthorne Borough Council

Ancient woodland

11.5.34 A single section of Ancient Woodland is located within the Proposed Development area, situated in the north-western limits. The area of woodland is just under 1 hectare in size and is unnamed in the Natural England Ancient Woodland database (ID 11255). It is located north of a section of non-ancient woodland called 'Old Wood' and east of another named 'Oak Plantation'. The section of woodland is bounded to the south by the M4. A further 15 sections

of ancient woodland are located within the wider study area, mostly found to the west near to registered parks and gardens and Windsor Castle.

Archaeological Priority Areas

11.5.35 All Boroughs across Greater London have designated areas which they highlight as Archaeological Priority Areas (APA), also known as Archaeological Priority Zones (APZ). These are defined to aid the decision-making process on the potential need for archaeological assessment and evaluation prior to a development taking place.

11.5.36 The Borough of Hillingdon, which the Proposed Development area is situated within, has a total of 22 APA's or APZ's across the Borough, one of which is the Heathrow APZ. This area covers over 2000 hectares, encompassing the section of the Colne Valley directly west of the airport, the entirety of the airport's grounds, and large portions of land north of the airport, up to the M4. The area is identified as having significant prehistoric potential, due to previous archaeological investigations. The entirety of the Proposed Development is within this APZ. The western half, past the River Colne, is not within the area, nor is the south-eastern-most corner. This is due to the evidence for the western half being a historical landfill, and the south-eastern corner having previously been a large gravel extraction pit.

11.5.37 An APA is also located within the Heathrow APZ itself, within the western limits of the current airport. This APA is titled the Stanwell Cursus Complex and runs on a north-west to south-east alignment from Stanwell at its southern end, to the Wraysbury River, just south of the M4 / M25 junction. Much of this Neolithic cursus complex has been excavated and / or destroyed by development but is evidence of the significant prehistoric activity (and potential) within the area.

11.5.38 Another APZ is located north of Heathrow Airport, titled Colne Valley APZ. Again, this is an area highlighted for prehistoric potential, following the valley northwards and is again further evidence for the significant prehistoric potential of the region.

11.6 Scoping of Potential Effects

Effects scoped into the assessment

11.6.1 The potential likely significant effects to be scoped into the historic environment assessment are displayed in **Table 11.5**. Construction and operation of the Proposed Development will likely have effects upon designated and non-designated heritage assets, both temporary and permanent. Cumulative effects resulting in the combination of the Proposed Development and others will also be assessed (see **Section 11.7.3**).

Table 11.5 Potential likely significant historic environment effects

Activity	Effect	Receptor (Asset/Potential Asset)
Construction		
Enabling works: earthworks and other groundworks involved in preparing the site for development, including demolition (e.g. topsoil removal, services installation / removal, scrub and tree clearance,	Direct, permanent and possibly total, loss of heritage assets through construction activities.	Non-designated and potentially designated heritage assets within the footprint of where earthworks/hard landscaping and other construction activities are to be undertaken.
	Change to significance of heritage assets through a change to their setting. These changes will likely	Designated and non-designated assets within the core study area (1km radius).

Activity	Effect	Receptor (Asset/Potential Asset)
mineral extraction, drainage installation and removal)	be temporary, until enabling works are completed.	
Changes to river alignments and flood storage (e.g. excavation of new channels, and hard landscaping / infilling of original waterways)	Direct, permanent and total loss of potential heritage assets.	Potential heritage assets not currently known (e.g. palaeoenvironmental remains, geoarchaeological deposits, chance finds, preserved organic remains).
	Permanent change to the setting of heritage assets and historic landscapes, and associated change to heritage significance.	Colne Valley, which is an identified landscape of historical interest. Potential for the setting of heritage assets to be impacted.
Construction of buildings or other infrastructure for Heathrow Western Hub and associated supporting facilities	Direct, permanent and possibly total, loss of heritage assets through construction activities.	Any heritage assets or potential heritage assets situated within the footprint of any proposed structures.
	Change to significance of heritage assets through a change to their setting, temporary and potentially permanent.	Heritage assets located within the core (1km) and wider (3km) study areas.
Changes to the road and rail surface access infrastructure	Direct, permanent and total loss of known and potential heritage assets through associated construction activities.	Non-designated and potentially designated heritage assets within the footprint of any new roads.
	Change to significance of heritage assets through a change to their setting. Both temporary (during construction) and permanent.	Heritage assets located within the core (1km) and potentially the wider (3km) study area.
Effects of construction activity resulting in changes to: Traffic, Noise, Vibration, Dust, Visual amenity	Physical change to heritage assets through impacts from vibration and / or dust. Change to significance of heritage assets due to perceptual change of their setting. Potentially permanent.	Heritage assets located within the core (1km) and potentially the wider (3km) study area.
	Direct loss of significance through material change to, or complete loss of, heritage assets. Potentially permanent.	Heritage assets within the core (1km) study area, e.g. assets impacted by increased traffic/vibration, as a result of construction activities and road diversions.
Operation		
Aviation and Terminal operation: increased visibility and noise of operations.	Changes to significance to heritage assets through a change in setting due to increased noise (particularly aviation noise from planes taxiing to the Terminal for example) and visual effects.	Heritage assets within both the core and wider study areas.
Increased traffic due to growth in airport capacity	Change to significance of heritage assets within study areas, with a change in setting due to perceptual change with increases in noise.	Heritage assets within both the core and wider study areas.

Activity	Effect	Receptor (Asset/Potential Asset)
Land-use changes as a result of Proposed Development	Change to significance of heritage assets due to a direct or indirect effect on the asset(s) and their setting. These impacts could be permanent.	Heritage assets within the core study area, located within an area where changes in land use will affect the setting and potentially significance of an asset(s), or remove an asset(s) completely.

Effects scoped out of the assessment

11.6.2 At this stage of the Proposed Development, no effects have been scoped out of the assessment. During production of the PEIR and subsequent ES, heritage assets that are identified as not being impacted, through a lack of visual links to the development, or due to evidence of no impact from other factors such as noise, vibration or traffic, will be scoped out of the assessment. This will be detailed within the PEIR and ES, accompanied by a proportionate and evidenced narrative, where required.

11.7 Approach to Assessment

11.7.1 The impact assessment upon the historic environment resource will follow a heritage significance-based approach to historic environment decision-making, as set out in the ANPS and NN NPS, in line with the statements set out in the NPPF. The assessment will also follow all relevant and appropriate guidance as detailed in **Table 11.6**, below.

Table 11.6 Guidance relevant to the historic environment assessment

Guidance	Relevance to assessment
<p>The Historic Environment in Local Plans Historic Environment Good Practice Advice in Planning 1 (Historic England, 2015a)</p>	<p>This document details the procedures involved in the decision-making process for the historic environment at a local planning level, providing guidance for implementing the NPPF requirements in respect of the historic environment.</p> <p>Despite this being a Proposed Development requiring a DCO, guidance within the document is relevant to ensuring data and documentation for the historic environment is of the standard required.</p>
<p>Managing Significance in Decision-Taking in the Historic Environment Historic Environment Good Practice Advice in Planning 2 (Historic England, 2015b)</p>	<p>This document provides advice and guidance on the assessing of significance for heritage assets, and how to understand the nature, extent and level of significance. It provides guidance on how to understand the impact of a proposed development on that significance and how to identify ways to avoid, minimise or mitigate that impact which meets the objectives of the NPPF.</p>
<p>The Setting of Heritage Assets Historic Environment Good Practice Advice in Planning 3 (Historic England, 2017a)</p>	<p>This document provides guidance on setting and development management, including on assessing the implications of development proposals. This industry-standard guidance document recommends a stepped (stage-based) approach for assessing the heritage setting implications of development proposals, as follows:</p> <p>Step 1: identify those heritage assets whose settings might be affected; Step 2: assess whether, how and to what degree setting makes a positive contribution to the value of those heritage assets; Step 3: assess the effect of a proposed development on the significance of those assets as a result of changes to setting; Step 4: maximise enhancement and minimise harm; and</p>

Guidance	Relevance to assessment
	Step 5: make and document decisions and monitor outcomes.
<p>Aviation Noise Metric – Research on the Potential Noise Impacts on the Historic Environment by Proposals for Airport Expansion in England (Temple, 2014)</p>	<p>This report, undertaken on behalf of English Heritage (now Historic England), identifies and details the methodology involved in producing a heritage impact assessment that specifically identifies the impact of aviation noise on heritage assets. The report was produced as a direct response to the potential expansion of airport capacity in the South East of England, which could potentially impact the setting of numerous heritage assets, which in turn could lead to changes in their significance.</p> <p>The output of the project details a methodology for assessing the impact of aviation noise on the setting of heritage assets. This methodology is one that will be followed during the production of the detailed settings assessments for the PEIR and subsequent ES.</p>
<p>Greater London Archaeological Priority Area Guidelines (Historic England, 2016).</p>	<p>The guidance details the Archaeological Priority Areas (APA) across Greater London, which are intended to provide a consistent strategic framework and structured information to local authorities to help them decide how to implement national and local policy. These APA's highlight where important archaeological interest may be located, based on the history of the area and previous archaeological investigation.</p>
<p>Understanding Place: Historic Area Assessments in a Planning and Development Context (Historic England, 2017b).</p>	<p>This is a guidance document detailing the function of Historic Area Assessments (HAA) and the practicalities of undertaking them. HAA will be a part of the historic environment chapter at PEIR and subsequent ES stages, with assessments made of key historic areas within the study area. The assessments will follow the broad approaches, as detailed in the guidance.</p>

11.7.2 The following methodologies, outlined below, will be used to assess the significance of effect of the various elements of the Proposed Development on the historic environment and will identify if the effect is beneficial, neutral or negative upon a heritage asset or related group of heritage assets. Where opportunities for enhancement are identified, an assessment of how the Proposed Development may be designed to enhance the historic environment or what the relevant requirements for mitigation are, where required, will also be detailed.

11.7.3 Procurement of data on the current historic environment baseline will be undertaken for the Proposed Development, with publicly available historic environment data referred to as a secondary source within the PEIR and final ES.

Study area

11.7.4 The proposed study areas for historic environment receptors are set out in **Section 11.4**. These will be refined at the assessment stage as the design and consultation processes progress and as related topic assessments are progressed (e.g. Landscape and Visual Assessment and Noise & Vibration Assessment). Therefore, the study areas (both core and wider) may evolve as data from the ZTVs and Spatial Noise Modelling become available. The use of Spatial Noise Modelling data will conform to the Historic England Aviation Noise Metric guidance (Temple Group, 2014).

11.7.5 The study areas for the assessment will be identified to ensure that the impact of the Proposed Development on the historic environment can be fully assessed. A likely ZOI for potential cumulative historic environment effects with other development will be defined separately as part of the CEA, as described in **Section 4.6 of Chapter 4 'Approach to EIA'**.

Additional baseline data collection and analysis

- 11.7.6 Current baseline data has been collated through a review of available records, such as the National Heritage List of England, along with a search of the Greater London Historic Environment Record, and encompasses the wider and core study areas respectively as described in **Section 11.4**. The data contains all currently available data on non-designated and designated assets within the study areas. Further searches of appropriate HER's (Surrey, Berkshire & Buckinghamshire) will be undertaken during the PEI stage.
- 11.7.7 If the core area changes, further searches of the relevant Historic Environment Records will be undertaken, as well as further reviews of all other sources (as set out in **Table 11.3**).

Baseline surveys

- 11.7.8 Baseline surveys will be undertaken during the production of the PEIR and subsequent ES. A site walkover survey, visits to heritage assets potentially affected and assessments of their setting will all be undertaken as part of the collection of further, more detailed, baseline data, post-scoping and following receipt of the PINS scoping opinion. Similarly, visits to the appropriate Historic Environment Records and other archives / records offices will be undertaken to review available and relevant documentary and cartographic sources.
- 11.7.9 Further to this, a review of historic Aerial Photography and Published Archaeological Journals / Monographs will also be employed for assessment of the historic environment and identification of potential impacts from the Proposed Development. The precise scope of this will be established in further consultation with historic environment stakeholders, post-scoping.
- 11.7.10 In accordance with Historic England guidance on Historic Landscape characterisation and targeted Historic Area Assessments (Historic England, 2017b) of identified key historic landscapes and urban centres within the core study area, and where identified, wide, study area, these will be undertaken. Again, the precise scope of this will be established in further consultation with historic environment stakeholders, post-scoping.
- 11.7.11 As initial baseline data collation and review has identified that archaeological evaluation has already been undertaken within the western portion of the Proposed Development, further evaluation of this specific area is thought to not be required because of this prior work, although this will be discussed and confirmed with the relevant historic environment stakeholders. Assessment of the evaluation results will be undertaken to better assess if there could be relevant areas of archaeological remains that may require further archaeological investigation prior to any potential development.
- 11.7.12 Any further areas of land identified through the production of the PEIR and subsequent ES as having archaeological potential, and not previously subject to non-intrusive or intrusive survey or evaluation, will require a phased approach to 'investigation' (e.g. geophysical surveys, other relevant field surveys, archaeological trial trenching) to help inform the PEIR and / or subsequent ES chapter (depending on programme and timescales), following consultation with the relevant historic environment stakeholders.
- 11.7.13 As the Proposed Development will potentially require the re-routing of waterways, assessment of the geoarchaeological potential of any deposits associated with the waterways will be undertaken. Geoarchaeological analysis of any geotechnical works undertaken at PEIR and / or ES stage will be undertaken and compiled within the final ES. This data will inform on

the potential for preserved alluvial deposits, associated organic remains and the potential wider hydrological changes, which can feed into any mitigation strategies. Specific geoarchaeological desk-based review and assessment will also be undertaken and reported upon.

Desk-based assessment

11.7.14 Following the collation of baseline data, a full and detailed desk-based assessment will be undertaken of all data to:

- Identify the location of all non-designated and designated heritage assets in the core study area;
- Identify the location of all designated heritage assets in the wider study area;
- Produce a deposit model for the Proposed Development area, to aid in identification of areas of archaeological potential (including geoarchaeological assessment of the extant waterways that may require re-routing);
- Predict the potential for as-yet unknown heritage assets to be present within the Proposed Development area (most likely in the form of buried archaeological remains);
- Identify which of the heritage assets are 'key for further consideration' and may be impacted by the Proposed Development through analysis of the ZTV and any current and forecast Spatial Noise Model;
- Determine the heritage significance (sensitivity) of the heritage asset(s) identified; and
- Assess the setting of each key identified heritage asset and how its setting affects (contributes to) heritage significance or an appreciated of heritage significance.

11.7.15 This desk-based assessment will be compiled into a technical supporting document forming an appendix to the Historic Environment PEIR and / or subsequent ES chapter, depending upon programme and timescales. Methodologies on determining heritage significance and significance of impact are detailed below (**Section 11.7.22** onwards).

Archaeological Investigation & Research Strategy

11.7.16 Due to the identified potential of the Proposed Development to impact upon the historic environment, and the scale of the project, a draft Archaeological Investigation & Research Strategy (AIRS) document will be produced as a technical appendix for the Historic Environment ES Chapter, in consultation with Historic England and local authority archaeologists, and other relevant historic environment stakeholders. This document will identify the potential for archaeological investigation, analysis and publication of results to further local, regional and potentially national research aims.

11.7.17 It is currently projected that a number of phases of fieldwork will be identified through the production of the PEIR and subsequent ES, which will be compiled within the AIRS. This is separate to any Written Schemes of Investigation that will be produced and agreed with stakeholders prior to any fieldwork (survey-specific and or mitigation related) taking place.

11.7.18 The AIRS document will also detail any identified works required upon historic buildings, detailing the methodologies to be employed in the recording of any buildings that will require investigation.

11.7.19 A more precise scope for the AIRS will be established in further consultation with historic environment stakeholders, post-scoping.

Assessment methodology

11.7.20 The below section details the specific methodologies for each of the historic environment assessments.

Settings assessment

11.7.21 A heritage asset's setting, and how it affects (contributes to) significance, is a complex topic, especially when it comes to NSIPs and airport expansion. The NPPF identifies setting simply as that which encompasses an asset's surroundings in which it is experienced. The extent of setting is not fixed, whilst elements of setting can provide both positive and negative contributors to the significance of an asset. Views are often referred to when describing an asset's setting, which allows for a relatively concise way of articulating the asset's physical surroundings and how the setting is experienced or appreciated.

11.7.22 These are not the only factors in identifying how the setting contributes to an asset's significance (or appreciation of significance), however. Other considerations include the asset's physical elements as well as perceptual and associational attributes relating to its surroundings. Examples of these considerations include: the asset's relationship with other assets, its visual dominance, tranquillity, effect of noises, smells and other pollution issues, its degree of interpretation or promotion to the public, celebrated artistic representations etc.

11.7.23 Assessing the setting of a heritage asset and how that setting contributes to its significance will follow the methodology outlined in the Setting of Heritage Assets: Historic Environment Good Practice Advice in Planning Note 3 (Historic England, 2017).

11.7.24 This guidance document recommends a stage-based approach for assessing the implications of development proposals, as follows:

- Step 1: identify those heritage assets whose settings might be affected;
- Step 2: assess whether, how and to what degree setting makes a positive contribution to the value of those heritage assets;
- Step 3: assess the effect of the Proposed Development on the significance of those assets as a result of changes to setting;
- Step 4: maximise enhancement and minimise harm; and
- Step 5: make and document decisions and monitor outcomes.

11.7.25 All non-designated and designated assets within the core study area, and all designated heritage assets within the wider study area will be brought into the analysis to identify which may have their setting affected by the Proposed Development. This will be done through identifying Heritage Assets within the Zone of Theoretical Visibility (ZTV) and Spatial Noise Modelling, amongst other approaches. The use of Spatial Noise Modelling data will conform with the Historic England Aviation Noise Metric (Temple Group, 2014).

Assessment of aviation noise impact

11.7.26 An assessment will be made in the ES of aviation noise impacts upon key identified heritage assets (i.e. the increase in noise from aircraft taxiing between HALs proposed Northwest

Runway and the Applicant's proposed terminal facilities). This will be a significant part of the assessment for the Proposed Development, particularly with reference to the cumulative effect of the Proposed Development with any other developments at or in proximity to Heathrow Airport environment, such as the proposed Northwest Runway (see paragraph 11.7.45 on cumulative effects, below).

11.7.27 Any assessment of aviation noise will be undertaken following the current Historic England guidance (Temple Group, 2014). This sets out the methodology for assessing the impact of aviation noise as:

- Use the relevant noise contours and data to identify spatial scope of study;
- Overlay this spatial noise model with all heritage data in GIS to identify which heritage assets are affected;
- Screen the identified assets into appropriate noise-sensitivity categories;
- Overlay this noise sensitivity results with the spatial noise model in GIS;
- Scope out the assets where noise impact is unlikely due to the absolute noise levels;
- Undertake detailed site-specific noise assessments for each affected asset; and
- Compile results of these site-specific assessments.

11.7.28 The resulting outcome will be an appraisal of whether impacts of aviation noise are to be beneficial, neutral or cause substantial or less than substantial harm to a heritage asset and its setting (ibid.).

Impact assessment – construction and operation

11.7.29 The following over-arching methodology for the Historic Environment Impact Assessment will remain the same for both construction and operational phases of development.

11.7.30 The first stage of an impact assessment for the historic environment is to identify the key heritage assets which may be impacted. This is done initially through a desk-based baseline assessment. Following further consideration including site visits and surveys, these assets are then given a sensitivity (or heritage significance / importance value), assigned broadly based on definitions and examples such as those tabulated below (**Table 11.7**).

11.7.31 Defining the significance of a heritage asset is achieved in part through professional judgment of its local, regional, national and international context. This can be established by incorporating the evidential, archaeological, historic, aesthetic, architectural and communal heritage values of an asset. The evidence for some heritage assets, particularly non-designated buried archaeological remains, is often an incomplete picture due to a lack of data on the remains (i.e. from a lack of intrusive investigations, ground truthing and associated reporting). Thus, the categories and definitions of importance (incorporating heritage significance) do not necessarily reflect a definitive level of importance of an asset. Where uncertainty occurs, the precautionary approach is to assign high importance (or significance); a good practice in impact assessments which reduces the potential for impacts to be under-estimated. Judgements on heritage significance, therefore, should be regarded as providing a preliminary significance level based on available information.

Table 11.7 Definitions of Sensitivity (Importance), incorporating Heritage Significance

Sensitivity (Importance), incorporating Heritage Significance	
High (perceived International / National Importance)	<p>For example:</p> <ul style="list-style-type: none"> World Heritage Sites; Scheduled Monuments; Grade I, II* and II Listed Buildings or structures; Designated historic landscapes of outstanding interest; and Conservation Areas containing very important buildings. Assets of acknowledged international / national importance. Assets that can contribute significantly to acknowledged international / national research objectives. Significance is related to an outstanding level of evidential, archaeological, historic, aesthetic, architectural and communal heritage interest, or combination of these values.
Medium (perceived Regional Importance)	<p>For example:</p> <ul style="list-style-type: none"> 'Locally Listed' buildings or structures; Conservation Areas containing buildings that contribute significantly to its historic character; and Designated historic landscapes of special interest. Assets that contribute to regional research objectives. Assets with regional value, educational interest or cultural appreciation. Significance is related to a high level of evidential, archaeological, historic, aesthetic, architectural and communal heritage interest, or combination of these values.
Low (perceived Local Importance)	<p>For example:</p> <ul style="list-style-type: none"> Assets that contribute to local research objectives Assets with local value, educational interest or cultural appreciation. Assets that may be heavily compromised by poor preservation and/or poor contextual associations. Significance is related to a certain level of evidential, archaeological, historic, aesthetic, architectural and communal heritage interest, or combination of these values.
Negligible	<p>For example:</p> <ul style="list-style-type: none"> The nature, form, level of survival, condition or ability to appreciate the asset or similar, means that it cannot be assigned heritage asset status in its own right. Assets with no significant value or archaeological / historical interest.

11.7.32 The classification of the magnitude of effect (see **Table 11.8**) on known heritage assets takes account of such factors as:

- The physical scale and nature of the anticipated impact; and
- Whether specific features or evidence would be lost that are fundamental to the historic character and integrity of a given asset, and its understanding and appreciation.

11.7.33 Both physical and non-physical (i.e. setting) impacts on heritage assets are considered relevant. Impacts may be adverse or beneficial. Depending on the nature of the impact and the duration of development, impacts can also be temporary and / or reversible or permanent and / or irreversible.

11.7.34 The finite nature of archaeological remains means that physical impacts are almost always adverse, permanent and irreversible; the 'fabric' of the asset and, hence, its potential to inform our historical understanding, will be removed.

Table 11.8 Definitions of magnitude

Magnitude	Definition
High	Total loss of or substantial harm to an asset.
Medium	Partial loss of, harm to or alteration of an asset which will affect its significance.
Low	Minor loss of or alteration to an asset which leave its current significance largely intact.
Negligible	Minor alteration to an asset which does not affect its significance in any notable way.
None / Nil	No alteration to an asset.

11.7.35 Following this, the significance of impacts will be predicted. To provide a consistent framework for the consideration and evaluation of impacts on different environmental parameters, the terminology set out in **Table 11.9** will be used within the PEIR and subsequent ES chapter and any supporting historic environment documents. In the EIA process, a significant impact (or change) is determined as one where the predicted net impact of the activity or process would exceed the normal variation in baseline conditions.

11.7.36 To assist in the assessment process, the impact assessment matrix provides a mechanism for assessing impact significance (see **Table 11.10**). An initial indication of impact significance (adverse or beneficial) is gained by combining magnitude of effect and sensitivity (importance, incorporating heritage significance) in accordance with the impact assessment matrix provided.

11.7.37 The potential for positive (beneficial) effects regarding the historic environment relates to the public value of the asset. Benefits can be in improving access to an asset, or improving its setting. Similarly, benefits can occur through data gathering involved in the project which will increase public appreciation or understanding of the asset.

Table 11.9 Definitions for Impact Significance

Impact	Definition
Major adverse	The impact gives rise to serious concern that should factor into the decision-making process for the development.
Moderate adverse	The impact gives rise to some concern, but it is likely to be tolerable (depending on its scale and / or duration)
Minor adverse	The impact is undesirable, but of limited concern
Negligible	The impact is considered to be of limited or no concern
Minor beneficial	The impact is of minor significance but has some heritage-related benefit
Moderate beneficial	The impact provides some tangible benefit to the historic environment
Major beneficial	The impact provides a significant positive benefit to the historic environment

11.7.38 Assessment of the impact significance is reliant on professional judgement and experience and is tailored to each heritage asset. The definitions and following indicative matrix for calculation of impact significance should therefore be seen as a framework to aid in understanding how the level has been reached, rather than as a direct tool for decision making.

Table 11.10 Significance of impact matrix

		Negative Magnitude				Positive Magnitude			
		High	Medium	Low	Negligible	Negligible	Low	Medium	High
Sensitivity	High	Major	Major	Moderate	Minor	Minor	Moderate	Major	Major
	Medium	Major	Moderate	Minor	Minor	Minor	Minor	Moderate	Major
	Low	Moderate	Minor	Minor	Negligible	Negligible	Minor	Minor	Moderate
	Negligible	Minor	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Minor

11.7.39 Assessment methodologies will be discussed going forward with relevant historic environment stakeholders to ensure an agreed approach acceptable to all parties will be implemented within the PEI and subsequent ES chapters.

Assessment scenarios

11.7.40 The Proposed Development will be implemented across an anticipated timeframe of 2022 – 2030. The historic environment assessment will consider a number of different assessment scenarios which will consider the construction and operational phases, and the activities which would give rise to the most significant historic environment impacts as a result of the Proposed Development, including enabling works, and the operation phase of the development.

11.7.41 The construction phase assessment will consider the effects of construction during the most ‘intensive’ phase, which will impact upon the historic environment the most. The period of most impact will be decided once further construction implications of the development are known. This phase of construction will most likely be a combination of factors, that will be assumed to be undertaken within the same period as a worst-case scenario, e.g. re-routing of rivers, diversion of roads, peak earthworks and construction of infrastructure and buildings, forming a worst-case scenario.

11.7.42 Operational effects will be assessed using all known data and any further data produced through production of other chapters of the ES (e.g. noise, landscape and visual assessment, traffic). A worst-case scenario will also be identified and form the basis on which the assessment is undertaken.

Cumulative effects

11.7.43 Cumulative historic environment effects resulting from the combination of effects from the Proposed Development and other developments will be assessed in accordance with the guidance and methodologies set out in **Section 4.6 of Chapter 4 ‘Approach to EIA’**. The assessment will be dependent on the availability and accessibility of information for other developments.

11.7.44 The Proposed Development does not include the new Northwest Runway and M25 realignment components of the NRS proposed by HAL. However, the Proposed Development is designed to be operated alongside these components of the NRS that are being progressed by the HAL DCO Project. Therefore the total cumulative historic environment effects will be

considered together to ensure an overarching assessment of the NRS as a whole.

11.7.45 Any components of the HAL DCO Project which would no longer be required as a result of the Proposed Development would not be included in the CEA.

11.8 Approach to Mitigation

11.8.1 The type and level of mitigation measures required will be informed by the expected level of impact. The ANPS does not identify mitigation measures for the historic environment relevant to the construction and operational phases which could be put forward to minimise impacts associated with the Proposed Development. It does however identify that where potential for impacts to heritage assets is identified, the Secretary of State will impose requirements to the DCO to ensure appropriate procedures are in place for identification and treatment of any potential heritage assets within the Development Area. Any mitigation must be undertaken in a timely manner in accordance with a Written Scheme of Investigation that complies with the ANPS and agreed with the relevant local authority. The following section sets out the initial approach to mitigation for the Proposed Development regarding the historic environment.

11.8.2 Where adverse impacts are identified, potential mitigating measures must be examined and recommended to reduce or offset potential impacts, as far as possible. Residual impacts must then be stated. Mitigation for the Proposed Development will be undertaken with preservation of the historic environment at the forefront, with greater weight given to an asset's conservation irrespective of the level of potential harm.

11.8.3 Associated with this principle of preservation and sympathetic design approach is the embedded mitigation within the design of the Proposed Development: wherever possible, the design, construction and operation of the Proposed Development (as secured by DCO drafting or requirements) will use practices that will either avoid completely, or reduce as substantially as possible, the impact on the historic environment.

11.8.4 Where an adverse impact is identified as unavoidable, a mitigation strategy will be implemented, which will be consulted on with relevant historic environment stakeholders and follow all current best practice and guidelines. This mitigation will be proportionate relative to the identified significance of the heritage asset.

11.8.5 Archaeological investigation and recording of heritage assets to aid further understanding of them is not a deciding factor on whether such a loss should be permitted, as described within the NPPF (NPPF 2018 para. 199). However, a number of opportunities for archaeological recording to take place will most likely be identified on a case by case basis during the production of the PEIR and subsequent ES. This will result in any assets or buried remains identified as subject to substantial physical impacts or as a worst case completed removed by the Proposed Development to be excavated and recorded by professional archaeologists, in a planned and controlled manner. Where this is the case, initial details of any investigative work will be outlined within the draft AIRS and Written Schemes of Investigation specific to each phase of works and agreed upon with the relevant historic environment stakeholders.

- Examples of mitigation measures (non-exhaustive) that may be employed to reduce or offset the impact of the development of the Proposed Development are:
- Avoidance by design, resulting in 'preservation in-situ' of heritage assets;

- Archaeological investigation, recording, post-excavation assessment, analysis, archiving and publication, resulting in ‘preservation by record’ of heritage assets at risk of damage or destruction;
- Landscape design considerations to mitigate loss of heritage assets or changes to their setting, e.g. green spaces, building up of land surfaces, on and off-site screening, where appropriate;
- Enhancement to heritage assets currently poorly accessible or known e.g. public information boards, interpretation, installation of signage and footpaths; and
- Noise reduction measures e.g. sound bunds by roads and on the boundary of new the proposed new terminal and other infrastructure.

11.9 Summary

11.9.1 The initial collation of baseline data for the historic environment indicates that there are a large quantity of designated heritage assets within the study area. In summary, there are currently 13 scheduled monuments, 987 listed buildings, eight registered parks and gardens, 11 conservation areas and 16 sections of ancient woodland within the greatest extent of the study area currently under consideration. Presently, a search of the GLHER has been undertaken and searches of the other relevant Historic Environment Records are underway. This initial search has identified a total of 910 non-designated monuments and 61 HER Events within the Proposed Development and 1km study area. Following compilation of all heritage asset data, potential impacts upon them will be identified through the EIA process. Currently, no impacts are scoped out of the assessment. The scope of the historic environment impacts described above are summarised in **Table 11.11**, below.

Table 11.11 Summary of potential impacts

Potential Impact	Construction	Operation
Direct impact to designated assets	✓	X
Direct impact to non-designated assets	✓	X
Indirect impact to designated assets	✓	✓
Indirect impact to non-designated assets	✓	✓
Cumulative impacts to heritage assets	✓	✓

Scoped in (✓) and scoped out (X)

11.9.2 Production of the ES chapter will be undertaken under consultation with all relevant stakeholders, including topic expert panel meetings. Similarly, the requirements of the ANPS will be at the forefront; principally that any project design will aim to make a positive contribution to the historic environment. Proposals for mitigation will be undertaken with preservation of the historic environment at the forefront, with greater weight given to an asset’s conservation irrespective of the level of potential harm.

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12 Health

12.1 Introduction

- 12.1.1 This chapter details the proposed scope of the assessment of potential impacts arising from the Proposed Development on health. The chapter considers impacts associated with the construction and operational phases.
- 12.1.2 Heathrow Airport is surrounded by communities who may experience positive and negative impacts due to the Proposed Development. This chapter considers the scope of potential effects to the health of people. It is one of three that considers the scope of effects to population groups together with **Chapter 9 ‘Community’** and **Chapter 10 ‘Economics and Employment’** (herein referred to as population assessments). The nature of effects across the population assessments are often interrelated and therefore necessitate commonalities between the assessments.
- 12.1.3 The EIA Regulations specifically require the inclusion of impacts to human health in the EIA process (Regulation 5(2)). There is no statutory guidance on considering health within the context of EIA.
- 12.1.4 To address this requirement, a Health Impact Assessment (HIA) will be prepared. HIA is defined as “a combination of tools and methods that helps to judge the potential health effects of a policy, plan, programme or project on the health of the population and the distribution of those effects within the population.”
- 12.1.5 This Chapter includes:
- A description of key policy and legislation with relevance to health;
 - A summary of ongoing and planned stakeholder engagement;
 - An overview of the approach that has been adopted to inform this Scoping Report;
 - A concise summary of baseline health;
 - A description of the potential likely significant effects of the Proposed Development on health, to be included in the scope of the assessment;
 - A summary of any potential effects that are proposed to be scoped out of the assessment;
 - A proposed approach to the EIA and the CEA with regards to health;
 - An overview of the proposed approach to mitigation; and
 - A summary of the Scoping Report chapter including a summary of impacts table.
- 12.1.6 This scoping assessment will use the World Health Organisation’s (WHO) definition of health, which states that health is “*a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity.*”
- 12.1.7 The terms ‘health’ and ‘wellbeing’ are used interchangeably. This chapter also uses a WHO definition for wellbeing which is an integral aspect of mental health. The WHO states that mental health is more than the absence of mental disorders and that mental health is a state of wellbeing defined as “*a state in which every individual realises his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution*”

to her or his community”.

- 12.1.8 Health and wellbeing are determined by a wide range of issues, many outside the control of individual choices. The assessment of human health will examine the ways in which the Proposed Development potentially affects determinants of health and wellbeing.
- 12.1.9 The chapter will also have regard to health inequalities. The effects of the Proposed Development may be experienced differently by different people. These people can be assessed within population groups categorised by factors including (but not limited to) age, gender, ethnicity, socio-economic status, place of residence or pre-existing health status.
- 12.1.10 The Proposed Development is a component of the Government's preferred NRS as set out in the ANPS. It does not include the Northwest Runway itself, or the major M25 realignment works required to accommodate the Northwest Runway. Therefore, potential health effects associated with these components of the NRS are excluded from the scope of the primary assessment. Potential health effects associated with the Northwest Runway and M25 realignment works will however be considered as part of the CEA, as set out in **Section 4.6 of Chapter 4 ‘Approach to EIA’**.

12.2 Policy and Legislation

- 12.2.1 **Table 12.1** provides a summary of the key topic specific policy and legislation which has informed the scope of the assessment. Further information on policies relevant to the EIA and their status is set out in Chapter 1 ‘Introduction’. Due regard will also be given to local policies and the Government’s 25 Year Environment Plan where they are relevant.
- 12.2.2 These documents are proposed to form the framework for detailed assessment post-scoping and will be taken into account in the assessment of potential health impacts during PEI and ES stages, with the relevant criteria followed throughout.

Table 12.1 Policy and Legislation relevant to the health assessment

Relevant policy / legislation	Relevance to assessment
Policy	
Airports National Policy Statement (ANPS) (2018)	<p>The ANPS lays out the general principles of assessment and the statutory framework for deciding applications for development consent for the Project in the Act (paragraph 4.1).</p> <p>The Appraisal of Sustainability presents an assessment of the likely environmental, social and economic impacts of the scheme.</p> <p><i>The HIA identified impacts which would affect the population’s health, including noise, air quality and socio-economic impacts. In order to be compliant with the Airports NPS, a further project level Health Impact Assessment is required. The application should include and propose health mitigation, which seeks to maximise the health benefits of the scheme and mitigate any negative health impacts. The Airports NPS has been subject to a Health Impact Analysis, which was published alongside the Airports NPS. The Health Impact Analysis identified impacts which would affect the population’s health, including noise, air quality and socio-economic impacts. In order to be compliant with the Airports NPS, a further project level Health Impact Assessment is required. The application should include and propose health mitigation, which seeks to maximise the health benefits of the scheme and mitigate any negative health impacts. (paragraphs 1.35-1.37)</i></p>

Relevant policy / legislation	Relevance to assessment
	<p><i>New or enhanced airports infrastructure may also have indirect health impacts, for example if they affect access to key public services, local transport, opportunities for cycling and walking, or the use of open space for recreation and physical activity. It should also be noted, however, that the increased employment stemming from airport expansion may have indirect positive health impacts. (paragraph 4.71).</i></p> <p><i>where the proposed project has likely significant environmental impacts that would have an effect on human beings, any environmental statement should identify and set out the assessment of any likely significant health impacts. (paragraph 4.72).</i></p> <p><i>The applicant should identify measures to avoid, reduce or compensate for adverse health impacts as appropriate. (paragraph 4.73).</i></p> <p>The ANPS also focusses on additional factors which are known to impact human health including:</p> <ul style="list-style-type: none"> • Air quality (paragraphs 5.23 – 5.34); • Noise (paragraphs 5.44 - 5.51); • Night flights (paragraph 3.54); and • Discharge to water resources (paragraph 5.172).
National Policy Statement for National Networks (NPSNN) (2014)	<p>The NPSNN outlines the decision-making process regard to achieving development consent orders for nationally significant rail and road infrastructure projects.</p> <p><i>The applicant should identify measures to avoid, reduce or compensate for adverse health impacts as appropriate. These impacts may affect people simultaneously, so the applicant, and the Secretary of State (in determining an application for development consent) should consider the cumulative impact on health. (paragraph 4.82).</i></p> <p><i>where the proposed project has likely significant environmental impacts that would have an effect on human beings, any environmental statement should identify and set out the assessment of any likely significant adverse health impacts. (paragraph 4.81).</i></p> <p><i>New or enhanced national network infrastructure may have indirect health impacts; for example if they affect access to key public services, local transport, opportunities for cycling and walking or the use of open space for recreation and physical activity. (paragraph 4.80)</i></p>
National Planning Policy Framework (NPPF) (2018)	<p>The purpose of the planning system is to contribute to the achievement of sustainable development, through three overarching objectives:</p> <ul style="list-style-type: none"> • Economic; • Social; and • Environmental. <p>Human health can be impacted by economic, social and environmental aspects. The main objectives within the Government policies relating to human health include:</p> <ul style="list-style-type: none"> • “strong, vibrant and healthy communities” (paragraph 8). • Developing strategic policies which set out an overall strategy for the pattern, scale and quality of development and make sufficient provisions e.g. through community facilities (such as health and cultural infrastructure) (paragraph 20) <p><i>Plans should set out the contributions expected from development. This should include setting out the levels and types of affordable housing provision required, along with other infrastructure (such as that needed for education, health, transport, flood and water management, green and digital infrastructure) (paragraph 34).</i></p>

Relevant policy / legislation	Relevance to assessment
The UK Industrial Strategy: a leading destination to invest and grow (2017)	<p>The UK Industrial strategy aims to set out ways in which to help businesses and the UK economy thrive, through developing a skilled workforce and by improving infrastructure.</p> <p>There are five foundations on which the Industrial strategy is built:</p> <ul style="list-style-type: none"> • <i>Ideas: the world's most innovative economy;</i> • <i>People: good jobs and greater earning power for all;</i> • <i>Infrastructure: a major upgrade to the UK's infrastructure;</i> • <i>Business Environment: the best place to start and grow a business; and</i> • <i>Places: prosperous communities across the UK.</i> <p>Human health can be negatively impacted by lack of training, skills, employment and poor infrastructure. By providing training, jobs and essential infrastructure not only will the economy and community cohesion improve, but also human health.</p>

12.3 Stakeholder Consultation

12.3.1 A detailed stakeholder engagement plan is currently being developed. Care will be taken to ensure all key stakeholders with views and concerns regarding health are provided with sufficient information on the Proposed Development to discuss and agree the details of the assessment in a meaningful and inclusive manner.

12.3.2 The stakeholders listed below were contacted in November 2018 to make them aware of the Proposed Development and timescales for further consultation. The stakeholders were provided with a presentation providing an overview of the Proposed Development and inviting initial comments on the scope of the assessment for economics and employment. The following stakeholders were provided with a presentation providing an overview of the Proposed Development and inviting initial comments on the scope of the health assessment:

- London Borough of Hounslow;
- London Borough of Hillingdon;
- Spelthorne Borough Council;
- Slough Borough Council; and
- South Bucks District Council.

12.3.3 The HAL Scoping Opinion is a useful source of stakeholder feedback, and has been used to inform this Scoping Report.

12.3.4 Further formal and informal consultations and meetings will be arranged to discuss and agree the details of the methodology for the assessment of potential health impacts arising from the Proposed Development.

12.4 Health Determinants

12.4.1 Human health can be influenced by a wide variety of direct and indirect factors, from controllable factors such as lifestyle to uncontrollable factors such as genetics. The influences and effects can be wide-ranging and are likely to vary between individuals. In determining 'physical, mental and social wellbeing', external contributory factors, known as 'determinants', are considered. Determinants reflect a mix of influences from an individual's society and environment.

12.4.2 The ‘wider determinants of health’ model is used to conceptualise how human health spans environmental, social and economic aspects. This is illustrated in **Diagram 12.1**.

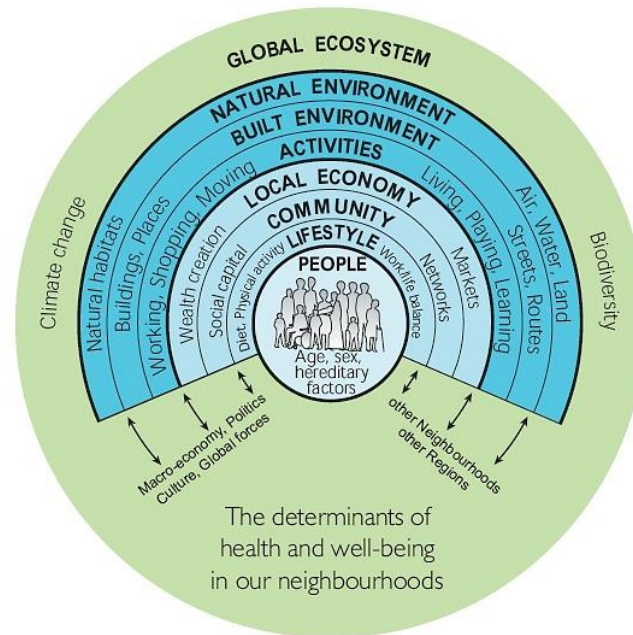


Diagram 12.1 Wide Determinants of Public Health (Cave et al, 2017b and PHE 2017c)

12.4.3 Influences that result in a change in determinants have the potential to cause beneficial or adverse effects on health, either directly or indirectly. The degree to which these determinants influence health varies, given the degree of personal choice, location, mobility and exposure.

12.5 Approach to Scoping

12.5.1 Population assessments are covered in **Chapter 9 ‘Community’, Chapter ‘10 Economics and Employment’** and this chapter. Effects on people, the communities they live in, the businesses they work in and their health have many interlinked determinants that are described by a similar source-pathway-receptor model. Therefore, the approach to scoping of these interrelated elements will be undertaken in a similar way.

Study areas

12.5.2 This section sets out the study areas that have been defined for the consideration of potential health effects at the scoping stage.

12.5.3 The study areas for the health assessment are based on those developed for the HAL DCO Project and further informed by the HAL Scoping Opinion provided by PINS. The study areas may be refined at the assessment stage to focus on the comparatively smaller scale of the Proposed Development. The study areas used in other EIA topics are also of relevance and will be used throughout assessment to inform the likelihood of effects on people. For example, the assessment will be informed by the study areas used for traffic and transport, landscape and visual amenity, noise and vibration, and air quality and odour assessments to understand how these potential effects may translate to health effects.

12.5.4 The study area has two components. The inner study area broadly relates to the direct effects of the Proposed Development and is developed using data at a small scale. The wider study area relates to indirect effects and the catchments of elements that may be directly affected

and includes the inner study area as shown in **Diagram 12.2**.

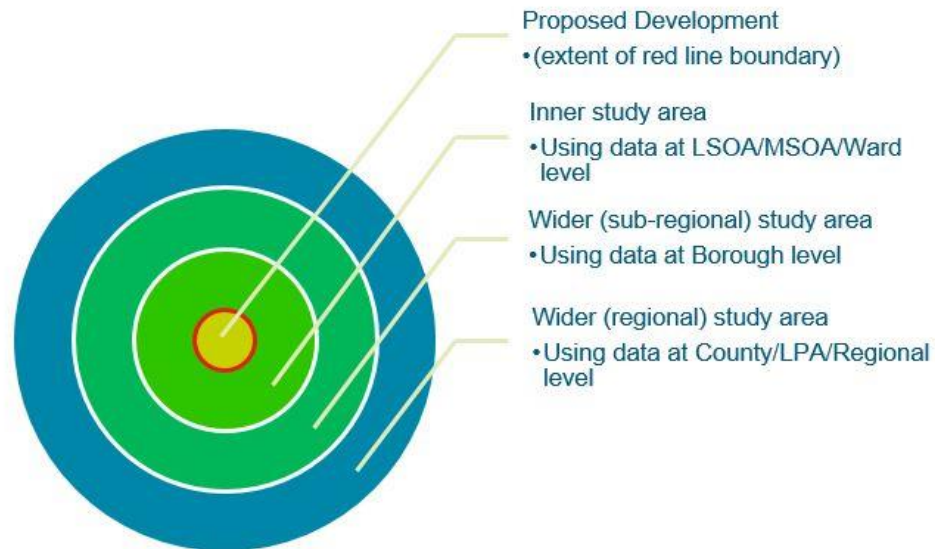


Diagram 12.2 Concept of Cumulative Study areas and Outline of Data used for the Baseline at each Study area

12.5.5 As the design of the Proposed Development is still in its early development, the study areas set out above will be kept under review as the design and consultation processes progress, and the Proposed Development is refined and related topic assessment study areas are confirmed. Therefore, the study areas at the assessment stage may evolve as appropriate.

Inner study area

12.5.6 The inner study area (**Figure 9.1**) for health will vary depending on which health determinant is being assessed. Therefore, the study areas used in supporting chapters will inform the inner study area as follows:

- **Chapter 9 ‘Community’:** people living in the communities around the existing Heathrow Airport and the Proposed Development are expected to be impacted by the requirement for land and impacts associated with construction;
- **Chapter 5 ‘Air Quality and Odour’:** aircraft, airside plant and vehicles, combustion plant (e.g. energy centre) and road traffic vehicles (oxides of nitrogen, nitrogen dioxide and particulate matter) have the potential to cause health effects due to changes in emissions to air. The study area for air quality is described in **Chapter 5 ‘Air Quality and Odour’**.

12.5.7 For construction dust, the study area will have a boundary for each relevant site and from routes used by construction vehicles (as per the assessment in **Chapter 5**).

12.5.8 **Chapter 13 ‘Landscape and Visual Amenity’:** Proposed Development activities may affect visual amenity. The Zone of Theoretical Visibility (ZTV) will be used as the basis for assessment as described in **Chapter 13 ‘Landscape and visual’**.

12.5.9 **Chapter 16 ‘Noise and Vibration’:** the study area is anticipated to have a boundary around construction and operational assets as set out in **Chapter 16 ‘Noise and Vibration’**.

Wider study area

12.5.10 The wider study area (**Figure 9.1**) for health will vary depending on which health determinant

is being assessed. Therefore, the study areas used in supporting chapters will be inform the wider study area as follows:

12.5.11 **Chapter 10 ‘Economics and Employment’**: Those living around Heathrow Airport are expected to benefit from employment generated by the Proposed Development. In addition, wider effects in the labour market are expected to be experienced over a larger area due to new economic activity. The study area for this topic is described in **Chapter 10 ‘Economics and Employment’**.

12.5.12 **Chapter 5 ‘Air Quality and Odour’**: health effects will be assessed if the air quality assessment finds air quality effects occurring remote from the study area identified at the scoping stage,

12.5.13 **Chapter 16 ‘Noise and Vibration’**: there is potential for health effects due to changes in sound exposure from aircraft (on the ground) and other sources such as road noise and rail noise.

Sources of baseline data

12.5.14 The human health chapter will inform and be informed by other relevant chapters within the Scoping Report. These will include:

- Air Quality and Odour;
- Carbon and Other Greenhouse Gases;
- Climate Change;
- Community;
- Economics and Employment;
- Land Quality and Waste;
- Major Accidents and Disasters;
- Noise and Vibration;
- Traffic and Transport; and
- Water.

12.5.15 The chapter baseline conditions and health priorities will be informed by and include the following evidence sources and information, which is summarised in the sections below:

- Scientific Literature;
- Desk Study;
- Consultation responses; and
- Policy context.

12.5.16 The review of evidence sources will be structured using the following eight themes that cut across the scope of construction and operational effects of the project:

- Noise;
- Air quality;

- Ground and/or water contamination;
- Physical activity
- Journey times and/or reduced access;
- Employment; and
- Electromagnetic Fields (EMF).

Scientific literature

12.5.17 An evidence base of publicly available information will be used to inform the chapter. Evidence statements will be extracted from a review of abstracts and full articles published in English on PubMed from the past five years on commencement of preparation of this chapter. The review provides a summary of the key issues relevant to the scope of the chapter in each of the themes identified above. The literature reviewed for each theme is listed in **Table 12.2**.

Table 12.2 Scientific literature

Theme	Author
Noise	Basner <i>et al.</i> , 2014; van Kamp and Davies, 2013
Air Quality	Meo and Suraya, 2015 Orellano <i>et al.</i> , 2017 van Kamp and Davies, 2013
Ground and/or water contamination	Andrade <i>et al.</i> , 2018 Koreiviene <i>et al.</i> , 2014 Lyons <i>et al.</i> , 2014 Park <i>et al.</i> , 2012 Testai <i>et al.</i> , 2016
Physical Activity	Calogiuri and Chroni, 2014 D'Haese <i>et al.</i> , 2015 Franco <i>et al.</i> , 2015 Huai <i>et al.</i> , 2016 Kuykendall <i>et al.</i> , 2015 Lubans <i>et al.</i> , 2016 Mochcovitch <i>et al.</i> , 2016 Winters <i>et al.</i> , 2017
Journey times and/or reduced access	Rosano <i>et al.</i> , 2013 Syed <i>et al.</i> , 2013 Weinhold and Gurtner, 2014
Employment	Herbig <i>et al.</i> , 2013 Kim and von dem Knesebeck, 2015 Norstrom <i>et al.</i> , 2014 Sommer <i>et al.</i> , 2015 van der Noordt <i>et al.</i> , 2014

Desk study

12.5.18 The main sources of data used for scoping are:

- Demographic, deprivation and health data as referenced in **Appendix 9.1**. ONS and Nomis official labour market statistics (Nomis, 2017) provide much of this information.

Whilst more recent statistics will be collected for some socio-economic variables, the 2011 census is considered an appropriate baseline for use in the Human Health chapter as it provides consistent comparative data across the population groups used in the assessment. The Index of Multiple Deprivation 2015 will be consulted and referenced as appropriate, including sub-domains and underlying indicators (Department of Communities & Local Government, 2015).

- Health priorities: Joint Strategic Needs Assessments (JSNAs) and Joint Health and Wellbeing Strategies (JHWSs) are published by local agencies responsible for public health. These documents review the needs of the population and set out the health issues that are relevant at a local level. The JSNAs covering the inner and wider components of the proposed study area have been reviewed to inform the scope of the assessment and are summarised in **Table 12.3** below.
- ANPS: Health Impact Analysis, shortlisted schemes. This document sets out some of the health issues relevant in comparing proposals for expansion at different airports in south-east England. The document identifies scientific evidence and studies that are relevant in considering the potential health impacts of construction and operation of an airport.

Consultation

12.5.19 The consultation activity undertaken and presented in **Section 12.3** has informed the baseline preparation for this chapter.

Policy context

12.5.20 The review of policy undertaken and presented in **Section 12.2** has informed the baseline preparation for this chapter.

12.6 Baseline Conditions

12.6.1 For the purposes of collecting baseline data, the inner and wider Study area described in **Chapter 9 ‘Community’** has been used. This is considered to be an appropriate geographic extent to capture the Proposed Development activities and impacts that may result in health effects. This area includes all or part of the area of the following local authorities: London Borough of Hillingdon, Slough Borough Council, London Borough of Hounslow, Spelthorne Borough Council, South Bucks District Council, The Royal Borough of Windsor and Maidenhead, Runnymede Borough Council, Elmbridge Borough Council and London Borough of Ealing.

12.6.2 Health Profiles (Public Health England, 2017b), Health Assets Profiles (Public Health England, 2017a) from PHE and Wider Determinants of Health (Public Health England, 2017c) from PHE will inform the local, regional and national baseline for the Human Health chapter.

12.6.3 An overview of the health baseline information for both the Inner and Wider Study areas respectively are provided below.

12.6.4 Figures showing the geographic distribution of wider determinants of public health are included as follows:

- **Figure 12.1** – Health Care Facilities;
- **Figure 12.2** – Deprivation levels in the inner study area;

- **Figure 12.3** – Deprivation levels in the wider study area;
- **Figure 12.4** – Long-term health problems in the inner study area;
- **Figure 12.5** – Unpaid care provision in the inner study area;
- **Figure 12.6** – Disability levels in the inner study area; and
- **Figure 12.7** – Economic inactivity due to disability in the inner study area.

Inner study area

12.6.5 The inner study area has an approximate population of 185,115 residents, 66.6% of households within these areas live in some form of deprivation. On average 21.7% of the inner study area population have a long-term illness and 3.17% are economically inactive due to illness or disability. An outline health profile is provided below in **Diagram 12.3**.

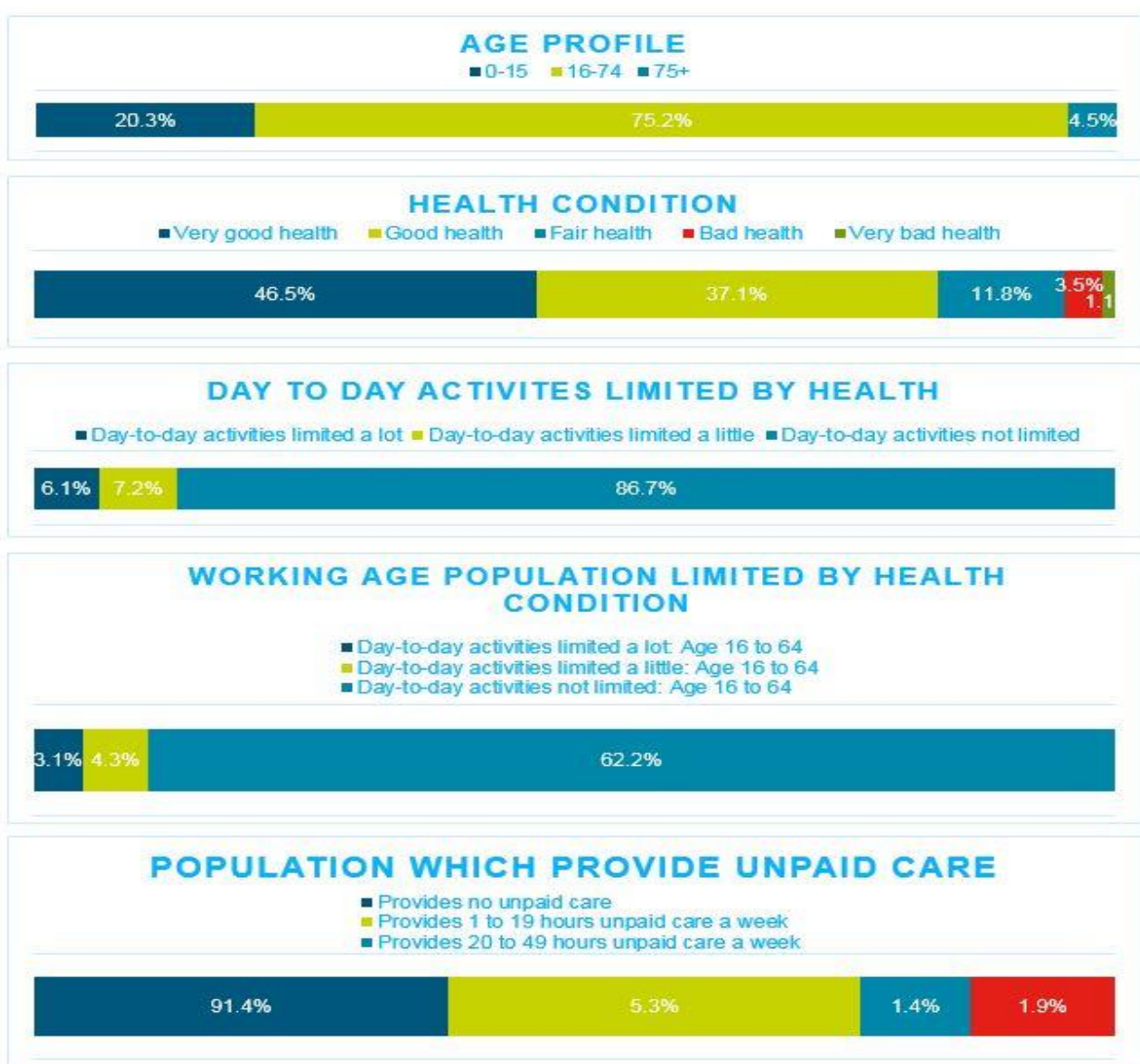


Diagram 12.3 Inner study area health baseline (Source: PHE)

Wider study area

12.6.6 The wider study area has a population of 1,923,344 residents (as of 2001 Census). 52.9% of

households within this area live in some form of deprivation. On average 21% of the inner study area population have a long-term illness and 2.6% are economically inactive due to illness or disability. An outline health profile is provided below in **Diagram 12.4**.

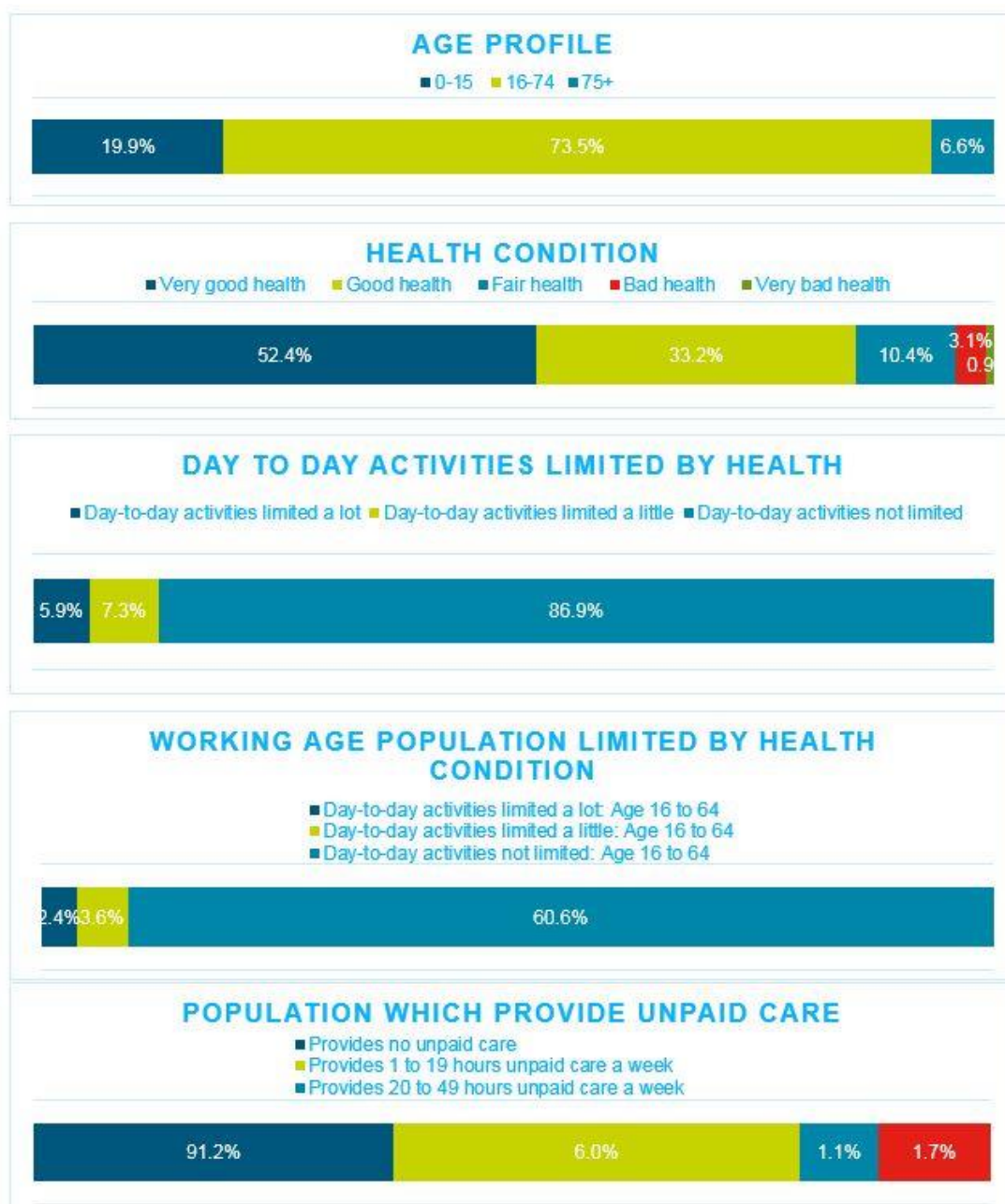


Diagram 12.4 Wider Study area health baseline (Source: PHE)

12.6.7 More detailed baseline information is provided in **Appendix 9.1**. This information includes information characterising demography, deprivation, health indicators, employment and social infrastructure. **Chapter 5 'Air Quality and Odour'** and **Chapter 16 'Noise and Vibration'**, both describe their respective baseline conditions.

12.7 Health Properties

12.7.1 Health priorities for each local authority are summarised in **Table 12.3**. As updates are made to health priorities appropriate amendments will be made.

Table 12.3 Local Health Priorities

Local authority	Health Priorities
<p>Ealing</p>	<p>JSNA Chapters of the JSNA range from publishing in 2014-2018. The policy objectives of the 2010 “Fair Society, Healthy Lives” Report, shape the JSNA:</p> <ul style="list-style-type: none"> • Give every child the best start in life; • Enable all children, young people and adults to maximise their capabilities and have control over their lives; • Create fair employment and good work for all; • Ensure a healthy standard of living for all; • Create and develop healthy and sustainable places and communities; and • Strengthen the role and impact of ill-health provision. <p>JHWS The JHWS is up to date (2016 – 2021). It states four ambitions:</p> <ul style="list-style-type: none"> • Create and sustain good mental and physical health for children and adults at every stage of life; • Reduce health inequalities by improving outcomes for neighbourhoods and communities experiencing poor health; • Enable people of working age to participate as fully as possible in working life, to improve the health and economic outcomes for them and their families; and • Enable everyone to be healthy and independent for as long as possible, helping to prevent or delay the need for social and acute care. <ul style="list-style-type: none"> • The four priority areas for action are: • Develop a systems leadership approach to health and wellbeing; • Make more extensive use of educational settings and workplaces as health promoting environments; • Address the broader social, economic, and environmental factors that can support people’s ability to be healthy and make changes to improve their health; and • Support residents and communities to manage their health, prevent ill health and recover quickly from ill health.
<p>Hillingdon</p>	<p>JSNA The JSNA is updated as needed and includes seven priority themes:</p> <ul style="list-style-type: none"> • Promoting healthier lifestyles; • Improved co-ordination of joint health and social care working; • Safeguarding, prevention and protection; • Community based, resident focussed services; • Promoting economic resilience; • Preserving and protecting the environment; and • Reducing disparities in health outcomes. <p>JHWS The JHWS is up to date (2018-2021). The needs which seek to be addressed are:</p> <ul style="list-style-type: none"> • Children engaged in risky behaviour; • Dementia; • Physical activity; • Adult and child mental health; • Type 2 diabetes; • Increasing child population and maternity services; • Older people including sight loss; and • Dental health.

Local authority	Health Priorities
	<p>The key objectives are:</p> <ul style="list-style-type: none"> • Improve health and wellbeing to reduce inequalities; • Invest in prevention and early intervention; • Develop integrated high quality social care and health services within the community or at home; and • Create a positive experience of care.
Hounslow	<p>JSNA</p> <p>The JSNA was updated in 2017 and highlighted 12 priority needs:</p> <ul style="list-style-type: none"> • Cardiovascular and respiratory disease; • Falls; • Dementia; • School readiness; • Accidents in children aged 0-14; • Obesity in children and adults; • Physical activity; • Air quality and noise; • Cancer; • Intimate partner violence; • Termination of pregnancy; and • Learning disabilities.
Hounslow <i>(continued)</i>	<p>JHWS</p> <p>Currently consultation on an updated JHWS (2018-2022) is underway which states three groups of needs; Start well; Live well and Age well. They include several aims:</p> <ul style="list-style-type: none"> • Improving school readiness; • Reducing obesity and increasing physical activity at all ages; • Reducing accidents in children and young people; • Reducing domestic violence and increasing support for children exposed to domestic abuse; • Increase cancer screenings; • Improving air quality; and • Improving care for those with learning disabilities, long term health conditions and dementia.
Richmond upon Thames	<p>JSNA</p> <p>The JSNA is updated as and when required. The specific aim of this JSNA is:</p> <ul style="list-style-type: none"> • Enable people to have access to high quality information and lifestyle interventions that prevent their health and care needs becoming serious. <p>The main priority is:</p> <ul style="list-style-type: none"> • Creating healthy communities. <p>JHWS</p> <p>The JHWS is up to date (2016-2021), and includes life course related three themes:</p> <ul style="list-style-type: none"> • Start well; • Live well; and • Age well.
Runnymede	<p>JSNA</p> <p>The JSNA covers Surrey which includes Spelthorne. It is split into sections focussed on specific health needs, the needs of groups, and determinants of health.</p> <p>JHWS</p> <p>The JHWS was updated in 2016 and includes five priorities:</p> <ul style="list-style-type: none"> • Improve children's health and wellbeing; • Developing a preventative approach;

Local authority	Health Priorities
	<ul style="list-style-type: none"> • Promoting emotional wellbeing and mental health; • Improving older adults' health and wellbeing; and • Safeguarding the population.
Slough	<p>JSNA</p> <p>The JSNA was updated in 2016 and its health priorities include:</p> <ul style="list-style-type: none"> • Crime reduction (violent crime and domestic abuse); • Childhood obesity and oral health; • Child and parental mental health; and • Prevention and reduction of early deaths from cardiovascular disease.
Slough (continued)	<p>JHWS</p> <p>The JHWS is up to date (2016 – 2020) and has four priorities:</p> <ul style="list-style-type: none"> • Protecting vulnerable children; • Increasing life expectancy by focussing on inequalities; • Improving mental health and wellbeing; and • Housing. <p>Additionally, it covers five key principles:</p> <ul style="list-style-type: none"> • Focus on prevention, early intervention and health promotion; • Provide opportunities for individual and community empowerment and volunteering; • Promote a culture of selfcare and personal responsibility; • Achieve more for less by making the best use of resources; and • Engage in an ongoing dialogue with our residents, communities and patients.
South Bucks	<p>JSNA</p> <p>The JSNA is up to date (2016 – 2020) it includes:</p> <ul style="list-style-type: none"> • Population characteristics; • Health determinants; and • Provides recommendations and conclusions but does not specifically state priorities. <p>JHWS</p> <p>The JHWS is up to date (2016-2021) and has 5 main priorities.</p> <ul style="list-style-type: none"> • Give every child the best start in life; • Keep people healthier for longer, and reduce the impact of long term conditions; • Promote good mental health and wellbeing for everyone; • Protect Residents from harm; and • Support communities to enable people to achieve their potential and ensure Buckinghamshire is a great place to live.
Spelthorne	<p>JSNA</p> <p>The JSNA covers Surrey and is updated as necessary. It is split into sections focussed on specific health needs, the needs of groups, and determinants of health.</p> <p>JHWS</p> <p>The JHWS is up to date (2016-2019) and includes four key priorities:</p> <ul style="list-style-type: none"> • A borough where health inequalities are reducing amongst all ages; • Develop an approach to prevent ill health and promote wellness; • Improve emotion and mental wellbeing; and • Safeguard the population.
Wandsworth	<p>JSNA</p> <p>The JSNA is updated as required. It includes key messages about health needs, diseases, vulnerable groups and determinants of health.</p>

Local authority	Health Priorities
	<p>JHWS</p> <p>The JHWS is up to date (2015-2020) and includes three priorities:</p> <ul style="list-style-type: none"> • Healthy places. “We will work to ensure regeneration and development schemes are opportunities to improve people’s health and wellbeing”; • Targeted interventions. “We will identify the people most in need and deliver holistic programmes that address their health needs”; and • Mental health. “We will make mental health as important as physical health in improving health and reducing inequalities”.
<p>Windsor and Maidenhead</p>	<p>JSNA</p> <p>The JSNA was updated in 2017 and follows a life course approach:</p> <ul style="list-style-type: none"> • Starting well; • Developing well; • Living and working well; and • Ageing well. <p>JHWS</p> <p>The JHWS is currently up to date (2016-2020) and comprises of three themes and twelve priorities:</p> <p>Supporting a healthy population:</p> <ul style="list-style-type: none"> • Enable more children and adults to be at a healthy weight; • Lower risky levels of alcohol intake; • Get more people to be more active more often; and • Empower people to be educated to self-care. <p>Prevention and early intervention:</p> <ul style="list-style-type: none"> • Enable a reduction in levels of cardiovascular disease; • Support people to have early diagnosis of dementia; • Support adults and children with mental health needs; and • Assist and empower people with long term conditions. <p>Enable residents to maximise their capabilities and life chances:</p> <ul style="list-style-type: none"> • Support carers of all ages; • Enable health and wellbeing through regeneration and sustainable planning, including housing; and • Promote and enable greater independence for people.

12.7.2 The health needs and priorities have been identified through review of Joint Strategic Needs Assessments (JSNAs) and Joint Health and Wellbeing Strategies (JHWSs) developed by Local Planning Authorities and Clinical Commissioning Group, and by reviewing the Public Health Profile of each area. Common themes can be identified throughout the JSNAs and JHWS’s including:

- The prevention of disease and early death;
- Meeting the needs of children, including providing support for vulnerable families;
- Prioritising mental health and improving services;
- Addressing the needs of older people, improving independence, care and support;
- Addressing health inequalities, through targeting deprived and poor health communities;
- Recognising the wider determinants of health and improving those environments and opportunities;

- Taking a life course approach that is considerate of how individuals needs change as they age; and
- Meeting the needs of vulnerable groups and individuals.

12.8 Scoping of Potential Effects

12.8.1 The EIA Regulations require significant effects on human health to be considered (Regulation 5(2)) and paragraph 1.37 of the ANPS (DfT, 2018) requires assessment of human health.

12.8.2 Socio-economic and human health are closely interlinked but should be considered as separate elements, as shown in **Diagram 12.5**. Community wellbeing is affected by the health of the people in the community and vice versa. Similarly, the productivity of a population is affected by the wellbeing of communities within it and vice versa.

12.8.3 **Diagram 12.5** describes the general structure of impacts within the chapters of an ES based on Royal HaskoningDHV’s experience in delivering population assessments under the EIA Regulations.

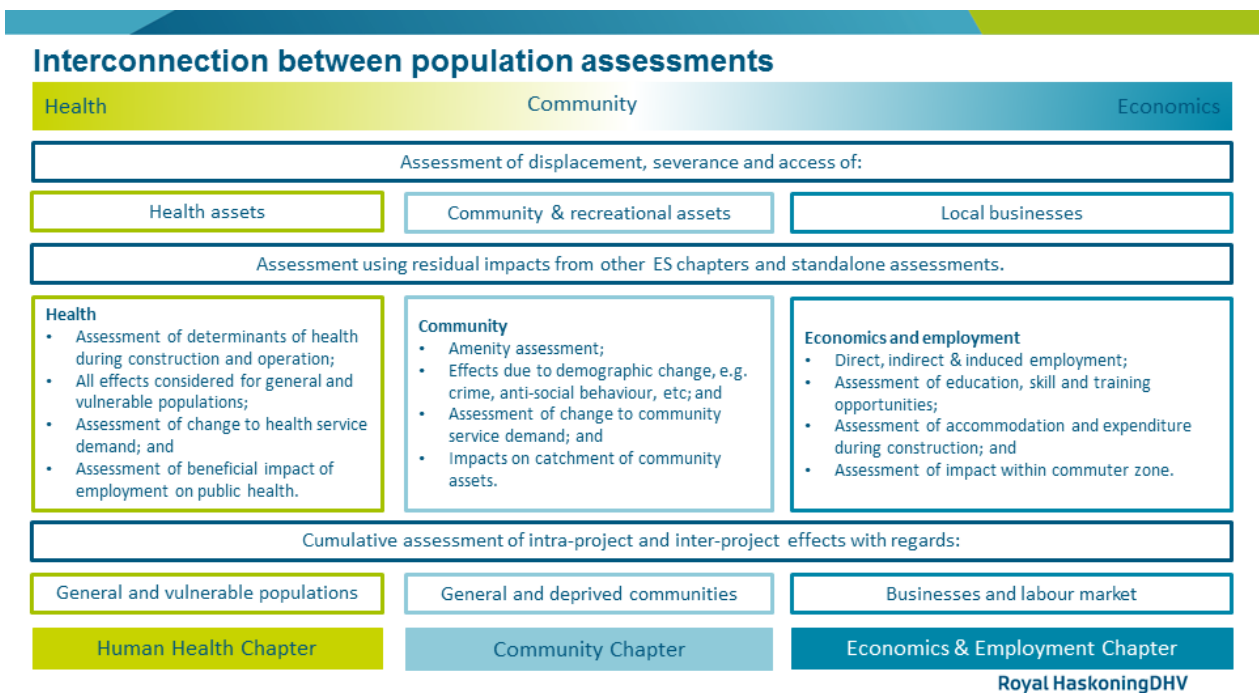


Diagram 12.5 General Structure of population and human health assessment under the EIA Regulations

Potential effects scoped into the assessment

12.8.4 The potential significant likely effects to be scoped into the water assessment are displayed in **Table 12.4**.

Table 12.4 Potential likely significant effects scoped in to the health assessment

Wider Determinant of health potentially effected	Source	Pathway	Receptor
Construction			
Access to services	Temporary change in number of people living in the community	Change in ability of local people to access public services, including health and social care, educational and recreational amenities and any effect on the viability of these resources.	Residents Users of community Facilities Operators of community facilities
Social cohesion	Temporary change in number of people living in the community	Disruption to existing social networks and feelings and perceptions of their community.	Residents
		Can be a source of concern for the local community.	Residents
Economy	Presence of a construction workforce, demand for employment and procurement of local goods and services.	Changes in employment leading to change in public health	Working age population
		Changes to local economic conditions	Operators of local amenities
Lifestyle	Temporary land required for Proposed Development	Change in opportunities for access to formal and informal open space affecting physical activity and active lifestyles.	Residents Users of open space and sports facilities
	Temporary change in local traffic and transport (including community severance)	Change in use of active travel modes (cycling and walking) and therefore affect active lifestyles. As well as potentially changing the safety of non-motorised road users.	Residents Commuters
Environment	Use of construction plant and construction traffic	May generate noise and vibration, emissions to air (including dust and odour), changes to visual amenity (including light pollution), and have effects on public safety which may affect health and wellbeing.	Residents Users of schools and medical and social care facilities
Operation			
Access to services	Change in the number of people accessing and demanding public healthcare services (additional passengers and airport workers).	Reduced access to healthcare services for local residents	Residents Users of community and healthcare facilities

Wider Determinant of health potentially effected	Source	Pathway	Receptor
Economy	Demand for operational workforce	Increased employment leading to high socio-economic status	Young people and working age population
Environment	Changes in sound exposure	Noise is a pathway for health effects relating to annoyance; sleep disturbance; cardiovascular impacts and cognitive development of children	Residents Users of schools and medical and social facilities Operators of schools and medical and social care facilities
	Changes to night time light levels which	May affect health and wellbeing.	Residents Schools Healthcare facilities
Lifestyle	Permanent land required for Proposed Development	Change in opportunities for access to formal and informal open space affecting physical activity and active lifestyles.	Residents Users of open space and sports facilities
Living conditions	Permanent land required for Proposed Development	Relocation and change in living conditions for those being relocated	Residents affected by relocation
Social cohesion	Permanent change in number of people living in the community	Disruption to existing social networks and feelings and perceptions of their community	Residents
	Changes in how local people feel about their community	Sense of place and wellbeing.	Residents Airport workers' Healthcare operators

Effects scoped out of the assessment

12.8.5 Human health may be affected by many factors, some of these are controllable by the individuals concerned (such as smoking) or by external influences (such as air pollution from a construction site). Some of these factors are considered in other chapters, such as Climate Change, Land Quality and Flooding. As these are considered in detail elsewhere in the assessment it would be disproportionate to consider them in the health assessment. However, if a significant residual adverse impact is assessed in the respective chapters these will then be considered as a health effect.

12.8.6 The HAL Scoping Report and the HAL Scoping Opinion have been considered when proposing the health effects to be scoped out of the health assessment. Comments from PINS and HSPG have been responded to where appropriate. These effects and justification for scoping out are presented in **Table 12.5**.

Table 12.5 Effects to be Scoped Out of the Health Assessment

Health effects	Justification for scoping out
Climate change	The climate change assessment will consider resilience to global climate change and the measures that will need to be taken by the expanded Airport to adapt to changing climate patterns. The potential impact of these changing climate patterns (e.g. temperature change, extreme weather events) will be assessed and measures proposed to manage these effects on the Airport and the people that use it. Therefore, potential health impacts associated with a changing global climate would not form part of the health assessment as they will be prevented / avoided through the climate resilience

Health effects	Justification for scoping out
	requirements. However, the health assessment will cross refer to the assessment undertaken in the ES chapter on climate change.
Land quality	Standard industry practices set out the approach to assessing and managing risks during construction activities where there is potential for workers to come into contact with contaminated soil or hazardous substances. The risks to construction workers from exposure to contamination in soil is will be covered in ES chapter on land quality and is therefore not duplicated in the health assessment.
Major accidents and disasters Outbreaks of communicable disease Flooding	<p>Major accidents, outbreaks of communicable disease and health effects due to flooding are possible but rare. These are generally considered low probability high consequence risks that are managed and controlled by appropriate methods.</p> <p>Although outbreaks of communicable diseases are rare, they do occasionally occur. The measures (as required by the 'Airport preparedness guidelines for outbreaks of communicable disease' Issued by Airports Council International (ACI) and the International Civil Aviation Organisation (ICAO) (Revised April 2009)) currently in place to detect, prevent and treat such diseases are expected to be applied to the expanded Airport, with facilities aligned to the demands created by an expanded airport. The emergency response measures, including the involvement of local health providers, is expected to be provided with continuity and therefore are not included in the health assessment.</p> <p>The responsibility for managing the risk of flooding lies with the Environment Agency. The DCO application will include a full FRA that will be reviewed by the Environment Agency to understand the risk to people and their property. Furthermore, no increase in flood risk would be consented as under existing policies any increase in flood risk would need to be counteracted by mitigation measures to prevent any increase in flood risk to property.</p> <p>Due to these factors, low probability high consequence events will not be considered in the scope of the health assessment.</p>
Non-communicable diseases	Non-communicable diseases (NCDs) are the leading cause of premature death worldwide. NCDs tend to be of long duration and are the result of a combination of genetic, physiological, environmental and behaviours factors. The controllable health determinants that increase the likelihood of contracting a NCD are the same as those for general health and, as such, are considered in the assessment. NCDs may be included where they are a relevant health outcome of significant change to a health determinant. As such, NCDs will not be considered as a specific aspect in the scope of the health assessment.
Electromagnetic fields	Electric and magnetic fields are produced wherever electricity is used, in the home, office, or anywhere else. Electric fields are produced by voltage and magnetic fields by current (it should also be noted that the people are constantly exposed to the earth's magnetic field). The UK policy is to comply with the 1998 ICNIRP ⁹ guidelines in the terms of the 1999 EU Recommendation and the electrical industry has a policy of complying with these guidelines. This limits exposure to magnetic fields of 360 µT and electric fields of 9 kV/m. In 2004 the National Radiological Protection Board (NRPB now part of PHE) produced Advice on Limiting Exposure to Electromagnetic Fields ¹⁰ . In this NRPB concluded that

⁹ International Commission on Non-Ionizing Radiation Protection

¹⁰ Available at:

<https://web.archive.nationalarchives.gov.uk/20140714093648/http://www.hpa.org.uk/Publications/Radiation/NPRBArchive/Documents/OfTheNRPB/Absd1502/>

Health effects	Justification for scoping out
	<i>“the results of epidemiological studies, taken individually or as collectively reviewed by expert groups, cannot currently be used as a basis for restrictions on exposure to EMFs”</i> . Due to the fact that all electrical infrastructure will be built to comply with current standards and that there is little scientific evidence linking EMF exposure to adverse health effects, this will not be included in the scope of the health assessment.
Pests control measures	Construction (Design & Management) Regulations (CDM 2015) are the main set of regulations for managing the health, safety and welfare of construction projects. These include pest control measures and these will be deployed on the Proposed Development during relevant periods. Health and Safety measures will be scrutinised and agreed with Local Planning Authorities that will include the control of pests. Therefore, the likely risk to human health will be managed and regulated and therefore pests are not considered within the scope of the health assessment.
Aviation fuel storage facilities	Aviation fuel storage facilities will be designed and build in compliance with the relevant regulations such as Control of Substances Hazardous to Health Regulations 2002 and Control of Major Accident Hazards (COMAH) Regulations. Therefore, any effect to human health would be due to a low probability high consequence event and will not be included in the scope of the health assessment.

12.9 Approach to Assessment

Study areas

- 12.9.1 The proposed study areas for health receptors are set out in **Chapter 9 ‘Community’** and **Chapter 10 ‘Economics and Employment’**, with reference to the inner and wider Study areas. The study areas used in other EIA topics are of relevance and will be used to inform the likelihood of health effects. These will be refined at the assessment stage as the design and consultation processes progress, and as related topic assessments are progressed.
- 12.9.2 The study areas for the assessment will be identified to ensure that the impact of the Proposed Development on health can be fully assessed. A likely ZOI for potential cumulative effects with other development will be defined separately as part of the CEA, as described in **Section 4.6 of Chapter 4 ‘Approach to EIA’**.

Additional baseline data collection

- 12.9.3 Should the study area change in response to the evolving design, the need for any additional baseline data for health may be reviewed and updated.
- 12.9.4 Should the study area change in response to the evolving design, the need for any additional baseline data for health may be reviewed and updated.
- 12.9.5 The baseline information will be updated in advance of the assessment where information is available. This includes: demographic information, new strategies and publications relevant to the management of health and wellbeing in the study area; and information relating to recorded health incidence relating to mortality and morbidity.

Baseline data limitations

- 12.9.6 The assessment of baseline conditions will be limited to the availability of data. Some datasets, like the 2011 Census, provide detailed spatial information and represent a reliable sample size. By the time of assessment this data will be around 9 years’ old. Where possible, other National Statistics and public datasets will be used to update 2011 Census data, but in some cases, this

remains the most reliable and spatially detailed source.

- 12.9.7 This assessment will also consider a future baseline based on projections of population change and demographic change, in order to consider the effects of the Proposed Development on health in the future compared to the characteristics of communities today. Projections of populations at interim assessment years across the study areas will be procured by the Applicant from reputable industry standard providers and the spatial scale, methodology and assumptions will be agreed with stakeholders through regular engagement to ensure they are fit for purpose for this assessment, and consistent with future baseline assumptions for other assessments.

Assessment scenarios

- 12.9.8 The Proposed Development would be constructed and implemented over a number of years. The approach to assessment will therefore be to assess the health impacts of the Proposed Development at key stages in its construction and operation.
- 12.9.9 Several assessment scenarios will need to be considered in the topic assessments, ranging from the current baseline year in which baseline data is collected and modelled through to the year of predicted maximum environmental effects during the operational phase.

Assessment methodology

- 12.9.10 This section sets out the proposed approach to assessing health effects. There is no formal guidance on considering health within the context of EIA. IEMA have published 'Health in Environmental Impact Assessment: A Primer for a Proportionate Approach' which provides a high-level introduction to considering public health in EIA.
- 12.9.11 To overcome the lack of guidance, Royal HaskoningDHV have previously collaborated with Ben Cave Associates to develop a methodology for human health assessment. Since the introduction of the EIA Regulations, this has been agreed with Public Health England (PHE) on the following NSIPs: Norfolk Vanguard (Royal HaskoningDHV, 2018a), Norfolk Boreas (Royal HaskoningDHV, 2018b), and East Anglia TWO (Royal HaskoningDHV, 2018c). Therefore, the following approach to assessment is considered best practice for human health assessments within EIA.

- Key aspects of the approach to assessing health effects are:
- Health pathways;
- Receptors;
- Assessment;
- Evaluation of significance; and
- Reporting.

- 12.9.12 Further detail on each of these is provided in the following sections.

Health pathways and likelihood

- 12.9.13 The first issue to consider in scoping or assessment is the likelihood of the project having an effect. A likely effect should be both plausible and probable.

- Plausible relates to their being a relevant source, pathway and receptor (see discussion of health pathways below); and
- Probable relates to a qualitative judgement to exclude those effects that could only occur under certain very rare conditions, except where these relate to the projects vulnerability to major accidents or disasters.

12.9.14 The term ‘health pathways’ describe how a specific activity of the project could change a determinant of health and potentially result in a change in health outcomes (an effect). Health pathways are considered with regards the source, pathway, and impact as follows:

- A ‘source’ represents an activity or factor that could affect the health outcomes of a receptor population;
- A ‘pathway’ describes the method or route by which the ‘source’ could affect the ‘receptor’ (either causation or association); and
- A ‘receptor’ is the recipient of an effect from the ‘source’, via the ‘pathway’.

12.9.15 **Table 12.6** shows how the Source-Pathway-Receptor model can be used to identify plausible health effects.

Table 12.6 Use of a Source-Pathway-Receptor model to identify plausible health effects (Royal HaskoningDHV 2018a, b and c)

Source	Pathway	Receptor	Plausible Health effect?	Explanation
x	✓	✓	No	There is not a clear source from where a potential health effect could originate.
✓	x	✓	No	The source of a potential health effect lacks a means of transmission to a population.
✓	✓	x	No	Receptors that would be sensitive or vulnerable to the health effect are not present.
✓	✓	✓	Yes	Identifying a source, pathway and receptor does not mean an effect is a likely significant effect; the probability of the effect should be qualitatively considered and a professional judgement reached on the significance of effects that are considered likely.

Receptors

12.9.16 A population health approach will be used, as it would be disproportionate to reach conclusions on the potential health outcomes of individuals. To take account of potential inequalities, where appropriate, conclusions on a particular health issue will be reached for more than one population. For example:

- One conclusion for the general population (for a defined area); and
- A second separate sub-population conclusion for relevant vulnerable groups (as a single defined class of sensitivities for that issue).

12.9.17 Engagement will be undertaken with statutory and non-statutory co stakeholders to identify:

- The receptors potentially impacted by the Proposed Development;

- The key sensitivities for each receptor (e.g. loss of assets, reduced access to health services, traffic congestion, increased noise, reduced air quality, visual change, etc); and
- Changes in population groups, in the context of standards for access to facilities and local context.

12.9.18 As recommended by Cave et al (2017a & b), to account for health inequalities, the assessment will consider potential effects on two types of receptors:

- The general population; and
- Vulnerable groups within the general population.

12.9.19 The general population scope of the health assessment considers: residents of and visitors to local communities in the study areas. The following population groups would not be included in the assessment: workforce and passengers of Heathrow and construction workers for the Proposed Development. This is because their health is managed by separate health and safety procedures.

12.9.20 Population groups may experience effects differently. Population groups can be characterised by factors including (but not limited to) age, gender, ethnicity, socio-economic status, place of residence or pre-existing health status.

12.9.21 Some groups may be more vulnerable than other. Examples include: Children and young people; Older people; Black and Minority Ethnic Groups; Faith groups; Disabled people living with a physical or mental impairment; Economically inactive or unemployed; People living on low incomes; People living in areas of deprivation; People with existing poor health status; People living in geographic or social isolation; Shift workers; Carers.

12.9.22 The health chapter in the ES will also report where impacts have a cumulative effect on resources, communities, or locations simultaneously. In addition to considering where impacts may have a different impact on vulnerable groups,

Assessment

12.9.23 Other assessments will inform the assessment of health determinants. These include:

- **Chapter 5 ‘Air Quality and Odour’;**
- **Chapter 9 ‘Community’;**
- **Chapter 10 ‘Economics and Employment’;**
- **Chapter 14 ‘Landscape and Visual Amenity’;**
- **Chapter 16 ‘Noise and Vibration’;** and
- **Chapter 17 ‘Traffic and Transport’.**

12.9.24 The assessment of each health effect will draw on quantitative and qualitative analysis and stakeholder engagement. The assessments will be professional judgements with appropriate reference to supporting evidence.

12.9.25 Quantitative analysis will be used where information is available to allow potential health outcomes to be modelled in a proportionate manner. It is expected that this modelling will be undertaken as part of other assessments (such as Noise and Vibration or Air Quality) and the residual impact transposed to specific population groups. In generally, cause and effect

responses that have been recognised by international bodies (such as the World Health Organization) and/or UK government guidance will be adhered to.

12.9.26 Qualitative analysis will be applied where the strength of evidence is insufficient. Generally this relates to impacts where the health outcome is likely to result in a change in wellbeing, rather than a mortality or morbidity. As far as practicable quantitative analysis will be used to inform qualitative assessments (such as the size of the population group being affected).

12.9.27 The methodology for assessing potential health effects qualitatively and quantitatively will be agreed with PHE and other health stakeholders in advance of the assessment.

Evaluation of significance

12.9.28 A determination of significance is required for compliance with the EIA regulations when a potential effect of the project is likely (or relates to the projects vulnerability to major accidents or disasters) (Royal HaskoningDHV, 2018a, b & c).

12.9.29 The determination of significance has two stages:

- Firstly, the sensitivity of the receptor affected, and the magnitude of the effect upon it are characterised. This establishes whether there is a relevant population and a relevant change in health outcomes to consider.
- Secondly, a professional judgement is made as to whether or not the change in a population's health is significant. This judgement is based on the collection and presentation of data to evidence reasoned conclusions.

Sensitivity

12.9.30 Further stakeholder engagement will be undertaken to determine receptors, vulnerable groups and key sensitivities. **Table 12.7** sets out factors characterising sensitivity for human health. The table informs the professional judgement on scoring high, medium, low or negligible sensitivity. In line with best practice a formulaic matrix approach to determining sensitivity has been avoided. The 'higher' and 'lower' sensitivity characterisations represent instructive positions on a spectrum that would also include more extreme, as well as intermediate, positions. Most situations have a mix of higher and lower characterising factors so a balanced expert view of sensitivity is taken.

Table 12.7 Factors characterising population sensitivity (Royal HaskoningDHV 2018a, 2018b and 2018c)

	Inequalities	Deprivation	Health Status	Life Stage	Outlook
Higher Sensitivity	High levels of inequalities or inequities.	High levels of overall deprivation or a high level of deprivation for a relevant sub-domain of the indices of multiple deprivation. High levels of poor access to financial, social or political resources.	High levels of poor health and/or disability (particularly multiple or complex long-term health conditions). High reliance on (or low capacity in) healthcare facilities, staff or resources.	Presence of dependants (particularly the elderly or children), pregnant women, shift workers or the economically inactive.	Presence of groups with strong views or high degrees of uncertainty about the project who may anticipate risks to their health and thus be affected by not only actual changes, but also by the possibility of change.

	Inequalities	Deprivation	Health Status	Life Stage	Outlook
Lower Sensitivity	Low levels of inequalities or inequities	Low levels of overall deprivation or a low level of deprivation for a relevant sub-domain of the indices of multiple deprivation. Good access to financial, social or political resources.	Low levels of poor health and/or low levels of disability. Low reliance on (or high capacity in) healthcare facilities, staff or resources.	Predominantly a working age population in steady good quality employment.	No indication that strong views are held about the project. People are well informed of the issues and potential effects.

12.9.31 The text of the assessment section of the Human Health chapter characterises the relevant populations for each health issue. For each professional judgement on sensitivity the text sets out detail on the one or more relevant factors from **Table 12.7** that informed the score.

Judgement framework for significance

12.9.32 As recommended by Cave et al (2017b), having established that a source, pathway and receptor for impact exist, the magnitude/sensitivity methods are used to consider whether there is a relevant population to consider and a relevant change in health outcomes, a professional judgement is made as to whether or not the change in a population's health is significant. (Royal HaskoningDHV 2018a, 2018b and 2018c)

12.9.33 The characterisation of sensitivity and magnitude provides consistency between EIA topics. However, other relevant information sources (in addition to sensitivity and magnitude) also need to be evidenced for the professional judgement on significance to be a reasoned and robust conclusion on population health outcomes.

12.9.34 The approach uses a framework for reporting on a range of data sources to ensure reasoned and robust professional judgements are reached. Key sources of data include: scientific literature; baseline conditions; health priorities; consultation responses; regulatory standards; and policy context.

12.9.35 Guide questions set out in **Table 12.8** are used to inform the professional judgements on significance. The table informs the professional judgement on scoring Major, Moderate, Minor or Negligible significance. In line with best practice a formulaic matrix approach to determining significance has been avoided.

Table 12.8 Human Health Guide Questions for Determining Significance (Royal HaskoningDHV 2018a, 2018b and 2018c)

Evidence sources	Guide Questions
Scientific Literature	Is there a sufficient strength of evidence from sufficiently high-quality studies to support an association between the project change, a relevant determinant of health and a relevant health outcome? Does the literature indicate thresholds or conditions for effects to occur? Are particular population groups identified as being particularly susceptible?
Baseline Conditions	Are relevant sensitivities or inequalities identified in the scientific literature present? Does the baseline indicate that conditions differ from relevant local, regional or national comparators? Are their geographic or population features of the baseline that indicate effects could be amplified?

Evidence sources	Guide Questions
Health Priorities	Have local, regional or national health priorities been set for the relevant determinant of health or health outcome (e.g. in Joint Strategic Needs Assessments or in Health and Wellbeing Strategies)?
Consultation Responses	Has a theme of local, regional or national consultation responses related to the relevant determinant of health or health outcome?
Regulatory Standards (if appropriate)	Is the change one that would be formally monitored by regulators? Are there regulatory or statutory limit values set for the relevant context? Has EIA modelling predicted change that exceed thresholds from the scientific literature or set by regulators? Are there relevant international advisory guideline limit values (e.g. by the World Health Organisation)?
Policy Context	Does local, regional or national government policy raise particular expectations for the relevant project change, determinant of health or health outcome (e.g. levels should be as low as reasonably practicable)? Is there a relevant international policy context (e.g. treaties or conventions)?

12.9.36 The text of the assessment section of the Human Health chapter will provide a structured discussion that responds to each of these questions for each health issue. The discussion will provide reasoned conclusions for the professional judgement as to whether in EIA terms an issue is significant, or not. Where appropriate, variation expressed in each evidence source will be reported. This approach is considered proportionate and in line with best practice for the consideration of human health in EIA.

12.9.37 Ultimately for human health, a likely significant effect is one that should be brought to the attention of the determining authority, as the effect of the project is judged to provide, or be contrary to providing, a high level of protection to human health. This may include reasoned conclusions in relation to health protection, health improvement and/or improving services.

12.9.38 For the purposes of the EIA, major and moderate effects are deemed to be significant. In addition, whilst minor effects are not significant in their own right, it is important to distinguish these from other non-significant effects as they may contribute to significant cumulative effects.

12.9.39 Where significant adverse effects are identified, mitigation will be considered to reduce the significance of such effects. Similarly, enhancements will be considered where significant and if proportionate opportunities to benefit population health are identified. The residual effects represent the output of iterative assessment, taking into consideration the mitigation and enhancement measures.

12.9.40 The human health chapter will take as its starting point the residual effects as assessed and determined in other relevant EIA topic chapters. This will include taking into account relevant embedded and standard good practice mitigation.

Categorising effects on human health

12.9.41 It is important to note that a health effect does not need to meet all of the characteristics to be assigned to a specific category. The assessment will provide the justification as to why a health effect has been assessed to be in a particular category; this will principally be based on the majority of shared characteristics, the interrelationships of characteristics and applying professional judgement. The categorisation of health effects will be agreed with PHE and health stakeholders prior to assessment.

Cumulative effects

12.9.42 Cumulative health effects resulting from the combination of effects from the Proposed Development and other developments will be assessed in accordance with the guidance and methodologies set out in **Section 4.6 of Chapter 4 ‘Approach to EIA’**. The assessment will be dependent on the availability and accessibility of information for other developments.

12.9.43 The Proposed Development does not include any primary assessment of impacts associated with the new Northwest Runway and M25 realignment components of the NRS proposed by HAL. However, the Proposed Development is designed to be operated alongside these components of the NRS that are being progressed by the HAL DCO Project. Therefore, the total cumulative health effects will be considered together to ensure an overarching assessment of the NRS as a whole.

12.9.44 Any components of the HAL DCO Project which would no longer be required as a result of the Proposed Development would not be included in the CEA.

12.10 Approach to Mitigation

12.10.1 Minimisation of health impacts will be embedded into the design of the Proposed Development where possible following the application of the hierarchy of mitigation as described in **Chapter 4 ‘Approach to EIA’**. The assessment of impacts will be made with these embedded mitigation measures in place.

12.10.2 The primary means of mitigating impacts to populations is through proactive engagement and inclusion of stakeholder’s views in the design and development of the Proposed Development. Measures such as a best practice to minimise dust, emissions and noise (as detailed in **‘Chapter 5 Air Quality and Odour’** and **Chapter ‘16 Noise and Vibration’**) as well as managed plans such as the Surface Access Strategy (as detailed in **Chapter 17 ‘Traffic and Transport’**) will also be crucial in mitigating population impacts.

12.11 Supporting Assessments

12.11.1 The three population assessments draw on the outputs of other environmental topics such as **Chapter 5 ‘Air Quality and Odour’**, **Chapter 13 ‘Landscape and Visual Amenity’** and **Chapter 16 ‘Noise and Vibration’**, and will be based on the location of the receptor population in relation to the source of effect.

12.11.2 They are also informed by separate assessments such as:

- The Equality Impact Assessment;
- Health Impact Assessment;
- Economic Assessment;
- Walkover surveys;
- Recreation Asset Survey; and
- Open Space Assessment.

12.11.3 There is a statutory requirement for EIA (including consideration of health), and there is also a policy requirement for HIA. The Proposed Development will seek to adopt a consistent yet proportionate approach between the EIA and HIA. Drawing on the analysis in the HIA, the ES

will report likely significant health effects and the measures taken by the Proposed Development to enhance positive health effects and reduce negative health effects. The HIA will be reported as an appendix to the Health chapter of the ES. The scoping of potential health effects is the same for the EIA and the HIA and the same methods will be used.

12.11.4 A project-level Equality Impact Assessment (EqIA) will be prepared to accompany the DCO application. The EqIA will focus on assessing impacts on the groups with protected characteristics defined in the Equality Act 2010. The consideration of health inequalities is broader than the statutory protected characteristics set out in the Equality Act 2010; some of the vulnerable groups are shared in the assessments, but the health assessment will consider impacts on additional population groups (and may not consider all groups with protected characteristics). The EqIA also considers issues that extend beyond health and wellbeing. The assessments share inputs such as demography, evidence-based relationships and inputs from stakeholder engagement. The assessments are complementary, it is expected that a proportion of the methods, assessment conclusions and mitigations will be common to both the Health chapter of the ES and the EqIA Report.

12.12 Summary

12.12.1 The scope of the health assessment described above is summarised in **Table 12.9**, below.

Table 12.9 Summary of scope of health assessment

Wider determinant of health potentially effected	Construction	Operation
Change in number of people living in the community affecting access to services	✓	✓
Change in number of people living in the community affecting social cohesion	✓	✓
Economic effects from the presence of a construction workforce, demand for employment and procurement of local goods and services.	✓	✗
Effects on lifestyle due to land use changes both temporary and permanent	✓	✓
Environmental effects such as changes to noise levels and air quality	✓	✓
Changes to residents living conditions resulting from relocation	✗	✓

12.12.2 Production of the ES chapter will be undertaken in consultation with all relevant stakeholders, including topic expert panel meetings, as appropriate. Similarly, the requirements of the ANPS will be at the forefront; principally that the Proposed Development design will seek to deliver beneficial outcomes for the local community, not merely mitigate adverse effects; be a good neighbour and deliver and catalyse improvement in the local communities, nearby London Boroughs and West London more generally.

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13 Landscape and Visual Amenity

13.1 Introduction

13.1.1 This chapter details the proposed scope of the assessment of potential impacts arising from the Proposed Development on landscape and visual amenity. The chapter considers potential impacts associated with the construction and operational phases.

13.1.2 The chapter includes:

- A description of key policy and legislation with relevance to landscape and visual amenity;
- A summary of ongoing and planned stakeholder engagement;
- An overview of the approach that has been adopted to inform this Scoping Report;
- A concise summary of the baseline landscape and visual amenity;
- A description of the potential likely significant effects of the Proposed Development on landscape and visual amenity, to be included in the scope of the assessment;
- A summary of any potential effects that are proposed to be scoped out of the assessment;
- A proposed approach to the EIA and the CEA with regard to landscape and visual amenity;
- An overview of the proposed approach to mitigation; and
- A summary of the Scoping Report chapter including a summary of impacts table.

13.1.3 The Proposed Development is a component of the Government's preferred NRS as set out in the ANPS. It does not include the Northwest Runway itself, or the major M25 realignment works to accommodate the Northwest Runway. Therefore, potential landscape and visual effects associated with these components of the NRS are excluded from the scope of the primary assessment. Potential landscape and visual effects associated with the Northwest Runway and M25 realignment works will however be considered as part of the CEA, as set out in **Section 4.6 of Chapter 4 'Approach to EIA'**.

13.2 Policy and Legislation

13.2.1 **Table 13.1** provides a summary of the key topic specific policy which has informed the scope of the assessment. Further information on policies relevant to the EIA and their status is set out in **Chapter 1 'Introduction'**. Due regard will also be given to local policies and the Government's 25 Year Environment Plan where they are relevant.

13.2.2 These documents are proposed to form the framework for detailed assessment post scoping and will be taken into account in the assessment of landscape and visual amenity during preparation of the PEIR and ES, with the relevant criteria followed throughout.

Table 13.1 Policy and legislation relevant to the landscape and visual amenity assessment

Relevant policy / legislation	Relevance to assessment
Policy	
Airports National Policy Statement (ANPS) (2018)	National planning policy in relation to potential landscape and visual impacts arising from airport developments – in particular sections 5.213-5.225 and sections 4.30 and 4.34 in relation to design and mitigation.

Relevant policy / legislation	Relevance to assessment
National Policy Statement for National Networks (NPS NN) (2014)	National planning policy in relation to potential landscape and visual impacts arising from alterations to the road and rail network – in particular section 4.34 in respect of design; 5.61 and 5.87 in relation to the consideration of lighting impacts and sections 5.143 to 5.161 in relation to assessment and mitigation of impacts.
National Planning Policy Framework (NPPF) (2018)	National planning policy in relation to landscape and visual matters – in particular section 15, and section 12 in relation to design and mitigation.

13.2.3 A review of The London Plan, current emerging local plans and guidance will include:

- Identification of relevant landscape and visual receptors and considerations;
- Policies identifying locally designated landscape and townscape and policies identifying valued views have been reviewed in preparing this Scoping Report and relevant receptors are shown on **Figure 13.1** and/or are identified in the text;
- Policy and guidance relating to landscape & townscape character, valued landscape and visual receptors, visual amenity, trees and vegetation, and residential visual amenity will be considered within the assessment;
- Relevant design and vegetation management policies will be considered in the design of mitigation proposals; and
- Local policies and guidance will be considered based on their relevance in relation to the potential effects within the Borough. For example, where development is not taking place within a Borough, only policy and guidance pertaining to receptors potentially affected by visual and perceptual effects will be considered. Whether or not receptors are potentially affected will be informed through the ZTV analysis and site observation.

13.3 Stakeholder Consultation

13.3.1 A detailed stakeholder engagement plan is currently being developed. Care will be taken to ensure all key stakeholders with views and concerns regarding landscape and visual amenity are provided with sufficient information on the Proposed Development to discuss and agree the details of the assessment in a meaningful and inclusive manner.

13.3.2 The stakeholders listed below were contacted in November 2018 to make them aware of the Proposed Development and timescales for further consultation. The following stakeholders were provided with a presentation providing an overview of the Proposed Development and inviting initial comments on the scope of the assessment for landscape and visual amenity.

- London Borough of Hillingdon;
- London Borough of Hounslow;
- Spelthorne Borough Council;
- Slough Borough Council;
- South Bucks District Council;
- Natural England;
- National Trust;

- Canal and River Trust;
- Royal Borough of Windsor and Maidenhead;
- Surrey County Council;
- Buckinghamshire County Council;
- Ealing Borough Council;
- Chilterns AONB;
- Colne Valley CIC;
- Richmond upon Thames Borough Council; and
- Slough Borough Council.

13.3.3 The HAL Scoping Opinion is a useful source of stakeholder feedback, and has been used to inform this Scoping Report.

13.3.4 Further formal and informal consultations will be arranged to discuss and agree the details of the methodology for the assessment of potential impacts to landscape and visual amenity arising from the Proposed Development.

13.4 Approach to Scoping

Study area and viewpoint selection

13.4.1 At present, the design is not sufficiently advanced to firmly fix the study area or prepare a ZTV study. Once the broad locations and heights of key elements are established, ZTV studies will be prepared and used to finalise the study area and viewpoint selection with consultees. Viewpoint selection will be informed by those discussed with consultees through the HAL DCO Project scoping process, modified as required to address differences between the HAL DCO Project and the Proposed Development.

13.4.2 At this early stage in the design development, an initial study area has been set as 5km from the Proposed Development (as shown on **Figure 13.1**). It is noted that for the HAL DCO Project some consultees suggested a slightly larger study area may be required, however the HAL Scoping Opinion (at ID 103) (PINS, 2018) did not suggest the area be extended, but that it must be both justified in the ES with reference to the ZTV study and sufficient to contain all likely significant effects. A study area of 5km is considered to be more than adequate to encompass all significant effects based on the likely scale of the largest element (the terminal building) of the Proposed Development.

13.4.3 The proposed approach to determining the final study area is based on the scale of the elements of the Proposed Development, which influences the likely extent of significant effects:

- 5km from all development of 25m or more above ground level;
- 2km from all development of less than 25m above ground level;
- Additional receptors included by exception on an individual basis where they are of local or national value and specific considerations in relation to intervisibility and/or special qualities indicate that there is the potential for significant effects. Noting the Natural England, Chilterns Conservation Board, Runnymede Borough Council, London Borough

of Hounslow and HSPG responses to the HAL Scoping Report, this will be specifically considered in relation to:

- The Chilterns AONB, and
- valued views from Royal Airforce Memorial (Cooper's Hill), King Henry VIII's Mound (Richmond) and Osterley Park viewpoints.

13.4.4 As a guide, it is anticipated that the study area will reduce to the north and west given that the anticipated development within this area will consist of road and drainage changes and a potential borrow pit – which are all likely to be below 25m above ground level.

13.4.5 To the east and south there is more likely to be built form associated with displaced uses from the main airport site, along with main construction compounds and some road and drainage changes. Some of the larger built elements in this area may merit a 5km study area.

Sources of baseline data

13.4.6 Sources of baseline data include:

- Local authority planning policy and guidance documents identified at **Section 13.2** above;
- Mapping, aerial photography and digital terrain data – these will be obtained as required and fully referenced within the ES;
- National Character Area Profile 115: Thames Valley;
- Local Landscape Character Assessments:
 - Colne Valley Landscape Character Assessment (Colne Valley Landscape Partnership, updated 2018);
 - Hillingdon Landscape Character Assessment (2012);
 - London Borough of Hounslow Urban Context and Character study (2014);
 - Landscape Character Assessment for the Royal Borough of Windsor and Maidenhead (2004);
 - Royal Borough of Windsor and Maidenhead Townscape Assessment (2010);
 - South Bucks District Landscape Character Assessment (2011); and
 - Surrey Landscape Character Assessment (2015).
- Studies relating to local landscape and townscape value and historic character as available, e.g. Conservation Area Appraisals, supporting studies relating to local landscape designations and studies identifying valued views.

13.4.7 No local landscape or townscape character studies were identified for some parts of the study area (Slough outside of the Colne Valley Regional Park, Richmond upon Thames and Ealing). These areas are predominantly urban and towards the outer edges of the study area. A suitable approach to baseline assessment will be agreed for potentially affected areas once the final study area is defined and ZTV analysis has been undertaken.

13.5 Baseline Conditions

13.5.1 Heathrow is a major international airport located east of the M25. Major roads and reservoirs

occur frequently in the study area. Much of the surrounding study area is urban, divided by river valley landscapes including Colne Valley Regional Park and Runnymede.

13.5.2 Open landscapes within the area are typically covered by designations related to their land use (as Parks and/or Green Belt) and/or their value (local landscape designations as shown on **Figure 13.1**) and many are important for their historic value and/or recreational uses. There are no Areas of Outstanding Natural Beauty (AONB) or National Parks within the study area – the nearest (The Chilterns AONB) is more than 6km to the north of the draft study area. The only nationally valued landscapes in the study area are Registered Parks and Gardens located predominantly to the western edges of the study area as shown on **Figure 13.1**.

13.5.3 The area is well-populated with both a large resident population living mostly within urban areas, and high use by people passing through the study area on journeys via rail, road or air. The groups of potentially affected visual receptors includes a wide range of sensitivities from indoor workers and motorway users, to local residents and visitors to valued viewpoints.

13.6 Scoping of Potential Effects

Effects scoped into the assessment

13.6.1 The potential likely significant effects to be scoped into the landscape and visual amenity assessment are displayed in **Table 13.2**.

Table 13.2 Potential likely significant landscape and visual amenity effects

Activity	Effect	Receptor
Construction		
Site clearance and groundworks.	Changes to landscape fabric incl. removal of vegetation.	Trees & vegetation within the Proposed Development area.
Site clearance and groundworks and construction activity including use of larger plant such as cranes.	Physical changes to landscape character.	Host landscape character areas
Construction activity including use of larger plant such as cranes.	Changes to perceptual characteristics, views and special qualities of valued landscapes.	Landscape/townscape character areas, views, and valued landscapes with visibility of construction activity.
Use of lighting during construction.	Changes to perceptual characteristics, views and special qualities of valued landscapes.	Landscape/townscape character areas, views, and valued landscapes potentially affected by increased light levels during construction.
Nearby construction activity.	Visual effects on residential amenity.	Residential properties within 500m of construction areas with visibility of construction activity.
Operation		
Operational airport including buildings and taxiways proposed as part of the Proposed Development, and aircraft using these.	Physical changes to landscape character.	Landscape character areas within which these development elements are proposed.
Operational airport including buildings and taxiways proposed as part of the	Changes to perceptual characteristics, views and special qualities of valued landscapes.	Landscape/townscape character areas, views, and valued landscapes with visibility of the Proposed Development.

Activity	Effect	Receptor
Proposed Development, and aircraft using these.		
Operational use of associated development.	Physical changes to landscape character.	Landscape character areas within which these development elements are proposed.
Operational use of associated development.	Changes to perceptual characteristics, views and special qualities of valued landscapes.	Landscape/townscape character areas, views, and valued landscapes with visibility of the associated development.
Operational use – lighting.	Changes to landscape character, views and special qualities of valued landscapes.	Landscape/townscape character areas, views, and valued landscapes potentially affected by increased light levels during operation.
Operational use.	Visual effects on residential amenity.	Residential properties within 500m of operational development with visibility of operational use.

Effects scoped out of the assessment

13.6.2 The effects proposed to be scoped out of the landscape and visual amenity assessment are displayed in **Table 13.3**.

Table 13.3 Effects to be scoped out of the landscape and visual amenity assessment

Activity	Effect	Receptor	Justification for scoping out
Construction			
All construction activity	Changes to perceptual characteristics, views and special qualities of valued landscapes.	Landscape/townscape character areas, views, and locally valued landscapes with no or very limited visibility of the construction activity as identified by the ZTV study.	Significant effects are unlikely to arise where there is no or limited visibility of the Proposed Development.
All construction activity	Visual effects on tranquillity.	Landscape/townscape character areas, views, and valued landscapes.	As identified within the NPPF para. 180 and inherent in the CPRE tranquillity mapping methodology (as set out within 'Tranquillity Mapping: Developing a Robust Methodology for Planning Support Technical Report on Research in England, January 2008 (revised)') and Chilterns CB response to the HAL DCO Project scoping (second paragraph of email dated 2/8/2018), noise is the primary factor in tranquillity. Changes to views are unlikely to significantly impact tranquillity.

Activity	Effect	Receptor	Justification for scoping out
Operation			
Operational use – airport and associated development	Changes to perceptual characteristics, views and special qualities of valued landscapes.	Landscape/townscape character areas, views, and valued landscapes with no or very limited visibility of the operational uses of the airport or associated development.	Significant effects are unlikely to arise where there is no or limited visibility of the Proposed Development.
Operational use	Visual effects on tranquillity.	Landscape/townscape character areas, views, and valued landscapes.	As identified within the NPPF para. 180 and inherent in the CPRE tranquillity mapping methodology (as set out within 'Tranquillity Mapping: Developing a Robust Methodology for Planning Support Technical Report on Research in England, January 2008 (revised)') and Chilterns CB response to the HAL DCO Project scoping (second paragraph of email dated 2/8/2018), noise is the primary factor in tranquillity. Changes to views are unlikely to significantly impact tranquillity.

13.7 Approach to Assessment

Study area

- 13.7.1 The proposed study area for landscape and visual amenity receptors are set out in **Section 13.4**. These will be refined at the assessment stage as the design and consultation processes progress, and as related topic assessments are progressed.
- 13.7.2 The study area for the assessment will be identified to ensure that the impact of the Proposed Development on the landscape and visual amenity can be fully assessed. A likely ZOI for potential cumulative landscape and visual amenity effects with other development will be defined separately as part of the CEA, as described in **Section 4.6 of Chapter 4 'Approach to EIA'**.

Additional baseline data collection

- 13.7.3 Baseline data will be gathered via a full desk review of local planning documents, guidance, management plans and supporting studies for potentially affected landscape and visual receptors in the study area.
- 13.7.4 The ZTV study will be verified through site work and used to direct site visits and the focus of detailed data collection. Site visits will be undertaken in different seasons and in both day and night to allow understanding of the effects of seasonal variations in leaf cover and the baseline lighting environment.

- 13.7.5 Information regarding consented development and other significant changes expected within the study area will be gathered in order to establish future baseline within which the Proposed Development would be constructed and operated.
- 13.7.6 The baseline data will be discussed with consultees to ensure completeness and ensure all relevant receptors are appropriately included within the assessment.

Assessment methodology

- 13.7.7 The assessment will be undertaken in accordance with 'The Guidelines for Landscape and Visual Impact Assessment', 3rd Edition, Landscape Institute with the Institute of Environmental Management and Assessment, 2013. This guidance covers all aspects of LVIA and provides a detailed description of which receptors should be considered and how sensitivity, magnitude and significance should be assessed.
- 13.7.8 The methodology will also draw on the following documents in relation to specific aspects of assessment:
- An Approach to Landscape Character Assessment, Natural England, 2014.
 - Special Report – The State of Environmental Impact Assessment Practice in the UK, Institute of Environmental Management and Assessment, 2011
 - Landscape Institute Advice Note 01/11 - Photography and photomontage in landscape and visual impact assessment.
 - Landscape Institute Technical Note 02/17 – Visual Representation
- 13.7.9 It is anticipated that the Landscape Institute will issue guidance regarding photography and Residential Visual Amenity Assessment during 2019. Any new and relevant guidance will be taken into account where they are issued before the relevant stage of the assessment is carried out.
- 13.7.10 The assessment will consider effects on landscape character, visual receptors, designated landscapes and residential amenity.
- 13.7.11 The consideration of landscape character will focus on local landscape and townscape character studies as set out at paragraph 13.4.7. National and regional studies will be used as additional information sources. The effects on individual character areas will be considered with reference to the development to take place within that character area and/or any potential changes to visual and perceptual characteristics. Judgements will be made regarding the susceptibility and value of each character area (informed by local studies, guidance and site observations), to inform a judgement of sensitivity. The magnitude of effect will be determined based on the scale, extent and duration of the potential effects on key characteristics. Sensitivity and magnitude judgements will be considered, along with the contributory factors, to reach a judgement of the significance of the effect.
- 13.7.12 The consideration of visual receptors will consider views available from publicly accessible spaces within the study area. The assessment will consider visual receptors as community groups (area based - including areas of settlement and associated local routes (footpaths and roads) and users of key routes such as A-roads, motorways, railways national and regional trails. Judgements will be made regarding the susceptibility of receptors and value of the views (informed by local studies, guidance and site observations), to inform a judgement of sensitivity. The magnitude of effect will be determined based on the scale, extent and duration

of the potential effects on those views. Sensitivity and magnitude judgements will be considered, along with the contributory factors, to reach a judgement of the significance of the effect.

13.7.13 The consideration of effects on designated landscapes and townscapes will be informed by the assessment of effects on character and views within that area; and by the special qualities and/or purposes of designation as identified by the relevant policy and guidance pertaining to that designation. Judgements (based on the relevant consultant's professional expertise) will be made regarding the susceptibility of those purposes and/or special qualities and value informed by the status of the designation, guidance and site observations, to inform a judgement of sensitivity. The magnitude of effect will be determined based on the scale, extent and duration of the potential effects on the special qualities and/or purposes of designation. Sensitivity and magnitude judgements will be considered, along with the contributory factors, to reach a judgement of the significance of the effect.

13.7.14 Effects on residential amenity will be considered based on the potential for construction activity or the Proposed Development when operational to be 'overwhelming' or 'overbearing' such that the visual effects could render a property 'an unattractive place in which to live'. The assessment will consider visual effects on both internal and external spaces in order to reach an overall judgement about the potential effect on residential visual amenity.

13.7.15 Visualisations to be provided for each viewpoint will be agreed with consultees once viewpoints are agreed and the design is sufficiently developed to determine what is likely to be visible from each viewpoint. A proportionate approach is proposed in line with the guidance within LI Technical Note 02/17, with the visualisation approaches and outputs taking account of development parameters ('worst case') and/or design detail as appropriate.

Cumulative effects

13.7.16 Cumulative landscape and visual effects resulting from the combination of effects from the Proposed Development and other developments will be assessed in accordance with the guidance and methodologies as set out in **Section 4.6 of Chapter 4 'Approach to EIA'**. The assessment will be dependent on the availability and accessibility of information for other developments.

13.7.17 Consented and proposed developments will be included in the assessment as follows:

- All major infrastructure projects within 10km;
- All EIA projects within 5km; and
- All projects involving the development of greenfield land or new built form over 25m in height within 2km.

13.7.18 Within the LVIA consented developments in the study area will be included as part of the assessment baseline in the main body of the LVIA as they form part of the environment within which the Proposed Development would be constructed and operated.

13.7.19 The Proposed Development does not include the new Northwest Runway and M25 realignment components of the NRS proposed by HAL. However, the Proposed Development is designed to be operated alongside these components of the NRS that are being progressed by the HAL DCO Project. Therefore, the total cumulative landscape and visual effects will be considered together to ensure an overarching assessment of the NRS as a whole.

13.7.20 Any components of the HAL DCO Project which would no longer be required as a result of the Proposed Development would not be included in the CEA.

Table 13.4 Effects to be scoped in to the cumulative landscape and visual amenity assessment

Activity	Effect	Receptor
Construction		
Operational airport including buildings, runway, aircraft and control tower proposed as part of the HAL DCO Project which would form part of the operational airport.	Physical changes to landscape character.	Landscape character areas within which these development elements are proposed.
Operational airport including buildings, runway, aircraft and control tower proposed as part of the HAL DCO Project which would form part of the operational airport.	Changes to perceptual characteristics, views and special qualities of valued landscapes.	Landscape/townscape character areas, views, and valued landscapes with visibility of the Proposed Development.

13.7.21 The effects associated with the HAL DCO Project proposed to be scoped out of the cumulative landscape and visual amenity assessment are displayed in **Table 13.5**.

Table 13.5 Effects to be scoped out of the cumulative landscape and visual amenity assessment

Activity	Effect	Receptor	Justification for scoping out
Operation			
Operational use – overhead aircraft	Changes to perceptual characteristics, views and special qualities of valued landscapes.	Landscape/townscape character areas, views, and valued landscapes.	All receptors within the study area are already affected by the existing flights to and from Heathrow Airport. Seeing and hearing planes is already part of the visual experience and character in the locality. The increase in numbers of flights is unlikely to give rise to significant effects on landscape and visual receptors, except for those affected by planes as they use the runway – which are included in scope as set out within table 13.4 above.
Operational use – overhead aircraft	Effects on residential visual amenity.	Residential properties	CAA low flying rules and flight path selection best practice will tend to ensure that planes are not close enough overhead to be visually oppressive.

13.8 Approach to Mitigation

13.8.1 Minimisation of landscape and visual amenity impacts will be embedded into the design of the Proposed Development where possible following the application of the hierarchy of mitigation as described in **Chapter 4 ‘Approach to EIA’**. The assessment of impacts will be made with these embedded mitigation measures in place.

13.8.2 The type and level of mitigation measures required will be informed by the expected level of impact. The ANPS lists a number of mitigation measures relevant to the construction and operational phases which could be put forward to minimise impacts associated with the Proposed Development. Mitigation identified by the ANPS that is relevant to the landscape and visual amenity assessment is outlined below:

- Avoidance or minimisation of impacts through design;
- Mitigation of impacts through design;
- A co-ordinated approach with other topic areas to deliver multi-functional mitigation;
- Clear identification of mitigation measures; and
- Traceability of mitigation into construction and management plans to ensure delivery.

13.8.3 Proposed landscape and visual mitigation measures will be informed by the assessment process and relevant national and local policy and guidance in relation to matters such as the retention of trees and vegetation, and aspects of design and species selection for landscape proposals. Local policies and projects seeking landscape improvement will be taken into account within mitigation proposals.

13.9 Summary

13.9.1 The scope of the landscape and visual impact assessment described above is summarised in **Table 13.7**.

Table 13.7 Scoping summary of potential impacts

Potential Impacts	Construction	Operation
Effects on landscape fabric	✓	✗
Effects on landscape character	✓	✓
Effects on views	✓	✓
Effects on valued landscapes	✓	✓
Visual effects on tranquillity	✗	✗
Visual effects at night as a result of lighting	✓	✓
Visual effects on residential amenity	✓	✓

13.9.2 Production of the ES chapter will be undertaken in consultation with all relevant stakeholders, including topic expert panel meetings, as appropriate. Similarly, the requirements of the ANPS will be at the forefront; principally that the Proposed Development design will aim to make a positive contribution to landscape and visual amenity. Proposals for mitigation will be undertaken with reference to local policy, guidance and local landscape improvement projects.

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14 Land Quality and Waste

14.1 Introduction

14.1.1 This chapter details the proposed scope of the assessment of potential effects arising from the Proposed Development on land quality (potential for contamination), agricultural land quality and mineral safeguarding. The proposed approach for undertaking a waste appraisal is provided in **Appendix 14.1**.

14.1.2 The chapter includes:

- A description of key policy and legislation with relevance to land quality and waste;
- A summary of ongoing and planned stakeholder engagement;
- An overview of the approach that has been adopted to inform this Scoping Report;
- A concise summary of the baseline conditions;
- A description of the potential likely significant effects of the Proposed Development with respect to land quality and waste; to be included in the scope of the assessment;
- A summary of any potential effects that are proposed to be scoped out of the assessment;
- A proposed approach to the EIA and the CEA with regards to land quality and waste;
- An overview of the proposed approach to mitigation; and
- A summary of the Scoping Report chapter including a summary of impacts table.

14.1.3 The Proposed Development is a component of the Government's preferred NRS as set out in the ANPS. It does not include the Northwest Runway itself, or the major M25 realignment works required to accommodate the Northwest Runway. Therefore, potential effects on land quality associated with these components of the NRS are excluded from the scope of the primary assessment. Potential effects on land quality associated with the Northwest Runway and M25 realignment works will however be considered as part of the CEA, as set out in **Section 4.6 of Chapter 4 'Approach to EIA'**.

14.2 Policy and Legislation

14.2.1 **Table 14.1** provides a summary of the key topic specific policy and legislation which has informed the scope of the assessment. Further information on policies relevant to the EIA and their status is set out in '**Chapter 1 'Introduction'**'. Due regard will also be given to local policies and the Government's 25 Year Environment Plan where they are relevant.

14.2.2 These documents are proposed to form the framework for detailed assessment post-scoping and will be taken into account in the assessment of potential land quality and waste impacts during PEI and ES stages, with the relevant criteria followed throughout.

14.2.3 A summary of the key waste planning policy that is associated with the Proposed Development is provided in **Appendix 14.1**.

Table 14.1 Policy and legislation relevant to the land quality assessment

Relevant policy / legislation	Relevance to assessment
Policy	
Airports National Policy Statement (ANPS) (2018)	Once designated, the ANPS will provide the principal planning policy. The revised draft ANPS advises that where the development is subject to an EIA, the applicant should undertake an assessment of any likely significant land quality (including land instability), agricultural land quality and minerals safeguarding effects and describe them in the ES
National Policy Statement for National Networks (NPS NN) (2014)	The NPS NN sets out the need for, and Government's policies to deliver, development of NSIPs on the national road and rail networks in England. It provides planning guidance for promoters of nationally significant infrastructure projects on the road and rail networks. It provides advice on agricultural land, contaminated land and mineral resources.
National Planning Policy Framework (NPPF) (2018)	The NPPF sets out the Government's planning policies for England and how these should be applied. It provides a framework within which locally-prepared plans for housing and other development can be produced. It outlines the requirement for managing and mitigating contamination and land instability risks associated with future site uses; the requirements to protect Best and Most Versatile agricultural land, geological conservation interests and soils and outlines the requirement for mineral safeguarding and extraction through the planning system.
Safeguarding our Soils: A Strategy for England (Defra, 2009)	Policy setting out strategy for the protection, enhancement and restoration of soils.
Legislation	
Environmental Protection Act 1990 (Part 2A): Contaminated Land Statutory Guidance	The Environmental Protection Act 1990 makes provision for the improved control of pollution arising from certain industrial and other processes. Part 2A of the Act provides the regulatory basis for the identification, designation and remediation of Contaminated Land.
The Environmental Permitting (England and Wales) Regulations 2016 transposing into domestic law the EU Landfill Directive (1999/31/EC (LFD))	Regulations to manage and reduce pollution from certain industrial activities through permitting, monitor compliance with permit conditions and promote environmental standard practice in operation of the activities covered by a permit. Of relevance to the assessment is the permitting of landfills and waste management facilities.
The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 transposing into domestic law the EU Water Framework Directive (2000/60/EC) (WFD)	The aim of the WFD is for all water bodies to achieve Good Status by 2027 (comprised of scores for Ecological Status and Chemical Status) and to ensure no deterioration from current status. Water quality is assessed within Chapter 14 Water in detail.
Water Resources Act (1991) as amended by the Water Act (2003)	The Acts provide the definition of and regulatory controls for the protection of water resources including the quality standards expected for controlled waters.
Environment Act 1995	The Act established the Environment Agency and gave it responsibility for environmental protection of controlled waters.

14.3 Stakeholder Consultation

- 14.3.1 A detailed stakeholder engagement plan is currently being developed. Care will be taken to ensure all key stakeholders with views and concerns regarding land quality and waste are provided with sufficient information on the Proposed Development to discuss and agree the details of the assessment in a meaningful and inclusive manner.
- 14.3.2 The stakeholders listed below were contacted in November 2018 to make them aware of the Proposed Development and timescales for further consultation. The following stakeholders were provided with a presentation providing an overview of the Proposed Development and inviting initial comments on the scope of the assessment for land quality.
- Environment Agency;
 - Natural England;
 - London Borough of Hounslow;
 - Spelthorne Borough Council;
 - Slough Borough Council;
 - South Bucks District Council; and
 - London Borough of Hillingdon.
- 14.3.3 The HAL Scoping Opinion is a useful source of stakeholder feedback, and has been used to inform this Scoping Report.
- 14.3.4 Further formal and informal consultations will be arranged to discuss and agree the details of the methodology for the assessment of potential impacts to land quality arising from the Proposed Development.
- 14.3.5 Consultation will also be undertaken with relevant local authorities and the Environment Agency to discuss and agree the approach to the waste assessment outlined in **Appendix 14.1**.

14.4 Approach to Scoping

Study area

- 14.4.1 This section sets out how the study area will be defined for the consideration of potential land quality effects at the assessment stage.
- 14.4.2 The same approach has been used to define the study area for scoping (see **Figure 14.1**), used to enable the identification of land quality receptors with the potential to be affected by the Proposed Development.
- 14.4.3 The study area at the scoping stage has been based on the Proposed Development, as shown in **Figure 1.1**. As the design of the Proposed Development is still in its early development, the study areas currently defined will be kept under review as the design and consultation processes progress, and related topic assessment study areas are confirmed. Therefore, the study areas at the assessment stage may evolve as appropriate.
- 14.4.4 The study area has been selected using the following approach:

- The study area for land quality includes all of the land being considered for the Proposed Development and an additional 500m buffer. The rationale for the study area is based on professional judgement taking into consideration the spatial extent across which potential hazards could have unacceptable risks; and
- The study area for agricultural land quality and minerals safeguarding includes all of the land being considered for the Proposed Development, based on the rationale that these resources will only be potentially significantly affected by activities taking place at the resource.

Sources of baseline data

14.4.5 The principal sources of data used in the preparation of this chapter are summarised below:

- Environment Agency: – Historic Landfill sites data – Permitted Waste Sites data – Ground Water Source Protection Zones;
- Defra Magic Map: - Sensitive land uses and Geological sites;
- British Geological Survey – Onshore Geoindex – Geology of Britain Viewer;
- ZeticaUXO: - online UXO risk maps;
- Natural England: - Provincial Agricultural Land Classification Maps;
- Cranfield University: - Soil types and properties;
- London Geopartnership: - Proposed local geological sites – local geological sites;
- Local Authority development plans/planning portal; and
- Google Earth: - satellite images and aerial photography.

14.5 Baseline Conditions

14.5.1 The baseline conditions for the study area (see **Figure 14.1**) have been developed for the following environmental conditions:

- Hydrology;
- Geology;
- Hydrogeology and Groundwater;
- Sensitive Land Uses & Environment;
- Soils; and
- Agricultural Land Quality.

Geology

14.5.2 A summary of the geological conditions of the study area are summarised in **Table 14.2** and an initial conceptual site model showing the superficial and solid geology (**Figure 14.2** and **Figure 14.3**).

Table 14.2 Summary of geological conditions underlying the study area.

Strata	Unit	Description
Superficial	Alluvium (along the M25 corridor)	Clay, silt and gravel
	Langley Silt Member (predominantly in the north)	Clay and silt
	Shepperton Gravel Member (along the M25 and to the west)	Sand and gravel
	Taplow Gravel Member (across the majority of the site)	Sand and Gravel
Bedrock	London Clay	Silty to very silty clay, clayey silt and sometimes silt, with some layers of sandy clay
	Chalk Group	Chalk, with or without flint and discrete limestone, marl (calcareous mudstone), sponge, calcarenite, phosphatic, hardground and fossil-rich beds.

Hydrogeology and groundwater

14.5.3 The superficial deposits across the study area generally designated as Principal Aquifers (Taplow Gravel Member and Shepperton Gravel Member) with some areas also designated as a Secondary A Aquifer (Alluvium), as shown in **Figures 14.2** and **14.3**.

14.5.4 Across the study area the bedrock geology is designated as both Principal and Secondary A Aquifers. The London Clay is classified as unproductive strata.

14.5.5 Larger areas of the of study area are designated as having a high groundwater vulnerability, with some areas designated as having an intermediate groundwater vulnerability.

14.5.6 There are three groundwater source protections (SPZ) to the north, south and west of the site and comprise:

- The Inner Zone (SPZ 1) is the most sensitive and some activities with the potential to pollute groundwater are restricted in this area;
- The Outer Zone (SPZ 2) is less sensitive, and there are fewer restrictions; and
- Outside Zone 2 is the Total Catchment (SPZ 3), which indicates the recharge area that contributes to that water supply.

Hydrology

14.5.7 A number of major rivers are present within the study area, including the Duke of Northumberland's River, the River Colne, the Wraysbury River, the River Crane and the Longford River. In addition, numerous surface water ponds and streams, including the Horton Brook, Colne Brook and Poyle Channel are also present across the study area. A detailed outline of the baseline condition of Hydrology is provided in **Chapter 18 'Water'**.

14.5.8 The surrounding environs of the study area contains a number of surface water bodies used for drinking water supplies, including the Staines Reservoirs and King George VI Reservoir.

Soil quality

14.5.9 The Soilscales Map developed by Cranfield Soil and Agri-food Institute in partnership with

DEFRA (Cranfield University, 2018) has been used to inform the baseline for this assessment. The Soils Map is a 1:250,000 scale simplified map of soil property based on the National Soils Map of the England and Wales and provides one of the most comprehensive sources of information of soil properties in the United Kingdom.

14.5.10 The Soils Map indicates that soils within the study area are predominantly classified as “freely draining slightly acidic loamy soils” with some areas of “loamy and clayey floodplain soils with naturally high groundwater” and “loamy soils with naturally high groundwater”.

Agricultural land quality

14.5.11 The Provisional ALC mapping (Natural England, 2013) is a 1:250,000 agricultural soil classification map and listing gradings of soils within England and Wales.

14.5.12 The Provisional ALC mapping indicates the study area as being predominantly ‘non-agricultural’ and ‘urban’ land. The post 1988 ALC mapping indicates isolated locations of Grade 1 (towards the north), Grade 2 (towards the north and west) Grade 3a and 3b (towards the north and west) and Grade 4 (towards the west). However, it should be noted the post 1988 maps do not cover the entire study area.

Mineral extraction

14.5.13 Mineral extraction (sand and gravel) around the study area has been undertaken for many years and there are several active quarries in the study area. The BritPits (BGS, 2010) list of active mines and quarries lists active crushed rock quarries including Colebrook Depot and West Drayton Rail Depot, as well as active sand and gravel for example Horton Brook Quarry and Sipson Lane Quarry. The study area is shown to exist within an area with significant know planning permissions for mineral extraction, as shown on BGS Sand and Gravel Resources Map (BGS, 2004). A number of sites within the study area are designated in the Local Planning Authority local plans for possible future extraction.

Geodiversity

14.5.14 There are no international or national geodiversity sites located within the study area. There are currently no RIGS or LIGS located within the study area. The London Geodiversity Partnership (LGP) published a list of candidate sites for proposed consultation which were considered worthy of inclusion as LIGS or RIGS. Sipson Lane Complex (LGP ref. GLA 62), is located within the study area (**Figure 14.4**).

Sensitive land use

14.5.15 There are a number of sensitive land uses in the area of the Proposed Development. The closest are located to the southwest and include Staines Moor SSSI (part of which is also located within the site boundary), Wraysbury Reservoir SSSI, Wraysbury and Hythe End Gravel Pits SSSI, and Wraysbury No.1 Gravel Pit SSSI. The majority of these water bodies are also from the Southwest London Waterbodies Ramsar site and Special Protection Area. The western section of the study area is also located in the Colne Valley Regional Park.

Current and historic land uses

14.5.16 An initial review of the known site historic and available historical map information indicates that prior to the construction of Heathrow Airport the area was predominantly rural. The airport started life as a single grass runway and a number of buildings, which over the years

has been redeveloped into the international airport we see today. The area is now dominated by the airport and associated infrastructure. Whilst there are areas of undeveloped land around the airport, there are significant areas of built development to the north, south and east, and major highway infrastructure and railways around the study area. As noted in previous sections there are also significant areas of surface water.

14.5.17 As previously noted gravel and crushed rock extraction has taken place across the study area for a number of years, with planning permission known to have been in place for over a decade, and many sites have been backfilled with a range of materials and are now recorded as landfills. Environment Agency historic landfill sites data indicates the presence of a number of historic landfills some of which are currently active within the north west and south of the site, as shown on **Figure 14.5**.

14.5.18 Some of the historic landfills were not designed to modern standards and adopted the principles of '*dilute and disperse*'. Landfills can generate leachate and landfill gas (methane, carbon dioxide, hydrogen sulphide) as a result of the breakdown of materials within the landfill (Kjeldsen et al, 2002). Landfill leachate can contain a range of potential contaminants of concern and impact groundwaters and migrate for some distance from the landfill (Butt, 2014). Leachate and ground gas can represent an unacceptable risk to sensitive receptors, particularly where construction activities interact with landfill/anthropogenic materials.

14.5.19 A number of waste management facilities have also been identified within the study area, including the Lakeside Energy from Waste Plant (ANPS, 2018).

Geohazards

14.5.20 A review of the BGS data on the risks associated with geohazards including compressible and collapsible ground, seismic activity, running sand and landslide indicates that the risks from geohazards are negligible to low. Further detail on the assessment of geospatial hazards is provided within **Chapter 11 'Major Accidents and Disasters'**.

14.5.21 Landfills have the potential to generate landfill gases which can present a risk to human health due to their potential asphyxiating and combustion properties. The desk study data available to date indicates that a number of the existing and historical landfills contain, or have the potential to contain, putrescible and household materials which could decompose to give rise to landfill gases.

Unexploded ordnance

14.5.22 An unexploded bomb risk map was downloaded from Zetica's online resource. The map indicates the potential for unexploded bombs to be present as a result of World War Two bombing. The map indicates that large areas of the study area are designated as green which represent a record of less than 10 bombs per square kilometre. Compared to other areas of the UK this represents a significant density, but is much lower than central London. The map also shows an increase in the bombing density across the south-eastern part of the study area.

Initial Conceptual Site Model

14.5.23 Current guidance recommends that a Conceptual Site Model (CSM) is formulated based on the information available. The initial CSM for the study area during the construction phase is presented in **Figure 14.11** and for the operational phase is presented in **Figure 14.12**. As more information becomes available the conceptual model will be updated. The CSM is limited

at this stage to the identification and assessment of potential sources, potential receptors, and the anticipated pathways to those receptors, identified as a result of desk-based research. Based on the research undertaken to support this Scoping Report the following key potential sources, pathways and receptors may be present within the study area.

Sources

14.5.24 Heathrow Airport operational activities, including; maintenance activities, refuelling, fuel storage, de-icing operations, etc.;

- Former and current land uses associated with PCOC (potential contaminants of concern);
- PCOC within artificial and made ground;
- Historic landfills;
- Waste management facilities;
- Railways; and
- Pollution incidents.

Pathways

- Direct contact including dermal exposure and ingestion;
- Airborne exposure including inhalation of particulate matter;
- Leaching;
- Surface water and groundwater migration; and
- Gas migration.

Receptors

- Construction workers;
- Site neighbours including residents and commercial/industrial workers;
- Off-site population including residents and commercial/industrial workers;
- Land and property;
- Surface water; and
- Groundwater aquifers and abstractions.

14.6 Scoping of Potential Effects

Effects scoped into the assessment

14.6.1 The potential likely significant effects to be scoped into the land quality, agricultural land quality and mineral safeguarding assessment are displayed in **Table 14.3**.

Table 14.3 Potential likely significant effects on land quality, agricultural land quality and mineral safeguarding

Category	Activity	Effects	Receptors
Construction			

Category	Activity	Effects	Receptors
Land Quality	Construction vehicles/equipment and storage of fuels	Accidental spillages and leaks could lead to the introduction of new PCOC and present unacceptable risks to construction works and the wider environment.	Human health, including construction workers and wider public and controlled waters.
	General earthworks associated with reprofiling, foundation construction, installation of utilities/drainage and other infrastructure	Direct exposure to existing sources of historic contamination associated with former land uses. Sources of PCOC are likely to exist within the proposed study area. The potential pathways would be through dermal contact, ingestion or inhalation through any contaminated soil present.	Human health, including construction workers and wider public.
		Alteration of the groundwater dynamics of the study area during construction could lead to leaching of groundwater contaminants causing the direct exposure to PCOC.	Controlled waters, sensitive land uses, human health, including construction workers and wider public.
		There is a risk of potential migration of off-site groundwater contamination, which could be a risk if volatile contaminants are able to migrate and accumulate in confined spaces leading to the creation of indirect exposure pathways.	Controlled waters, sensitive land uses, human health, including construction workers and wider public, property and infrastructure.
		Alteration of the ground surface by excavation could interact with existing ground gas sources leading to new exposure pathways leading to the accumulation of ground gas from likely sources identified within the study area.	Human health, including construction workers and wider public, property and infrastructure.
		Existing ground condition could lead to the exposure to aggressive ground conditions from the introduction of new pathways during the construction process. For example, construction of new building and infrastructure in soils with high sulphate content.	Land, property and infrastructure.
	Piled foundations	Mobilisation of contamination of existing sources of contamination, could lead to the introduction of new exposure pathways to existing sources of contamination. This could lead to the direct exposure of PCOC to groundwaters.	Controlled waters and sensitive land uses receptors.
		There is a risk of potential migration of off-site groundwater contamination, which could be a risk if volatile contaminants are able to migrate and accumulate in confined spaces leading to the creation of indirect exposure pathways.	Controlled waters, sensitive land uses, human health, including construction workers and wider public, property and infrastructure
Soils & Agricultural Land Quality	Permanent or temporary construction related activities on land during the development phase of the project	Permanent or temporary loss of, or damage to best and most versatile (BMV) agricultural land.	Agricultural land quality.
		Permanent or temporary loss of topsoil.	
		Effects on soil structure.	Soil quality.
	Loss of soil structure leading to soil erosion.		
		Permanent or temporary loss of RIGS.	RIGS.

Category	Activity	Effects	Receptors	
Geology & Mineral Safeguarding	Construction activities	Permanent loss of nationally significant resources.	Active or former quarry where large quantities of resource remain. Sites allocated for mineral extraction in a local plan. Sites that are of a high significance, regionally or nationally. Site allocated as a Safeguarded Mineral Site or Mineral Safeguarding Area in a national, regional or local plan.	
		Permanent loss of locally or regional significant resources.		
		Permanent loss to the viability of the operation of an ongoing mineral extraction site is clearly and demonstrably reduced.		
		Permanent sterilisation of a significant quantity of material at sites currently undergoing extraction not identified as regionally or nationally significant.		Deposits with substantial mineral reserves. Redevelopment areas with substantial mineral reserves subject to general safeguarding policy.
		Temporary sterilisation of a significant proportion of a mineral deposit.		
		Temporary and reversible activities during development (i.e. location of construction compounds etc.)		Redevelopment areas covered by existing development with substantial mineral reserves subject to general safeguarding policy.
Operation				
Land Quality	Existing ground conditions and airport operations including maintenance, fuel storage and refuelling, de-icing	Direct exposure to contamination, for example during maintenance works which may disturb or introduce contamination.	Human health.	
		Migration and mobilisation of new and existing sources of PCOC as result of spillages/ maintenance works.	Human health, controlled waters and sensitive land uses.	
		Accumulation of ground gases.	Human health, land and property.	
		Exposure to aggressive ground conditions.	Land and property.	
		Leaching of PCOC as result of disturbance during future maintenance activities.	Controlled waters and sensitive land uses.	

Effects scoped out of the assessment

14.6.2 The effects proposed to be scoped out of the land quality, agricultural land quality and mineral safeguarding assessment are displayed in **Table 14.4**.

Table 14.4 Effects to be scoped out of the land quality assessment

Category	Activity	Effect	Receptor	Justification for scoping out
Construction				
Agricultural Land Quality	Construction activities on land associated with the Proposed Development either permanently or temporarily	Permanent or temporary loss of, or damage to non-BMV best most versatile agricultural land	Non-BMV agricultural land	National policy statement (NPS & NPPF) and broader nationally policy guidance such as the Government's 25 year plan indicate that loss of non-BMV is not considered to have significant decision-making relevance. Specifically, the NN NPS states that " <i>the decision maker should give little weight to the loss of agricultural land in grades 3b, 4 and 5</i> " and the NPPF states that in relation to planning decisions " <i>local planning authorities should take into account the economic and other benefits of the best and most versatile agricultural land</i> ". Therefore, assessment of non-BMV agricultural land is proposed to be scoped out of assessment.

14.7 Approach to Assessment

Study area

- 14.7.1 The proposed study area for land quality receptors are set out in **Section 14.4**. These will be refined at the assessment stage as the design and consultation processes progress, and as related topic assessments are progressed.
- 14.7.2 The study area for the assessment will be identified to ensure that the impact of the Proposed Development on the land quality can be fully assessed. A likely ZOI for potential cumulative effects on land quality with other development will be defined separately as part of the CEA, as described in **Section 4.6 of Chapter 4 'Approach to EIA'**.

Additional baseline data collection

- 14.7.3 The baseline will be developed further from the scoping assessment using a range of additional data sources as outlined below.

Land quality

- 14.7.4 The baseline for land quality will be established following current guidance which advocates a phased risk-based approach. A desk based Preliminary Risk Assessment (PRA) will be undertaken to establish a preliminary conceptual site model and the identification of potential pollutant linkages.
- 14.7.5 The key guidance which will be used to inform the assessment included the following:
- Defra, Environmental Protection Act 1990: Part 2A, Contaminated Land Statutory Guidance;
 - Environment Agency Model Procedures for the Management of Land Contamination, Contaminated Land Report II (CLR II);

- British Standard BS10175 Investigation of Potentially Contaminated Sites – Code of Practice; and
- CIRIA publication C665 Assessing risks posed by hazardous ground gases to buildings.

14.7.6 The desk-based study forms the initial step in the assessment of ground conditions and provides valuable information for the design of intrusive investigation works that may be required in the event of the PRA identifying potential unacceptable risks associated with the ground conditions. The PRA will be progressed based on data obtained from a Landmark Envirocheck© report which incorporates historical maps, site sensitivity data, and regulatory information, and will be supplemented with information from the following sources listed in **Table 14.5** and a site walkover.

Table 14.5 Proposed data and sources for Preliminary Contaminated Land Risk Assessment

Data	Source
Historical maps	Landmark Envirocheck
Site sensitivity data	Landmark Envirocheck
Regulatory information	Landmark Envirocheck
UXO Risk	Zetica site specific desk-based study
Radon Gas Risk	Public Health England UK radon affected areas: http://www.ukradon.org/information/ukmaps
Historic Landfill sites	Environmental Agency: https://data.gov.uk/dataset/
Permitted Waste Sites - Authorised Landfill Site Boundaries	Environmental Agency: https://data.gov.uk/dataset/
Ground water source protection zones	Environmental Agency: https://data.gov.uk/dataset/
Closed mining sites	Coal Authority: http://mapapps2.bgs.ac.uk/coalauthority/home.html
Solid Geology	British Geological Survey Onshore Geoindex: http://www.bgs.ac.uk/GeoIndex/ Geology of Britain view: http://mapapps.bgs.ac.uk/geologyofbritain/home.html
Superficial Geology	British Geological Survey Onshore Geoindex: http://www.bgs.ac.uk/GeoIndex/ Geology of Britain view: http://mapapps.bgs.ac.uk/geologyofbritain/home.html
Borehole records	British Geological Survey https://www.bgs.ac.uk/data/boreholescans/home.html
SSSI, Ramsar sites, Nature Reserves, Special Areas of Conservation	Defra: https://magic.defra.gov.uk/MagicMap
Groundwater vulnerability	Defra: https://magic.defra.gov.uk/MagicMap
Aquifer designations – superficial and bedrock	Defra: https://magic.defra.gov.uk/MagicMap

14.7.7 Where the desk-based PRA identifies potential pollutant linkages that could represent significant risks to sensitive receptors and / or there are significant uncertainties regarding the potential for ground contamination that may represent a significant risk, recommendations on the necessary further investigations will be provided. Specifically, the requirement for further intrusive ground investigations shall be outlined.

- 14.7.8 Any future ground investigations are likely to include the collection of soil and water samples for laboratory analysis and monitoring of ground gases. The ground investigation would be designed and implemented following current guidance outlined above in paragraph 14.7.5, and would be subject to agreeing suitable land access.
- 14.7.9 Where intrusive investigations are completed, and laboratory results available, a generic quantitative risk assessment shall be undertaken to determine potential risks to sensitive receptors.
- 14.7.10 The desk-based PRA and generic assessment shall be reported in standalone reports. Furthermore, generic assessment reports shall be sectioned by local authority area to facilitate understanding of the potential effects at a local level.
- 14.7.11 The PRA, intrusive investigation and generic assessments shall inform the EIA and will be included as technical appendices.

Agricultural land and soil quality

- 14.7.12 Due to limited availability of data, additional baseline ALC surveys will be undertaken to determine the presence of BMV agricultural land. The surveys will be undertaken on land within the study area currently in agricultural use. The ALC surveys will be undertaken according to the Natural England 2018 guidance and will involve:
- Collection of soil observations across the survey site (one observation per hectare);
 - Description of soil type;
 - Laboratory testing of soils where required to support the classification process; and
 - Reporting of ALC survey findings.

Mineral safeguarding

- 14.7.13 The baseline for the minerals safeguarding assessment will be established using desk study data and details of the Proposed Development. The following additional information will be collected/reviewed as part of finalising the mineral resources baseline:
- Planning permissions and records for existing minerals extraction and safeguarded sites held by local authorities, Minerals Planning Authorities and Aggregate Working Parties; and
 - Any additional ground investigation data and borehole records obtained as part of future ground investigation works.

Assessment methodology

Overall approach

- 14.7.14 The overall approach to assessment of impacts will consider impacts on land quality (potential for contamination), agricultural land quality, mineral safeguarding and waste.

Receptor sensitivity and value

- 14.7.15 Receptor sensitivity will be defined with reference to the adaptability, tolerance, recoverability and value of individual receptors. **Table 14.6** provides an example of the likely criteria for appraisal of sensitivity for identified water resources and flood risk receptors based on professional judgement.

Table 14.6 Example sensitivity definitions for water resources and flood risk receptors

Sensitivity	Definition
High	Has very limited or no capacity to accommodate physical or chemical changes.
Medium	Has limited capacity to accommodate physical or chemical changes or influences.
Low	Has moderate capacity to accommodate physical or chemical changes.
Negligible	Is generally tolerant of physical or chemical changes.

14.7.16 Receptor value considers for example whether the receptor:

- is rare;
- has protected or threatened status;
- has importance at a local, regional or national scale; or
- has a key role in ecosystem function (in the case of biological receptors).

14.7.17 Therefore, overall receptor sensitivity will be determined by considering a combination of value, adaptability, tolerance and recoverability and applying professional judgement and/ or experience.

14.7.18 Generic receptors sensitivity examples based on the above criteria are presented below in **Table 14.7**.

Table 14.7 Receptor sensitivity criteria

Sensitivity	Examples
High	General Receptor is Internationally or Nationally important / rare with limited potential for offsetting / compensation.
	Land Quality – Human Health <ul style="list-style-type: none"> • Construction workers • Future end-users • Public and local residents (off-site)
	Land Quality – Controlled Waters <ul style="list-style-type: none"> • Groundwater SPZ 1 & 2. • Surface waters with high WFD status. • Surface and groundwaters supporting internationally or nationally designative sites (e.g SAC, SSSI, SPA, Ramsar Sites).
	Mineral Resources <ul style="list-style-type: none"> • Active or permitted and developed quarrying and mineral extraction sites.
	Agricultural Land Quality <ul style="list-style-type: none"> • ALC Grade 1 or 2 land • Land with Notifiable Weeds (risk of spread); • Land with notifiable Scheduled diseases (risk of spread); or Soil vulnerable to structural damage and erosion or unrecoverable or not adaptable to changes.
Medium	General Receptor is regionally important / rare with limited potential for offsetting / compensation.
	Land Quality – Controlled Waters <ul style="list-style-type: none"> • Principle Aquifers.

Sensitivity	Examples
	<ul style="list-style-type: none"> Groundwater SPZ Tier 3 (total catchment). Licences ground or surface water abstractions. Private water abstractions. Secondary A Aquifers. Groundwater or surface waters supporting regionally important sites (e.g. LNR, SNCI)
	<p>Mineral Resources</p> <ul style="list-style-type: none"> Mineral Safeguarding areas (regionally important resources)
	<p>Agricultural Land Quality</p> <ul style="list-style-type: none"> ALC Grade 3 & Seasonally susceptible to structural damage or erosion.
Low	<p>General</p> <ul style="list-style-type: none"> Receptor is locally important / rare
	<p>Land Quality – Controlled Waters</p> <ul style="list-style-type: none"> Secondary B Aquifers
	<p>Agricultural Land Quality</p> <ul style="list-style-type: none"> ALC Grade 4
Very Low	<p>General</p> <p>Receptor is not considered to be particularly important / rare</p>
	<p>Land Quality – Controlled Waters</p> <ul style="list-style-type: none"> Unproductive strata Surface waters with WFD status “Bad”
	<p>Agricultural Land Quality</p> <ul style="list-style-type: none"> Urban ALC

Magnitude of effects

14.7.19 Potential effects may be adverse, beneficial or neutral. The magnitude of an effect is assessed qualitatively, according to the criteria set out in **Table 14.8**. The following definitions apply to time periods used in the magnitude assessment:

- Long-term: >5 years
- Medium-term: 1 to 5 years
- Short-term: <1 year

Table 14.8 Magnitude of impact criteria

Criteria	Examples
High - Permanent or large-scale change affecting usability, risk or, value over a wide area, or certain to affect regulatory compliance	<p>Land Quality – Human Health</p> <ul style="list-style-type: none"> Permanent or major change to existing risk of exposure (Adverse / Beneficial). Unacceptable risks to one or more receptors over the long-term or permanently (Adverse). Prosecution e.g. under health and safety legislation (Adverse). Remediation and complete source removal (Beneficial). Construction workers at risk due to lack of appropriate personal protective equipment (Adverse).
	<p>Land Quality – Controlled Waters</p>

Criteria	Examples
	<ul style="list-style-type: none"> • Permanent, long-term or wide scale effects on water quality or availability (Adverse / Beneficial). • Permanent loss or long-term derogation of a water supply source resulting in prosecution (Adverse). • Change in WFD water body status / potential or its ability to achieve WFD status objectives in the future (Adverse / Beneficial). • Permanent habitat creation or complete loss (Adverse / Beneficial). • Measurable habitat change that is sustainable / recoverable over the long-term (Adverse / Beneficial). <p>Mineral Resources</p> <ul style="list-style-type: none"> • Sterilisation and loss of a resource <p>Agricultural Land Quality</p> <ul style="list-style-type: none"> • The proposed development would lead to the loss of 50 ha or more of agricultural land. The proposed development would lead to the loss of more than one of soils primary functions and a reduction in the primary functions of soils off-site.
<p>Moderate - Permanent or long-term reversible change affecting usability, value, or risk, over the medium-term or local area; possibly affecting regulatory compliance</p>	<p>Land Quality – Human Health</p> <ul style="list-style-type: none"> • Medium-term or moderate change to existing risk of exposure (Adverse / Beneficial). • Unacceptable risks to one or more receptors over the medium-term (Adverse). • Serious concerns or opposition from statutory consultees (Adverse). <p>Land Quality – Controlled Waters</p> <ul style="list-style-type: none"> • Medium-term or local scale effects on water quality or availability (Adverse / Beneficial). • Medium-term derogation of a water supply source, possibly resulting in prosecution (Adverse). • Observable habitat change that is sustainable / recoverable over the medium-term (Adverse / Beneficial). • Temporary change in status / potential of a WFD waterbody or its ability to meet objectives (Adverse / Beneficial). <p>Agricultural Land Quality</p> <ul style="list-style-type: none"> • The proposed development would lead to the loss of 20 – 50 ha of agricultural land. A reduction in the primary function of soils on site would occur.
<p>Low - Temporary change affecting usability, risk or value over the short-term or within the site boundary; measurable permanent change with minimal effect usability, risk or value; no effect on regulatory compliance</p>	<p>Land Quality – Human Health</p> <ul style="list-style-type: none"> • Short-term temporary or minor change to existing risk of exposure (Adverse / Beneficial). • Unacceptable risks to one or more receptors over the short-term (Adverse). <p>Land Quality – Controlled Waters</p> <ul style="list-style-type: none"> • Short-term or very localised effects on water quality or availability. (Adverse / Beneficial). • Short-term derogation of a water supply source (Adverse). • Measurable permanent effects on a water supply source that do not impact on its operation (Adverse). • Observable habitat change that is sustainable / recoverable over the short-term (Adverse / Beneficial). • No change in status / potential of a WFD waterbody or its ability to meet objectives (Neutral). <p>Agricultural Land Quality</p> <ul style="list-style-type: none"> • The proposed development would lead to the loss of 5 – 20 ha of agricultural land. Soil displacement will still allow the primary functions of soil to occur onsite.
<p>Very Low -</p>	<p>Land Quality – Human Health</p> <ul style="list-style-type: none"> • Negligible change to existing risk of exposure.

Criteria	Examples
Minor permanent or temporary change, indiscernible over the medium- to long-term short-term, with no effect on usability, risk or value	<ul style="list-style-type: none"> Activity is unlikely to result in unacceptable risks to receptors (Neutral).
	<p>Land Quality – Controlled Waters</p> <ul style="list-style-type: none"> Very minor or intermittent impact on local water quality or availability (Adverse / Beneficial). Usability of a water supply source will be unaffected (Neutral). Very slight local changes that have no observable impact on dependent receptors (Neutral). No change in status / potential of a WFD waterbody or its ability to meet objectives (Neutral).
	<p>Agricultural Land Quality</p> <ul style="list-style-type: none"> The proposed development would lead to the loss of 5 ha or less of agricultural land. Soil would retain all pre-existing functions.

Evaluation of impact significance

14.7.20 The impact significance assessment combines receptor sensitivity with effect magnitude, as shown in **Table 14.9**. Assessment of impact significance is qualitative and reliant on professional experience, interpretation and judgement. The matrix should therefore be viewed as a framework to aid understanding of how a judgement has been reached, rather than as a prescriptive, formulaic tool.

Table 14.9 Significance of impact matrix

		Negative Magnitude				Positive Magnitude			
		High	Medium	Low	Very Low	Very Low	Low	Medium	High
Sensitivity	High	Major	Major	Moderate	Minor	Minor	Moderate	Major	Major
	Medium	Major	Moderate	Minor	Minor	Minor	Minor	Moderate	Major
	Low	Moderate	Minor	Minor	Negligible	Negligible	Minor	Minor	Moderate
	Very Low	Minor	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Minor

14.7.21 Effects that result in Major or Moderate impacts are considered to be ‘significant’ in EIA terms. Significant impacts are those which are likely to influence the outcome of the application for consent. Adverse significant impacts may require mitigation that is difficult or expensive to achieve whereas, beneficial significant impacts contribute to the case in favour of the proposed development. The definitions of significant impacts are presented in **Table 14.10**.

Table 14.10 Impact Significance Definitions

Impact Significance	Definition
Major	Very large or large change in receptor condition (adverse or beneficial), which are likely to be key factors in the decision-making process because they contribute to achieving international, national or regional objectives, or could result in exceedance of statutory objectives and / or breaches of legislation.

Impact Significance	Definition
Moderate	Intermediate change in receptor condition (adverse or beneficial), which are likely to be important considerations in the decision-making process because they contribute to achieving local objectives, or could result in exceedance of statutory objectives and / or breaches of legislation.
Minor	Small change in receptor condition (adverse or beneficial), which may be important but are unlikely to be important considerations in the decision-making process. .
Negligible	Very small changes in receptor condition (adverse or beneficial), which may be raised as local issues but are unlikely to be important in the decision-making process.
No change	No or imperceptible effects, within normal variations or within the margins of forecasting error.

Land quality assessment

14.7.22 The approach to determining impacts to land quality will follow a source-pathway-receptor approach to assessment. The approach used will be taken in accordance with Environment Agency Model Procedures for the Management of Land Contamination, Contaminated Land Report II (CLR II). A phased risk-based approach will consider potential sources, pathways and receptor to identify potential pollutant linkages that may result in unacceptable risk to receptors from ground contamination. For a risk to exist, all three elements (set out below) must be present:

- Source - potentially polluting activity or existing ground contamination;
- Pathway - a route or means by which a receptor could be exposed to or affected by contamination; and
- Receptor - something that could be adversely affected by contamination.

1.1.1 The EIA baseline will comprise a description of current ground condition and potential receptors. The impact assessment will compare the baseline to a conceptual site model (CSM), which will describe feasible pollutant linkages associated with the proposed development. The impact assessment will therefore be based on the finding of the PRA. The impact assessment will be undertaken taking into consideration embedded mitigation.

1.1.2 This initial conceptual site model for the site (CSM) will be used as the baseline for this assessment. The EIA baseline comprises a description of the current ground conditions and potential receptors. The impact assessment compares the baseline to a CSM describing feasible pollutant linkages associated with the construction and post completion phases of the proposed development.

1.1.3 Development activities or features that materially affect the baseline CSM may increase or decrease the level of risk, compared with the baseline. The EIA considers what impact the proposed development would have on the baseline level of risk. Creating a new pollutant linkage or increasing the likelihood that an existing linkage would occur (e.g. by exposing contaminated ground during construction), would increase risk, resulting in an adverse impact. Reducing the risk to a receptor (e.g. by remediating any ground contamination at a site) would result in a beneficial impact.

1.1.4 For human health, magnitude reflects the likely increase or decrease in exposure risk for a particular receptor. For controlled waters, magnitude represents the likely effect that an activity would have on resource usability or value, at the receptor. Magnitude is therefore

affected by the distance and connectivity between an impact source and the receptor.

Agricultural Land Quality assessment

14.7.23 The EIA baseline will comprise a description of soil quality and agricultural land classification. This will be used to identify and determine the likelihood best most versatile (BMV – Defined as Agricultural Land Classification Soils Grades 1, 2 and 3A) which within the study area are likely to be lost as a resource or damage by the proposed development. The impact assessment will compare the baseline to the proposed development worst case to determine the impacts on BMV from the interactions with the various aspects of the Proposed Development. The magnitude of impacts will relate to the footprint, nature, location and duration of the proposed development. The assessment of impacts will be undertaken using professional judgement to determine the area and extent of BMV likely to be lost as a result of the Proposed Development. The impact assessment will be undertaken taking into consideration embedded mitigation.

Mineral safeguarding assessment

14.7.24 The assessment of impacts to mineral safeguarding will consider the mineral resources present within the study area and develop the EIA baseline as stated previously. The magnitude of impacts will relate to the footprint and duration of the proposed development and the criteria set out in **Table 14.8**. The impact assessment will be undertaken taking into consideration embedded mitigation. This approach will also be adopted for the assessment of impacts to geodiversity sites

Cumulative effects

14.7.25 Cumulative effects on land quality resulting from the combination of effects from the Proposed Development and other developments will be assessed in accordance with the guidance and methodologies set out in **Section 4.6** of **Chapter 4 ‘Approach to EIA’**. The assessment will be dependent on the availability and accessibility of information for other developments.

14.7.26 The Proposed Development does not include the new Northwest Runway and M25 realignment components of the NRS proposed by HAL. However, the Proposed Development is designed to be operated alongside these components of the NRS that are being progressed by the HAL DCO Project. Therefore, the total cumulative land quality effects will be considered together to ensure an overarching assessment of the NRS as a whole.

14.7.27 Any components of the HAL DCO Project which would no longer be required as a result of the Proposed Development would not be included in the CEA.

14.8 Approach to Mitigation

14.8.1 Minimisation of impacts will be embedded into the design of the Proposed Development where possible following the application of the hierarchy of mitigation as described in **Chapter 4 ‘Approach to EIA’**. The assessment of impacts will be made with these embedded mitigation measures in place.

14.8.2 Where embedded mitigation is not possible, and existing contamination presents a potential risk to human health or the environment based on the future use of the land a remediation strategy shall be developed to break the contaminant linkage. The approach to remediation will follow the approach outlined in CLR I I.

- 14.8.3 Where unstable/unsuitable ground conditions are identified, additional mitigation will be developed as part of the construction design to mitigate/manage the risks, for example, the use of piling, in-situ ground improvement techniques or excavation and replacement of poor material.
- 14.8.4 With regards to mineral safeguarding, avoidance of minerals sterilisation where possible will be considered. Additional mitigation requirements for mineral safeguarding will be considered as part of the waste assessment for the project.
- 14.8.5 **Appendix 14.1** details the proposed approach to waste management through the waste hierarchy, alongside additional mitigation measures such as adherence to a Site Waste Management Plan (SWMP).

14.9 Summary

- 14.9.1 The proposed scope of the land quality assessment described in this chapter is summarised in **Table 14.11** below.

Table 14.11 Summary of potential and quality and waste impacts

Potential Impact	Construction	Operation
Impacts to human health resulting from alteration to land quality: <ul style="list-style-type: none"> • Mobilisation of contaminants from existing sources. • Alterations to exposure pathways. • Introduction of new contaminant sources. 	✓	✓
Impacts to controlled waters resulting from alteration to land quality: <ul style="list-style-type: none"> • Mobilisation of contaminants from existing sources. • Alterations to exposure pathways. • Introduction of new contaminant sources. 	✓	✓
Impacts to soil quality and loss of agricultural land	✓	✗
Impact to mineral resources and mineral resource sterilisation	✓	✗
Impact to geologically significant areas and loss of designated geological sites	✓	✗

Scoped in (✓) and scoped out (✗)

- 14.9.2 Production of the ES chapter will be undertaken in consultation with all relevant stakeholders, including topic expert panel meetings, as appropriate. Similarly, the requirements of the ANPS will be at the forefront; principally that the Proposed Development design will aim to make a positive contribution to land quality and waste management. Proposals for mitigation will be undertaken with reference to local policy, guidance and with preservation of land quality at the forefront.

14.10 References

British Geological Survey (2010) UK BritPits database of current and active mineral workings <https://www.bgs.ac.uk/products/minerals/britpits.html> [Accessed: 01/12/2018]

British Geological Survey (2004) Onshore mineral resource maps for England and Wales – London Boroughs – Sand and Gravel Resource Map <https://www.bgs.ac.uk/mineralsuk/planning/resource.html> [Accessed: 01/12/2018]

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Defra & Government Statistical Service (2018) UK Statistics on Waste. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/746642/UK_Statistics_on_Waste_statistical_notice_October_2018_FINAL.pdf [Accessed: 27/11/2018].

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Kjeldsen, P., Morton, B. B., Rooker, A. P., Baun, A., Ledin, L. Christensen, T. H. (2002) Present and Long-Term Composition of MSW Landfill Leachate: A Review Critical Reviews in Environmental Science and Technology 32.

15 Major Accidents and Disasters

15.1 Introduction

15.1.1 This chapter details the proposed scope of the assessment of potential impacts arising from the vulnerability of the Proposed Development to major accidents and disasters, as required under the EIA Regulations (Regulation 5(4)).

- This chapter includes:
- A description of key policy and legislation with relevance to the major accidents and disasters;
- A summary of ongoing and planned stakeholder engagement;
- An overview of the approach that has been adopted to inform this Scoping Report;
- A concise summary of the relevant baseline conditions;
- A description of the potential likely significant effects to be included in the scope of the assessment;
- A summary of any potential effects that are proposed to be scoped out of the assessment;
- A proposed approach to the EIA and the CEA with regards to major accidents and disasters;
- An overview of the proposed approach to mitigation; and
- A summary of the Scoping Report chapter including a summary of impacts table.

15.1.2 To date, there is no specific guidance on how to consider major accidents and disasters under the EIA framework. This assessment will therefore incorporate emerging EIA good practice and consider any additional relevant guidance documents that are available. The approach to the assessment has been developed by drawing on the approach set out in the National Risk Register of Civil Emergencies (Cabinet Office, 2017). However, the assessment will go beyond this guidance to consider potential risks over the lifespan of the Proposed Development, not only the five years considered by the National Risk Register. To achieve this, other guidance will be drawn upon, including the UK government Emergency Response and Recovery guidance and International Federation of Red Cross & Red Crescent Societies Disaster and Crisis Management Guidance (IFRC, 2011).

15.1.3 The Proposed Development is a component of the Government's preferred NRS as set out in the ANPS. It does not include the Northwest Runway itself, or the major M25 realignment works required to accommodate the Northwest Runway. Therefore, risks of major accidents and disasters associated with these components of the NRS are excluded from the scope of the primary assessment. Potential risks associated with the Northwest Runway and M25 realignment works will however be considered as part of the CEA, as set out in **Section 4.6** of **Chapter 4 'Approach to EIA'**.

15.2 Policy and Legislation

15.2.1 **Table 15.1** provides a summary of the key topic specific policy and legislation which has informed the scope of the assessment. Further information on policies relevant to the EIA and

their status is set out in **Chapter I ‘Introduction’**. Due regard will also be given to local policies and the Government’s 25 Year Environment Plan where they are relevant to the Proposed Development.

15.2.2 These documents are proposed to form the framework for detailed assessment post-scoping and will be taken into account in the major accidents and disasters assessment during PEI and ES stages, with the relevant criteria followed throughout.

Table 15.1 Policy and legislation relevant to the major accidents and disasters assessment

Relevant policy / legislation	Relevance to assessment
Policy	
Airports National Policy Statement (ANPS) (2018)	<p>The ANPS sets out a number of factors which may influence the causes, severity or likelihood of major accidents and disasters (e.g. flood risk, climate change, good infrastructure design, pollution control, security, land instability).</p> <p>The ANPS states that:</p> <ul style="list-style-type: none"> • where there are safety critical elements of the design with a design life of 60 years or greater the applicant should apply the latest UK Climate Projections for 2080 against the 10, 50 and 90% probability levels to include high impact, low likelihood scenarios (paragraph 4.43); • government policy regarding the prevention of terrorism will apply at the expanded airport and that adequate consideration must be given in the design to the management of security risks. They also state that the development must comply with the UK civil aviation safety regime regulated by the CAA and that the applicant should consult with relevant security experts from the Centre for the Protection of National Infrastructure and the Department for Transport to ensure that physical, procedural and personnel security measures have been adequately considered in the design process, and that adequate consideration has been given to the management of security risks (paragraph 4.60 – 4.65); • the expanded airport must comply with aviation security regulations and guidance in the same way as the existing airport (paragraph 4.65) • the planning authority must ensure that unacceptable risks or adverse impacts to receptors in the water environment do not occur from water pollution (paragraph 5.171); and • there is a need to avoid unacceptable risk due to land instability (paragraph 5.225).
National Planning Policy Framework (NPPF) (2018)	<p>The NPPF sets out the UK governments approach to planning policy in England. The NPPF states that:</p> <ul style="list-style-type: none"> • Local Authorities should consult the appropriate bodies when considering applications for the siting or changes to hazardous substances establishments, or for development around such establishments (paragraph 46). • Planning policies and decisions should promote public safety and take account of the wider security and defence requirements by: <ul style="list-style-type: none"> ○ Anticipating and addressing all plausible malicious threats and natural hazards, especially in locations where large numbers of people are expected to congregate. Local policies for relevant areas and the layout and design of developments, should be informed by up-to date information from the police and other agencies about the nature of potential threats and their implications. This includes appropriate and proportionate steps that can be taken to reduce vulnerability, increase resilience and ensure public safety and security (paragraph 96); and

Relevant policy / legislation	Relevance to assessment
	<ul style="list-style-type: none"> ○ Recognising and supporting development required for operational defence and security purposes, and ensuring that operational sites are not affected adversely by the impact of other development proposed in the area (paragraph 96). ● Local Authorities should consult appropriate bodies when planning or determining applications for developments around major hazards (paragraph 194).
Legislation	
Regulation (EU) No 402/2013 on the Common Safety Method on Risk Evaluation and Assessment (CSM-RA) (as amended by Regulation EU 2015/1136)	Common Safety Method on Risk Evaluation and Assessment (CSM-RA) is intended to harmonise the Risk Assessment (RA) process and provide a reasonable practical approach to safety requirements. This therefore sets out the UK's approach to RA and the requirement for assessments to be suitable and sufficient.
EU Seveso III Directive. Directive 2012/18/EU 2012	<p>The Seveso Directives are the main EU legislation dealing specifically with the control of on-shore major accident hazards involving dangerous substances. The Seveso III Directive came into force on 1 June 2015, replacing the Seveso II Directive. The Directive states that:</p> <p><i>“In order to ensure a high level of protection of the environment, precautionary actions need to be taken for certain projects which, because of their vulnerability to major accidents, and / or natural disasters (such as flooding, sea level rise, or earthquakes) are likely to have significant adverse effects on the environment. For such projects, it is important to consider their vulnerability (exposure and resilience) to major accidents and / or disasters, the risk of those accidents and / or disasters occurring and the implications for the likelihood of significant adverse effects on the environment.”</i> (paragraph 15).</p>
Health and Safety at Work Act 1974	This primary legislation governs workplace health and safety in the United Kingdom. The Health and Safety at Work Act sets out various obligations aimed at ensuring that reasonable and practical measures have been taken so that people are not exposed to risk to their health and safety. The Health and Safety Executive, along with local authorities, are responsible for enforcing the Act. The relevance to major accidents and disasters is related to the management of major hazards under the Act.
Civil Contingencies Act 2004	The Civil Contingences Act and relevant guidance document set out to deliver a framework for civil protection in the UK. The Act comprises two separate parts, civil protection (Part 1) and emergency powers (Part 2). Part 1 of the act establishes statutory guidance for emergency preparedness and sets out the roles and responsibilities for individuals involved in emergency preparedness. The duties set out include the following: risk assessment, contingency planning, emergency planning, management arrangements, outlining information requirements and outline stakeholder requirements.
Control of Major Accident Hazards Regulations 2015 (COMAH)	<p>COMAH is aimed at providing a set of regulations to prevent major accidents, involving hazardous substances. The regulations set out in COMAH are enforced by the COMAH Competent Authority. In England, for Airport developments this is the Health and Safety Executive (HSE) and the Environment Agency.</p> <p>COMAH applies to the majority of UK industries and substances. The regulation is dependent upon threshold exceedances. Specific obligations exist to aid the management of major accidents and disasters. A level of demonstration is also</p>

Relevant policy / legislation	Relevance to assessment
	required which is proportionate to the level of risk posed by the establishment, and the quantity of dangerous substances involved.

15.3 Stakeholder Consultation

- 15.3.1 A detailed stakeholder engagement plan is currently being developed. Care will be taken to ensure all key stakeholders with views and concerns regarding major accidents and disasters are provided with sufficient information on the Proposed Development to discuss and agree the details of the assessment in a meaningful and inclusive manner.
- 15.3.2 The HSE were contacted in November 2018 to make them aware of the Proposed Development and timescales for further consultation. HSE were provided with a presentation providing an overview of the Proposed Development and inviting initial comments on the scope of the major accidents and disasters assessment.
- 15.3.3 The HAL Scoping Opinion is a useful source of stakeholder feedback, and has been used to inform this Scoping Report.

15.4 Approach to Scoping

- 15.4.1 An initial list of potential major accidents and disasters for consideration during the scoping stage of this EIA was developed from the National Risk Register of Civil Emergencies (Cabinet Office, 2017). This list was then expanded upon to account for the limited timeframe of National Risk Register of Civil Emergencies, which only accounts for five years. This was done by also considering UK government Emergency response and Recovery guidance (HM Government, 2013) and International Federation of Red Cross & Red Crescent Societies Disaster and Crisis Management Guidance (IFRC, 2011). The full list of potential hazard categories has been divided into natural and anthropogenic hazards and then further subdivided into seven subcategories: geophysical, hydrological, climatological meteorological and biological hazards, malicious incidents and major accidents. The full initial list of potential major accidents and disasters hazards is set out in **Table 15.2**.

Table 15.2 Initial List of Potential Major Accident and Disaster Hazards Considered

Category	Subcategory	Hazard
Natural hazards	Geophysical hazards	Earthquake
		Landslide
		Tsunami
		Volcanic eruption
	Hydrological hazards	Avalanche
		Coastal flooding
		Riparian (river) flooding
	Climatological hazards	Drought
		Extreme temperatures
		Wildfire

Category	Subcategory	Hazard
	Meteorological hazards	Heavy snow and extreme cold
		Hurricanes and storms
		Severe space weather
		Storm surge
		Poor air quality conditions
	Biological hazards	Infectious disease epidemics and pandemics
		Infectious animal disease epidemics and pandemics
		Animal plagues and pests
Anthropogenic hazards	Malicious incidents	Industrial action
		Public disorder and civil unrest
		Conflict and wars (including terrorist attack)
		Cyber-attacks
		Large and small-scale chemical, biological and conventional attacks
		Public nuisance (including drones)
	Major accidents	Famine and food insecurity
		Widespread electricity failure and infrastructure failures
		Transport accidents
		Industrial accidents
		Legacy issues

15.4.2 From the initial list of hazards for consideration, the assessment then considered the Proposed Development's location and proposed use for the scoping assessment. This considered the potential hazards against these factors to determine the severity and likelihood of a major accident and disaster consequence occurring from the Proposed Development. The basis of this screening was therefore completed considering the likelihood and the consequences of the events.

Study area

15.4.3 This section sets out the study area that has been defined for the consideration of potential risks from major accidents and disasters at the scoping stage.

15.4.4 The proposed study area for major accidents and disasters is shown in **Figure 15.1**. The study area for the Proposed Development has been defined based on the identified receptors and receptor characteristics, meaning that the assessment of will consider different distances depending on the receptors identified for each hazard. Specifically, surface water receptors have been considered for a 10km buffer from the Proposed Development area and groundwater and community receptors have been considered for a 1km buffer from the

Proposed Development.

15.4.5 As the design of the Proposed Development is still in development, the study area set out above will be kept under review as the design and consultation processes progress, and the Proposed Development is refined, and related topic assessment study areas are confirmed. Therefore, the study areas at the assessment stage may evolve as appropriate.

Sources of baseline data

15.4.6 Baseline information relevant to the topic of major accidents and disasters has been developed where possible from the existing baselines developed for other individual scoping topics relevant to major accidents and disaster requirements. **Table 15.3** outlines the proposed data and sources used to inform this Scoping Report. In addition to the data sources outlined below, individual data sources to assess likelihood have been obtained, where possible, from regulatory authorities and public bodies.

Table 15.3 Proposed data sources for major accidents and disasters assessment

Source	Data
Cabinet Office, 2017	National Risk Register of Civil Emergencies.
Thames Valley Community Risk Register, 2016	Potential external major accidents and natural disasters identified by local authorities that may affect Heathrow Airport.
London Risk Register, 2016	
European Commission, 2018	Major Accident Reporting (eMARS).
CAA, 2013	CAP 1036: Global Fatal Accident Review 2002 to 2011.

15.5 Baseline Conditions

15.5.1 The baseline condition for the assessment of major accidents and disasters as outlined above has been developed from the existing baseline data collected as part of the scoping stage for completion of other topics. The following relevant chapters have been reviewed to develop appropriate baselines:

- Built Environment – **Chapter 11 ‘Historic Environment’**;
- Human Populations – **Chapter 12 ‘Health’** and **Chapter 9 ‘Community’**;
- Groundwater – **Chapter 14 ‘Land Quality and Waste’** and **Chapter 14 ‘Water’**;
- Surface water – **Chapter 10 ‘Land Quality and Waste’** and **Chapter 14 ‘Water’**;
- Soils and receiving environment – **Chapter 10 ‘Land Quality and Waste’**; and
- Ecological Receptors – **Chapter 2 ‘Biodiversity’**.

15.6 Scoping of Potential Effects

15.6.1 The potential likely significant effects to be scoped into the major accidents and disasters assessment are displayed in **Table 15.4**.

Table 15.4 Potential likely significant major accidents and disasters effects

Hazard	Activity	Effect	Receptor
Construction			

Hazard	Activity	Effect	Receptor
Anthropogenic hazards - Major accident: Legacy issues	Unexploded ordnance interaction with construction works. Interaction with sites of historic contamination and waste landfill sites, leading to the release of contaminants into the environment.	Fatalities, injuries to people within the study area and damage to infrastructure.	Human population. Specifically, airport users, staff and local populations. The Airports, and environs land-based receptors and built environment.
Construction and Operation			
Natural Hazards - Hydrological hazards: Riparian (rivers) Flooding	Disruption and alteration of the surface water hydrology which may affect the risk of any surface water flooding. Given the close proximity of surface waters to the study area this hazard could result in potential flooding events which could impact local infrastructure.	Fatalities, injuries and damage to property within the study area, potential for release of hazardous substances.	Human population. Specifically, airport users, staff and local populations. The Airports' and environs land-based receptors and built environment.
Natural Hazards – Climatological hazards: Drought	Construction works altering the hydrological regime leading to drought of a significant nature.	Crop failures, animal loss and major disruption to agricultural activity.	Local agricultural, wildlife and ecosystems (sensitive land uses).
Natural Hazards – Climatological hazards: Wildfire	Extreme weather conditions interacting with construction activity leading to wildfire activity and uncontrolled fire hazards.	Fatalities, injuries and damage to property within the study area, potential for release of hazardous substances.	Human population. Specifically, airport users, staff and local populations. The Airports' and environs land-based receptors and built environment.
Natural Hazards - Meteorological hazards: Heavy snow and extreme cold	Extreme weather conditions leading to transport accidents and major accidents.	Fatalities, injuries and damage to property within the study area, potential for release of hazardous substances.	Human population. Specifically, airport users, staff and local populations. The Airports' and environs land-based receptors and built environment.
Natural Hazards - Meteorological hazards: Hurricanes and storms	Extreme weather conditions leading to transport accidents and major accidents.	Fatalities, injuries and damage to property within the study area, potential for release of hazardous substances.	Human population. Specifically, airport users, staff and local populations. The Airports' and environs land-based receptors and built environment.

Hazard	Activity	Effect	Receptor
Natural Hazards - Biological Hazards: Infectious disease epidemics and pandemics	The release and proliferation of infectious diseases which could occur leading to adverse major consequences such as fatalities, economic damage and disruption of normal activity.	Fatalities and injuries within the study area and beyond.	Human population. Specifically, airport users, staff and local populations. The Airports' and environs land-based receptors and built environment.
Natural Hazards - Biological Hazards: Infectious animal disease epidemics and pandemics	Foot and Mouth, Swine Fever, Avian Flu, West Nile Virus, Blue Tongue are examples of infectious animal diseases which could occur leading to adverse major consequences such as fatalities, economic damage and disruption of normal activity.	Fatalities and injuries within the study area and beyond.	Human population. Specifically, airport users, staff and local populations. The Airports' and environs land-based receptors, specifically animals and wildlife.
Natural Hazards - Biological Hazards: Animal plagues and pests	Introduction of invasive species.	Fatalities, injuries and damage to property within the study area and beyond.	Human population. Specifically, airport users, staff and local populations. The Airports' and environs land-based receptors, specifically animals and wildlife and local agricultural sites.
Anthropogenic hazards – Malicious incidents: Industrial actions	Intentional malicious acts of disruption including public protests and civil disobedience.	Fatalities, injuries and damage to property within the study area and beyond.	Infrastructure and human population. Specifically, airport users, staff and local populations. The Airports' and environs land-based receptors and built environment.
Anthropogenic hazards – Malicious incidents: Public disorder and civil unrest	Intentional malicious acts of disruption including public protests and civil-disobedience.	Fatalities, injuries and damage to property within the study area and beyond	Infrastructure and human population. Specifically, airport users, staff and local populations. The Airports' and environs land-based receptors and built environment.

Hazard	Activity	Effect	Receptor
Anthropogenic hazards: Malicious incidents Conflict and wars – terrorist attack	Terrorist attacks on construction site and Heathrow airport operations.	Fatalities, injuries to people within the study area, potential for release of environmentally damaging substances.	Human populations at the Airport (e.g. staff, public and construction workers), local resident populations. The Airports' and environs surrounding sensitive receptors surface water, groundwater and land-based receptors, built environment.
Anthropogenic hazards: Malicious incident - Cyber Attacks	Alteration to current safeguarding operations leading to increased vulnerability from cyber-attacks.	Fatalities, injuries to people within the study area and surrounding environs.	Human populations at the Airport (e.g. staff, public and construction workers), local resident populations. The Airports and environs surrounding sensitive receptors surface water, groundwater and land-based receptors, built environment.
Anthropogenic hazards – Malicious incidents: Large and small-scale chemical, biological and conventional attacks.	Intentional malicious acts leading to significant loss of life directly and indirectly though destruction of the built environment.	Fatalities, injuries and damage to property within the study area, potential for release of hazardous substances.	Human population. Specifically, airport users, staff and local populations. The Airports' and environs land-based ecological receptors and built environment.
Anthropogenic hazards – Major accident: Widespread electrical failures and infrastructure failure.	Intentional malicious acts and accidental incidents leading to significant loss of life directly and indirectly though destruction of the built environment assets such as electricity or communications networks.	Fatalities, injuries and damage to property within the study area, potential for release of hazardous substances.	Human population. Specifically, airport users, staff and local populations. The Airports' and environs land-based ecological receptors and built environment.
Anthropogenic hazards - Major accident: Transport accidents	Air traffic and land-based traffic.	Fatalities, injuries and damage to property within the study area, potential for release of hazardous substances.	Human population. Specifically, airport users, staff and local populations. The Airports' and environs land-based receptors and built environment.

Hazard	Activity	Effect	Receptor
Anthropogenic hazards – major accidents: Industrial accidents	Interaction of construction works with vital utilities and infrastructure.	Fatalities, injuries and damage to property within the study area, potential for release of hazardous substances.	Human population. Specifically, airport users, staff and local populations. The Airports' and environs land-based receptors and built environment.

Effects scoped out of the assessment

15.6.2 The effects proposed to be scoped out of the major accidents and disasters assessment are displayed in **Table 15.5**. The approach to this assessment has been to scope out low likelihood and low consequence events as these do not meet the criteria for assessment to be considered under major accidents and disasters. For example, minor events, such as accidental spills have been scoped out of assessment under major accidents and disasters. Where low consequence highly likely events have been scoped out, and events covered by existing legislation, the justification have been listed below in **Table 15.5**. Where possible we have aimed to remove the consideration of effects that will be covered under existing operating licenses which exist for this Proposed Development, for example malicious incidents including public nuisances leading to major accidents have been scoped out of assessment as the operational licences where effects to Heathrow Airport are covered by their existing operational licence requirements determined by the CAA and the effects to this project will either be covered by this existing licence or be of a significance not requiring assessment under major accidents and disasters definition.

Table 15.5 Effects to be scoped out of the major accidents and disasters assessment.

Hazard	Activity	Effect	Receptor	Justification for scoping out
Construction and Operation				
Natural hazards - Geophysical hazards: Earthquakes	Seismic activity within the development area of a significant magnitude to cause harm and damage to receptors.	Fatalities, injuries to people within the study area, damage to property.	Infrastructure, the built environment and Human population. Specifically, airport users, staff and local populations. The Airports' and environs land-based receptors and built environment.	<p>London and the Proposed Development area are areas of low seismicity. BGS seismic hazard map for the UK indicates a Peak Ground Acceleration (PGA; "g") of 0.005 - 0.02 for the development area, which is considered to be low in comparison to the rest of the UK and negligible in comparison to the rest of the world.</p> <p>Damaging earthquakes in the UK are very rare, the BGS carries out seismic monitoring across the UK and on average records approximately 100 earthquakes per year, of which 20 are actually noted by the public each year. The BGS is capable of detecting all earthquakes anywhere in the UK likely to be felt by the public and cause damage. The potential damage caused by these events is unlikely to be of the severity or nature observed in other</p>

Hazard	Activity	Effect	Receptor	Justification for scoping out
				<p>regions of the globe where major infrastructural damage is observed and reported.</p> <p>The UK has had no significant earthquakes occur within the past decade with the most significant being a 5.2ml magnitude earthquake in Market Rasen, Lincolnshire on the 27/02/2008. This event led to an estimated insurance cost of in the region of low tens of millions of pounds (BGS, 2011).</p> <p>No significant earthquakes have been recorded in the region of the Proposed Development. Historically the South East, has had a magnitude 4.6 earthquake recorded by BGS, which occurred in Colchester in 1884. This event is thought to have caused damage to over 1000 buildings and structure damage to walls and pavements.</p> <p>The likelihood of occurrence is low and the potential future changes to the baseline are also low. Therefore, this hazard has been scoped out of further assessment.</p>
Natural hazards - Geophysical hazards: Landslides	Land instability and land movement during construction and operation.	Fatalities, injuries to people within the study area, damage to property.	Infrastructure, the built environment and Human population. Specifically, airport users, staff and local populations. The Airports; and environs land-based receptors and built environment.	<p>No significant landslide issues due to natural phenomena identified.</p> <p>The available BGS online records do not appear to show that the study area is at risk from land instability and landslides. The BGS onshore records also don't list any recorded landslides within the Proposed Development area.</p> <p>The Coal Authority interactive map indicates that the Proposed Development area is not within a coal mining reporting area or high-risk development area. The study area is therefore not at risk from instability from former mine workings.</p> <p>The likelihood of occurrence is low and the potential future changes to the baseline are also low. Therefore, this</p>

Hazard	Activity	Effect	Receptor	Justification for scoping out
				hazard has been scoped out of further assessment.
Natural hazards - Geophysical hazards: Tsunami	Significant onshore flooding and coastal flooding of the Proposed Development area.	Fatalities, injuries to people within the study area, damage to property.	Infrastructure, the built environment and Human population. Specifically, airport users, staff and local populations. The Airports' and environs land-based receptors and built environment.	<p>The Proposed Development is not located within an identified tsunamis risk zone (European Spatial Planning Observation Network, Espon 2005 <i>Europe: Tsunamis hazard map</i>).</p> <p>The likelihood of occurrence is low and the potential future changes to the baseline are also low. Therefore, this hazard has been scoped out of further assessment.</p>
Natural hazards - Geophysical hazards: Volcanic eruptions	Ash, cloud and volcanic eruptions affecting flight safety resulting in aircraft related incidents.	Fatalities, injuries to people within the study area, potential for release of environmentally damaging substance	Human populations at the Airport (e.g. staff, public and construction workers), local resident populations. The Airport's and environs surrounding sensitive receptors including surface water, groundwater and land-based receptors, built environment.	<p>The direct risk of volcanic eruption in the UK is extremely low and potential changes to the baseline are extremely unlikely during the lifetime of this project.</p> <p>There are two types of volcanic eruption included in the UK Government's National Risk Register for Civil Emergencies. Firstly, Icelandic style (gas rich eruptions – “explosive” eruptions) and secondly “effusive” eruptions. Explosive eruptions are characterised as eruptions causing large ash clouds and disruption to air travel. Effusive eruptions cause long term alterations to air quality and are associated with impacts to human health and crops.</p> <p>The main hazard to UK airspace and aircraft operations is from Icelandic “explosive” style volcanic eruptions and subsequent volcanic ash cloud risks. However, the risks associated with this hazard have been assessed taking into account the mitigation and procedural requirements already in place in the UK and at Heathrow Airport, specifically Heathrow's operational compliance with CAA (2017) CAP 1236 <i>Guidance regarding flight operation in the vicinity of volcanic ash</i>. The CAA authority has undertaken test flights and sets out new regulatory requirements to ensure safe travelling and to minimise disruption to UK aviation industry from such events.</p>

Hazard	Activity	Effect	Receptor	Justification for scoping out
				<p>The main mitigating requirements are: monitoring volcanic ash atmospheric concentrations charts, via met office and Icelandic CAA</p> <p>UK aerodrome operational requirements for flight decisions during volcanic hazards (EC reg No. 965/2012)</p> <p>Requirement for Safety Risk Assessments for flight operations during volcanic ash cloud.</p> <p>Therefore, direct volcanic hazards are scoped out due to their low likelihood, and in-direct hazards are scoped out due to current mitigation requirements already in place for the assessment of their risk.</p>
Natural hazards - Hydrological hazards: Avalanche	Avalanches of snow interacting with human populations and infrastructure.	Fatalities, injuries to people and damage to property	Infrastructure, the built environment and Human population.	<p>The study area is not located in an area of potential avalanche hazard, as identified on the ESPON 2004 <i>European: avalanche hazard map</i>. The only avalanche hazards identified are in the highlands of Scotland.</p> <p>The likelihood of occurrence is low and the potential future changes to the baseline are moderate with a likely reduction in the hazard compared with 2004. Therefore, this hazard has been scoped out of further assessment.</p>
Natural hazards - Hydrological hazards: Coastal flooding	Significant onshore flooding and coastal flooding of the Proposed Development area.	Fatalities, injuries to people within the study area, damage to property.	Airport infrastructure, the built environment and Human population. Specifically, airport users, staff and local populations.	<p>The Proposed Development area is not located on the coast or in an area of known coastal flooding risk.</p> <p>The likelihood of occurrence is low and the potential future changes to the baseline are also low. Therefore, this hazard has been scoped out of further assessment.</p>
Natural hazards - Meteorological hazards: Severe space weather	“Space weather” events, specifically geomagnetic storms, radiation storms and solar flares leading to loss of critical systems (communication, security and	Fatalities, injuries to people within the study area, damage to property.	Airport infrastructure, the built environment and Human population. Specifically, airport users, staff and local populations.	<p>Space weather events predominately relate to variations in solar activity. Solar activity occurs on different cycles leading to solar events occurring with varying likelihood. Low severity events occur on a cycle with an increased frequency and therefore likelihood of occurrence. The severity and type of event most relevant to a major hazard or accident occurring as a result of a space weather event are events which</p>

Hazard	Activity	Effect	Receptor	Justification for scoping out
	electricity supply leading to a failure in airport operations).			are likely to cause major incidents have a low likelihood of occurrence. Space weather is monitored and therefore preparedness and mitigations can be put into place prior to effects that are likely to lead to major incidents are scoped out of assessment.
Natural hazards - Meteorological hazards: storm surges	Significant onshore flooding and coastal flooding of the Proposed Development area.	Fatalities, injuries to people within the study area, damage to property.	Airport infrastructure, the built environment and Human population. Specifically, airport users, staff and local populations.	The Proposed Development area is not located on the coast or in an area of known coastal flooding and therefore risk from storm surges. The likelihood of occurrence is low and the potential future changes to the baseline are also low. Therefore, this hazard has been scoped out of further assessment.
Natural hazards - Meteorological hazards: Poor Air Quality	Significant loss of air quality due to natural phenomena including ozone changes and weather events.	Fatalities, injuries to people	Human population within the study area.	The Proposed Development area is not located in an area associated with natural phenomena where poor air quality occurs. The likelihood of occurrence is low and the potential future changes to the baseline are also low. Therefore, this hazard has been scoped out of further assessment.
Operation				
Anthropogenic hazards- Major Accident: Legacy issues	Accidental release of historic contamination wastes and UXO chemicals during construction works and site operations. Leading to major alteration of the site.	Fatalities, injuries to people within the study area, potential for release of environmentally damaging substance.	Human populations at the Airport (e.g. staff, public and construction workers), local resident populations. The Airports and environs surrounding sensitive receptors surface water, groundwater and land-based receptors, built environment.	Legacy issues including UXO risk will be assessed within the Land Quality chapter and will consider aspects which relate to major accidents and disasters in the construction phase of works.

15.7 Approach to Assessment

Study area

15.7.1 The proposed study area for the assessment of risks from major accidents and disasters is set out in **Section 15.4**. The study area will be refined at the assessment stage as the design and consultation processes progress, and as related topic assessments are progressed.

Assessment methodology

- 15.7.2 The overall approach to the assessment will follow a process which scopes in assessment from the initial list outlined previously (**Table 15.2**) and then considers the likelihood of an occurrence, in order to then evaluate the significance of the potential effects depending on the likelihood.
- 15.7.3 The major accidents and disaster impacts identified and scoped in will then be assessed by a detailed assessment of the potential for major accidents and disasters in relation to the Proposed Development. The detailed assessment will consider the Proposed Development, design and embedded mitigation. These factors will then be compared to the baseline and where appropriate redesign / further mitigation requirements will be incorporated into the Proposed Development.
- 15.7.4 The detailed assessment will consider the potential hazards scoped in from the initial list to identify the following requirements:
- Their cause is within the Proposed Development area;
 - Interaction with the proposed construction, decommissioning and / or operational stages of the project; and
 - Have receptors in the Proposed Development area.
- 15.7.5 The approach to the methodology will use the source, pathway and receptor approach to assessment. The sources of potential major accidents and disasters have been developed from the initial list (**Table 15.2**). The potential for identified relevant major accident and / or disaster events to result in a significant adverse environmental effect will be evaluated using a risk-based approach. The approach will consider the environmental consequences of a major accident or disaster occurring, the likelihood of these consequences occurring, taking into account planned design and embedded mitigation, and the acceptability of the subsequent risk to the environment. The process will follow the following iterative approach:
- Scoping of hazards (scoping stage);
 - Screening of risks;
 - Defining the impact; and
 - Evaluation of significance.

Screening of risks

- 15.7.6 Following the development of the initial list during this scoping stage each hazard scoped in for assessment will be assessed to identify the risks from the identified hazards. All low consequence events, whatever their likelihood, that do not meet the definition of major accidents and / or disasters threshold. For example, minor spills which may occur during construction, but would be limited in area and volume and temporary.
- 15.7.7 In order to identify whether a hazard has the potential to be a major accident and / or disaster, which also has the potential to have a significant adverse effect on an environmental receptor, three components need to be present: a source, a pathway (between source and receptor) and a receptor. As such, and as recommended by Defra (2011), the assessment uses the following conceptual model:

- The source is the original cause of the hazard, which has the potential to cause harm;
- The pathway is the route by which the source can reach the receptor; and
- The receptor, which is the specific component of the environment that could be adversely affected, if the source reaches it.

Magnitude of effects

15.7.8 The magnitude of change considered for major accidents and disasters will be the severity of harm/damage (hazard) and the duration of exposure. This therefore takes into account the resistance and resilience of receptors.

15.7.9 The severity of major accidents and disaster hazards will be considered using a threshold-based approach. This will develop on from the approach used during the scoping stage to determine if hazards should be assessed further. The threshold used will be developed for Human Receptors from HSE'S R2P2 guidance (HSE, 2001), and for the built environment CDOIF guidance will be adopted.

15.7.10 The magnitude for assessment will consider the severity of each major accidents and disasters hazard and the duration in order to establish the magnitude of change likely to occur from major accidents and disaster events. The details of this matrix are outlined in **Table 15.6**.

Table 15.6 Magnitude of change matrix

Hazard severity	Duration of effect			
	Short	Medium	Long	Permanent
Catastrophic	Scoped Out	High	Very high	Very high
Major		Medium	High	Very high
Severe		Low	Medium	High
Not significant		Scoped out of assessment under major accidents and disasters threshold		

Evaluation of significant effects

15.7.11 The significance of an effect for major accidents and disasters is focussed on the understanding of risks. This represents a different approach to the assessments undertaken as part of the EIA process. The typical EIA approach utilises an effects-based approach building up a picture of the potential impacts that are likely to occur as a result of a Proposed Development. This approach has often led to the omission of major accidents and disasters from EIA assessments as by their very nature major accidents and disasters are often less likely to occur and therefore don't meet the requirement for EIA to consider impacts which are likely to arise from a development.

Likelihood

15.7.12 The Major accidents and disasters chapter will seek to build on the understanding of the Scoping Report and assess the potential consequences which could arise from Major accidents and disasters. This approach has been set out in **Table 15.7**. The evaluation of significance relates to the likelihood of occurrence and tolerability of the risk. Risk tolerability for Major accidents and disasters in the UK generally falls under the following principle "ALARP" meaning: as low as reasonably practicable. For Major accidents and disasters assessments this means that intolerable risk should be eliminated, and residual risk should be reduced where practicable. For the EIA the definition of intolerable risk is interpreted as meaning Significant

Adverse effects. This assessment will apply expert judgment to identify significant adverse effects and determine the intolerable risks.

15.7.13 There are no industry standard approaches to the assessment of major accidents and disasters. The approach to this assessment will use a combination of the likelihood and magnitude as this is the emerging industry standard for assessing Major accidents and disasters.

15.7.14 The first issue to consider in the assessment is the likelihood of the project having an effect. A likely effect should be both plausible and probable.

- Plausible relates to their being a relevant source, pathway and receptor (see discussion of health pathways below); and
- Probable relates to a qualitative judgement to exclude those effects that could only occur under certain very rare conditions, except where these relate to the projects vulnerability to major accidents or disasters (as required by PART I para 4(4) EIA Regulation 2017).

15.7.15 The assessment applies expert judgement to identify risks that are significant, once the design and procedural measures for risk reduction are applied. This includes prevention, control, emergency planning and preparedness, emergency response, and post event restoration and clean-up associated with major accidents and disasters.

Table 15.7 Major accident and disaster assessment matrix

Magnitude	Likelihood to occur			
	Reasonably likely	Unlikely	Very unlikely	Extremely unlikely
Very High	Major	Major	Moderate	Minor
High	Major	Moderate	Minor	Minor
Medium	Moderate	Minor	Minor	Negligible
Low	Minor	Minor	Negligible	Negligible

Cumulative effects

15.7.16 Cumulative major accidents and disasters resulting from the combination of effects from the Proposed Development and other developments will be assessed in accordance with the guidance and methodologies set out in **Section 4.6 of Chapter 4 ‘Approach to EIA’**. The assessment will be dependent on the availability and accessibility of information for other developments.

15.7.17 The Proposed Development does not include the new Northwest Runway and M25 realignment components of the NRS proposed by HAL. However, the Proposed Development is designed to be operated alongside these components of the NRS that are being progressed by the HAL DCO Project. Therefore, the total cumulative effects will be considered together to ensure an overarching assessment of the NRS as a whole.

15.7.18 Any components of the HAL DCO Project which would no longer be required as a result of the Proposed Development would not be included in the CEA.

15.8 Approach to Mitigation

15.8.1 Minimisation of impacts will be embedded into the design of the Proposed Development where possible following the application of the hierarchy of mitigation as described in

Chapter 4 ‘Approach to EIA’.

- 15.8.2 As the assessment of major accidents and disasters impacts based upon thresholds and identification of intolerable risks, the requirement for re-design and introduction of new primary, secondary and tertiary mitigation measures and reassessment is required in order to ensure major accidents and disaster risks fall below the intolerable threshold where identified. The approach to mitigation is therefore considered during the design stage and also fed back into the design as this assessment is undertaken.
- 15.8.3 The assessment and approach will be carried out in a way that allows for and encourages design evolution. Design evolution is required for sufficient mitigation measures to be incorporated into the Proposed Development. The design of the Proposed Development will continue to be informed by a suite of health and safety regulations, design codes and other legal requirements. Adhering to these requirements minimises the risk of major accidents and disasters.
- 15.8.4 It is at the design stage where inherent project risks from the initial list of potential major accidents and disaster hazards will be mitigated. This will form a primary mitigation measure aimed at where practicable eliminating the potential hazards to the Proposed Development. Where embedded design mitigation cannot eliminate the risk, further best practice mitigation will be adopted.
- 15.8.5 Should significant effects remain after consideration of embedded mitigation and best practice, the following steps will have to occur, firstly further amend the design to eliminate risk and then further assessment and additional mitigation measures. This approach will take into account the required health and safety legislation and compliance with good practice measures to ensure major accidents and hazards are mitigated for.

15.9 Summary

- 15.9.1 The scope of the major accidents and disasters assessment described above is summarised in **Table 15.8** below.

Table 15.8 Summary of the scope of major accidents and disasters assessment

Category	Subcategory	Hazard	Construction	Operation
Natural hazards	Geophysical hazards	Earthquake	×	×
		Landslide	×	×
		Tsunami	×	×
		Volcanic eruption	×	×
	Hydrological hazards	Avalanche	×	×
		Coastal flooding	×	×
		Riparian (river) flooding	✓	✓
	Climatological hazards	Drought	✓	✓
		Extreme temperatures	✓	✓
		Wildfire	✓	✓
	Meteorological hazards	Heavy snow and extreme cold	✓	✓

Category	Subcategory	Hazard	Construction	Operation	
		Hurricanes and storms	✓	✓	
		Severe space weather	✗	✗	
		Storm surge	✗	✗	
		Poor air quality conditions	✗	✗	
	Biological hazards	Infectious disease epidemics and pandemics	✓	✓	
		Infectious animal disease epidemics and pandemics	✓	✓	
		Animal plagues and pests	✓	✓	
	Anthropogenic hazards	Malicious incidents	Industrial action	✓	✓
			Public disorder and civil unrest	✓	✓
Conflict and wars (including terrorist attack)			✓	✓	
Cyber-attacks			✓	✓	
Large and small-scale chemical, biological and conventional attacks			✓	✓	
Public nuisance (including drones)			✓	✓	
Major accidents		Famine and food insecurity	✓	✓	
		Widespread electricity failure and infrastructure failures	✓	✓	
		Transport accidents	✓	✓	
		Industrial accidents	✓	✓	
		Legacy issues	✓	✗	

Scoped in (✓) and scoped out (✗)

15.9.2 Production of the ES chapter will be undertaken in consultation with all relevant stakeholders, including topic expert panel meetings, as appropriate. Similarly, the requirements of the ANPS will be at the forefront; principally that the Proposed Development design will seek to reduce the vulnerability of the Proposed Development to major accidents and disasters.

15.10 References

- British Geological Survey (2011) Market Rasen earthquake report.
- Cabinet Office (2013) Emergency Response and Recovery Non statutory guidance accompanying the
- Cabinet Office (2017) National Risk Register of Civil Emergencies HM Government.
- Chemical and Downstream Oil Industries Forum (2015) Guideline – Environmental Risk Tolerability for COMAH Establishments
- Civil Contingencies Act 2004 HM Government.
- Civil Aviation Authority (2017) CAP 1236 Guidance regarding flight operation in the vicinity of volcanic ash.

Defra (2011) Guidance for environment risk assessment and management HM Government.

European Spatial Planning Observation Network (2004) European: avalanche hazard map. Available here: <https://www.preventionweb.net/english/professional/maps/v.php?id=3772> [Accessed 01/21/2018]

European Spatial Planning Observation Network (2005) Europe: Tsunamis hazard map Available here: <https://www.preventionweb.net/english/professional/maps/v.php?id=3831> [Accessed 01/21/2018]

Health and Safety Executive (2001) Reducing risk, protecting people HSE's decision-making process ISBN 0 7176 2151 0

International Federation of Red Cross & Red Crescent (2011) Societies Disaster and Crisis Management Guidance

16 Noise and Vibration

16.1 Introduction

16.1.1 This section details the proposed scope of the assessment of potential impacts arising from the Proposed Development on noise and vibration. This chapter considers impacts associated with the construction and operational phases of the Proposed Development.

16.1.2 This chapter includes:

- A description of policy and legislation with relevance to noise and vibration;
- A summary of ongoing and planned future stakeholder engagement;
- An overview of the approach that has been adopted to inform this scoping report;
- A concise summary of the baseline noise environment;
- A description of the potential likely significant effects of the Proposed Development on noise and vibration, to be included in the scope of the assessment;
- A summary of any potential effects that are proposed to be scoped out of the assessment;
- A proposed approach to the EIA and the CEA with regards to noise and vibration;
- An overview of the proposed approach to mitigation; and
- A summary of the Scoping Report chapter including a summary of impacts table.

16.1.3 The Proposed Development is a component of the Government's preferred NRS as set out in the ANPS. It does not include the Northwest Runway itself, or the major M25 realignment works required to accommodate the Northwest Runway. Therefore, noise and vibration effects associated with these components of the NRS are excluded from the scope of the primary assessment. Potential noise and vibration effects associated with the Northwest Runway and M25 realignment works will however be considered as part of the CEA, as set out in **Section 4.6 of Chapter 4 'Approach to EIA'**.

16.2 Policy and Legislation

16.2.1 **Table 16.1** provides a summary of the key topic specific policy and legislation which has informed the scope of the assessment. Further information on policies relevant to the EIA and their status is set out in **Chapter 1 'Introduction'**. Due regard will also be given to local policies and the Government's 25 Year Environment Plan where they are relevant.

16.2.2 These documents are proposed to form the framework for detailed assessment post-scoping and will be taken into account in the assessment of potential noise and vibration impacts during PEI and ES stages, with the relevant criteria followed throughout.

Table 16.1 Policy and legislation relevant to the noise and vibration assessment

Relevant policy / legislation	Relevance to assessment
Policy	
Airports National Policy Statement (ANPS) (2018)	The Proposed Development will use the ANPS as the primary policy for noise. The ANPS states that noise can be a material consideration in the granting of consent (paragraph 5.68):

Relevant policy / legislation	Relevance to assessment
	<p>“Development consent should not be granted unless the Secretary of State is satisfied that the proposals will meet the following aims for the effective management and control of noise, within the context of Government policy on sustainable development:</p> <ul style="list-style-type: none"> • avoid significant adverse impacts on health and quality of life • mitigate and minimise adverse impacts on health and quality of life • where possible, contribute to the improvement of health and quality of life.” <p>The ANPS provides details of the appropriate construction and operational time periods for consideration and information that should be included in the noise assessment.</p> <p>The ANPS accepts that in some instances it may not be possible at the time of the application for development consent for all aspects of the proposal to have been settled in precise detail, particularly with regard to airborne aircraft noise (in the context of this Proposed Development this is relevant only to the cumulative assessment).</p>
<p>Noise Policy Statement for England (NPSE) (2010)</p>	<p>The NPSE document was published by Defra in 2010 and paragraph 1.7 states three policy aims:</p> <p>“Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:</p> <ul style="list-style-type: none"> • avoid significant adverse impacts on health and quality of life; • mitigate and minimise adverse impacts on health and quality of life; and • where possible, contribute to the improvement of health and quality of life.” <p>The first two points require that significant adverse impact should not occur and that, where a noise level falls between a level which represents the lowest observable adverse effect and a level which represents a significant observed adverse effect:</p> <p>“...all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life whilst also taking into consideration the guiding principles of sustainable development. This does not mean that such effects cannot occur.” (Paragraph 2.24, NPSE, March 2010).</p> <p>Section 2.20 of the NPSE introduces key phrases including “Significant adverse” and “adverse” and two established concepts from toxicology that are being applied to noise impacts:</p> <p>“NOEL – No Observed Effect Level This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise. LOAEL – Lowest Observed Adverse Effect Level This is the level above which adverse effects on health and quality of life can be detected”.</p> <p>Paragraph 2.21 of the NPSE extends the concepts described above and leads to a significant observed adverse effect level – SOAEL, which is defined as the level above which significant effects on health and quality of life occur. The NPSE states:</p>

Relevant policy / legislation	Relevance to assessment
	<p><i>“it is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations”.</i> (Paragraph 2.22, NPSE, March 2010).</p> <p>Furthermore paragraph 2.22 of the NPSE acknowledges that:</p> <p><i>“further research is required to increase understanding of what may constitute a significant adverse effect on health and quality of life from noise”.</i></p>
National Policy Statement for National Networks (NPS NN) (2014)	Nationally significant road and rail components of the Proposed Development will be examined under the NN NPS. This applies the same ‘noise test’ as the ANPS (reference 5.195 of the NN NPS) and this common ‘noise test’ is in line with the Government’s noise policy (NPSE, 2010).
National Planning Policy Framework (NPPF) (2018)	<p>The NPPF was revised in July 2018 and this document now forms the basis of the Government’s planning policies for England and how these should be applied. Paragraph 170 of the NPPF states planning policies and decisions should contribute to and enhance the natural and local environment by:</p> <p><i>“.....preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution.....”</i></p> <p>Furthermore, Paragraph 180 of the NPPF states:</p> <p><i>“Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:</i></p> <ul style="list-style-type: none"> <i>a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;</i> <i>b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and</i> <i>c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.”</i> <p>The NPPF also refers to the NPSE.</p>
Aviation Policy Framework (APF) (2013)	The APF sets the framework for noise management at UK Airports. This was amended in October 2017 by the Consultation Response on UK Airspace Policy, DfT and applies until the publication by Government of its Aviation Strategy (understood to be early 2019).
Legislation	
Land Compensation Act (LCA) (1973)	<p>Part I of the Land Compensation Act provides a means by which compensation can be paid to owners of land or property which has experienced a loss in value caused by the use of public works, such as new or improved roads. Noise and vibration are two of the factors which would be considered in any claims for compensation, but the claim must consider all changes and effects, including betterment.</p> <p>Claims can be made under Part I of the Act from 1 to 7 years after the opening of a project. However, consideration of the likely extent of claims may be made during detailed design following the completion of statutory processes.</p>

Relevant policy / legislation	Relevance to assessment
Noise Insulation Regulations 1975 and Noise Insulation (Amendment) Regulations 1988	<p>The Noise Insulation Regulations were made under Part II of the Land Compensation Act 1973.</p> <p>Regulation 3 imposes a duty on authorities to provide, or make a grant towards the installation of, noise insulation at eligible buildings. This is subject to meeting certain criteria given in the relevant regulations.</p> <p>Regulation 4 provides authorities with discretionary powers to provide noise insulation at other buildings, in situations where existing carriageways are altered, such as additional lanes provided.</p> <p>Regulation 5 provides relevant authorities with discretionary powers to provide noise insulation at dwellings to reduce the impact of construction noise.</p>
Control of Pollution Act 1974	<p>The Control of Pollution Act 1974 Section 61 sets out procedures for those undertaking works to obtain 'Prior Consent' for construction works within agreed noise limits.</p> <p>Applications for such consent are made to the relevant local authority and should contain a method statement of the works and the steps to be taken to minimise noise. Under Section 60 of the Act, the local authority has powers to attach conditions to any consent, limit or qualify any consent to allow for changes and limit the duration of any consents. It should be noted that although it is generally for those undertaking the works to decide whether or not to seek such consent, this is also dependent on the custom and practice of the local authority. Some local authorities request demonstration of best practicable means rather than formal "Prior Consent" applications.</p> <p>For the control of noise and vibration at construction sites, BS5228:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites provides guidance for predicting construction noise and also provides advice on noise and vibration control techniques.</p>
Civil Aviation Act 1982	Provides the ability to set controls for noise at specific airports which the government has designated for the purposes of noise management (includes Heathrow).
Environmental Protection Act 1990	<p>Under Part III of the Environmental Protection Act 1990 local authorities have a duty to investigate noise complaints from premises (land and buildings) and vehicles, machinery or equipment in the street. It does not apply to road traffic noise but may be applicable to some construction activities.</p> <p>If a local authority's Environmental Health Officer is satisfied that a complaint amounts to a statutory nuisance then the authority must serve an abatement notice on the person responsible or in certain cases the owner or occupier of the property. The notice could require that the noise or nuisance must be stopped altogether or limited to certain times of the day.</p>
Noise and Statutory Nuisance Act 1993	The Noise and Statutory Nuisance Act 1993 amended Part III of the Environmental Protection Act 1990 by placing additional definitions in the list of statutory nuisances in Section 79 of the Environmental Protection Act. The definitions relate to nuisance caused by vehicles, machinery and equipment in the road.
Transport Act 2000	Enables the Secretary of State to: a) prevent or deal with environmental noise and vibration attributable to aircraft used for the purpose of civil aviation; and b) limit or mitigate the effects of such noise, vibration, pollution or disturbance.
Planning Act 2008	Gives statutory authority for noise nuisance unless a granted DCO gives provision to the contrary.
Localism Act 2011	The Localism Act 2011 provides a basis for defining The Mayor's London Environment Strategy. The Strategy contains provisions dealing with the Mayor's

Relevant policy / legislation	Relevance to assessment
	proposals and policies relating to ambient noise and promotes social, economic and environmental wellbeing.
The Environmental Noise (England) Regulations 2006	<p>Environmental Noise Regulations have been introduced into the UK to implement the Assessment and Management of Environmental Noise Directive 2002/49/EC. This Directive relates to the assessment and management of environmental noise in EU member states. At the time of publication and in the future, it is expected that Noise Action Plans and additional guidance may be available to designers that might need to be taken into account during the assessment of road projects.</p> <p>A number of Noise Important Areas exist around Heathrow.</p>
EU Regulation 598/2014	Gives rules on the process of introducing noise-related operating restrictions consistently on an airport-by-airport basis. This improves the noise climate and limits or reduces the number of people significantly affected by potentially harmful effects of aircraft noise. This is in accordance with the ICAO Balanced Approach.
International Civil Aviation Organization (ICAO)	<p>The International Civil Aviation Organization (ICAO) is a UN specialized agency, established by States in 1944 to manage the administration and governance of the Convention on International Civil Aviation (Chicago Convention).</p> <p>ICAO works with the Convention's 192 Member States and industry groups to reach consensus on international civil aviation Standards and Recommended Practices (SARPs) and policies in support of a safe, efficient, secure, economically sustainable and environmentally responsible civil aviation sector. These SARPs and policies are used by ICAO Member States to ensure that their local civil aviation operations and regulations conform to global norms, which in turn permits more than 100,000 daily flights in aviation's global network to operate safely and reliably in every region of the world.</p>

16.3 Stakeholder Consultation

16.3.1 A detailed stakeholder engagement plan is currently being developed. Care will be taken to ensure all key stakeholders with views and concerns regarding noise and vibration are provided with sufficient information on the Proposed Development to discuss and agree the details of the assessment in a meaningful and inclusive manner.

16.3.2 The stakeholders listed below were contacted in November 2018 to make them aware of the Proposed Development and timescales for further consultation. The following stakeholders were provided with a presentation providing an overview of the Proposed Development and inviting initial comments on the scope of the assessment for noise and vibration:

- London Borough of Hounslow;
- London Borough of Hillingdon;
- Spelthorne Borough Council;
- Slough Borough Council; and
- South Bucks District Council.

16.3.3 The HAL DCO Project has received a Scoping Opinion from PINS, which is a useful source of stakeholder feedback, and has been used to inform this Scoping Report.

16.3.4 Further formal and informal consultations will be arranged to discuss and agree the details of the methodology for the assessment of potential noise and vibration impacts arising from the Proposed Development.

16.4 Approach to Scoping

Study area

16.4.1 This section sets out how the study area will be defined for the consideration of potential noise effects at the assessment stage.

16.4.2 Where possible, the same approach has been used to define the study area for scoping, which has been used to enable the identification of noise receptors with the potential to be affected by the Proposed Development.

16.4.3 The study areas at the scoping stage have been based on the Proposed Development, as shown in **Figure 1.1**. As the design of the Proposed Development is still in its early development, the study areas currently defined will be kept under review as the design and consultation processes progress, and related topic assessment study areas are confirmed. Therefore, the study areas at the assessment stage may evolve as appropriate.

Construction assessment

16.4.4 The construction noise assessment study areas for the different sources of noise are defined as:

- Noise from construction sites – with reference to BS 5228:2009+A1:2014 predictions of construction noise at distances greater than 300m must be treated with caution due to the increasing importance of meteorological effects. For this reason, the study area has been restricted to 300m from any construction activity;
- Noise emissions from sources within the Heathrow Western Hub and associated development will have the greatest impact at receptors closest to Heathrow. The criteria for determining roads which are affected by the Proposed Development are detailed in Highways England's Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 7 (HD 213/11). Construction traffic on existing roads will be studied where the increase or decrease in road traffic volumes or traffic types caused by the construction of the DCO Project would be likely to cause a change in noise level (equivalent continuous sound level, LAeq, T) exceeding 1 dB during either the day (07:00 to 23:00 hours) or night time periods (23:00 to 07:00 hours); and
- Vibration from construction sites - up to 300m from any construction activity.

16.4.5 If significant effects are predicted to occur outside of the study areas defined above, it will be revised to ensure all areas are covered where exposure is predicted to exceed the relevant LOAEL (onset of adverse effects).

Operation assessment

16.4.6 The operation noise assessment study areas for the different sources of noise are defined as:

- Heathrow Western Hub and any permanent ancillary or associated development - up to 1km from any ground or airfield operations; and

- Noise emissions from sources from the Proposed Development will have the greatest impact at receptors closest to the Proposed Development. The criteria for determining roads which are affected by the Proposed Development are detailed in Highways England's Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 7 (HD 213/11). Operation traffic on existing roads will be studied where the increase or decrease in road traffic volumes or traffic types caused by the construction of the DCO Project would be likely to cause a change in noise level (equivalent continuous sound level, LAeq, T) exceeding 1 dB during either the day (07:00 to 23:00 hours) or night time periods (23:00 to 07:00 hours).

16.4.7 If significant effects are predicted to occur outside of the study areas defined above, it will be revised to ensure all areas are covered where exposure is predicted to exceed the relevant LOAEL (onset of adverse effects).

Sources of baseline data

16.4.8 Publicly available noise data sources will be used to support baseline survey data presented in the ES, these include:

- Noise Action Plan and Noise Action Plan Contours for Heathrow (2006 to 2016);
- Heathrow Fixed and Mobile Noise Monitoring data (2007 onwards);
- Heathrow WebTrak (2008 onwards);
- Heathrow Community Reports (2014 onwards);
- DEFRA England noise map (2012);
- Local authority monitoring data (where available); and
- Various noise survey reports for planning applications within the study area.

16.5 Baseline conditions

16.5.1 This section describes the existing baseline noise and vibration environment around Heathrow Airport.

16.5.2 Existing receptors in the study area are currently exposed to the following main sources of noise:

- Aircraft noise (including helicopters);
- Aircraft ground and airfield noise;
- Road traffic noise from the local road traffic network and wider motorway network;
- Railway noise; and
- Noise from industrial, leisure and commercial uses near Heathrow.

Baseline data collection

16.5.3 Baseline data will be collected at residential and non-residential sensitive receptor locations close to the Proposed Development site and will be used to inform the ES. The acoustic environment will be characterised during the noise monitoring through measurements of noise from specific sources, observations of relative contribution of noise sources and a

subjective commentary on the prevailing noise environment.

- 16.5.4 Agreement will be sought on the methodology of the noise surveys from the relevant Environmental Health representatives for the Local Authorities. Where applicable and where made available, information provided from the Noise Expert Review Group (NERG) with respect to the HAL DCO, will also be taken into account where relevant to the Proposed Development.
- 16.5.5 Where applicable, baseline data collected as part of the HAL DCO Project will be reviewed and used to inform the Proposed Development ES.

Existing operations at Heathrow Airport

- 16.5.6 A full description of the current operation at Heathrow Airport, including details of the surrounding area and existing infrastructure, is provided in **Chapter 2 ‘Description of Existing Site and Surroundings’**.
- 16.5.7 Current (2016) noise exposure data for Heathrow is published in ERCD report 1701: Heathrow Airport 2016 Summer Noise Contours and Noise Action Plan Contours, CAA (November 2017). This publication provides a full summary of the noise exposure statistics due to current operations.
- 16.5.8 Mitigation, in the form of noise barriers, bunds and an Operational Noise Management Plan, exists to reduce current impacts due to noise. Activities from aircraft on taxiways, runway hold and exit points, engine testing facilities and parking stands will contribute to the baseline noise level. Ground noise is likely to be noticeable at the airport boundary and in surrounding areas of Sipson, Harmondsworth, Harlington Cranford, Hatton, East Bedfont, West Bedfont, Stanwell, Stanwell Moor and Longford.
- 16.5.9 Major sources of road traffic noise include the M4 and M25 motorways, the A4 spurs, other major A-roads and many local roads. These road networks form the primary routes for airport traffic.
- 16.5.10 Heathrow Airport is currently served by an overground and underground railway system. Railway noise maps prepared by Defra for the Round 2 Noise Action Plan in 2011 indicate that rail noise is likely to be audible in communities proximate to the existing and operational: Piccadilly line, Heathrow Express and Southern and Western Rail access routes.

16.6 Scoping of Potential Effects

Effects scoped into the assessment

- 16.6.1 The potential likely significant effects to be scoped into the noise and vibration assessment are displayed in **Table 16.2**.

Table 16.2 Potential likely significant noise and vibration effects

Activity	Effect	Receptor
Construction		
Site construction	The proximity of likely sensitive receptors to the Proposed Development, allied to the scale and complexity of the works, means that there is potential for some disruption, albeit temporary, during the construction phase. This	<ul style="list-style-type: none"> • Residential receptors (individual dwellings). • Wider community, including: <ul style="list-style-type: none"> ○ external open spaces; and
Road		
Rail		

Activity	Effect	Receptor
	<p>conclusion would be reinforced should any night-working be required. The potential effects associated with the construction of the Proposed Development are likely to include:</p> <ul style="list-style-type: none"> • The generation of noise and vibration from on and off-site activities during the construction phase potentially causing a disturbance to proximate receptors; • An increase in noise and vibration emissions from road traffic and non-road mobile machinery (NRMM), which may potentially cause a disturbance to proximate sensitive receptors; <p>Potential road traffic vibration will also be assessed.</p>	<ul style="list-style-type: none"> ○ community facilities, such as places of worship, hospitals and schools. • Commercial properties, including: <ul style="list-style-type: none"> ○ Hotels; and ○ Offices.
Concurrent operations	<p>Project-wide combined effects, as well as cumulative effects with other developments will be assessed.</p> <p>For residential and non-residential receptors health outcomes assessed will include:</p> <ul style="list-style-type: none"> • Annoyance; • Sleep disturbance; and • Interruption to general function. 	
Operation		
Proposed Development, including stationary sources, associated ground aircraft operations and maintenance and supporting infrastructure	<p>The potential effects associated with the operation of the Proposed Development are likely to include:</p> <ul style="list-style-type: none"> • Operation noise, primarily including, but not limited to: <ul style="list-style-type: none"> ○ ground aircraft movements; ○ general airfield operations; ○ external static sound sources; ○ potential low frequency noise sources; and ○ maintenance of aircraft. • Short and long term changes to road and rail traffic on the surrounding existing network. <p>Potential road traffic vibration will be assessed.</p> <p>Potential rail-induced vibration will be assessed.</p> <p>Project-wide combined effects, as well as cumulative effects with other developments, including the Northwest Runway, will be assessed.</p>	<ul style="list-style-type: none"> • Residential receptors (individual dwellings). • Wider community, including: <ul style="list-style-type: none"> ○ external open spaces; and ○ community facilities, such as places of worship, hospitals and schools. • Commercial properties, including: <ul style="list-style-type: none"> ○ Hotels; and ○ Offices.

Activity	Effect	Receptor
	For residential and non-residential receptors health outcomes assessed (WebTAG approach) will include: <ul style="list-style-type: none"> • Annoyance; • Sleep disturbance; • AMI; • Hypertension; and • Interruption to general function. 	

Effects scoped out of the assessment

16.6.2 The effects proposed to be scoped out of the noise and vibration assessment are displayed in **Table 16.3**.

Table 16.3 Effects to be scoped out of the noise and vibration assessment

Activity	Effect	Receptor	Justification for scoping out
Operation			
Environmental noise induced hearing loss	Hearing loss	Human receptors	Hearing loss is associated with long-term exposure to very high noise levels, such as occupational and industrial noise exposures higher than 75-85 dBA or through exposure to an intense impulse sound, such as gunfire. Noise levels of this magnitude are likely only to be experienced within the apron of the airport.

16.7 Approach to Assessment

Study area

16.7.1 The proposed study areas for noise receptors are set out in **Section 16.4**. These will be refined at the assessment stage as the design and consultation processes progress, and as related topic assessments are progressed (e.g. Traffic and Transport).

16.7.2 The study areas for the assessment will be identified to ensure that the impact of the Proposed Development on noise can be fully assessed. A likely ZOI for potential cumulative air quality effects with other development will be defined separately as part of the CEA, as described in **Section 4.6 of Chapter 4 'Approach to EIA'**.

Assessment methodology

Construction phase

16.7.3 The following standards and guidance are relevant to the prediction and assessment of construction noise and will be implemented in the noise and vibration assessment:

- Construction activities within construction sites (direct effects):
 - British Standard (BS) 5228-1:2009+A1: 2014 Code of practice for noise and vibration control on construction and open sites: Part 1 – Noise (BS5228-1);

- BS 5228-2 Code of Practice for Noise and Vibration Control on Open Construction Sites – Part 2: Vibration;
- BS 6472-1 Guide to evaluation of human exposure to vibration in buildings: 1- Vibration sources other than blast-induced vibration; and
- BS 7385-2 Evaluation and measurement for vibration in buildings – Part 2: Guide to damage levels from ground-borne vibration.
- Construction traffic on existing roads and railways (indirect effects):
 - Calculation of Road Traffic Noise (CRTN), 1988; and
 - Calculation of Railway Noise (CRN), 1995.

16.7.4 Noise during site clearance, demolition and construction is assessed in accordance with Annex E ‘significance of noise effects’ of British Standard (BS) 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise.

16.7.5 Construction site noise is assessed differently to noise from permanent installations as it is recognised that some degree of noise is an inevitable by-product of required works and that the construction works are a transient activity.

16.7.6 Construction noise affecting existing receptors, as identified in **Table 16.4**, will be assessed using the guidance and datasets contained in BS 5228 and based on knowledge of similar projects. The noise calculations will be undertaken using the calculation methodology within BS 5228, taking into account the sound power levels of construction equipment, distance to receptors, screening from barriers or topography, ‘on-times’ of equipment and soft ground absorption. Predicted impacts will be assessed against the proposed limits provided in Annex E of the standard and reported within the ES alongside any mitigation measures.

16.7.7 **Table 16.4**, reproduced from ‘BS 5228:2009+A1:2014 Table E.1’, presents the criteria for selection of a noise limit for a specific receptor location.

Table 16.4 Construction noise threshold levels based on the ABC method (BS 5228)

Assessment category and threshold value period (L_{Aeq})	Threshold value, in decibels (dB)		
	Category A ^{A)}	Category B ^{B)}	Category C ^{C)}
Night time (23.00 – 07.00)	45	50	55
Evenings and weekends ^{D)}	55	60	65
Daytime (07.00 – 19.00) and Saturdays (07.00 – 13.00)	65	70	75
A) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.			
B) Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values.			
C) Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.			
D) 19.00–23.00 weekdays, 13.00–23.00 Saturdays and 07.00–23.00 Sundays.			

16.7.8 The ‘ABC method’ described in BS 5228 establishes that there is no impact below the three thresholds presented above.

- 16.7.9 For noise associated with the alteration of existing public roads or the construction of new public roads, the Noise Insulation Regulations 1975 (as amended 1988) contain the power to enable noise insulation to properties as a result of construction noise from highway schemes.
- 16.7.10 For noise associated with the alteration of existing public railway lines or the construction of new public railway lines, the Noise Insulation (Railway and Other Guided Transport Systems) Regulations 1996 contain the power to enable noise insulation to properties as a result of construction noise from railway schemes.
- 16.7.11 Vibration from construction sites at all identified vibration sensitive receptors within the study area will be predicted using empirical calculations to predict the period Peak Particle Velocity (PPV) according to the guidance in Transport Research Laboratory (TRL) Report 53 and TRL Report 429 and BS 5228-2.
- 16.7.12 The assessment of potential damage to buildings will be undertaken by predicting the external PPV values at vibration sensitive receptors and comparing to the thresholds for the onset of building damage set out in BS7385-2.
- 16.7.13 For the assessment of potential effects in the form of annoyance and disturbance to occupants of buildings, predicted PPV values will be converted to a period Vibration Dose Value (VDV) inside vibration sensitive receptors, using empirical calculations, and will be compared to the VDV thresholds for the onset of human annoyance and disturbance from vibration set out in BS6472-1.
- 16.7.14 A qualitative appraisal of potential impacts of construction site vibration at vibration sensitive non-residential receptors will be undertaken on a precautionary basis. Where the predicted levels, taking account of mitigation, exceed the screening criteria then a receptor specific assessment will be undertaken and reported in the ES.

Operation phase

- 16.7.15 This section sets out the methodologies that will be employed to predict levels of noise and vibration during the operational phase of the Proposed Development for the following sources:
- Proposed Development, including stationary sources, associated ground aircraft operations and maintenance and supporting infrastructure;
 - Road traffic noise;
 - Rail noise; and
 - Rail vibration.

Ground aircraft noise

16.7.16 No current standards or guidance are available for specifically aircraft ground noise.

16.7.17 Annex II of the Environmental Noise Directive states that:

“...the noise produced during aircraft ground operations may be considered to be transport infrastructure and that the attenuation due to atmospheric absorption may be predicted using ISO 9613-2: 1996 Acoustics – Attenuation of sound during propagation outdoors – Part 2: general Method of Calculation (ISO 9613-2).”

16.7.18 The SoundPLAN noise modelling package will be used to predict aircraft ground noise using

information regarding the aircraft and operation parameters to predict noise at surrounding noise sensitive receptors using ISO 9613-2.

16.7.19 Source noise levels for aircraft will be established from:

- Data describing noise levels of aircraft;
- Directivity patterns relating to aircraft noise emissions; and
- Data describing the spectral content of aircraft noise emissions.

16.7.20 From the above data sources, the SoundPLAN noise modelling package will be used to predict aircraft ground noise at surrounding noise sensitive receptors.

16.7.21 Modelling will predict the daytime $L_{Aeq,16hr}$ and night time $L_{Aeq,8hr}$ noise metrics as noise contours for the various baseline and assessment years. Predicted ground noise will be combined, as necessary, with aircraft noise in the vicinity of Heathrow Airport, to establish operation impact.

Maintenance and supporting infrastructure

16.7.22 With the nature of the noise associated with the Proposed Development being broadly similar in character to the existing noise environment, the change in noise level resulting from the development will be a factor in determining the potential adverse effect of operation noise. The baseline L_{Aeq} levels before the Proposed Development will be compared to the levels predicted with the Proposed Development in operation, for daytime, evening and night periods, in the relevant assessment years. Tables shown in Chapter 7 of the IEMA guidance will be considered as relevant but further justification will be given within the ES as to why such criteria are used.

16.7.23 The operational phase would require a noise assessment based on the guidance contained within BS 4142:2014 Methods for rating and assessing industrial and commercial sound. This requires the existing noise levels at nearby noise sensitive properties to be established through a baseline noise survey and the impact of the Proposed Development to be referenced against these existing levels in the relevant assessment years. Advice will be provided on the level of noise emission that is acceptable from the site, with reference to the baseline situation, within the ES.

Road traffic noise and vibration

16.7.24 T The assessment of traffic noise and vibration will be undertaken in accordance with DMRB HD 213/11 – Revision 1. All road traffic noise predictions will be undertaken in accordance with the calculation methodology presented in the former Department of Transport/Welsh Office technical memorandum Calculation of Road Traffic Noise (CRTN).

16.7.25 Upon receipt of appropriate traffic flow information, it is proposed that a Detailed Level assessment will be undertaken in accordance with guidance contained with HD 213/11.

16.7.26 Consideration will be given to both the “short-term” and “long-term” effects, which are defined as those occurring during the year of opening (short-term) and between the year of opening and the worst case year within 15 years of the year of opening (long-term), which is typically the 15th year. Each relevant assessment year will be considered.

16.7.27 The assessment includes a requirement to determine the change in road traffic noise level at each dwelling (and other sensitive receptors) within the study area. A computerised 3D road

traffic noise model will be used to facilitate the assessment.

16.7.28 In addition to the above requirements of the DMRB, an analysis of SOAEL will be undertaken in accordance with the NPSE and referenced in ProPG: Planning and Noise (May 2017). Where a receptor is exposed to SOAEL and experiences an increase in noise levels of ≥ 1 dB $L_{A10,18hr}$ as a result of the Proposed Development (in the short or long term), a significant effect in terms of EIA is deemed to have occurred.

16.7.29 As set out in HD 213/11, a link has been identified between noise impacts and effects on both mental and physiological health. Further research is required to define exposure parameters for a quantitative analysis of such symptoms. Therefore, this assessment will consider noise levels with respect to the Noise Policy Statement for England and in particular its first aim, which is to:

"...avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development".

16.7.30 The measurement of SOAEL takes into account of the health effects of noise. Where noise exceeds the SOAEL due consideration will be given to measures that might be adopted to limit the number of locations so affected and minimise the road traffic noise levels at these locations. The assessment will also consider the noise index for night time noise, which is recognised by the World Health Organisation (WHO) as an indicator of impact from night time noise on health.

16.7.31 Where human health effects are identified in this and any other topic, whether significant or not, these effects will be incorporated into the cumulative effects assessment of human health.

Rail noise

16.7.32 Noise associated with railways is predicted in accordance with the Department of Transport technical memorandum 'Calculation of Railway Noise' (CRN). This document published in 1995 provides a standardised approach to noise assessments undertaken in connection with the Noise Insulation (Railways and Other Guided Transport Systems) Regulations 1996. The Regulations provide criteria for overall noise levels, the contribution from movements on the new or altered railway and a distance cut off of 300m.

16.7.33 For the assessment of potential rail noise effects, the SoundPLAN model will be used to predict the daytime $L_{Aeq,16hr}$ and night time $L_{Aeq,8hr}$ noise parameters.

Rail vibration

16.7.34 The ground-borne noise and vibration potentially generated by rail operations associated with the Proposed Development will be calculated using empirical calculations. A method is fully consistent with ISO 14837-1103, and takes account of all key parameters, including train design, train speed, track design, tunnel design, tunnel depth, ground conditions, receiving building foundations and receiving building type.

16.7.35 The train vibration calculations will be used to predict the VDV and maximum internal groundborne noise level (L_{ASMax}) at vibration sensitive properties within the study area.

Identification of effects

16.7.36 The assessment will identify the best available evidence Exposure Response Functions (ERF)

to be used in the assessment for each health and quality of life outcome. ERF are available for a range of standard noise parameters, for example $L_{Aeq, 16hr}$, $L_{Aeq, 8hr}$ or L_{den} for various health and quality of life consequences.

16.7.37 The ES will consider likely significant effects evaluated using LOAEL and SOAEL values for noise sources, in line with policy requirements identified in **Table 16.3**. Where the predicted noise or vibration exceeds the relevant SOAEL value for the noise source as a result of the Proposed Development, then the assessment will identify a significant adverse effect on health and quality of life at each receptor. In line with best practice, the assessment will also identify likely significant adverse or beneficial effects in respect of the Town and Country Planning (Environmental Impact Assessment) 2017 (EIA regulations) on both individual receptors and on an area basis due to increases or decreases in noise exposure in situations where the predicted noise or vibration is above the relevant LOAEL value.

Assessment scenarios

16.7.38 The Proposed Development will be implemented across an anticipated timeframe of 2021 – 2035. The noise and vibration assessment will consider a number of different assessment scenarios which will consider the construction and operational phases, and the activities which would give rise to the most significant effects.

16.7.39 In response to this requirement, the proposed assessment years are as follows:

- 2013 baseline (based on guidance provided in Paragraph 5.58 of the ANPS which requires noise mitigation measures which “should ensure the impact of aircraft noise is limited and, where possible, reduced compared to the 2013 baseline assessed by the Airports Commission”);
- Current baseline (2019);
- Future baseline to allow assessment of do minimum and do something scenarios;
- Release of first phase of increased airspace capacity following opening of new runway;
- Year of maximum environmental effects from the construction phase;
- Year of opening;
- Year of maximum environmental effects from the operation phase; and
- Year of maximum operation airspace capacity associated with the Proposed Development.

Cumulative effects

16.7.40 Cumulative noise and vibration effects resulting from the combination of effects from the Proposed Development and other developments will be assessed in accordance with the guidance and methodologies set out in **Section 4.6 of Chapter 4 ‘Approach to EIA’**. The assessment will be dependent on the availability and accessibility of information for other developments.

16.7.41 The Proposed Development does not include the new Northwest Runway and M25 realignment components of the NRS proposed by HAL. However, the Proposed Development is designed to be operated alongside these components of the NRS that are being progressed by the HAL DCO Project. Therefore, the total cumulative noise effects will be considered together to ensure an overarching assessment of the NRS as a whole.

16.7.42 Any components of the HAL DCO Project which would no longer be required as a result of the Proposed Development would not be included in the CEA.

16.8 Approach to Mitigation

16.8.1 Minimisation of noise and vibration effects will be embedded into the design of the Proposed Development where possible following the application of the hierarchy of mitigation as described in **Chapter 4 ‘Approach to EIA’**. The assessment of impacts will be made with these embedded mitigation measures in place.

16.8.2 The type and level of mitigation measures required will be informed by the expected level of impact. The ANPS lists a number of mitigation measures relevant to the construction and operational phases which could be put forward to minimise impacts associated with the Proposed Development. Mitigation identified by the ANPS that is relevant to the noise and vibration assessment includes:

- Reducing noise at point of generation and containment of noise generated;
- Where possible, optimising the distance between source and noise-sensitive receptors, and incorporating good design to minimise noise transmission through screening by natural barriers or other buildings; and
- Restricting activities allowed on the site.

16.8.3 The Applicant will ensure that the most appropriate and effective measures are taken forward in consultation with local communities and other stakeholders.

16.9 Summary

16.9.1 The proposed scope of the noise and vibration assessment is summarised below in **Table 16.5** below.

Table 16.5 Summary of the scope of the noise assessment

Potential impacts	Construction	Operation
Noise affecting human and ecological receptors	✓	✓
Vibration affecting human and ecological receptors	✓	✓
Cumulative impacts	✓	✓

Scoped in (✓) and scoped out (✗)

16.9.2 Production of the ES chapter will be undertaken in consultation with all relevant stakeholders, including topic expert panel meetings, as appropriate. Similarly, the requirements of the ANPS will be at the forefront; principally that the Proposed Development design will aim to avoid significant adverse impacts on health and quality of life, mitigate and minimise adverse impacts on health and quality of life and, where possible, contribute to the improvement of health and quality of life.

16.10 References

- BSI (2003). British Standards Institution [BS] 7445-1:2003 - Description and measurement of environmental noise. Guide to quantities and procedures. BSI, London.
- BSI (2003). British Standards Institution [BS] EN 61672-1:2003 Electroacoustics. Sound level meters. Specifications. BSI, London.
- BSI (2008). British Standards Institution [BS] 6472-1:2008 Guide to evaluation of human exposure to vibration in buildings. Part 1: Vibration sources other than blasting, BSI, London.
- BSI (2014). British Standards Institution [BS] 5228-1:2009+A1:2014 “Code of practice for noise and vibration control on construction and open sites – Part 1: Noise”.
- BSI (2014). British Standards Institution [BS] 5228-2: 2009+A1:2014 “Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration”.
- BSI (2014). British Standards Institution [BS] 4142:2014 Methods for rating and assessing industrial and commercial sound, BSI, London.
- Department of Transport, Welsh Office (1988). Calculation of Road Traffic Noise HMSO, London.
- Environmental Protection Act 1990. HMSO, London.
- Highways Agency (2011). Design Manual for Roads and Bridges, Volume 11, Section 3, Part 7: Noise and Vibration. The Highways Agency.
- Hiller. DM and Crabb GI (2000). Ground borne vibrations caused by mechanised construction works. Highways Agency, Transport Research Laboratory, TRL report 429.
- International Organization for Standardization (1996). ISO9613-2:1996 Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation. ISO, Switzerland.
- International Organization for Standardization (2010). ISO 3744:2010 Acoustics –Determination of sound power levels and sound energy levels of noise sources using sound pressure -- Engineering methods for an essentially free field over a reflecting plane. ISO, Switzerland.
- Rockhill D.J, Bolton M.D and White D.J (2014). Ground-borne vibrations due to press-in piling operations. Cambridge University Engineering Department.
- Transport Research Laboratory (2000). Hiller D.M and Crabb G.I Groundborne vibration caused by mechanised construction works. TRL Report 429. Wokingham:TRL,2000.
- Watts, GR (1990). Traffic induced vibrations in building. Department for Transport, Transport and Road Research Laboratory Research Report (TRRL), Research Report 246.
- World Health Organization (2009). Night Noise Guidelines for Europe; available at URL: http://www.euro.who.int/__data/assets/pdf_file/0017/43316/E92845.pdf

17 Traffic and Transport

17.1 Introduction

17.1.1 This chapter details the proposed scope of the assessment of potential impacts arising from the Proposed Development on traffic and transport. The chapter considers impacts associated with the construction and operational phases.

17.1.2 This chapter includes:

- A description of key policy and legislation with relevance to traffic and transport;
- A summary of ongoing and planned stakeholder engagement;
- An overview of the approach that has been adopted to inform this Scoping Report;
- A concise summary of the baseline traffic and transport;
- A description of the potential likely significant effects of the Proposed Development on traffic and transport, to be included in the scope of the assessment;
- A summary of any potential effects that are proposed to be scoped out of the assessment;
- A proposed approach to the EIA and the CEA with regards to traffic and transport;
- An overview of the proposed approach to mitigation; and
- A summary of the Scoping Report chapter including a summary of impacts table.

17.1.3 This chapter covers all modes of surface transport using the public highway and public transport networks, including:

- Private vehicle movements (including freight);
- Construction movements;
- Private hire and taxis;
- Public buses;
- Coaches;
- Rail; and
- Walking and cycling adjacent to the public highway only.

17.1.4 The assessment will consider all users of the highway and public transport networks across these modes, regardless of their trip purpose.

17.1.5 Use of off-road footpaths and cycle routes is not considered within this chapter and is instead covered in **Chapter 5 'Community'**.

17.1.6 The Proposed Development is a component of the Government's preferred NRS as set out in the ANPS. It does not include the Northwest Runway itself, or the major M25 realignment works required to accommodate the Northwest Runway. Therefore, potential traffic and transport effects associated with these components of the NRS are excluded from the scope of the primary assessment. Potential traffic and transport effects associated with the Northwest Runway and M25 realignment works will however be considered as part of the

CEA, as set out in **Section 4.6** of **Chapter 4 ‘Approach to EIA’**.

17.2 Wider Assessment of Traffic and Transport

17.2.1 Traffic and Transport are fundamental topics for the Proposed Development, and are to be addressed through a portfolio of technical work. This includes:

- This EIA Scoping Report chapter;
- A Traffic and Transport ES chapter;
- A Transport Assessment (TA);
- Surface access transport modelling;
- The development of a Surface Access Study (incorporating a Pre-Appraisal Transport Study); and
- A Surface Access Strategy (SAS).

17.2.2 A Surface Access Study (the ‘SAS’) is being progressed for the Proposed Development. The SAS is being progressed in line with the Government’s Transport Analysis Guidance (WebTAG) procedures in a staged approach. The SAS identifies existing and future travel patterns that could affect the Proposed Development, such as potential changes to the transport and policy networks and will provide the basis to inform a subsequent SAS.

17.2.3 The purpose of the SAS is to gather information and existing publicly-available data of the travel patterns and transport infrastructure in the assumed study area, to analyse existing transport movements. The SAS has informed the proposed approach to assessment set out in this chapter of the Scoping Report as such, salient sections of the SAS are provided in **‘Appendix 17.1’**.

17.2.4 Heathrow Airport Transport Forum have been consulted, as requested by the ANPS, during the development of the Pre-Appraisal Transport Study. Consultee responses are summarised in **Section 17.5**.

17.2.5 The SAS will be informed by the Strategic Digital Transport Baseline (SDTB). The SDTB was built in the Cube Voyager software to process and present area-wide travel patterns. Cube is an international transportation modelling suite of tools, which also covers all aspects related to transportation planning, engineering, and land-use. With an open platform, Cube allows the building, calibration and testing of transport baselines of any type. Full details of the modelling applications for the Proposed Development are contained within **Appendix 17.1**. The modelling suite will be used to inform the development of the SAS, TA, Traffic and Transport ES chapter and air quality and noise and vibration assessments as part of the EIA.

17.2.6 A TA will be prepared in unison with local guidance and policy but separately to the Traffic and Transport ES chapter. The TA will be undertaken to assess how the Proposed Development impacts the operation of the surface access network. Both operation and construction impacts of the Proposed Development will be assessed, the outputs of which, will be used to inform the assessment of effects.

17.2.7 The TA will be established in light of stakeholder consultation and guidance. Although separate to the Traffic and Transport ES chapter, the TA will share the same technical base including baseline and modelling data, but with differing objectives and outcomes.

Furthermore, the scope of the TA is not outlined in this Scoping Report.

17.3 Traffic and Transport in EIA

17.3.1 The Traffic and Transport ES chapter considers the following effects relevant in assessing the potential traffic effects of the Proposed Development on receptors:

- Highway network delay;
- Driver stress and view from the road;
- Pedestrian and cyclist delay and amenity;
- Severance;
- Public transport amenity;
- Road safety; and
- Hazardous loads.

17.3.2 Potential effects outlined in paragraph 17.3.1 reflect the requirements of the EIA Regulations. The requirements state that the EIA is required to assess the effects on factors such as the human population.

Table 17.1 Transport effects for the Proposed Development

Effect	Assessed for the Proposed Development	Cumulative Effect
Highway network delay	Yes	Yes
Driver stress and view from the road	Yes	Yes
Pedestrian and cyclist delay	Yes	Yes
Pedestrian and cyclist amenity	Yes	Yes
Severance	Yes	Yes
Public transport amenity	Yes	Yes
Road safety	Yes	Yes
Hazardous loads	Yes	No

17.3.3 Hazardous loads will not be assessed as a cumulative effect as the risk is managed by safe working practices and preventative, protective measures and health and safety legislation.

17.3.4 Data derived from the Traffic and Transport ES chapter will also be utilised to inform the Proposed Development's Noise and Vibration, Air Quality and Populations (including health, community, economics and employment) assessments.

17.4 Policy and Legislation

17.4.1 **Table 17.2** provides a summary of the key topic specific policy and legislation which has informed the scope of the assessment. Further information on policies relevant to the EIA and their status is set out in **Chapter I 'Introduction'**. Due regard will also be given to local policies and the Government's 25 Year Environment Plan where they are relevant.

17.4.2 These documents are proposed to form the framework for detailed assessment post-scoping

and will be taken into account in the assessment of potential traffic and transport impacts during PEI and ES stages, with the relevant criteria followed throughout.

Table 17.2: Policy and Legislation Relevant to the Traffic and Transport Assessment

Policy and Legislation	Relevance to assessment
Policy	
Airports National Policy Statement (ANPS) (2018)	<p>The ANPS sets out the Government’s planning policies for the development consent application associated with a Northwest Runway at Heathrow Airport.</p> <p>Paragraphs 5.5 to 5.22 (‘surface access’) state that a SAS is required alongside the submission of a DCO application.</p> <p>Paragraph 5.10 specifies that WebTAG methodology should be used when assessing the implications of airport expansion on surface access network capacity. The role of the TA and EIA are considered as follows: a TA will evaluate the effectiveness of a SAS on minimising the effects on the surface access network. An EIA will consider environmental effects.</p> <p>The ANPS contains specific information regarding rail improvements which will support a new NRS at the Heathrow Airport including; Crossrail, a Western Rail Link to Heathrow Airport and Southern Rail Access to Heathrow Airport (Heathrow Southern Railway).</p> <p>The assessment will also take into consideration the following statements taken from the ANPS:</p> <p>Paragraph 4.7: <i>“Where the applicant’s proposals in relation to surface access meet the thresholds to qualify as nationally significant infrastructure projects under the Planning Act 2008, or is associated development under section 115 of the Planning Act 2008, the Secretary of State would consider those aspects by reference to both the NN NPS and the ANPS, as appropriate.”</i></p> <p>Paragraph 4.8: <i>“The Secretary of State will consider any relevant nationally significant road and rail elements of the applicant’s proposals in accordance with the NN NPS and with the ANPS. If there is conflict between the Airports NPS and other NPSs, the conflict should be resolved in favour of the NPS that has been most recently designated.”</i></p> <p>Paragraph 5.9: <i>“The airport surface access strategy must contain specific targets for maximising the proportion of journeys made to the airport by public transport, cycling or walking. The strategy should also contain actions, policies and defined performance indicators for delivering against targets, and should include a mechanism whereby the Airport Transport Forum can oversee implementation of the strategy and monitor progress against targets alongside the implementation and operation of the preferred scheme.”</i></p> <p>Paragraph 5.10: <i>“The applicant should consult Highways England, Network Rail and highway and transport authorities, as appropriate, on the assessment and proposed mitigation measures. The assessment should distinguish between the construction and operational project stages for the development comprised in the application.”</i></p> <p>Paragraph 5.11: <i>“The applicant should also consult with Highways England, Network Rail and relevant highway and transport authorities, and transport operators, to understand the target</i></p>

Policy and Legislation	Relevance to assessment
	<p><i>completion dates of any third party or external schemes included in existing rail, road or other transport investment plans.”</i></p> <p>Paragraph 5.13: <i>“For schemes and related surface access proposals or other works impacting on the strategic road network, the applicant should have regard to DfT Circular 02/2013, The Strategic Road Network and the delivery of sustainable development (or prevailing policy), and the National Networks NPS.”</i></p> <p>Paragraph 5.14: <i>“The surface access systems and proposed airport infrastructure may have the potential to result in severance in some locations. Where appropriate, the applicant should seek to deliver improvements or mitigation measures that reduce community severance and improve accessibility.”</i></p> <p>Paragraph 5.17: <i>“Must include details of how the applicant would increase the proportion of journeys made to the airport by public transport, cycling and walking to achieve a public transport mode share of at least 50% by 2030, and at least 55% by 2040 for passengers as well as a 25% reduction of all staff car trips by 2030, and a reduction of 50% by 2040 from a 2013 baseline.”</i></p>
<p>National Policy Statement for National Networks (NPS NN) (2014)</p>	<p>The NN NPS sets out the Government’s approach to delivering infrastructure which is of national significance to road and rail networks throughout the UK.</p> <p>Paragraphs 5.203 to 5.205 outline the requirement for assessments to refer to local policies and undertake consultation with relevant highway and planning authorities. In doing so, assessments will then be required to consider opportunities to support alternative modes of transport and consider the effects upon the transport network.</p> <p>Paragraphs 5.206 to 5.207 refer to the role of the Environmental Statement (ES) to identify and mitigate significant environmental changes and effects to the transport network. For strategic rail freight developments, WebTAG methodology should be used.</p> <p>Paragraph 5.209: <i>“For schemes impacting on the Strategic Road Network, applicants should have regard to DfT Circular 02/2013 The Strategic Road Network and the delivery of sustainable development (or prevailing policy) which sets out the way in which the highway authority for the Strategic Road Network, will engage with communities and the development industry to deliver sustainable development and, thus, economic growth, whilst safeguarding the primary function and purpose of the Strategic Road Network.”</i></p>
<p>The London Plan – The Spatial Development Strategy for London Consolidated with Alterations Since 2011</p>	<p>The London Plan (The Spatial Development Strategy for London Consolidated with Alterations Since 2011) is the current adopted Development Plan.</p> <p>Policy 6.6 (Aviation) sets out policies for London relating to airport expansion.</p> <p>The policy is subdivided into sections. Section A states that <i>“adequate airport capacity serving a wide range of destinations is critical to the competitive position of London in a global economy.”</i></p>

Policy and Legislation	Relevance to assessment
	<p>Section B states that The Mayor ‘strongly opposes any further expansion at Heathrow involving an increase in the number of aircraft movements’ but ‘supports improvements of the facilities for passengers at Heathrow and other London airports’ for example through providing “attractive public transport options”.</p> <p>Section C details the requirement for airport operators to “increase the share of access journeys by passengers and staff made by sustainable means, minimise the impacts of airport servicing and onward freight transport, and take full account of environmental impacts when making decisions on patterns of aircraft operation.”</p> <p>Planning decisions are referenced in section D whereby development proposals should “give a high priority to sustainability and take full account of environmental impacts” and “promote access to airports by travellers and staff by sustainable means, particularly by public transport”.</p> <p>In addition to the subdivided sections of the policy, paragraphs 6.28 and 6.29 set out the Government’s views on the proposed Heathrow Airport expansion.</p> <p>Paragraph 6.28 states that the Mayor notes a “need for thorough reappraisal of airport policy in the south east of England”. It is also noted that “development proposals which affect airport operations (particularly those involving an increase in the number of air traffic movements) should be carefully scrutinised, and particular attention should be given to environmental impacts”.</p> <p>Paragraph 6.29 references the Davies Commission, a Government established independent Commission put in place to identify and recommend options for “maintaining the south east’s status as an international hub for aviation”. In doing so, the Commission was tasked to examine how the requirement for additional capacity could be met in the short, medium and long term. It is also stated that “wherever runway capacity is located, the Mayor strongly supports efforts to make aviation less environmentally harmful, and the promotion of more environmentally sustainable means of accessing airports through ensuring viable and attractive public transport alternatives”. It is noted that “the provision of additional public transport capacity to serve the airports should not be to the detriment of non-airport passengers”.</p>
The Mayor’s Transport Strategy	<p>This document, sets out details on how The Mayor of London aims to change the transport mix across London.</p> <p>Policy 22: <i>“The Mayor will continue to oppose expansion of Heathrow airport unless it can be shown that no new noise or air quality harm would result and the benefits of future regulatory and technology improvements would be fairly shared with affected communities. Any such expansion must also demonstrate how the surface access networks will be invested in to accommodate the resultant additional demand alongside background growth.”</i></p> <p>Proposal I01: <i>“The Mayor will: Work with industry partners and stakeholders to assess options for surface access to Heathrow, and seek a commitment from Government to fund and deliver within an appropriate timescale the extensive transport measures required to support the expansion of Heathrow.”</i></p>

17.5 Stakeholder Consultation

17.5.1 A detailed stakeholder engagement plan is currently being developed. Care will be taken to ensure all key stakeholders with views and concerns regarding traffic and transport are provided with sufficient information on the Proposed Development to discuss and agree the details of the assessment in a meaningful and inclusive manner.

17.5.2 The stakeholders listed below were contacted in November 2018 to make them aware of the Proposed Development and the emergence of the SAS. The following stakeholders were provided with a presentation showing an overview of the Proposed Development and inviting initial comments on the SAS and the scope of the wider assessment for traffic and transport, which has also been used to inform this Scoping Report:

- Network Rail;
- Transport for London (TfL);
- Heathrow Area Transport Forum;
- London Borough of Hillingdon;
- London Borough of Hounslow;
- Highways England;
- Southwestern Railway;
- Heathrow Express;
- NCP; and
- Purple Parking.

17.5.3 A summary of responses received from the above stakeholders is outlined in **Table 17.3**.

Table 17.3: Summary of Key Stakeholder Responses on the Proposed Development (January 2019)

Consultee	Summary of responses
Transport for London	<p>Date of response: 8th November 2018</p> <ul style="list-style-type: none"> • The Mayor’s Transport Strategy (MTS) considers the expansion of Heathrow to be unacceptable due to the increased levels of traffic and resulting air quality issues, exposing nearby residents to ‘unacceptable’ levels of air quality unless otherwise shown. • Any such expansion must also demonstrate how the surface access networks will be invested in to accommodate the resultant additional demand alongside background growth. • MTS requires any Heathrow Airport expansion proposals to include significant investment in rail infrastructure, including a western rail link to Heathrow and a southern rail link to Heathrow. • Improvement of surface links to London’s airports, with airport operators contributing a fair share of the funding required, will be promoted by the Mayor. • On the TfL’s Response to CAA Economic Regulation Consultation, TfL seeks that the CAA ensure that the airport contributes its fair share towards new surface accesses. • On the TfL’s response to Second CAA Economic Regulation Consultation, TfL outlines their concerns with regards to the funding of the required surface access improvements associated with the Heathrow expansion. In particular, TfL do not agree with the contribution that Heathrow Airport Limited would be required to make.

Consultee	Summary of responses
	<ul style="list-style-type: none"> • TfL's requirements for surface access if the expansion were allowed are: <ul style="list-style-type: none"> ○ No increase in highway traffic – including passengers, staff and freight. ○ No worsening of air quality or exceedance of legal limits. If the above are to be prevented, TfL suggests that a road user charging scheme will be required at Heathrow Airport. ○ An attractive public transport offer (including connectivity, capacity and fares) able to drive sufficient mode shift. ○ Sufficient public transport capacity to accommodate increased airport demand alongside non-airport background flows. • On TfL response to National Policy Statement on Heathrow Expansion, TfL outlines its concerns on how demand from an expanded Heathrow can be accommodated on already congested surface access networks, or how significant mode shift away from car/taxi can be achieved. • TfL have considerable concern about the costs of the scheme and in particular the surface access costs. • TfL has also produced the Heathrow third runway: Surface access analysis Technical Note, which has assessed the impact of the proposed expansion on the local transport network.
London Borough of Hounslow	<p>Date of response: 8th November 2018</p> <ul style="list-style-type: none"> • Existing poor permeability at the Airport and the inhospitable environment for pedestrians and cyclists. • The expansion of Heathrow Airport is likely to bring more surface traffic to the major road network. LBH will contribute ideas to mitigate the impact. • There is a need to provide better rail and tube services to improve passenger access to Heathrow Airport. • To accommodate the increase in public transport trips, a number of potential infrastructure improvements associated with Heathrow Airport, both in the short and long term have been identified along with a list of potential funding sources. • The key infrastructure improvements are the proposed Southern Rail Access and the Southern Road Tunnel. In particular, the Southern Rail Access would provide a key component for achieving the commitment made by Heathrow Airport, for the expansion to result in no new highway trips.
Highways England	<p>Date of response: 5th December 2018</p> <ul style="list-style-type: none"> • Prior to any submission of development proposals to the Planning Inspectorate, Highways England must be satisfied that the impact of the development on the Strategic Road Network (SRN) has been robustly understood. • An assessment of transport related impacts of the proposal must be carried out and reported as described in the Department for Transport 'Guidance on Transport Assessment' (GTA). • Highways England would expect to agree with the Applicant which junctions require individual capacity assessments, and any consequential mitigation activities proposed. • Highways England will require a complete understanding of proposed changes to the SRN that both enable the construction of a new runway and mitigate the impacts of the proposals on the SRN ahead of any DCO submission. • Environmental impact arising from any disruption during construction, traffic volume, composition or routing change and transport infrastructure modification should be fully assessed and reported to relevant parties. • Highways England expects to be consulted on the scope of the schemes Environmental Impact Assessment in 2019.

Consultee	Summary of responses
	<ul style="list-style-type: none"> • DfT Circular 02/2013: The strategic road network and the delivery of sustainable development (“The Circular”) sets out the policy tests that scheme promoters will need to satisfy in order to demonstrate that a proposal is acceptable to Highways England. • The applicant shall confirm both how the runway is to be constructed crossing the M25, and the impact of the proposed terminals and their access arrangements on both, the design and capacity of existing and proposed access routes. • Highways England supports pre-application discussions on the content of the EIA Scoping and Stage 1 Transport Consultations as proposed to be carried out in 2019. • Highways England would wish to understand the implications of separate terminal ownership on the sustainability of the airport and its resilience during periods of disruption, with particular reference to SRN operation. • Highways England’s traffic flow data for the SRN can be accessed via Highways England’s WebTRIS platform. • Highways England is planning and currently undertaking a number of schemes in the area such as: <ul style="list-style-type: none"> ○ M4 junctions 3-12 ○ M25 junctions 10-16 ○ M25 junction 10/A3 Wisley Interchange • Details of the above schemes are available from the Highways England website and delivery timescales contained within Highways England’s Delivery Plan 2018/19. Also, the applicant’s proposals shall consider alignment with these schemes.
Heathrow Express	<p>Date of response: 16th November 2018</p> <ul style="list-style-type: none"> • Alongside the committed rail improvements, Heathrow Airport Limited (HAL) have indicated an ambition to provide additional rail improvements such as optimisation of the Elizabeth Line, support on the delivery of a new Western Rail Link, and Southern Rail Link, although HAL do not consider this necessary for achieving their mode split targets and improvement of Hatton Cross Station. • HAL have committed to aiming to reduce existing points of congestion in conjunction with any changes to the road network required in association with the airport expansion. These include changes to the M25, local roads and a potential Southern Access Tunnel and associated changes to Southern Perimeter Road. • HAL has the ambition to grow the coach network through strengthening existing routes, potential new routes from the south coast, M40 corridor and North West London and expanding the role of Heathrow Coach Hub further. • In order to enhance the transport offering to local communities, HAL is seeking to enhance existing bus services, work with local operators to establish new bus routes, deliver bus priority measures and upgrade walking and cycling facilities. • HAL seeks to advocate measures to make public transport easier for passengers and staff through: <ul style="list-style-type: none"> ○ Building on the success of the Free Travel Zone ○ Make travel by public transport as affordable as possible ○ Encourage airlines and operators to offer seamless and easy ticketing ○ Aligning public transport connectivity with airport operating hours ○ Efficient use of taxis ○ Reducing emissions through vehicle charging ○ Consolidation and prioritisation of parking ○ Measures to influence freight vehicles and delivery behaviour • Encourage a behavioural change in journeys to work through a series of measures such as personalised travel planning for colleagues, support discounted colleague public transport travel, reduction and prioritisation of colleague parking and promotion of a culture of active travel.

17.5.4 Further formal and informal consultations and meetings are ongoing to discuss and agree the details of the methodology for the assessment of traffic and transport for the Proposed Development.

17.6 Approach to Scoping

Study area

17.6.1 This section sets out how the study area will be defined for the consideration of potential traffic and transport effects at the assessment stage.

17.6.2 Where possible, the same approach has been used to define the study area for scoping (see **Figure 17.1**), which has been used to enable the identification of traffic and transport receptors with the potential to be affected by the Proposed Development.

17.6.3 The study areas at the scoping stage have been based on the Proposed Development, as shown in **Figure 1.1**. As the design of the Proposed Development is still in its early development, the study areas currently defined will be kept under review as the design and consultation processes progress, and related topic assessment study areas are confirmed. Therefore, the study areas at the assessment stage may evolve as appropriate.

17.6.4 The study areas used in other EIA topics are of relevance and will be used throughout the assessment to inform the likelihood of effects on traffic and transport. For example, **Chapter 1 'Air Quality'** and **Chapter 12 'Noise and Vibration'** respectively, set out the thresholds to be incorporated into the highway study area and should be read in conjunction with this chapter of the EIA Scoping Report.

17.6.5 The study areas for traffic and transport are based on the transport modes under consideration. There are differing scales of study area for the following mode groups:

- Road based and public transport; and
- Non-motorised users (NMU).

Road based and public transport

17.6.6 The analysis will follow the relevant Design Manual for Roads and Bridges (DMRB) (Highways England, 1992) guidance and Guidelines for the Environmental Assessment of Road Traffic (GEART) (Highways England, 1993) procedures.

17.6.7 GEART suggests the application of the following rules to define the extent and scale of the assessment required:

- Rule One – Include highway links where traffic flows are predicted to increase by more than 30% (or where the number of Heavy Good Vehicles (HGVs) is predicted to increase by more than 30%); and
- Rule Two – Include any other specifically sensitive areas where traffic flows (or HGV component) are predicted to increase by 10% or more.

17.6.8 In justifying these rules, GEART examines the science of traffic forecasting and states:

“It is generally accepted that accuracies greater than 10% are not achievable. It should also be noted that the day to day variation of traffic on a road is frequently at least some

+ or -10%. At a basic level, it should therefore be assumed that projected changes in traffic of less than 10% create no discernible environmental impact.

...a 30% change in traffic flow represents a reasonable threshold for including a highway link within the assessment.”

- 17.6.9 Locations which are predicted to fall below the assessment thresholds will not be assessed further. However, it is necessary to consider the study area screening thresholds for air quality and noise and vibration when determining the scale of the highway study area. **Chapter I ‘Air Quality’** and **Chapter 12 ‘Noise and Vibration’** set out the thresholds to be incorporated into the highway study area.
- 17.6.10 To assess the surface access impact of the Proposed Development, a comprehensive programme of modelling assessments will be undertaken to assess all modes of transport. For highways, a mixture of strategic and local transport modelling will be used to test detailed traffic engineering and road operations to identify design and capacity issues, as well as test future improvement options. The TfL Strategic Cube Model (‘TfL Model’) will be used. The TfL model is an iterative package allowing the effect of transport mitigation to be tested in terms of, firstly, in-terms mode share and then, secondly, mitigation assigned to the transport networks to test Level of Service (LOS). The TfL model provides a comprehensive representation of the highway and public transport network surrounding the Proposed Development to allow for testing of potential impacts. Further information of the modelling suite and functionality in relation to the Proposed Development, can be found in **Appendix 17.1** to be read in conjunction with this Scoping Report.
- 17.6.11 The assessment of transport effects on the highway network is based upon modelling to identify changes in traffic flow volumes which exceed change in flow thresholds in a study area. As identified in paragraphs 17.6.4 and 17.6.5, in accordance with GEART thresholds, changes greater than 30% in traffic flow or 10% for HGVs will be subject to further assessment.
- 17.6.12 For public transport, outputs from the TfL Model will be produced to provide network-wide trip assignments (distribution of public transport movements across the study area). The TfL Model contains comprehensive coverage of public transport networks and includes ‘crowd’ functionality to model train and bus capacity (i.e. number of seats/passengers standing). LOS and capacity analysis, focusing on peak hours, will be the key outputs that will inform the assessment.
- 17.6.13 Capacity and demand estimates for transport by rail are summarised in **Appendix 17.1**.

Non-motorised users

- 17.6.14 The most likely opportunity for this mode group will be employees travelling to the Proposed Development during the operational phase.
- 17.6.15 The Chartered Institution of Highways and Transportation (CIHT) document entitled ‘Guidelines for Providing for Journeys on Foot’ (The Institution of Highways and Transportation, 2000), notes that an average walking speed of three miles per hour can be assumed. By this measure, in 15 minutes a pedestrian could walk approximately 1,200m and in 25 minutes, up to 2,000m. The upper limit has been adopted to inform the extents of the walking study area.
- 17.6.16 The CIHT guidance ‘Cycle Friendly Infrastructure, Guidelines for Planning and Design’ (Davies

and Morgan, 1996), states that three quarters of journeys by all modes are less than five miles (8km) and that this distance can be cycled comfortably by a fit person. This distance corresponds to an approximate 25-minute cycling time. This parameter has been adopted to inform the cycle study area.

Sources of baseline data

17.6.17 Detailed baseline information is in the process of being collated from third party sources to inform the assessment, as well as to support the TA. This includes (but is not limited to):

- Information on public bus routes including timetables, bus stop locations and routes, will be obtained from relevant service operators;
- TfL Strategic Cube Model – modelling suite to determine the likely number of trips, trip origin, trip destination and mode of transport; and
- Civil Aviation Authority (CAA) passenger survey data to determine mode of transport, origin and destination of passengers; and
- Personal Injury Collison’s (PIC): Full analysis of PIC’s within the study area.

17.6.18 As the design of the Proposed Development is still in its early development, the study areas set out above will be kept under review as the design and consultation processes progress, and the Proposed Development is refined and related topic assessment study areas are confirmed. Therefore, the study areas at the assessment stage may evolve as appropriate. Numerous sources of baseline data have been set out in the Stage 1a SAS (**Appendix 17.1**).

17.7 Baseline Conditions

17.7.1 A summary of baseline conditions is presented, which will be refined further over the course of the EIA. This information currently focuses upon the key routes (highway and public transport) to and from the Proposed Development. These key routes are the most likely to experience impacts and affect non-airport trips as well as those trying to access the Proposed Development. All baseline conditions presented are correct as of the 3rd December 2018, and will be updated to support the EIA.

17.7.2 A detailed baseline has been prepared as part of our Stage 1 Pre-Appraisal study (**Appendix 17.1**) which is being discussed with Highways England. Further baseline information will be presented at PEIR.

Highways

17.7.3 The Proposed Development can be directly accessed via the M25 and M4. The M1, M3 and M40 motorways are all located in close proximity to the Proposed Development and provide access to throughout the UK. TfL operated A4 and A30 routes provide local road access. Aforementioned highways and minor roads are heavily congested surrounding the Proposed Development.

Rail

17.7.4 The Proposed Development is well connected by rail to London. Services include the London Underground Piccadilly Line, TfL Rail and Heathrow Express. The combined frequency of these rail services provides 18 trains per hour from the Proposed Development into Central London during peak times.

- 17.7.5 Six trains per hour in each direction between central London and Heathrow Terminals 2, 3 and 5 are provided via the Piccadilly Line on the London Underground at peak times. The journey takes less than 49 minutes from Piccadilly Circus to Heathrow Terminals 2 and 3, 48 minutes to Heathrow Terminal 4 and 52 minutes to Heathrow Terminal 5.
- 17.7.6 TfL Rail (formally, 'Heathrow Connect' until 20th May 2018) provides a service calling at stations between London Paddington and Heathrow Terminals 2, 3 and 4. Trains operate every 30 minutes during peak times and hourly during off-peak times on Monday to Friday. The journey time is approximately 30 minutes to Terminal 4 and 26 minutes to Terminals 2 and 3.
- 17.7.7 A direct service between London Paddington and Heathrow Terminals 2, 3 and 5 is provided by Heathrow Express, running every 15 minutes from 05:10 to 23:25 every day of the week. The journey from London Paddington to Terminals 2 and 3 takes 15 minutes with an additional six minutes to Terminal 5. Passengers travelling to Terminal 4 can take a free transfer service departing from Terminals 2 and 3 which takes four minutes.

Buses

- 17.7.8 There are 24 bus routes which serve the Proposed Development at present with a combined frequency of approximately 67 buses per hour. Included in this are 23 routes providing early hours of the morning and 24-hour services which allow shift workers public transport access. The use of bus travel in and around Heathrow Airport is supported by Heathrow's Free Travel Zone with bus routes managed by TfL. The Proposed Development is well connected to the rest of the UK, 24-hours a day via frequent coach services. National Express links over 60 major towns and cities with the Proposed Development.

Walking and cycling

- 17.7.9 Employee commutes can be made by walking and cycling. The Proposed Development provides options for sustainable travel by foot through footways and pedestrian crossings and by cycling through cycle routes.

Private hire, taxis and car hire facilities

- 17.7.10 Today, 32% of passengers travel to Heathrow by taxis and private hire vehicles (PHV). This is the highest share across all modes of transport. Taxi ranks are located at each of the terminals. A number of private hire minicabs and minibus services are located at Heathrow Airport with various other private hire and taxi companies serving the airport.
- 17.7.11 Car hire facilities are located at numerous sites on the Northern Perimeter Road, adjacent to Terminals 2 and 3.

Parking drop off and pick up

- 17.7.12 The Applicant controls over 1,000 car parking spaces with an approximate 306,324sqft. of parking area, located on Sealand Road, near Terminal 4.
- 17.7.13 Approximately 41,000 on-airport car parking spaces, with 25,000 spaces for passengers and 16,000 for employees are managed by HAL. British Airways and other airport tenants control a further 12,500 spaces.
- 17.7.14 Drop off lanes are provided free of charge for passengers arriving at Heathrow Airport. There are no free pick up areas at Heathrow Airport. For passengers requiring a pick-up service, short stay and long stay car parks can be used for free if less than two hours.

17.8 Scoping of Potential Effects

Effects scoped into the assessment

17.8.1 The potential likely significant effects to be scoped into the traffic and transport assessment are displayed in **Table 17.4**.

Table 17.4 Potential likely significant traffic and transport effects

Activity	Effect	Receptor
Construction		
Movement of materials to and from the Proposed Development or surrounding areas due to related development (hotels, car parking facilities, cargo sites)	<ul style="list-style-type: none"> Highway network delay Pedestrian and cyclist amenity Pedestrian and cyclist delay Severance Driver stress and view from the road 	<ul style="list-style-type: none"> Highway users (all modes) Communities
Movement of construction workers to and from the Proposed Development and the variation in numbers required based on construction phasing, due to related development (hotels, car parking facilities, cargo sites)	<ul style="list-style-type: none"> Public transport amenity Pedestrian and cyclist delay Pedestrian and cyclist amenity Highway network delay Severance 	<ul style="list-style-type: none"> Highway users (all modes) Public transport users Communities
Movement of materials to and from the Proposed Development	<ul style="list-style-type: none"> Highway network delay Severance Public transport amenity Pedestrian and cyclist delay Pedestrian and cyclist amenity Driver stress and view from the road 	<ul style="list-style-type: none"> Highway users (all modes) Communities
Movement of construction workers to and from the Proposed Development and the variation in numbers required based on construction phasing relating to the building of the terminal	<ul style="list-style-type: none"> Public transport amenity Highway network delay Severance Pedestrian and cyclist amenity Pedestrian and cyclist delay 	<ul style="list-style-type: none"> Highway users (all modes) Public transport users Communities
Changes to road layouts or temporary traffic interventions or management (such as single lane working)	<ul style="list-style-type: none"> Highway network delay Public transport amenity Severance Pedestrian and cyclist amenity Pedestrian and cyclist delay Driver stress and view from the road 	<ul style="list-style-type: none"> Highway users (all modes) Public transport users (not including rail) Communities
Movement of hazardous material to and from the Proposed Development	<ul style="list-style-type: none"> Severance Highway network delay Pedestrian and cyclist delay Pedestrian and cyclist amenity Driver stress and view from the road 	<ul style="list-style-type: none"> Highway users (all modes) Communities
Operation		

Activity	Effect	Receptor
Movement of people (passengers, employees) to and from the Proposed Development	<ul style="list-style-type: none"> Highway network delay Public transport amenity Severance Pedestrian and cyclist amenity Pedestrian and cyclist delay 	<ul style="list-style-type: none"> Highway users (all modes) Public transport users Communities
Movement of people (passengers, employees) to and from the Proposed Development by public transport	<ul style="list-style-type: none"> Public transport amenity 	<ul style="list-style-type: none"> Public transport users
Movement of freight to and from the Proposed Development	<ul style="list-style-type: none"> Driver stress and view from the road Severance Pedestrian and cyclist delay Pedestrian and cyclist amenity Highway network delay 	<ul style="list-style-type: none"> Highway users (all modes) Communities
Changes to bus service routes as a result of changes to road layouts.	<ul style="list-style-type: none"> Public transport amenity Driver stress and view from the road Highway network delay 	<ul style="list-style-type: none"> Public transport users
Movement of people (passengers, employees) to and from the Proposed Development, due to related development (hotels, car parking facilities, cargo sites)	<ul style="list-style-type: none"> Public transport amenity Highway network delay Severance Pedestrian and cyclist delay Pedestrian and cyclist amenity 	<ul style="list-style-type: none"> Highway users (all modes) Public transport users Communities
Movement of people (passengers, employees) to and from the Proposed Development by public transport, due to related development (hotels, car parking facilities, cargo sites)	<ul style="list-style-type: none"> Public transport amenity 	<ul style="list-style-type: none"> Public transport users
Increase in terminal capacity due to increased runway capacity available	<ul style="list-style-type: none"> Highway network delay Public transport amenity Severance Pedestrian and cyclist delay Pedestrian and cyclist amenity 	<ul style="list-style-type: none"> Highway users (all modes) Public transport users

17.8.2 For the transport and traffic topic, receptors have been identified as other highway and public network users including:

- Vehicle drivers and passengers;
- Bus passengers;
- Coach passengers;
- Rail passengers;
- Pedestrians and cyclists;
- Residents; and

- Community Groups.

Effects scoped out of the assessment

17.8.3 The effects proposed to be scoped out of the traffic and transport assessment are displayed in **Table 17.5**.

Table 17.5 Effects to be Scoped out of the Traffic and Transport Assessment

Activity	Effect	Receptor	Justification for Scoping Out
Operation			
Hazardous Loads	Hazardous material spilling onto the transport network	<ul style="list-style-type: none"> • Vehicle drivers; • Vehicle passengers; • Bus passengers; • Coach passengers; • Rail passengers; • Pedestrians and cyclists; • Residents; and • Community groups. 	The risk is managed by safe working practices and preventative, protective measures and health and safety legislation.

17.8.4 At this stage in the assessment, no construction effects are to be scoped out of the assessment.

17.9 Approach to Assessment

Study area

17.9.1 The proposed study areas for traffic and transport receptors are set out in **Section 17.4**. These will be refined at the assessment stage as the design and consultation processes progress, and as related topic assessments are progressed.

17.9.2 The study areas for the assessment will be identified to ensure that the impact of the Proposed Development on traffic and transport can be fully assessed. A likely ZOI for potential cumulative traffic and transport effects with other development will be defined separately as part of the CEA, as described in **Section 4.6 of Chapter 4 ‘Approach to EIA’**.

Assessment scenarios

17.9.3 The Proposed Development will be implemented across an anticipated timeframe of 2022 – 2030. The traffic and transport assessment will consider a number of different assessment scenarios which will consider the construction and operational phases, and the activities which would give rise to the most significant traffic and transport impacts as a result of the Proposed Development.

17.9.4 The Traffic and Transport ES Chapter will be informed by the Strategic Digital Transport Baseline (SDTB).

17.9.5 The SDTB was built in the Cube Voyager software to process and present area-wide travel patterns. Cube is an International transportation modelling suite of tools, which also covers all aspects related to transportation planning, engineering, and land-use. With an open platform, Cube allows the building, calibration and testing of transport baselines of any type.

17.9.6 The following modelling assessment years are proposed:

- Base Year;

- Reference Year (Early ATM Uplift);
- Peak Runway Construction Year;
- Third Runway Opening Year;
- Phase I of the HWH Transport Plans;
- Construction Completion Year;
- Full Opening Year of the HWH Transport Plans; and
- Final Target Year

17.9.7 Each assessment year will be considered without the Proposed Development to provide a baseline (reference case) for each assessment year. This will enable the impact significance to be assessed for the Proposed Development.

17.9.8 Traffic and transport conditions are likely to be subject to change over assessment years as new infrastructure systems are commissioned. Examples of proposed new infrastructure includes the Western Rail Link to Heathrow Airport and the Heathrow Southern Railway.

17.9.9 The Western Rail Link has been proposed as an improved rail link between Reading and the west of Heathrow Airport to improve accessibility to Heathrow from the west, southwest, south Wales and west Midlands. The new infrastructure will also provide a direct route from Reading to Slough, reducing congestion for rail passengers at London Paddington.

17.9.10 The Heathrow Southern Railway proposes to improve connectivity between Surrey and Hampshire to Heathrow Airport in addition to improved access to Heathrow Airport from the southwest. The new scheme proposes to link with the Elizabeth Line and High Speed Two (HS2) Railway at Old Oak Common, London to provide a direct route to London Paddington.

Scope of the assessment

17.9.11 The potential significant effects which will be assessed include;

- Highway network delay;
- Driver stress and view from the road;
- Pedestrian and cyclist delay;
- Pedestrian and cyclist amenity;
- Severance;
- Public transport amenity;
- Noise and vibration;
- Air quality; and
- Hazardous loads (construction only).

Highway network delay

17.9.12 Highway network delay is defined as delay due to physical changes to the road network, and changes in traffic flow associated with the Proposed Development. This will apply to both private trips (all vehicle types) and public transport (buses). In addition, the journey time delay

due to increase in traffic is a key consideration.

Driver stress and view from the road

17.9.13 Driver stress, as outlined in DMRB (Highways England, 1993) guidance, is classed as the adverse mental and physiological effects experienced by a driver traversing a road network. Factors which can influence levels of driver stress include road layout, road geometry, surface riding characteristics (road smoothness), junction frequency and speed and flow per lane.

Pedestrian and cyclist delay

17.9.14 Pedestrian and cyclist delay occurs when there is the potential for a change in journey times to pedestrians and cyclists. For example, increased traffic making it more difficult to cross the highway and / or a change in route leading to increases in journey time or distance, due to the Proposed Development.

17.9.15 Where the potential for pedestrian and cyclist delay is identified, assessments will be made to assess the impact of increased traffic flow to delaying the journey of pedestrians and cyclists.

Pedestrian and cyclist amenity

17.9.16 Pedestrian and cyclist amenity is broadly defined as the relative pleasantness of a journey, and is considered to be affected by traffic flow, traffic composition, footway width and separation from traffic. This definition also includes pedestrian fear and intimidation, and can be considered to be a much broader category including consideration of the exposure to noise and air pollution, and the overall relationship between pedestrians and traffic.

17.9.17 GEART suggests that a threshold of doubling total traffic flow or the HGV component may lead to a negative impact upon pedestrian amenity.

17.9.18 Qualitative analysis based on DMRB (Highways England, 1993) guidance will also be undertaken to assess pedestrian and cyclist amenity.

Severance

17.9.19 Severance is the perceived division that can occur within a community when it becomes separated by a major traffic artery. The term is used to describe a complex series of factors that separate people from places and other people. Severance may result from the difficulty of crossing a heavily trafficked road or a physical barrier created by the road itself. It can also relate to relatively minor traffic flows if they impede pedestrian access to essential facilities. Severance effects could equally be applied to residents, motorists, cyclists or pedestrians.

17.9.20 GEART suggests that changes in total traffic flow of 30%, 60% and 90% are considered to be 'slight', 'moderate' and 'substantial', respectively.

Public transport amenity

17.9.21 Public transport amenity considers the impact of physical changes to the public transport network, including changes in public transport demand associated with the Proposed Development. This includes the pleasantness of journeys made by public transport, capacity and overcrowding, delay and re-routing issues.

Road safety

17.9.22 The salient GEART guidance on road safety is as follows:

17.9.23 "Where a development is expected to produce a change in the character of traffic (e.g. HGV

movements on rural roads), then data on existing accident levels may not be sufficient. Professional judgement will be needed to assess the implications of local circumstances, or factors which may elevate or lessen the risk of accidents, e.g. junction conflicts.”

17.9.24 In this context, an examination of the existing collisions occurring within the onshore highway study area will be undertaken to identify any areas of the highway with concentrations of collisions with similar patterns, or roads with collision rates that are higher than national averages. These sites are considered to be sensitive to changes in traffic flows (sensitive receptors) and therefore a more detailed analysis of significance has been undertaken in the context of the proposals.

17.9.25 In addition to considering existing patterns of collisions that could be exacerbated by the development proposals, the road safety assessment also considers the potential for introduction of new risks associated with the formation of new junctions.

Hazardous loads (construction only)

17.9.26 For the purpose of this assessment, transport of hazardous loads are considered for the construction phase only. This is likely to be the transportation of Abnormal Indivisible Loads (AILs) on the highway network and the requirement to ensure suitable access routes (both in terms of geometry and load bearing capacity) and also the potential delay to highway users.

Assessment methodology

17.9.27 In order to provide a consistent framework, where appropriate, a matrix approach has been adopted to assign sensitivity (the environmental value), magnitude of change, and significance of effects included in the scope of the assessment.

Receptor sensitivity

17.9.28 Characterising the existing environment helps to determine the sensitivity of receptors, and the potential impacts on receptors. The ability to tolerate, adapt to and recover from potential impacts is a key assessment for evaluating sensitivity to the impact under consideration.

- Receptors for this assessment will include the following:
- Vehicle drivers and passengers;
- Bus passengers;
- Coach passengers;
- Rail passengers;
- Pedestrians and cyclists;
- Residents; and
- Community groups.

17.9.29 Initially, a desktop exercise has been undertaken to identify the potential sensitive receptors within an assumed study area. These are presented graphically in **Figure 17.1**. Each receptor will be assigned a sensitivity value for the assessment in accordance with the parameters summarised in 17.9.12 to 17.9.26.

Magnitude of effects

17.9.30 The proposed methodology for determining the magnitude of change to the baseline refers to

the 'size' or 'amount' of an effect and is typically defined by four factors:

- Extent – the area over which an effect occurs;
- Duration – the time for which the effect occurs;
- Frequency – how often the effect occurs; and
- Severity – the degree of change relative to existing environmental conditions.

17.9.31 The proposed methodology for determining the magnitude of change to the baseline will be undertaken in line with guidance set out in the DMRB. In addition, where necessary, magnitude will be determined by applying professional judgement due to the qualitative nature of some parts of this assessment. The same approach will apply to the construction and operation phases, considering the location of the effect, how long it would last for and considering if it is permanent or temporary.

17.9.32 The following quantitative and qualitative criteria are proposed for determining the magnitude of effect, considering positive and negative effects:

- Major Magnitude –Very substantial change (positive or negative) to infrastructure or service provisions and/or severe departure from baseline conditions. Large scale or major improvement proposed;
- Moderate Magnitude –Notable change (positive or negative) to infrastructure or service provisions, but not negatively affecting the integrity. Some departure from baseline conditions;
- Minor Magnitude –Minor change (positive or negative) or improvement to infrastructure or service provisions but does not cause great change from baseline conditions;
- Negligible Magnitude –Very small change (positive or negative) to baseline conditions which may not be noticeable in the instance of most trips; and
- No Change –No loss, gain or alteration to baseline conditions.

Evaluation of impact significance

17.9.33 The combination of the magnitude and the sensitivity will be used to determine the significance of effects and is provided in the matrix in **Table 17.6**.

17.9.34 To assign significance, a number of factors have been taken into consideration including; the professional judgement of qualified Transport Planners, reasoned argument, stakeholder consultation and assessment of changes to traffic flow.

17.9.35 Where there is significance of moderate or above, these shall be classified as 'significant'. Where there is significance that is deemed neutral or slight, these shall be classified as 'not significant'. This is summarised in **Table 17.7**.

Table 17.6 Significance of impact matrix (DMRB)

	Magnitude				
	No Change	Negligible	Minor	Moderate	Major

Sensitivity	Very High	Neutral	Slight	Moderate or Large	Large or Very Large	Very Large
	High	Neutral	Slight	Slight or Moderate	Moderate or Large	Large or Very Large
	Medium	Neutral	Neutral or Slight	Slight	Moderate	Moderate or Large
	Low	Neutral	Neutral or Slight	Neutral or Slight	Slight	Slight or Moderate
	Negligible	Neutral	Neutral	Neutral or Slight	Neutral or Slight	Slight

Table 17.7 Assigned significance ratings (DMRB)

		Magnitude of Effect				
		No Change	Negligible	Minor	Moderate	Major
Sensitivity	Very High	Not significant	Not significant	Significant	Significant	Significant
	High	Not significant	Not significant	Significant	Significant	Significant
	Medium	Not significant	Not significant	Not significant	Significant	Significant
	Low	Not significant	Not significant	Not significant	Not significant	Significant
	Negligible	Not significant	Not significant	Not significant	Not significant	Not significant

Cumulative effects

17.9.36 Cumulative traffic and transport effects resulting from the combination of effects from the Proposed Development and other developments will be assessed in accordance with the guidance and methodologies set out in **Section 4.6 of Chapter 4 ‘Approach to EIA’**. The assessment will be dependent on the availability and accessibility of information for other developments.

17.9.37 The Proposed Development does not the new Northwest Runway and M25 realignment components of the NRS proposed by HAL. However, the Proposed Development is designed to be operated alongside these components of the NRS that are being progressed by the HAL DCO Project. Therefore, the total cumulative traffic and transport effects will be considered together to ensure an overarching assessment of the NRS as a whole.

17.9.38 Any components of the HAL DCO Project which would no longer be required as a result of the Proposed Development would not be included in the CEA.

17.10 Approach to Mitigation

17.10.1 Minimisation of traffic and transport impacts will be embedded into the design of the Proposed Development where possible following the application of the hierarchy of mitigation as described in **Chapter 4 ‘Approach to EIA’**. The assessment of impacts will be made with these embedded mitigation measures in place.

17.10.2 The type and level of mitigation measures required will be informed by the expected level of impact. The ANPS lists a number of mitigation measures relevant to the construction and operational phases which could be put forward to minimise impacts associated with the Proposed Development. Mitigation identified by the ANPS that is relevant to traffic and transport assessment is outlined below:

- Traffic restrictions and / or traffic relocation around sensitive areas;
- Development of a construction traffic management plan (which may include the possible use of rail and consolidation sites or waterways);
- The use of low emission construction plant / fleet, fitting of diesel particulate filters, and use of cleaner engines;
- The use of freight consolidation sites;
- Active workforce management / a worker transport scheme;
- Construction site connection to grid electricity to avoid use of mobile generation; and
- Selection of construction material to minimise distance of transport and increase recycling percentages of the material where appropriate.

Mitigation during construction

17.10.3 An outline Construction Traffic Management Plan (CTMP) will be produced. This will set out proposed measures to be applied throughout the construction phase. In doing so, the CTMP will be a form of management and control during the period of construction and help mitigate potential traffic and transport impacts.

17.10.4 Typical measures to be adopted could include:

- Traffic restrictions and / or traffic relocation around sensitive areas;
- Development of a construction traffic management plan (which may include the possible use of rail and consolidation sites or waterways);
- The use of low emission construction plant / fleet, fitting of diesel particulate filters, and use of cleaner engines;
- The use of freight consolidation sites;
- Active workforce management / a worker transport scheme;
- Construction site connection to grid electricity to avoid use of mobile generation; and
- Selection of construction material to minimise distance of transport and increase recycling percentages of the material where appropriate.

Mitigation during operation

17.10.5 The SAS will inform the mitigation strategy for the Proposed Development. The surface access study and SAS will be developed in parallel to the TA and EIA, through an interactive process, to ensure the results of any assessments are fed back to shape the Proposed Development (and therefore embed mitigation). A number of key issues will need to be considered:

- Identifying and mitigating transport effects which extend outside of the assumed study area;
- Determining the appropriate level of travel growth expected;
- Recognising that the Proposed Development could form part of wider transport initiatives; and

- Maintenance of existing travel across transport modes and the assumed study area to mitigate negative effects resulting from the Proposed Development.

17.10.6 **Chapter 3 ‘The Proposed Development’** sets out the emerging measures that will inform the operational EIA

17.11 Summary

17.11.1 The scope of the traffic and transport assessment described above is summarised in **Table 17.8**, below.

Table 17.8: Summary of Potential Impacts of the Traffic and Transport Assessment

Potential Impacts	Construction	Operation
Increased journey times to vehicle drivers and passengers	✓	✓
Increased journey times to public transport users	✓	✓
Road safety implications	✓	✓
Increase in HGV and freight movements	✓	✓
Hazardous material spillage onto the transport network	✓	×
Changes to road layout/functionality	✓	✓
Increase in highway congestion	✓	✓
Overcrowding on public transport	✓	✓
Difficulty accessing public transport	✓	✓
Reduced amenity	✓	✓
Severance of communities	✓	✓
Cumulative effects	✓	✓

Scoped in (✓) and scoped out (×)

17.11.2 Production of the ES chapter will be undertaken in consultation with all relevant stakeholders, including topic expert panel meetings, as appropriate. Similarly, the requirements of the ANPS will be at the forefront; principally that the Proposed Development design will aim to ease and improve intermodal passenger flow through a new public transport interchange at the new terminal and provide better access to sustainable forms of public transport, including for the wider community; and improve the quality and environment of the local road network.

17.12 References

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Royal HaskoningDHV. (2018). Heathrow Western Hub Surface Access - Pre Appraisal Transport Study (Stage 1a)

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18 Water

18.1 Introduction

18.1.1 This chapter describes the proposed approach to the assessment of potential impacts arising from the Proposed Development on the water environment, including surface water hydrology, quality and geomorphology, groundwater quality and quantity, and flood risk. The chapter considers potential impacts associated with the construction and operational phases.

18.1.2 The chapter includes:

- A description of key policy and legislation with relevance to the water environment;
- A summary of ongoing and planned stakeholder engagement;
- An overview of the approach that has been adopted to inform this Scoping Report;
- A concise summary of the baseline water environment;
- A description of the potential likely significant effects of the Proposed Development on the water environment, to be included in the scope of the assessment;
- A summary of any potential effects that are proposed to be scoped out of the assessment;
- A proposed approach to the EIA and the CEA with regards to the water environment;
- An overview of the proposed approach to mitigation; and
- A summary of the Scoping Report chapter including a summary of impacts table.

18.1.3 The Proposed Development is a component of the Government's preferred NRS as set out in the ANPS. It does not include the Northwest Runway itself, or the major M25 realignment works required to accommodate the Northwest Runway. Therefore, potential effects on the water environment associated with these components of the NRS are excluded from the scope of the primary assessment. Potential effects associated with the Northwest Runway and M25 realignment works will however be considered as part of the CEA, as set out in **Section 4.6 of Chapter 4 'Approach to EIA'**.

18.2 Policy and Legislation

18.2.1 **Table 18.1** provides a summary of the key policy and legislation which has informed the scope of the assessment. Further information on policies relevant to the EIA and their status is set out in **Chapter 1 'Introduction'**. Due regard will also be given to local policies and the Government's 25 Year Environment Plan where they are relevant.

18.2.2 These documents are proposed to form the framework for detailed assessment post-scoping and will be taken into account in the assessment of potential water impacts during PEI and ES stages, with the relevant criteria followed throughout.

Table 18.1 Policy and Legislation relevant to the health assessment

Relevant policy / legislation	Relevance to assessment
<p>Policy</p> <p>ANPS (2018)</p>	<p>The ANPS sets out requirements for the management of i) flood risk and ii) water quality and resources. These include the requirement to comply with the National Planning Policy Framework, UK Climate Change Risk Assessment, the FWMA2010 and the Water Framework Directive and related directives.</p> <p>With regards to assessing flood risk, paragraphs 5.147 – 5.171 of the ANPS specify that the applicant should:</p> <ul style="list-style-type: none"> • Consider the risk of all forms of flooding arising from the proposed development, in addition to the risk of flooding to the project, and demonstrate how those risks will be managed and, where relevant, mitigated, so that the development remains safe throughout its lifetime; • Take account of the potential impacts of climate change, clearly stating the development lifetime over which the assessment has been made; • Consider safe access and egress arrangements; • Assess residual risks following the application of risk reduction measures, and demonstrate that this is acceptable for the development; • Consider if the project needs to remain operational during a worst case flood event; and • Provide evidence for the Secretary of State to apply the Sequential Test and Exception Test, as appropriate. <p>With regards to water quality and resources, paragraphs 5.172 – 5.186 of the ANPS specifies that the assessment should consider:</p> <ul style="list-style-type: none"> • The existing quality of water that could be affected by the project; • Existing water resources that could be affected by the project, and the impacts of the project on water resources; • Existing physical characteristics of the water environment (including quantity and dynamics of flow) affected by the project, and any impact of physical modifications to these characteristics; • Any impacts of the project on water bodies or protected areas under the Water Framework Directive and source protection zones around potable groundwater abstractions; and • Any cumulative effects. <p>The ANPS also specifies that project developers should assess potential effects on the surrounding water supply and wastewater treatment network, in conjunction with the appropriate water and sewerage undertakers. Future water infrastructure (including potable water and sewerage treatment) requirements should also be considered.</p>
<p>NPPF (2014) and supporting National Planning Practice Guidance (NPPG) (2018)</p>	<p>The National Planning Policy Framework (NPPF) sets out the UK Government planning policies for England. The NPPF seeks to ensure that flood risk is considered at all stages in the planning and development process, to avoid inappropriate development in areas at risk of flooding and to direct development away from areas at risk of flooding.</p> <p>The National Planning Practice Guidance (NPPG) on Flood Risk and Coastal Change supports the NPPF with additional guidance on flood risk vulnerability</p>

Relevant policy / legislation	Relevance to assessment
	<p>classifications and managing residual risks. The NPPG makes use of the concepts of Flood Zones, Vulnerability Classifications and Compatibility in order to assess the suitability of a specific site for a certain type of development.</p> <p>The NPPF directs development away from areas at highest risk of flooding via the application of the Sequential Test. If, following application of the Sequential Test, it is not possible for the project to be located in zones with a lower probability of flooding; the Exception Test can be applied if appropriate.</p>
The London Plan (2016)	<p>The London Plan is an overarching strategic plan which sets out an integrated economic, environmental, transport and social framework for the sustainable development of London over the next 20-25 years. The current version was adopted in 2016. The plan covers a variety of policy aspects, including environmental and flood risk management. In the absence of their own local policies, many Local Authorities have adopted the policies and guidance set out within the London Plan.</p>
Local Authority Flood Risk Management policies	<p>The Local Authorities (e.g. the London Boroughs of Hillingdon and Hounslow) have developed a portfolio of policy documents which establish the context for flood risk management in their areas. These include:</p> <p>The Local Flood Risk Management Strategy, which sets the strategy on how local flood risk should be managed within each Authority by various key organisations.</p> <p>The Preliminary Flood Risk Assessment compiles information on historic flooding and uses this to provide information on potential future flood risk.</p> <p>The Strategic Flood Risk Assessment, which collates evidence on all sources of flood risk and forms part of the evidence base for the Local Plan.</p> <p>Surface Water Management Plans are more focussed studies which specifically consider local sources of flooding in key areas with known surface water and groundwater flooding issues.</p> <p>A SuDS Design and Evaluation Guide, which sets out specific policies related to the design of drainage systems.</p>
Thames River Basin Management Plan (2015)	<p>The River Basin Management Plan (RBMP) is a strategic document that sets out the objectives that have been set for implementation of the WFD at a regional (River Basin District (RBD)) level. The purpose of a RBMP is to provide a framework for protecting and enhancing the benefits provided by the water environment. To achieve this, and because water and land resources are closely linked, it also informs decisions on land-use planning.</p> <p>The second RBMP for the Thames RBD was finalised by the Department for Environment, Food and Rural Affairs (Defra) and the Environment Agency in December 2015 and published in February 2016. This document sets out the current state of the water environment according to WFD parameters, pressures affecting the water environment, environmental objectives for protecting and improving the waters, programme of measures to improve the water environment and deliver WFD objectives, actions needed to achieve the objectives, progress since the 2009 RBMP, and also informs decisions on land-use planning because water and land resources are closely linked.</p>
Thames Catchment Flood Management Plan (CFMP) Summary Report (2009)	<p>The Catchment Flood Management Plan (CFMP) is a strategic document published by the Environment Agency which gives an overview of flood risk in the Thames catchment. It sets out the preferred plan and policies for the</p>

Relevant policy / legislation	Relevance to assessment
	delivery of sustainable flood risk management over the next 50 to 100 years summarised in a series of sub-areas. It considers all types of inland flooding including rivers, groundwater, surface water and tidal flooding. It does not include flooding directly from the sea (i.e. coastal flooding) which is covered by relevant Shoreline Management Plans.
Legislation	
Water Framework Directive (2000/60/EC)	The Water Framework Directive (WFD) (Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for Community action in the field of water policy) was adopted by the European Commission (EC) in December 2000. The WFD requires that all European Union (EU) Member States must prevent deterioration and protect and enhance the status of aquatic ecosystems. This means that Member States must ensure that new schemes do not adversely impact upon the status of aquatic ecosystems, and that historical modifications that are already impacting it need to be addressed. The WFD applies to all water bodies (rivers, lakes, estuaries, coastal waters and groundwater) including those that are man-made.
Water Environment (Water Framework Directive) (England and Wales) Regulations 2017	The WFD was transposed into national law in the UK by means of the Water Environment (Water Framework Directive) (England and Wales) Regulations 2003. These regulations were updated by the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. The Regulations provide for the implementation of the WFD, from designation of all surface waters as water bodies, and set objectives for the achievement of Good Ecological Status (GES) or Good Ecological Potential (GEP).
Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015	The standards used to determine the ecological or chemical status of a water body are provided in the WFD (Standards and Classification) Directions (England and Wales) 2015. This includes the thresholds for determining the status of the biological, hydromorphological, physico-chemical and chemical status of surface water bodies, and the quantitative and chemical status of groundwater bodies.
Floods Directive (2007/60/EC)	The Floods Directive (Directive 2007/60/EC of the European Parliament and of the Council on the assessment and management of flood risks) came into force in November 2007. The Floods Directive requires all EU Member States to assess whether all watercourses and coast lines are at risk of flooding and to map the associated flood extent, to identify the assets and people at risk within these areas. It requires Member States to establish flood risk management plans focused on the prevention, protection and preparedness to flooding.
Flood Risk Regulations 2009	The Floods Directive was transposed into UK law by the Flood Risk Regulations 2009 requiring the assessment and management of flood risk in England and Wales. The Regulations set out requirements related to the duties of the Environment Agency and Lead Local Flood Authorities with regard to the preparation of Preliminary Flood Risk Assessments (PFRAs), flood hazard maps and flood risk maps and flood risk management plans.
Flood and Water Management Act 2010	The Flood and Water Management Act (FWMA) aims to improve both flood risk management and the way we manage our water resources by creating clearer roles and responsibilities. This includes a lead role for local authorities in managing local flood risk (from surface water, ground water and ordinary watercourses) and a strategic overview role of all flood risk for the Environment Agency. The FWMA provides opportunities for a comprehensive, risk-based approach on land use planning and flood risk management by local authorities and other key partners.

Relevant policy / legislation	Relevance to assessment
Land Drainage Act 1991	The Land Drainage Act 1991 assigns landowners as the responsible parties for maintaining flows in watercourses, and provides Local Authorities with powers to compel landowners to maintain flows in watercourses.
Water Resources Act 1991; Water Act 2003; The Environmental Permitting (England and Wales) Regulations 2016	The Water Resources Act 1991 makes it an offence to cause or knowingly permit polluting, noxious, poisonous or any solid waste matter to enter controlled waters. The Act was revised by the Water Act 2003, which establishes regulatory controls for water abstraction, water impoundment and protection of water resources. The Environmental Permitting (England and Wales) Regulations 2016 establish provisions for the regulation of water discharges to controlled waters, which replaced provisions from the earlier Acts.

18.3 Stakeholder Consultation

- 18.3.1 A detailed stakeholder engagement plan is currently being developed. Care will be taken to ensure all key stakeholders with views and concerns regarding the water environment have the evidence and opportunity to discuss and agree the details of the assessment in a meaningful and inclusive manner.
- 18.3.2 The stakeholders listed below have already been contacted to make them aware of the Proposed Development and outline the timescales for further consultation. In November 2018, the following stakeholders were provided with a presentation providing an overview of the Proposed Development and inviting initial comments on the scope of the assessment for water:
- Environment Agency;
 - London Borough of Hillingdon;
 - London Borough of Hounslow;
 - Spelthorne Borough Council;
 - Slough Borough Council;
 - South Bucks District Council;
 - Thames Water; and
 - Affinity Water.
- 18.3.3 The HAL DCO Project has received a Scoping Opinion from PINS, which is a useful source of stakeholder feedback, and has been used to inform this Scoping Report.
- 18.3.4 Further formal and informal consultations and meetings will be arranged to discuss and agree the details of the methodology for the assessment of potential water impacts arising from the Proposed Development (including surface water hydrology, quality and geomorphology, groundwater quality and quantity, flood risk, abstractions, discharges and surface and foul drainage networks, and WFD compliance).

18.4 Approach to Scoping

Study area

- 18.4.1 This section sets out the study areas that have been defined for the consideration of potential water effects at the scoping stage.
- 18.4.2 The study area for surface water resources and flood risk includes all the surface hydrological catchments that contain components of the Proposed Development or are hydrologically connected to (i.e. directly upstream or downstream) these catchments. The Environment Agency’s WFD river water body catchments are based on surface hydrological catchments and have therefore been used to delineate the boundaries of the study area and define surface water receptors (**Figure 18.1**). The drainage catchments which comprise the study area for surface water resources are described in detail in **Section 18.5**.
- 18.4.3 The study area for groundwater resources includes all the hydrogeological units that underlie the Proposed Development or are hydrologically connected to these units. The Environment Agency’s WFD groundwater bodies are based on hydrogeological units and have therefore been used to delineate the boundaries of the study area and define groundwater receptors (**Figure 18.2**). The groundwater units which comprise the study area for groundwater resources are described in **Section 18.5**.
- 18.4.4 The study areas at the scoping stage have been based on the Proposed Development, as shown in **Figure 1.1**. As the design of the Proposed Development is still in its early development, the study areas currently defined will be kept under review as the design and consultation processes progress, and related topic assessment study areas are confirmed. Therefore, the study areas at the assessment stage may evolve as appropriate.

Sources of baseline data

- 18.4.5 This Scoping Report chapter has been informed by a baseline desk study that has used publicly available data for a range of sources listed in **Table 18.2**. Data requests will be made to the Environment Agency, local authorities and water utilities for further information to support subsequent post-scoping stages of the assessment, including the PEIR and ES chapter (**Section 18.7**).
- 18.4.6 Field assessments have not been undertaken at this stage as the archive data sources listed below are considered to be suitably robust to inform the scoping assessment for surface and groundwater receptors.
- 18.4.7 It is important to note that, although WFD classification data have been used to inform the baseline characterisation of surface and ground water quality and define the extent of receptors, the assessment of potential scheme implications on WFD compliance will be considered separately to the main Environmental Impact Assessment.

Table 18.2 Sources of data used to inform this assessment

Data used to inform this assessment	Source (accessed December 2018)
Risk of Flooding from Surface Water	Environment Agency (data.gov.uk)
Risk of Flooding from Rivers and Sea	Environment Agency (data.gov.uk)
Risk of Flooding from Reservoirs	Environment Agency (data.gov.uk)
WFD water body status objectives and classification data	Environment Agency Catchment Data Explorer

Data used to inform this assessment	Source (accessed December 2018)
WFD water body shapefiles (rivers, river catchments, lakes, transitional and groundwater)	Environment Agency (data.gov.uk)
Source Protection Zones	Environment Agency (data.gov.uk)
Aquifer designation (bedrock and superficial) mapping	Magic.defra.gov.uk
Groundwater vulnerability mapping	Magic.defra.gov.uk
Geological mapping	British Geological Survey
Licensed abstraction data	Environment Agency, as presented in HAL (2018)
Consented discharges	Environment Agency, as presented in HAL (2018)
Statutory and non-statutory designated sites	Natural England (data.gov.uk)

18.5 Baseline Conditions

Surface drainage

Hydrological catchments

- 18.5.1 The Proposed Development site is located within the catchments of the Rivers Crane and Colne (both of which are tributaries of the lower River Thames), and includes a complex network of Main Rivers and ordinary watercourses (**Figure 18.1**). Note that the watercourses named below are all designated as Main Rivers by the Environment Agency; the smaller watercourses which drain into them are largely ordinary watercourses.
- 18.5.2 The River Crane (known as the Yeading Brook in its headwaters) is a low energy lowland river that has been extensively modified, channelised and diverted as a result of historical industrial development. The river rises near Pinner and flows in a southerly direction towards Heathrow Airport, before flowing eastwards through Twickenham and then northwards until it joins the tidal River Thames at Isleworth. The Crane catchment contains the majority of existing infrastructure associated with Heathrow Airport, and would therefore contain a large proportion of the Proposed Development.
- 18.5.3 The River Colne (known as the Fray's River or River Frays for some of its length) is located immediately to the west of the proposed Heathrow Western Hub, and would be directly affected by the Proposed Development, as described in **Chapter 3 'The Proposed Development'**. The Colne is a chalk river, an internationally rare river type that is characterised by high baseflow inputs from underlying chalk aquifers, clear, mineral-rich water and gravel substrates. The Colne rises from a spring near London Colney, flowing south-eastwards towards Watford and Rickmansworth before turning southward past Uxbridge and Heathrow Airport until it joins the River Thames at Staines. The river flows through the Staines Moor SSSI (see **Chapter 6 'Biodiversity'**), where it is designated for its chalk river habitats. The Colne has been extensively modified, and as a result has a large number of secondary channels (or bifurcations) which diverge from and re-join the Main River and/or connect to other watercourses. The hydrology of the system is therefore highly complex, and any changes (e.g. to hydrology, geomorphology and water quality) in one part of the system could potentially affect connected watercourses. The major tributaries and secondary channels that are located in the study area are summarised in **Table 18.3**.

Table 18.3 Major tributaries and secondary channels of the River Colne

Name	Description
Colne Brook	Diverges from the River Colne near Uxbridge, flowing southwards approximately parallel to the Colne until it joins the Thames at Egham.
The Duke of Northumberland's River and Longford River	These artificial watercourses diverge from the River Colne and flow around the western and southern perimeter of Heathrow Airport before joining the River Thames at Isleworth and Hampton Court, respectively. Both channels were diverted into adjacent channels as part of the Twin Rivers Diversion Scheme during the construction of Heathrow Terminal 5.
Wraysbury River	Diverges from the River Colne near West Drayton and flows southwards before rejoining the Colne near Staines. Part of the flow is diverted westwards along the Poyle Channel towards the Colne Brook.
Bigley Ditch	Diverges from the River Colne near Yiewsley and flows in a southerly direction until it joins the Wraysbury River near Harmondsworth Moor.
Stanwell Brook	Rises in Stanwell and flows in a south-easterly direction until it joins the Thames near Sunbury.
River Ash	Diverges from the River Colne near Staines and flows in a south-easterly direction until it converges with the Stanwell Brook near Ashford.
Horton Brook	Rises from springs near Langley and Iver Heath and flows southwards until it joins Colne Brook near Staines.
River Pinn	Rises near Harrow Weald and flows south and westwards through Pinner, Ruislip and Uxbridge before joining the Colne near Yiewsley.

18.5.4 The area to the south of Heathrow Airport is drained by Portlane Brook, which flows directly into the River Thames. Portlane Brook rises near Lower Feltham and flows in a south-easterly direction until it joins the River Thames between Sunbury and West Molesey. This catchment includes Felthamhill Brook, which is located to the south of the main river and joins it near Kempton Park. The catchment is bounded by the River Ash to the west and the River Crane to the north east.

18.5.5 The watercourses described above are designated as river water bodies (or, in the case of the Duke of Northumberland's River and Longford River, surface water transfers) under the WFD, either wholly or in part. Further information on these water bodies is provided later in this section.

Water quality

18.5.6 Data from the latest WFD water body classification cycle from 2016 presented on the Environment Agency's online Catchment Data Explorer (2018a) demonstrates that water quality in the surface drainage network is affected by a variety of pressures, which result in it being below the level required to achieve GES or GEP under the WFD:

- The River Crane (including Yeading Brook) has low concentrations of dissolved oxygen and high concentrations of ammonia, phosphate, triclosan, di(2-ethylhexyl)phthalate and nonylphenol. This is likely to be indicative of pollution from sewage discharges, misconnections, urban runoff, airport runoff and discharges from industrial sources (Environment Agency, 2018a). Water quality is sufficiently low to pressurise macrophyte (plant), invertebrate and fish populations in the watercourse;

- Water quality is generally better in the River Colne catchment (including tributaries such as Colne Brook, Horton Brook and the River Ash), although phosphate concentrations are elevated. This is attributed to sewage discharges, urban runoff and discharges from private water treatment facilities by the Environment Agency (2018a). Phosphate concentrations are sufficiently high to contribute towards pressures on invertebrate populations in parts of the catchment; and
- The main River Thames also has elevated phosphate concentrations, reflecting contamination from sewage discharges, transport discharges and agricultural runoff (Environment Agency, 2018a).

Hydrological regime

18.5.7 The Thames CFMP (Environment Agency, 2009) states that the wide, flat floodplains of the River Thames and the River Colne store water naturally and reduce the risk of flooding downstream. It also notes that there are major flood defences that protect the Lower Colne through Uxbridge and Yiewsley which are upstream of the Proposed Development.

18.5.8 Fluvial flood risk on the River Colne in the study area is relatively low due to the complexity and number of drainage channels and tributaries as well as the length of the contributing watercourse. These factors mean that during an extreme rainfall event there is a significant lag in the time it takes for the water to enter the tributaries and subsequently progress through the catchment to the Lower Colne, ensuring that the flow hydrograph is relatively spread out during a storm event resulting in a lower peak flow. Flood risk is discussed in more detail later in this section.

18.5.9 Information related to the hydrological regime in this location is also available from the National River Flow Archive (NRFA) website which contains catchment and flow data related to gauging stations along key watercourses. There are a number of gauging stations located along the River Colne and its tributaries as well as the River Crane and its tributaries.

18.5.10 A review of gauging stations along the River Colne and the River Crane on the NRFA website indicates both have a complex catchment. Upstream from the Proposed Development Area the Colne at Denham references both the complex water utilisation within the catchment but also the impact of the underlying Chalk on baseflow; however, it also indicates considerable groundwater abstraction reduces overall flows.

18.5.11 NRFA data for the gauging station on the River Crane at Cranford Park includes reference to the complexity of the catchment as well as the small transfer of water from the River Colne catchment via the Duke of Northumberland's River.

Other surface water features

18.5.12 In addition to the surface watercourses, there are also a large number of lakes and reservoirs along the River Thames and in the lower River Colne catchment to the south west of the existing airport complex (**Figure 18.1**). These include the Queen Mother, Wraysbury, King George VI, Staines (North and South) and Queen Mary Reservoirs, all of which are artificial lakes used for public water supply by Thames Water. The remainder largely consist of flooded gravel pits in the Thames valley (including Wraysbury Lake, Wraysbury No. 2, Heron Lake and Queensmead).

18.5.13 Several of the lakes are designated as Sites of Special Scientific Interest (SSSIs) and make up the South West London Waterbodies Special Area of Conservation (SAC) and Ramsar site.

Further information on these nationally and international designations is provided in **Chapter 6 ‘Biodiversity’**.

18.5.14 High concentrations of phosphorus are recorded in the King George VI, Staines (North and South), Queen Mary and Wraysbury Reservoirs. These are attributed to sewage discharges, urban runoff and agricultural runoff by the Environment Agency (2018a). No other impediments to water quality are reported on the Catchment Data Explorer (Environment Agency, 2018a).

18.5.15 The lakes and reservoirs described above are designated as lake water bodies under the WFD. Further information on these water bodies is provided later in this section.

Groundwater

Groundwater bodies

18.5.16 The bedrock geology of the study area is dominated by the deep Chalk bedrock, which is overlain by the clays, silts and sands of the Lambeth Group and the London Clay Formation. The bedrock is overlain by a series of superficial deposits, including river terrace gravels, alluvium along the river channels, and glacial sands and gravels (BGS, 2018).

18.5.17 These units support several Principal (an aquifer that is composed of highly permeable rocks that provide a high level of water storage and support public water supply and baseflow for rivers, lakes and wetlands on a strategic scale) and Secondary A (an aquifer with a variable storage capacity that may be an important source of baseflow and support local water supplies) aquifers alongside unproductive units (low permeability rocks with negligible significance for water supply). The hydrogeology of the study area is shown in **Figure 18.2** and summarised in **Table 18.4**.

Table 18.4 Hydrogeological characteristics of the study area

Formation		Aquifer designation	Hydrogeological characteristics
Superficial	Alluvium	Secondary A Aquifer	Hydraulic conductivity in the sand and gravel aquifer is limited by the presence of silts and clays.
	Langley Silt	Unproductive	Aquitard which consists of low-permeability silts and clays.
	Shepperton, Kempton Park, Taplow and Lynch Hill Gravel Members (Pleistocene river terrace gravels)	Principal Aquifer and Drinking Water Protected Area	Hydraulic conductivity is variable due to the presence of clay and silt lenses. Furthermore, hydraulic continuity between adjacent terraces may be limited. The Shepperton Gravel Member directly overlies Chalk bedrock to the west of the proposed development, allowing hydraulic interaction between the two aquifers.
	Boyn Hill and Black Park Gravel Members (Pleistocene river terrace gravels)	Secondary A Aquifer and Drinking Water Protected Area	Hydraulic conductivity is variable due to the presence of clay and silt lenses. The aquifers are largely disconnected from overlying river terrace deposits.
Solid	London Clay	Unproductive	An aquitard which consists of low permeability silts and clays.

Formation	Aquifer designation	Hydrogeological characteristics
Lambeth Group	Secondary A Aquifer	The aquifer is likely to be in hydraulic continuity with the underlying Chalk. Largely confined by the London Clay, with the exception of an outcrop to the north west of the proposed development.
Chalk	Principal Aquifer	The aquifer can be divided into two units; the Grey Chalk, which consists of a low permeability marl-rich aquitard, and the White Chalk, a fractured limestone aquifer. Largely confined by the London Clay, with the exception of an outcrop to the north west of the proposed development and an area to the west where the Chalk is overlain by the Shepperton Gravel Member.

18.5.18 The superficial groundwaters described above are designated as a groundwater body under the WFD. Further information on this water body is provided later in this section.

Groundwater flows

18.5.19 Groundwater typically flows south and eastwards towards the River Thames, following the surface topography (HAL, 2018). There is a limited degree of groundwater flow from the recharge zone in the unconfined Chalk and Lambeth Group outcrop (situated to the north west of the Proposed Development) to the confined aquifers which underlie the Proposed Development Area, with flows emerging along a spring line where the aquifers become confined. There is likely to be an upward movement of water from the bedrock aquifers to the overlying Pleistocene river terrace deposits, through the London Clay aquitard.

18.5.20 Regional contouring by the Environment Agency suggests that groundwater levels within the Chalk are approximately 15-20m below ground level, are typically within a few metres of ground level in the Pleistocene gravels, and are at or near ground level on the River Thames floodplain (HAL, 2018). The high specific yield and high hydraulic conductivity of the river gravels means that seasonal variations in groundwater levels are limited to less than 0.5-1.5m, although the influence of water levels in the River Thames is evident within floodplain aquifers (HAL, 2018).

Groundwater quality

18.5.21 The 2016 WFD classification data presented on the Environment Agency's Catchment Data Explorer (2018a) indicates that the underlying groundwater is of good quality, and is unaffected by pressures from chemical and microbiological contamination and saline intrusion. Furthermore, the Catchment Data Explorer also demonstrates that the groundwater quantity is not under pressure from abstraction and saline intrusion.

Water Framework Directive water bodies

18.5.22 The surface and groundwater features described in the preceding sub-sections are designated as water bodies (or parts of water bodies) under the WFD, and documented in the Thames RBMP (Environment Agency, 2016). These are shown in **Figure 18.3** and their main characteristics (including type and current status) are summarised in **Table 18.5**.

Table 18.5 WFD water bodies in the study area

Type	Name	Water body ID	Status / Potential (2016)	Hydromorphological designation
Rivers	Yeading Brook	GB106039023051	Moderate	Heavily Modified
	River Crane	GB106039023030	Poor	None
	Colne (confluence with Chess to River Thames)	GB106039023090	Moderate	Heavily Modified
	Colne Brook	GB106039023010	Moderate	Heavily Modified
	Horton Brook	GB106039023040	Moderate	None
	Pinn	GB106039023070	Moderate	Heavily Modified
	Surrey Ash	GB106039023480	Moderate	Heavily Modified
	Portlane Brook	GB106039023451	Moderate	Heavily Modified
	Thames (Cookham to Egham)	GB106039023231	Moderate	Heavily Modified
	Thames (Egham to Teddington)	GB106039023232	Poor	Heavily Modified
Surface water transfers	Upper Duke of Northumberland's River	GB806100108	Moderate	Artificial
	Lower Duke of Northumberland's River	GB806100095	Moderate	Artificial
	Longford River	GB806100109	Moderate	Artificial
Lakes	Heron Lake	GB30642538	Moderate	Artificial
	King George VI Reservoir	GB30642488	Moderate	Artificial
	Queen Mary Reservoir	GB30642639	Poor	Artificial
	Staines Reservoir North	GB30642490	Moderate	Artificial
	Staines Reservoir South	GB30642525	Moderate	Artificial
	The Queen Mother Reservoir	GB30642334	Moderate	Artificial
	Wraysbury Reservoir	GB30642417	Moderate	Artificial
	Wraysbury No.2	GB30642489	Moderate	Artificial
Transitional	Thames Upper	GB530603911403	Moderate	Heavily Modified
Groundwater	Lower Thames Gravels	GB40603G000300	Good	N/A

(source: Environment Agency Catchment Data Explorer, 2018a)

Flood risk

18.5.23 Although the proposed development site is primarily located within Flood Zone 1 (i.e. land having a less than 1 in 1,000 annual probability of river or sea flooding), there are key locations within Flood Zone 2 (i.e. land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding) and Flood Zone 3 (i.e. land having a 1 in 100 or greater annual probability of river flooding), linked to both the River Crane to the east, and the River Colne to the west (**Figure 18.4**).

18.5.24 There is an existing surface water flood risk around the Proposed Development and although this does not cover extensive areas, the Environment Agency online flood risk mapping (Environment Agency, 2018b) indicates a risk to many of the built areas around Heathrow Airport and adjacent highways.

18.5.25 There are a number of reservoirs located around the Proposed Development Area including the Queen Mother, Wraysbury, King George VI, Staines (North and South) and Queen Mary. These are primarily located to the south west of Heathrow Airport and comprise artificial lakes used for public water supply by Thames Water. The Environment Agency online flood risk mapping (Environment Agency, 2018b) provides an indication of the flood extent associated with these structures. It shows there to be a risk of reservoir flooding to some areas in the south west of the Proposed Development. Reservoir flooding (as a result of an uncontrolled release of water) can have significant consequences; however, the Environment Agency provides guidance (Environment Agency, 2018b) that even if a location is shown to be at risk, flooding from reservoirs is extremely unlikely. There has been no loss of life in the UK from reservoir flooding since 1925. Therefore, the potential for reservoir flooding to affect the Proposed Development Area is very low.

18.5.26 The Proposed Development is located upstream of Teddington Lock, which marks the upstream boundary of the tidal limit on the River Thames. However, tidal flooding downstream of the tidal limit may have an influence upstream of Teddington Lock due to the backing up of fluvial flows along the River Thames and / or the network of watercourses which drain into it.

18.5.27 There is a risk of groundwater flooding affecting the Proposed Development as seasonal variations in groundwater are relatively close to the surface. However, the influence of water levels in the River Thames is evident within floodplain aquifers (HAL, 2018) and therefore identifying the risk of flooding specifically from groundwater is difficult to consider independently from other sources of flood risk.

Abstractions and discharges

Abstractions

18.5.28 There are a large number of surface and groundwater abstractions in the study area, typically for public water supply, agriculture and industrial uses:

- There are 14 licensed surface water abstractions (covering 24 abstraction points) (HAL, 2018). Although there are no abstraction points within Heathrow Airport, there is one on the River Colne to the west of the existing airport (within the land being considered for ancillary and related infrastructure as part of the Proposed Development) and a large number on the connected watercourses further west; and

- There are 68 licensed groundwater abstractions (covering 128 abstraction points; 73 from the Pleistocene river gravels, 33 from the Chalk and 22 from unspecified aquifers) (HAL, 2018). Three of these groundwater abstraction points are located within Heathrow Airport, and approximately 15 further points are located within a kilometre of the existing Heathrow Airport boundary.

18.5.29 There are several groundwater Source Protection Zones (SPZs) in the study area, which safeguard public water supply abstractions (**Figure 18.2**). These are largely located to the north, west and south of Heathrow Airport, and are not located within or close to the boundaries (<4km) of the existing airport.

Discharges

18.5.30 There are also a large number of licensed discharges to surface water and groundwater (HAL, 2018), including:

- There are 155 discharges to surface water. A large number of these are located along the River Colne and connected watercourses to the west of the existing airport, with a further three points located along the eastern airport boundary; and
- There are 87 discharges to groundwater. These are largely located to the west of the existing airport complex, along the River Colne corridor. However, there are two discharge points within 1km of the southern and eastern boundaries of the existing airport.

Existing water supply and foul drainage networks

18.5.31 The foul drainage network in the study area is maintained and operated by Thames Water. The current drainage network in Heathrow Airport drains via four key catchments (HAL, 2018):

- Eastern catchment, which flows through the Eastern Balancing Reservoirs prior to discharge into the River Crane;
- Southern catchment, which flows into Clockhouse Lane Pit before discharging into the Portlane Brook (and subsequently the River Thames) via the Feltham Relief Sewer;
- Western catchment, which flows into Clockhouse Lane Pit via Spout Lane Lagoon (with contaminated water diverted for treatment at Mogden Sewage Works via a Thames Water sewer); and
- North-Western catchment, which drains to the North West Balancing Pond and overtops into the Wraysbury River via a system of syphons and culverts.

18.5.32 These catchments incorporate a range of water treatment features, including attenuation and treatment ponds and the Heathrow Constructed Wetlands Facility at Mayfield Farm to remove chemical contaminants and improve water quality prior to discharge into surface waters (HAL, 2018).

18.5.33 The water supply network in the area is maintained and operated by Affinity Water. Assets in the area of the Proposed Development include:

- Major strategic pipelines within the proposed development boundary, including a 450mm diameter trunk water main and a network of smaller distribution pipelines and service pipes;

- Iver Raw Water Tunnel No.1, which conveys raw water from an abstraction point on the River Thames at Sunnymeads to the water treatment works at Iver. This is used during standard operational conditions; and
- Iver Raw Water Tunnel No.2, which conveys raw water from Wraysbury Reservoir to the Iver water treatment works. This is only used as an emergency supply if it is not possible to abstract from the River Thames.

18.6 Scoping of potential effects

Definition of receptors

- 18.6.1 As outlined in **Section 18.4**, the study area for this Scoping Report has been determined on the basis of surface water drainage catchments and groundwater bodies that are hydrologically connected to the Proposed Development site. A similar approach has been used to define the principal water receptors in the study area, with each receptor consisting of a discrete surface drainage catchment or body of surface or groundwater. The receptors to be used in the assessment are summarised in **Table 18.6** and shown in **Figure 18.5**.
- 18.6.2 There are a large number of ways in which surface water drainage catchments can be defined, ranging from first order streams that have no further watercourses upstream (cf. Strahler, 1957) to much larger catchments that incorporate a number of smaller individual watercourses that combine in a single overarching drainage basin. For the purposes of this assessment, the Environment Agency's WFD water body catchments have been used to define receptors within the surface drainage network; these are readily available and robust units that are based on existing surface drainage catchments. In some cases, smaller or adjacent water bodies have been combined. This proportionate approach will allow the complexity of the drainage network to be represented while avoiding the creation of a large number of very small receptors.
- 18.6.3 The lakes and reservoirs that are located to the south and west of the proposed development area are each designated as a water body in their own right in the Thames RBMP (Environment Agency, 2016). However, for the purposes of this assessment, it is proposed that they are amalgamated into a single lake receptor, reflecting the likely hydrological inter-relationships between the different bodies of water in the Pleistocene gravel aquifers.
- 18.6.4 The hydrogeological baseline presented in **Section 18.5** demonstrates that there are several aquifers contained within the superficial deposits that underlie and surround the Proposed Development site. Due to the high degree of spatial variability in the outcrops of the superficial aquifers and the fact that they have been classed as a single groundwater body by the Environment Agency, they have been combined into a single receptor based on the groundwater body boundary. These near-surface aquifers are separated from the deeper bedrock aquifers by an aquitard, which is therefore considered to be a separate receptor for the purposes of this assessment.
- 18.6.5 In addition, water supply infrastructure and surface and foul drainage networks have also been considered as separate receptors because they are entirely man-made features that are distinct from the natural surface and subsurface features described above.

Table 18.6 Water receptors

Receptor	Description
River Colne	Surface waters (hydrology, geomorphology, water quality), water resources (abstractions and discharges), water-dependent habitats and receptors to flood risk (people, property and infrastructure) within the River Colne and connected watercourses, including the Wraysbury River and Bigley Ditch.
River Crane	Surface waters (hydrology, geomorphology, water quality), water resources (abstractions and discharges), water-dependent habitats and receptors to flood risk (people, property and infrastructure) within the River Crane and its tributaries, including Yeading Brook.
Colne Brook	Surface waters (hydrology, geomorphology, water quality), water resources (abstractions and discharges), water-dependent habitats and receptors to flood risk (people, property and infrastructure) within the Colne Brook and its tributaries.
River Ash	Surface waters (hydrology, geomorphology, water quality), water resources (abstractions and discharges), water-dependent habitats and receptors to flood risk (people, property and infrastructure) within the River Ash, Stanwell Brook and their tributaries.
Surface Water Transfers	Surface waters (hydrology, geomorphology, water quality), water resources (abstractions and discharges), water-dependent habitats and receptors to flood risk (people, property and infrastructure) within the Duke of Northumberland's River, Longford River and watercourses which flow into them.
Horton Brook	Surface waters (hydrology, geomorphology, water quality), water resources (abstractions and discharges), water-dependent habitats and receptors to flood risk (people, property and infrastructure) within the Horton Brook and its tributaries.
River Pinn	Surface waters (hydrology, geomorphology, water quality), water resources (abstractions and discharges), water-dependent habitats and receptors to flood risk (people, property and infrastructure) within the River Pinn and its tributaries.
Portlane Brook	Surface waters (hydrology, geomorphology, water quality), water resources (abstractions and discharges), water-dependent habitats and receptors to flood risk (people, property and infrastructure) within the Portlane Brook, Felthamhill Prook and their tributaries.
River Thames	Surface waters (hydrology, geomorphology, water quality), water resources (abstractions and discharges), water-dependent habitats and receptors to flood risk (people, property and infrastructure) within the freshwater River Thames from Cookham to Teddington.
River Thames (tidal)	Surface waters (hydrology, geomorphology, water quality), water resources (abstractions and discharges), water-dependent habitats and receptors to flood risk (people, property and infrastructure) within the tidal River Thames downstream of Teddington.
Lakes and reservoirs	Surface waters (hydrology, geomorphology, water quality), water resources (abstractions and discharges), and water-dependent habitats within the King George VI, Queen Mary, Queen Mother, Staines (North and South) and Wraysbury Reservoirs, Heron Lake and Wraysbury No.2 lake.
Lower Thames Gravels aquifers	Groundwaters (quality and quantity), water resources (abstractions and discharges) and groundwater-dependent habitats supported by the Lower Thames Gravels WFD groundwater body, incorporating the Principal and Secondary A aquifers located in the superficial geology.
Bedrock aquifers	Groundwaters (quality and quantity), water resources (abstractions and discharges) and groundwater-dependent habitats supported by the Principal and Secondary A aquifers in the Chalk and Lambeth Group bedrock.
Water supply infrastructure	Water supply infrastructure, including abstractions, treatment plants, pumping stations and distribution networks (including the Iver Raw Water Tunnels and the 450mm trunk water main).

Receptor	Description
Surface and foul drainage infrastructure	Surface and foul drainage infrastructure including sewer networks, treatment plants, pumping stations and discharges.

Effects scoped into the assessment

18.6.6 The potential likely significant effects to be scoped into the water assessment are displayed in **Table 18.7**.

Table 18.7 Potential likely significant effects on water resources and flood risk

Activity	Effect	Receptors
Construction		
Realignment or modification of existing surface watercourses and provision of flood storage	Direct changes to the hydrology and geomorphology of affected watercourses, including changes to flow volume and apportionment, loss or alteration of existing geomorphological characteristics, and changes to in-channel physical habitats (note that impacts on biological receptors are considered separately in Chapter 6 'Biodiversity').	<ul style="list-style-type: none"> • River Colne • Colne Brook • Surface Water Transfers • Water supply infrastructure • Surface and foul drainage infrastructure
	Changes to the hydrology of the watercourses and the potential loss of functional floodplain could impact upon flood risk.	
	Changes to flow apportionment and the hydrology of surface watercourses could affect the use of these features for water supply (including emergency supplies used when water cannot be abstracted from the Thames; cf. Section 18.5)	
Changes to land use	Changes to floodplain extent, ground cover, topography and surface permeability (e.g. due to earthworks and increased areas of hardstanding) could result in changes to surface flow patterns and infiltration rates. This could impact upon the hydrology and geomorphology of surface waters.	<ul style="list-style-type: none"> • River Crane • River Colne • Colne Brook • River Ash • Surface Water Transfers • Horton Brook • River Pinn • Portlane Brook • River Thames • River Thames (tidal) • Lower Thames Gravels aquifers • Bedrock aquifers • Water supply infrastructure • Surface and foul drainage infrastructure
	Changes to the hydrology of the watercourses and the potential loss of functional floodplain could impact upon flood risk.	
	Changes to surface flow patterns and infiltration rates could affect groundwater recharge and groundwater levels.	

Activity	Effect	Receptors
	Changes to the distribution of surface flows could also affect water supply and the drainage network.	
Ground disturbance during construction	Increased sediment supply to surface waters through erosion of exposed soils by surface run-off, which could impact upon the geomorphology and quality of surface waters.	<ul style="list-style-type: none"> • River Crane • River Colne • Colne Brook • River Ash • Surface Water Transfers • Horton Brook • River Pinn • Portlane Brook • River Thames • River Thames (tidal)
Use of construction materials	<p>Supply of construction materials (including concrete) to surface waters, as a result of surface run-off or accidental spillage, could impact upon the quality of surface waters and connected groundwater.</p> <p>Changes to the quality of surface waters and groundwater could impact upon the use of these resources for water supply.</p>	<ul style="list-style-type: none"> • River Crane • River Colne • Colne Brook • River Ash • Surface Water Transfers • Horton Brook • River Pinn • Portlane Brook • River Thames • River Thames (tidal) • Lakes and reservoirs • Lower Thames Gravels aquifers • Bedrock aquifers • Water supply infrastructure
Use of construction machinery	<p>Supply of fuel oils and lubricants to surface waters during construction, as a result of accidental spillage or leakage from construction vehicles, could impact upon the quality of surface waters and connected groundwater.</p> <p>Changes to the quality of surface waters and groundwater could impact upon the use of these resources for water supply.</p>	<ul style="list-style-type: none"> • River Crane • River Colne • Colne Brook • River Ash • Surface Water Transfers • Horton Brook • River Pinn • Portlane Brook • River Thames • River Thames (tidal) • Lakes and reservoirs • Lower Thames Gravels aquifers • Bedrock aquifers • Water supply infrastructure
Construction drainage and dewatering	The installation of a new drainage system to manage drainage from the construction area (including dewatering from subsurface activities) could result in changes to surface flow patterns (including volumes and distribution between watercourses and channels) and infiltration rates. This could impact upon	<ul style="list-style-type: none"> • River Crane • River Colne • Colne Brook • River Ash • Surface Water Transfers • Horton Brook • River Pinn • Portlane Brook

Activity	Effect	Receptors
	<p>the hydrology and geomorphology of surface waters, groundwater hydrology, and existing drainage patterns.</p> <p>Changes to the hydrology of the watercourses resulting from discharges from dewatering and the construction drainage system into the existing drainage network could impact upon flood risk.</p> <p>The supply of sediment and other contaminants could also be increased, which could impact upon surface water and groundwater quality.</p> <p>Changes to the quality of surface waters and groundwater could impact upon the use of these resources for water supply.</p>	<ul style="list-style-type: none"> • River Thames • River Thames (tidal) • Lower Thames Gravels aquifers • Bedrock aquifers • Water supply infrastructure • Surface and foul drainage infrastructure
Water use	<p>Increased abstraction requirements to provide water for use in construction processes and potable water by site operatives could potentially increase pressure on existing water resources and supply networks.</p>	<ul style="list-style-type: none"> • Water supply infrastructure • Lower Thames Gravels aquifers • Bedrock aquifers
Disposal of foul waters	<p>Disposal of foul effluent from welfare facilities could potentially increase pressure on existing foul drainage networks.</p>	<ul style="list-style-type: none"> • Surface and foul drainage infrastructure
Operation		
Presence of new infrastructure	<p>Changes in surface water run-off as a result of changes in land use, an increase in impermeable area and new or increased discharges from the site during operation could impact upon the hydrology and geomorphology of the surface water system.</p> <p>Changes to the hydrology of the watercourses could impact upon flood risk.</p> <p>The presence of new below-ground infrastructure could impact upon groundwater volumes and flow patterns, as could changes to surface infiltration characteristics.</p> <p>Changes to surface and subsurface flow patterns and infiltration rates could affect groundwater recharge and groundwater levels.</p>	<ul style="list-style-type: none"> • River Crane • River Colne • Colne Brook • River Ash • Surface Water Transfers • Horton Brook • River Pinn • Portlane Brook • River Thames • River Thames (tidal) • Lower Thames Gravels aquifers • Bedrock aquifers • Water supply infrastructure • Surface and foul drainage infrastructure

Activity	Effect	Receptors
	Changes to the distribution of surface flows could also affect water supply and the drainage network.	
Operational use of new infrastructure	<p>Supply of sediment, fuel oils, lubricants and other contaminants to surface waters during, as a result of accidental spillage or leakage from vehicles using the site could impact upon surface water quality and the quality of connected groundwaters.</p> <p>Changes to the quality of surface waters and groundwater could impact upon the use of these resources for water supply.</p>	<ul style="list-style-type: none"> • River Crane • River Colne • Colne Brook • River Ash • Surface Water Transfers • Horton Brook • River Pinn • Portlane Brook • River Thames • River Thames (tidal) • Lakes and reservoirs • Lower Thames Gravels aquifers • Bedrock aquifers
Operation of site drainage system	<p>The installation of a new drainage system to manage drainage from the operational development could result in changes to surface flow patterns (including volumes and distribution between watercourses and channels) and infiltration rates could impact upon the hydrology and geomorphology of surface waters, groundwater hydrology.</p> <p>Changes to the hydrology of the watercourses could impact upon flood risk.</p> <p>The supply of sediment and other contaminants could also be increased, which could impact upon surface water and groundwater quality.</p> <p>Changes to the quality of surface waters and groundwater could impact upon the use of these resources for water supply.</p>	<ul style="list-style-type: none"> • River Crane • River Colne • Colne Brook • River Ash • Surface Water Transfers • Horton Brook • River Pinn • Portlane Brook • River Thames • River Thames (tidal) • Lower Thames Gravels aquifers • Bedrock aquifers • Water supply infrastructure • Surface and foul drainage infrastructure
Water use	Increased requirements for potable water for use in operational infrastructure could potentially increase pressure on existing water resources and supply networks.	<ul style="list-style-type: none"> • Water supply infrastructure • Lower Thames Gravels aquifers • Bedrock aquifers
Disposal of foul waters	Disposal of foul effluent from operational infrastructure could potentially increase pressure on existing foul drainage networks.	<ul style="list-style-type: none"> • Surface and foul drainage infrastructure

Effects scoped out of the assessment

18.6.7 No potential effects on water resources and flood risk receptors have been scoped out of the

assessment at this stage. However, **Table 18.7** demonstrates that the receptors that will be considered for each potential effect is limited (i.e. not all receptors will be considered under each potential impact). The scope of the assessment has been made proportionate by reducing the scope of the receptors affected by different impacts rather than reducing the types of impact that are considered, as summarised in **Table 18.8**. This approach will ensure that the next stage of the EIA is robust, comprehensive and proportionate.

Table 18.8 Summary of potentially significant effects considered for each receptor

Potentially significant effect	River Crane	River Colne	Colne Brook	River Ash	Surface Water Transfers	Horton Brook	River Pinn	Portlane Brook	River Thames	River Thames (tidal)	Lakes and reservoirs	Lower Thames Gravels aquifers	Bedrock aquifers	Water supply infrastructure	Surface and foul drainage infrastructure
Construction															
Realignment or modification of existing surface watercourses and provision of flood storage	x	✓	✓	x	✓	x	x	x	x	x	x	x	x	✓	✓
Changes to land use	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	x	✓	✓	✓	✓
Ground disturbance during construction	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	x	x	x	x	x
Use of construction materials	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Use of construction machinery	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Construction drainage and dewatering	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	x	✓	✓	✓	✓
Water use	x	x	x	x	x	x	x	x	x	x	x	✓	✓	✓	x
Disposal of foul waters	x	x	x	x	x	x	x	x	x	x	x	x	x	x	✓
Operation															
Presence of new infrastructure	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	x	✓	✓	✓	✓

Potentially significant effect	River Crane	River Colne	Colne Brook	River Ash	Surface Water Transfers	Horton Brook	River Pinn	Portlane Brook	River Thames	River Thames (tidal)	Lakes and reservoirs	Lower Thames Gravels aquifers	Bedrock aquifers	Water supply infrastructure	Surface and foul drainage infrastructure
Operational use of new infrastructure (including aircraft and ground-based airport traffic)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	x	x
Operation of site drainage system	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	x	✓	✓	✓	✓
Water use	x	x	x	x	x	x	x	x	x	x	x	✓	✓	✓	x
Disposal of foul waters	x	x	x	x	x	x	x	x	x	x	x	x	x	x	✓

18.7 Approach to Assessment

Study area

18.7.1 The proposed study areas for surface water and groundwater receptors are set out in **Section 18.4**. These will be refined at the assessment stage as the design and consultation processes progress, and as related topic assessments are progressed (e.g. field surveys and modelling undertaken to support the development of designs for the realignment of surface watercourses).

18.7.2 The study areas for the assessment will be identified to ensure that the impact of the Proposed Development on the water environment can be fully assessed. A likely ZOI for potential cumulative water effects with other developments will be defined separately as part of the CEA, as described in **Section 4.6 of Chapter 4 ‘Approach to EIA’**.

Additional baseline water collection

18.7.3 The subsequent stages of this assessment will be informed by a detailed desk-based assessment, supported by a series of field investigations and monitoring programmes. These surveys will be used to provide a robust baseline against which the potential impacts of the Proposed Development can be assessed. The surveys will also be used to inform the Proposed Development design and associated assessments (cf. **Section 18.9**).

18.7.4 The desk-based assessment will, to the extent relevant, include a comprehensive review of the relevant technical reports and data produced by HAL to inform their PEI and ES, as set out in their scoping report (HAL, 2018), where these data are available. Our proposed approach is summarised in **Table 18.9**. Third-party data referenced in the description of baseline conditions (**Section 18.5**) will be updated from the original sources where appropriate prior to consideration in the PEI and ES.

Table 18.9 Proposed analysis to inform the assessment

Assessment	Description
Desk-based assessment of archive data	<p>This assessment will consist of an in-depth review of the readily available archive data to characterise the baseline water environment, including:</p> <ul style="list-style-type: none"> • Detailed Ordnance Survey mapping, aerial photography and LiDAR topographic data; • Flood risk data from the Environment Agency and LLFAs; • WFD water body data from the Catchment Data Explorer, plus detailed water body information sheets and list of mitigation measures from the Environment Agency; • Surface water flow and quality data from the Environment Agency; • Groundwater level and quality data from the Environment Agency, including groundwater vulnerability mapping and aquifer designations; • Licensed abstraction and consented discharge data from the Environment Agency; • Water supply infrastructure data from Affinity Water; • Surface and foul water infrastructure data from Thames Water, the local authorities and Heathrow Airport Ltd. (including the private drainage system which serves the existing airport complex); and • Designated site information from Natural England.

Assessment	Description
Geomorphological walkover survey	A detailed geomorphological walkover survey using a combined fluvial audit and physical biotope mapping technique will be used to identify the predominant geomorphological characteristics of the main watercourses that will be affected by the proposed channel diversion. The extent of this survey will be sufficient to characterise baseline conditions in each of the watercourses that could be directly affected by the proposed development, and will therefore consider reaches within, upstream and downstream of the Proposed Development footprint. Connected watercourses (e.g. tributaries and side channels) will also be surveyed where appropriate. The results of this survey will be used to inform the assessment of impacts on geomorphology, surface hydrology and physical habitats. The survey will also be used to inform the WFD compliance assessment (Section 18.9)
Channel topographic baseline survey	A detailed topographic survey of each of the watercourses that could be affected by the Proposed Development will be undertaken, including channel cross sections, channel long sections, and long sections of the bank top and bank base. This survey will cover an area sufficient to inform detailed hydraulic modelling, the results of which will be used to inform the scheme design and assessment of impacts on geomorphology, surface hydrology and physical habitats. The survey results will also be used to inform the WFD compliance assessment and Flood Risk Assessment (FRA) (Section 18.9)
Surface water hydrological monitoring	A network of continuous (i.e. 15-minute) gauging stations will be installed to monitor surface water flows and stage across the drainage network that could be affected by the Proposed Development. Gauging stations will be positioned to ensure that the hydrological characteristics of all inlets and outlets from the Proposed Development boundary (i.e. upstream and downstream) are monitored. The results of this monitoring programme will be used to inform the scheme design, hydraulic modelling and the assessment of impacts on surface hydrology and geomorphology. The survey results will also be used to inform the FRA (Section 18.9)
Surface water quality monitoring	Surface water quality monitoring will be undertaken at monthly intervals at key locations across the surface drainage network that could potentially be affected by the Proposed Development (with a focus upstream and downstream of the Proposed Development boundary). This will include measurements of basic water quality parameters (e.g. pH, dissolved oxygen, conductivity), nutrients (e.g. phosphorus, nitrogen) and contaminants (e.g. metals, hydrocarbons). The results of this monitoring programme will be used to inform the assessment of impacts on surface water quality, and will also be used to inform the WFD compliance assessment (Section 18.9)
Groundwater level monitoring	Groundwater levels will be monitored at selected borehole locations across the study area installed as part of a future ground investigation (cf. Chapter 14 'Land Quality and Waste'). The results of this monitoring programme will be used to inform the assessment of impacts on surface and groundwater hydrology, and will also be used to inform the WFD compliance assessment and FRA (Section 18.9)
Groundwater quality monitoring	Groundwater quality will be monitored selected borehole locations across the study area installed as part of a future ground investigation (cf. Chapter 14 'Land Quality and Waste'). The results of this monitoring programme will be used to inform the assessment of impacts on surface and groundwater quality, and will also be used to inform the WFD compliance assessment (Section 18.9)

Assessment	Description
Hydraulic modelling	Detailed hydraulic modelling will be undertaken to support the development of proposals to realign or modify the existing surface watercourses to accommodate the Proposed Development. The outputs of this process will be used to inform the assessment of impacts on flood risk, flow conveyance, hydrology and geomorphology within affected receptors.

18.7.5 In addition, the primary data sources described above could also be augmented by data and reporting produced by HAL as part of their EIA for the HAL DCO Project, where available. This could potentially include the Drainage Impact Assessment, Groundwater Impact Assessment, surface water quality assessment, aspects of the Quantitative Risk Assessment with relevance to surface and groundwater quality, and the Water Resources Management Plan.

Assessment methodology

Overall approach

18.7.6 Two key groups of impacts have been identified for the purposes of this assessment:

- Water resources: These include potential effects on the physical (including hydrology and geomorphology), biological or chemical character of surface waters or groundwater, potentially impacting on secondary receptors such as wetlands or abstractions, and WFD water body status; and
- Flood risk: These include potential effects of the proposed development on surface and subsurface drainage, flow conveyance and flood risk.

18.7.7 Whilst there are clear links between the two impact groups, the assessment of receptor sensitivity and the magnitude of effect may differ. Definitions of receptor sensitivity and value and impact magnitude and significance are provided in the paragraphs below. These definitions have been developed with reference to guidance provided by the Department of Transport (2015) and Highways Agency (2008).

18.7.8 Our proposed approach follows the four-level classification of receptor sensitivity and value and impact magnitude recommended by the Department of Transport (2015) (i.e. high, medium, low, very low / negligible) rather than the five-level system recommended in Highways Agency (2008) (very high, high, medium, low, negligible) to ensure that it is consistent with the approach adopted in the other chapters of the EIA. However, the Highways Agency (2008) guidance has been fully consulted and used to inform the definition of each key assessment term where appropriate.

18.7.9 The flood risk implications of the Proposed Development will be explored in more detail in a separate Flood Risk Assessment, which will accompany the EIA. The EIA will also be accompanied by a separate WFD compliance assessment. The proposed approach to these assessments are set out in **Section 18.10**.

Receptor sensitivity and value

18.7.10 Receptor sensitivity has been defined with reference to the adaptability, tolerance, recoverability and value of individual receptors. **Table 18.10** provides the criteria for appraisal of the value and sensitivity for identified water resources and flood risk receptors based on professional judgement.

Table 18.10 Definitions of sensitivity for water resources and flood risk receptors

Sensitivity	Definition
High	<p>Receptor has very limited capacity to tolerate changes to hydrology, geomorphology, and water quality or flood risk.</p> <p>Water resources</p> <ul style="list-style-type: none"> • Controlled waters with an unmodified, naturally diverse hydrological regime, a naturally diverse geomorphology with no barriers to the operation of natural processes, and good water quality. • Supports habitats or species that are highly sensitive to changes in surface hydrology, geomorphology or water quality. • Supports Principal Aquifer with public water supply abstractions by provision of recharge. • Site is within Inner or Outer Source Protection Zones. <p>Flood risk</p> <ul style="list-style-type: none"> • Highly Vulnerable Land Use, as defined by NPPF PPG (Department for Communities and Local Government (DCLG) 2014). • Land with more than 100 residential properties (after Design Manual for Roads and Bridges, Highways Agency, 2008).
Medium	<p>Receptor has limited capacity to tolerate changes to hydrology, geomorphology, and water quality or flood risk.</p> <p>Water resources</p> <ul style="list-style-type: none"> • Controlled waters with hydrology that sustains natural variations, geomorphology that sustains natural processes, and water quality that is not contaminated to the extent that habitat quality is constrained. • Supports or contributes to habitats or species that are sensitive to changes in surface hydrology, geomorphology and/or water quality. • Supports Secondary A or Secondary B Aquifer with water supply abstractions. • Site is within a Catchment Source Protection Zone. <p>Flood risk</p> <ul style="list-style-type: none"> • More Vulnerable Land Use, as defined by NPPF PPG (DCLG, 2014). • Land with between 1 and 100 residential properties or more than 10 industrial premises (after Highways Agency, 2008).
Low	<p>Receptor has moderate capacity to tolerate changes to hydrology, geomorphology, and water quality or flood risk.</p> <p>Water resources</p> <ul style="list-style-type: none"> • Controlled waters with hydrology that supports limited natural variations, geomorphology that supports limited natural processes and water quality that may constrain some ecological communities. • Supports or contributes to habitats that are not sensitive to changes in surface hydrology, geomorphology or water quality. • Supports Secondary A or Secondary B Aquifer without abstractions. <p>Flood risk</p> <ul style="list-style-type: none"> • Less Vulnerable Land Use, as defined by NPPF PPG (DCLG, 2014). • Land with 10 or fewer industrial properties (after Highways Agency, 2008).
Very Low	<p>Receptor is generally tolerant of changes to hydrology, geomorphology, and water quality or flood risk.</p>

Sensitivity	Definition
	<p>Water resources</p> <ul style="list-style-type: none"> Controlled waters with hydrology that does not support natural variations, geomorphology that does not support natural processes and water quality that constrains ecological communities. Aquatic or water-dependent habitats and/or species are tolerant to changes in hydrology, geomorphology or water quality. Non-productive strata that does not support groundwater resources. <p>Flood risk</p> <ul style="list-style-type: none"> Water Compatible Land Use, as defined by NPPF PPG (DCLG, 2014). Land with limited constraints and a low probability of flooding of residential and industrial properties (after Highways Agency, 2008).

18.7.11 It should be noted that high value and high sensitivity are not necessarily linked with respect to a particular impact. A receptor could be of high value but have a low sensitivity to an effect. It is therefore important not to inflate the significance of an impact due to the value of the receptor. Instead, the value can be used as a modifier for the sensitivity assigned to the receptor. Definitions for the value of surface waters are provided in **Table 18.11**.

Table 18.11 Definitions of value for water resources and flood risk receptors

Value	Definition
High	<p>Receptor has a high quality and rarity, and is an internationally or nationally important resource with very limited potential for offsetting, compensation or substitution.</p> <p>Water resources</p> <ul style="list-style-type: none"> Supports or contributes to designated habitats or species of international or national importance (e.g. Special Area of Conservation (SAC), Special Protection Area (SPA), and Site of Special Scientific Interest (SSSI)). Licensed potable abstractions (surface water and groundwater). <p>Flood risk</p> <ul style="list-style-type: none"> Nationally significant infrastructure. Internationally or nationally designated planning policy areas.
Medium	<p>Receptor has a medium quality and rarity, and is a regionally important resource with limited potential for offsetting, compensation or substitution.</p> <p>Water resources</p> <ul style="list-style-type: none"> Supports or contributes to habitats or species of UK regional value (Site of Nature Conservation Interest (SNCI), Regionally Important Geological Site (RIGS)). Licensed non-potable abstractions and unlicensed potable abstractions (surface water and groundwater). <p>Flood risk</p> <ul style="list-style-type: none"> Locally significant infrastructure. Local planning policy designated sites.
Low	<p>Receptor has a low quality and rarity, and is a locally important resource with some potential for offsetting, compensation or substitution.</p> <p>Water resources</p>

Value	Definition
	<ul style="list-style-type: none"> Supports or contributes to habitats or species of local value (e.g. Local Nature Reserve (LNR)). Unlicensed non-potable abstractions (surface water and groundwater). <p>Flood risk</p> <ul style="list-style-type: none"> Drainage that does not discharge to Critical Drainage Areas.
Very Low	<p>Receptor has a very low quality and rarity, and is not considered to be an important resource.</p> <p>Water resources</p> <ul style="list-style-type: none"> Does not support or contribute to habitats or species of particular importance. No abstractions (surface water and groundwater). <p>Flood risk</p> <ul style="list-style-type: none"> No significant infrastructure.

Magnitude of effects

18.7.12 Impact magnitude has been defined with reference to the spatial extent, duration, frequency and severity of the effect. Impact magnitude is defined in **Table 18.12**.

Table 18.12 Definitions of impact magnitude for water resources and flood risk receptors

Magnitude	Definition
High	<p>Fundamental, permanent / irreversible changes, over the whole receptor, and / or fundamental alteration to key characteristics or features of the receptor's character or distinctiveness.</p> <p>Water resources</p> <ul style="list-style-type: none"> Permanent changes to geomorphology and/or hydrology that prevent natural processes operating. Permanent and/or wide scale effects on water quality or availability. Permanent loss or long-term (>5 years) degradation of a water supply source resulting in prosecution. Permanent or wide scale degradation of habitat quality. Deterioration in water body status or prevention of future achieving status objectives. <p>Flood risk</p> <ul style="list-style-type: none"> Permanent or major change to existing flood risk. Reduction in on-site flood risk by raising ground level in conjunction with provision of compensation storage. Increase in off-site flood risk due to raising ground levels without provision of compensation storage. Failure to meet either sequential or exception test (if applicable).
Medium	<p>Considerable, permanent / irreversible changes, over the majority of the receptor, and / or discernible alteration to key characteristics or features of the receptor's character or distinctiveness.</p> <p>Water resources</p> <ul style="list-style-type: none"> Medium-term (1-5 years) effects on water quality or availability. Medium-term (1-5 years) degradation of a water supply source, possibly resulting in prosecution. Habitat change over the medium-term (1-5 years).

Magnitude	Definition
	<p>Flood risk</p> <ul style="list-style-type: none"> • Medium-term (1-5 years) or moderate change to existing flood risk. • Possible failure of sequential or exception test (if applicable). • Reduction in off-site flood risk within the local area due to the provision of a managed drainage system.
Low	<p>Discernible, temporary (throughout project duration) change, over a minority of the receptor, and / or limited but discernible alteration to key characteristics or features of the receptor's character or distinctiveness.</p> <p>Water resources</p> <ul style="list-style-type: none"> • Short-term (<1 year) or local effects on water quality or availability. • Short-term (<1 year) degradation of a water supply source. • Habitat change over the short-term. <p>Flood risk</p> <ul style="list-style-type: none"> • Short-term (<1 year), temporary or minor change to existing flood risk. • Localised increase in on-site or off-site flood risk due to increase in impermeable area. • Passing of sequential and exception test.
Negligible	<p>Discernible, temporary (for part of the project duration) change, or barely discernible change for any length of time, over a small area of the receptor, and/or slight alteration to key characteristics or features of the receptor's character or distinctiveness.</p> <p>Water resources</p> <ul style="list-style-type: none"> • Intermittent impact on local water quality or availability. • Intermittent or no degradation of a water supply source. • Very slight local changes to habitat that have no observable impact on dependent receptors. <p>Flood risk</p> <ul style="list-style-type: none"> • Intermittent or very minor change to existing flood risk. • Highly localised increase in on-site or off-site flood risk due to increase in impermeable area.

Evaluation of impact significance

18.7.13 The potential significance of an impact is a function of the sensitivity and value of the receptor and the magnitude of the effect (noting that value and sensitivity are not necessarily linked, as described above). The significance is derived using an impact significance matrix, as shown in **Table 18.13**. Definitions of each level of significance are provided in **Table 18.14**.

Table 18.13 Significance of impact matrix

		Negative Magnitude				Positive Magnitude			
		High	Medium	Low	Very Low	Very Low	Low	Medium	High
Sensitivity	High	Major	Major	Moderate	Minor	Minor	Moderate	Major	Major
	Medium	Major	Moderate	Minor	Minor	Minor	Minor	Moderate	Major
	Low	Moderate	Minor	Minor	Negligible	Negligible	Minor	Minor	Moderate
	Very Low	Minor	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Minor

Table 18.14 Definitions of impact significance for water resources and flood risk receptors

Impact	Definition
Major	Very large or large change in receptor condition (adverse or beneficial), which are likely to be key factors in the decision-making process because they contribute to achieving international, national or regional objectives, or could result in exceedance of statutory objectives and / or breaches of legislation.
Moderate	Intermediate change in receptor condition (adverse or beneficial), which are likely to be important considerations in the decision-making process because they contribute to achieving local objectives, or could result in exceedance of statutory objectives and / or breaches of legislation.
Minor	Small change in receptor condition (adverse or beneficial), which may be important but are unlikely to be important considerations in the decision-making process.
Negligible	Very small changes in receptor condition (adverse or beneficial), which may be raised as local issues but are unlikely to be important in the decision-making process.
No change	No or imperceptible effects, within normal variations or within the margins of forecasting error.

18.7.14 Assessment of impact significance is qualitative and reliant on professional experience, interpretation and judgement. The matrix should therefore be viewed as a framework to aid understanding of how a judgement has been reached, rather than as a prescriptive, formulaic tool. Impacts may be adverse or beneficial. Effects that result in major or moderate impacts are considered to be ‘significant’ in EIA terms. Adverse significant impacts may require mitigation; beneficial significant impacts could contribute to the case in favour of the project.

Assessment scenarios

18.7.15 The Proposed Development will be implemented across an anticipated timeframe of 2022 – 2030. The water assessment will consider a number of different assessment scenarios which will consider the construction and operational phases, and the activities which would give rise to the most significant water impacts as a result of the Proposed Development.

18.7.16 Construction impacts will be assessed according to the current baseline, as defined by data collected in the desk-based assessment and, where appropriate, supplementary field surveys. The impacts of operational activities post-2035 will be assessed with reference to future baseline conditions, including likely changes to surface and groundwater receptors anticipated

under appropriate climate change scenarios (e.g. UKCPI8, as specified in **Chapter 8 ‘Climate Change’**) and, where appropriate, predicted improvements in the status of surface and groundwater bodies following the implementation of the measures outlined in the Thames RBMP.

Cumulative effects

18.7.17 Cumulative water effects resulting from the combination of effects from the Proposed Development and other developments will be assessed in accordance with the guidance and methodologies set out in **Section 4.6 of Chapter 4 ‘Approach to EIA’**. The assessment will be dependent on the availability and accessibility of information for other developments. The potential for cumulative effects will be considered for all of the potential construction-stage and operational activities identified in **Section 18.6**. As with the main impact assessment, the assessment of each impact will be restricted to the receptors set out in **Table 18.8**.

18.7.18 The Proposed Development does not include the new Northwest Runway and M25 realignment components of the NRS proposed by HAL. However, the Proposed Development is designed to be operated alongside these components of the NRS that are being progressed by the HAL DCO Project. Therefore, the total cumulative water effects will be considered together to ensure an overarching assessment of the NRS as a whole.

18.7.19 Any components of the HAL DCO Project which would no longer be required as a result of the Proposed Development would not be included in the CEA.

18.8 Approach to Mitigation

18.8.1 Minimisation of water impacts will be embedded into the design of the Proposed Development where possible following the application of the hierarchy of mitigation as described in **Chapter 4 ‘Approach to EIA’**. The assessment of impacts will be made with these embedded mitigation measures in place.

18.8.2 The type and level of mitigation measures required will be informed by the expected level of impact. The ANPS lists a number of mitigation measures relevant to the construction and operational phases, which, where relevant, will be put forward to minimise impacts resulting from the Proposed Development. Mitigation identified in the ANPS that is relevant to the water assessment is outlined below:

- Impacts on local water resources should be minimised through planning and design for the efficient use of water, including water recycling.
- Impacts on the water environment should be reduced through careful design which adheres to good practice for pollution prevention and control.
- The project should adhere to national standards for sustainable drainage systems, which introduce a hierarchical approach to drainage design that promotes the most sustainable approach, whilst recognising the importance of conventional drainage systems as part of a sustainable solution. Surface water drainage systems should be designed according to the following principles:

- They should be able to cope with events that exceed the design capacity of the system, in order to ensure that excess water can be safely stored on or conveyed from the site without adverse impacts;
 - Volumes and peak flows leaving the site should be no greater than the rates prior to the proposed project, taking into account climate change, unless specific off-site arrangements are made and result in the same net effect;
 - Surface water storage and infiltration should be provided where necessary to limit and reduce the peak rate of discharge from the site and the total volume discharged. Off-site attenuation, infiltration and storage arrangements could be provided where necessary; and
 - A sequential approach should be applied to the layout and design of the proposed development, whereby vulnerable uses should be located on parts of the site at lower probability and residual risk of flooding. Open space should be used for multiple uses such as amenity, wildlife habitat and flood storage where appropriate. Opportunities to lower flood risk by improving flow routes, flood storage capacity and the use of sustainable drainage systems should also be identified.
- The preferred scheme design should include measures to ensure that the development is safe from flooding, and that it will not increase flood risk elsewhere in the proposed development's lifetime. Specific measures to achieve these aims could include:
 - Source control measures, including rainwater recycling and drainage;
 - Infiltration devices to allow water to soak into the ground, including individual and communal soakaways;
 - Vegetated features such as filter strips and swales, which hold water and mimic natural drainage patterns;
 - Filter drains and porous pavements, which allow rainwater and surface runoff to infiltrate into permeable material below the ground;
 - Basins and ponds, which hold excess water after periods of rainfall and allow it to be discharged in a controlled way to avoid flooding; and
 - Flood routes to carry and direct excess water through developments to minimise the impact of flooding from severe rainfall.

18.9 Supporting Assessments

18.9.1 The ES chapter will also be informed by separate assessments, including:

- A detailed Flood Risk Assessment; and
- A WFD Compliance Assessment.

18.9.2 Further details of these assessments are provided in the subsequent sections.

Flood Risk Assessment

18.9.3 In England, the requirements of a flood risk assessment for planning purposes are set out by national government, supported by the Environment Agency. Flood risk assessments for

planning must adhere to the NPPF; however, some Local Planning Authorities will have additional requirements, based on local policy and often associated with particular styles of development. The London Borough of Hillingdon has adopted standard national policies; however, it set out a number of specific requirements related to the principles and design of surface water drainage within its document Sustainable Drainage Design & Evaluation Guide (London Borough of Hillingdon, 2018).

- 18.9.4 Flood risk assessments for planning and DCO applications are required for all development, regardless of scale for development within Flood Zone 2 or 3, or within a Critical Drainage Area. Developments of 1ha or greater will also require a flood risk assessment regardless of location. Some Local Planning Authorities have additional requirements for when developers require a flood risk assessment; often when surface water flooding has been identified as a concern a flood risk assessment will be required. Heathrow Airport is located partially within Flood Zones 2 and 3 and is also within a Critical Drainage Area, therefore a site-specific flood risk assessment will be required for the proposed development.
- 18.9.5 The information and data required within a flood risk assessment is dependent on location and type of development; for example, a new development of over 1ha in Flood Zone 1 will have different needs to a new development over 1ha in Flood Zone 3. Environment Agency data are required for all flood risk assessments for planning purposes; however, the level of detail required again varies depending on the type of development and its location. Furthermore, information from the Lead Local Flood Authorities (LLFAs) and Thames Water will be key in understanding the existing surface water, foul water or combined sewer system in this location and any known capacity issues within the network.
- 18.9.6 The flood risk assessment for the project will incorporate data from a number of sources, including;
- The relevant level of Environment Agency flood data;
 - Topographic survey data or remotely sensed LiDAR data;
 - Local Council Policy and Local Plan;
 - Strategic Flood Risk Assessments;
 - Surface Water Management Plans; and
 - Details of drainage infrastructure (sewers, drainage features).
- 18.9.7 For development located in close proximity to potentially sensitive receptors, a joined-up approach will be required to ensure development can be undertaken without increasing flood risk, or negatively affected the ecology of an area. Permanent structures and temporary structures, during construction, will also need to be managed differently.
- 18.9.8 As the proposed development site is located within a heavily urbanised catchment assessing the flood risk from surface water and / or the sewer network is also key in understanding the potential issues affecting the Proposed Development site. It will also be necessary to understand the influence that tidal flooding has in the wider area and whether there is any impact on fluvial flows along the River Thames and its tributaries.
- 18.9.9 Hydraulic modelling is required to determine the design of the realigned river channel and the results of this modelling will be utilised to assess the flood risk to the proposed development.

18.9.10 Due to the complexity of the hydrological regime in the area, as well as the urbanised nature of the catchment, it is therefore necessary to give consideration to all potential sources of flood risk within the EIA.

WFD compliance assessment

Overall approach

18.9.11 The way in which WFD impacts are assessed is different to the approach conventionally used within the EIA process. The standard EIA approach assesses whether an impact is minor, moderate or major, and whether it is beneficial or adverse. This is not compatible with the requirements of the WFD, which requires an assessment of whether a scheme (or element of a scheme) is compliant or non-compliant with the environmental objectives of the Directive (i.e. prevent deterioration and/or restore water bodies).

18.9.12 There is no detailed published methodology for the assessment of plans or projects in relation to undertaking WFD compliance assessments across all types of water bodies. There are, however, several sets of guidance that have been developed to support these assessments in the different water body types, predominantly written by the Environment Agency. The following are considered to be the most relevant to the proposed project:

- Advice Note 18: The WFD (Planning Inspectorate, 2017), which provides an overview of the WFD and provides an outline methodology for considering WFD as part of the Development Consent Order (DCO) process;
- WFD risk assessment: How to assess the risk of your activity (Environment Agency, 2016a), which provides guidance for bodies planning to undertake activities that would require a flood risk activity permit; and
- Protecting and improving the water environment: WFD compliance of physical works in rivers (Environment Agency, 2016b) and associated supplementary guidance (Environment Agency, 2016c), which provides more detailed guidance for assessing WFD compliance of various activities in river water bodies.

18.9.13 For the purposes of this assessment, the broad methodologies outlined in the guidance documents listed above have been brought together to develop a three-stage assessment methodology that can be used for all types of water bodies.

Stage 1: Screening

18.9.14 This stage consists of an initial screening exercise to identify relevant water bodies in the proposed onshore development area. Water bodies will be selected for inclusion in the early stages of the compliance assessment using the following criteria, with reference to the 2015 Thames RBMP (as presented in the online Catchment Data Explorer; Environment Agency, 2018a):

- All surface water bodies that could potentially be directly impacted by the proposed project;
- Any surface water bodies that have direct connectivity (e.g. upstream and downstream) that could potentially be affected by the proposed project; and
- Any groundwater bodies that underlie the project.

Stage 2: Scoping

- 18.9.15 This stage identifies whether there is potential for deterioration in water body status or failure to comply with WFD objectives for any of the water bodies identified in Stage 1. This stage considers potential non-temporary impacts and impacts on critical or sensitive habitats for each water body and each activity. Water bodies and activities can be scoped out of further assessment if it can be satisfactorily demonstrated that there will be no impacts. If impacts are predicted, it will be necessary to undertake a detailed compliance assessment.
- 18.9.16 The Stage 2 assessment considers the potential for each activity planned as part of the proposed project to affect each quality element in turn, based on a series of trigger questions for the quality elements that are applicable in each type of water body.
- 18.9.17 The water body and activity under assessment will be progressed to the detailed compliance assessment (Stage 3) if the answer to one or more of the scoping questions is 'Yes', but only for those quality elements that could potentially be impacted. Conversely, if the answer to a scoping question is 'No' or enough information can be provided at this stage to scope the issue out, the quality element is scoped out of further assessment.
- 18.9.18 At this stage, it is anticipated that the potential effects resulting from the proposed project set out in **Table 18.7** could have the potential to impact upon the biology, hydromorphology, physico-chemistry and chemistry of surface waters and the quality and quantity of groundwaters. The water bodies set out in **Section 18.5**.

Stage 3: Detailed compliance assessment

- 18.9.19 The Stage 3 assessment determines whether the activities and/or project components that have been put forward from the Stage 2 scoping assessment will cause deterioration and whether this deterioration will have a significant non-temporary effect on the status of one or more WFD quality elements at water body level. For priority substances, the process requires the assessment to consider whether the activity is likely to cause the quality element to achieve good chemical status. If it is established that an activity and/or project component is likely to affect status at water body level (that is, by causing deterioration in status or by preventing achievement of WFD objectives and the implementation of mitigation measures for HMWBs), or that an opportunity may exist to contribute to improving status at a water body level, potential measures to avoid the effect or achieve improvement must be investigated. This stage considers such measures and, where necessary, evaluates them in terms of cost and proportionality. Note that this stage is referred to as a WFD Impact Assessment in the Planning Inspectorate (2017) guidance.
- 18.9.20 If deterioration in the status of one or more quality elements is predicted as a result of any proposed project activities when all possible mitigation has been applied, the project will be considered to be non-compliant with the requirements of the WFD and it will be necessary to apply for an exemption under Article 4.7 of the WFD in order for the non-compliant activities to proceed. Consultation with the Environment Agency will be required to determine the scope of works required to demonstrate that the project meets the exemption criteria set out in Article 4.7. At this stage, it is anticipated that the following would be required:
- An assessment of whether the Proposed Development can be classified as being of imperative overriding public interest and if the benefits to society resulting from the project outweigh the local benefits of WFD implementation;

- An assessment of whether all practicable steps to avoid adverse impacts have been taken. These steps are defined as those that are technically feasible, not disproportionately costly, and compatible with the overall requirements of the proposed project; and
- An assessment of whether the proposed project can be delivered by an alternative, environmentally better option. This option will need to be technically feasible and not disproportionately costly to be feasible.

18.9.21 The Environment Agency, as the competent authority for WFD in England, would use the evidence presented in this stage to determine whether the exemption criteria have been met and the project can proceed. However, the requirement for an exemption under Article 4.7 is considered to be extremely unlikely, given that the overall ethos of the proposed project is to prevent deterioration in water body status through the implementation of an effective mitigation strategy.

18.10 Summary

18.10.1 The scope of the water assessment described above is summarised in **Table 18.15** below. As stated in **Section 18.6**, no potential effects on water resources and flood risk receptors have been scoped out of the assessment at this stage. However, not all receptors will be considered under each potential impact.

Table 18.15 Summary of the scope of the water assessment

Potential Impacts	Construction	Operation
Realignment or modification of existing surface watercourses and provision of flood storage	✓	✗
Changes to land use	✓	✗
Ground disturbance during construction	✓	✗
Use of construction materials	✓	✗
Use of construction machinery	✓	✗
Construction drainage and dewatering	✓	✗
Water use	✓	✓
Disposal of foul waters	✓	✓
Presence of new infrastructure	✗	✓
Operational use of new infrastructure (including aircraft and ground-based airport traffic)	✗	✓
Operation of site drainage system	✗	✓

Scoped in (✓) and scoped out (✗)

18.10.2 Production of the ES chapter will be undertaken in consultation with all relevant stakeholders, including topic expert panel meetings, as appropriate. Similarly, the requirements of the ANPS will be at the forefront; principally that the Proposed Development design will aim to make a positive contribution to the water environment. Proposals for mitigation will be undertaken with preservation of the water environment at the forefront, with greater weight given to a receptor's conservation irrespective of the level of potential harm.

18.11 References

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Heathrow Western Hub

EIA SCOPING REPORT – TECHNICAL APPENDICES

Revision: P03

Date: February 2019



APPENDIX 4.1

Initial list of 'other development' for CEA

I Initial list of ‘other development’ for CEA

I.1 Introduction

- I.1.1 In line with Stage I of the approach set out in PINS Advice Note 17 on CEA (PINS, 2015), the Applicant will develop a comprehensive long-list of ‘other development’ through a review of online planning applications, local development plans and the PINS website for proposed NSIPs.
- I.1.2 The likely Zone of Influence (ZOI) used for each topic to develop the long-list will be agreed upon with the relevant local authorities and statutory consultees.
- I.1.3 At this early stage of the Proposed Development, and in the absence of agreed ZOIs, the Applicant has developed an initial list of ‘other development’. The list, provided in **Table I** of this Appendix, includes:
- NSIPs for which a Scoping Report has been submitted; and
 - Other major developments consisting of:
 - Residential schemes of 100+ units within the boroughs of Hillingdon, Hounslow, Slough, Spelthorne and Ealing; and
 - Industrial and warehousing schemes within 5km of the centre of Heathrow Airport.
- I.1.4 The developments listed in **Table I** are also shown on **Figure 4.1** of the Scoping Report.
- I.1.5 This list has been prepared as a means of identifying the principal major developments likely to result in significant effects on the environment in the vicinity of the area which the Scoping Report relates to, in order to provide some context for the EIA. It is not a definitive list and other schemes below this threshold would still be included where they have the potential to have cumulative effects with the Proposed Development. It also provides a means of identifying new major developments, or changes in the status of major developments since the HAL Scoping Report was published in May 2018. Consultation will be carried out with relevant stakeholders on the full list of projects for the cumulative assessment at an appropriate time in the EIA process.

Table 1 Initial list of other developments for CEA NSIPs

Project	Relevant local authorities project traverses through	Application No.	Description of Development	Status / Date
M4 Junctions 3 to 12 Smart Motorway - DCO	London Borough of Hounslow to West Berkshire	PINS Ref No. TR010019	From Examiners' Report: "The development proposed principally comprises: (a) conversion of the hard shoulder to a permanent running lane and, where no hard shoulder is in place at present, the construction of a new lane (mainly between Junction 4b and Junction 8/9); (b) replacement of overbridge structures that are too narrow to accommodate the improved motorway; (c) extension of underbridges and other structures such as culverts and subways to accommodate the improved motorway; (d) changes to junctions and slip roads needed to accommodate the improved motorway, and the use of the hard shoulder as a running lane, as well as allowing 'through junction running'; (e) provision of new gantries and signs to allow the motorway to function as a smart motorway with a variable speed limit, and to provide messages to road users; and (f) other infrastructure needed for the improved motorway, such as emergency refuge areas, enhanced communication systems, closed circuit television and electrical supplies, as well as works to accommodate statutory undertakers' apparatus and other parties who may be affected by the proposed development"	Consent granted 02/09/16
Thames Tideway Tunnel - DCO	The proposed Scheme will traverse the local authority areas of: 1. City of London Corporation 2. City of Westminster 3. London Borough of Ealing 4. London Borough of Hammersmith and Fulham 5. London Borough of	WW010001	1 New tunnel for the transfer or storage of waste water	Consent granted 12/09/14

Project	Relevant local authorities project traverses through	Application No.	Description of Development	Status / Date
	<p>Hounslow 6. London Borough of Lambeth 7. London Borough of Lewisham 8. London Borough of Newham</p> <p>9. London Borough of Richmond upon Thames 10. London Borough of Southwark</p> <p>11. London Borough of Tower Hamlets 12. London Borough of Wandsworth 13. London Legacy Development Corporation</p> <p>14. Royal Borough of Greenwich 15. Royal Borough of Kensington and Chelsea</p>			
High Speed 2 (London - West Midlands) - Hybrid Bill	<p>The proposal will traverse through:</p> <p>London Borough of Camden London Borough of Brent London Borough of Westminster London Borough of Kensington & Chelsea London Borough of Hammersmith and Fulham London Borough of Ealing London Borough of Hillingdon Hertfordshire County Council Three Rivers District Council Buckinghamshire County Council South Bucks District Council Chiltern District Council Aylesbury Vale District Council Oxfordshire County Council Cherwell District Council Northamptonshire County Council South Northants District Council Warwickshire County Council</p>	N/A	High speed railway linking London, Birmingham, the East Midlands, Leeds and Manchester.	Granted November 2013

Project	Relevant local authorities project traverses through	Application No.	Description of Development	Status / Date
	Stratford on Avon District Council Warwick District Council North Warwickshire District Council Solihull Metropolitan Borough Council Birmingham City Council Staffordshire County Council Lichfield District Council			
Western Rail Link to Heathrow	The Proposal will traverse through the local authorities of Slough, South Bucks and London Borough of Hillingdon	PINS Ref No. TR040009	Explanation taken from Scoping Report "The Western Rail Link to Heathrow Scheme will create a new rail connection with the nearby Great Western Main Line (GWML), providing a more direct rail route for passengers travelling to Heathrow from Reading, Oxford, South Wales, Bristol, Birmingham and beyond. An additional rail connection to the west will also provide more efficient commuting opportunities for those from the Thames Valley region who work at Heathrow Airport."	No DC application yet - EIA scoping report has been submitted to pins. Submission expected in Q1 2019.

Table 2 Initial list of other developments for CEA - other large scale applications

Local Authority	Site	Application No.	Development description	Status / Date
Slough Borough Council				
Slough Borough Council	Land Rear of 2-78 Castleview Road, Part of Upton Court Park & Part of 36 Blenheim Road, Upton Court Road, Slough	P/11425/012	Residential development for 300 dwellings with access from Upton Court Road/pedestrian/cycle access from Blenheim Road and Associated Highways, Public Open Space and Landscaping	Approved 18/07/2013

Local Authority	Site	Application No.	Development description	Status / Date
Slough Borough Council	Queensmere Shopping Centre, Wellington Street, Slough, Berkshire, SL1 1LN	P/06684/015	Partial demolition and internal alterations/extensions to existing shopping centre as part of a part new build/part refurbished mixed used scheme for 11, 833 sq m of retail including the creation of an additional 535m ² of a1 retail, 439m ² of class a3 - a5 food and drink, 958m ² of class d2 assembly and leisure floor space and 908 residential units. The residential element comprising 632 no. 1 bedroom, 189 no. 2 bedroom and 87 no. Studio apartments being contained within 4 no. Towers of between 14 and 21 storeys plus infilling development on top of the existing shopping centre and a stand alone tower of 21 storeys with a viewing galley on top. Reconfiguration of existing access and frontages onto wellington street and works including, alterations and improvements to the entrances to the shopping centre; provision of amenity space and landscaping; vehicle and cycle parking; refuse and recycling storage; provision of new and/or upgrading existing infrastructure; groundwork's and re-profiling of site levels; ancillary engineering and other operations and plant and machinery	Delegated for approval 26/11/2015
Slough Borough Council	43-61, Windsor Road, Slough, SL1 2EE	P/00906/030	Erection of a part 10 / part 7 / part 6 / part 5 storey building comprising 153 residential units, part 7 / part 6 storey building comprising 131 bedroom hotel and ancillary a1, a3, d2 floor space, access, servicing, car parking, landscaping and associated works.	Approved 28/10/2015
Slough Borough Council	Aspire 2 Site, Corner of Church Street and Herschel Street, Slough, SL1 1PG	P/01508/042	Construction of a part eight and part nine storey building (Class C3 Use) to accommodate 238 flats together with 47 car parking spaces with landscaping and ancillary works.	Approved 12/06/2018
London Borough of Hounslow				

Local Authority	Site	Application No.	Development description	Status / Date
London Borough of Hounslow	Steining Way, Hounslow London TW4 6DL	P/2017/3562	Outline application for the demolition of existing buildings and replacement with new building or buildings up to 12 metres in height and at total floor area of up to 6,170 square metres and for B1c/B2/B8 uses with all matters reserved.	Approved with a Legal Agreement 14/09/2018
London Borough of Hounslow	632-652 London Road, Isleworth TW7 4EY	P/2013/0941 00707/632- 652/P29	The proposed development would consist of the demolition of the existing office building and the re-development of the site to provide 155 mixed tenure homes with associated landscaping, parking and access arrangements.	Approved 09/10/2013
London Borough of Hounslow	396-418 London Road Isleworth London TW7 5AD	P/2015/0567	Redevelopment of the site by erection of blocks two to six-storeys high comprising 203 flats and 768 square metres (gross internal area) of commercial space for a flexible use within Use Classes B1, A1, A2 or A3, together with associated landscaping, roof gardens and decked amenity spaces, revised access from London Road, car parking, cycle parking, refuse and recycling, and ancillary facilities	Approved 13/11/2015
London Borough of Hounslow	High Street Quarter, Alexandra Road/Holloway Street/Prince Regent Road	P/2015/0913	Demolition of commercial and residential properties, site clearance and redevelopment comprising - The construction of a mixed-use development comprising five blocks with 527 residential units (311 private units, 108 shared ownership units and 108 affordable rent units), a multiscreen cinema (Use Class D2) of 5,267sqm (GEA), 9,830sqm (GEA) of retail, restaurant and cafe uses (Use Classes A1, A2, A3, A4 and A5), infrastructure including 513 parking spaces, 686 cycle parking spaces, service areas, public realm incorporating pedestrian/cycle circulation areas with associated hard and soft landscaping and private amenity spaces	Approved 08/02/2016

Local Authority	Site	Application No.	Development description	Status / Date
London Borough of Hounslow	Hounslow Civic Centre and 88 Lampton Road, Hounslow, TW34DW	P/2015/5505 00676/88/P2	Hybrid application for demolition of existing buildings, to include a Full application for:- 178 residential dwellings (C3 use), flexible uses including retail (A1 use) or cafe (A3 use) or community centre (D1 use), car parking, public space, landscaping and associated works; and an Outline application for:- up to 762 residential dwellings (C3 use) and associated car parking, public space, landscaping and associated works, with all matters to be reserved except means of access.	Approved 08/07/2016
London Borough of Hounslow	Hounslow Town Primary School Pears Road, Hounslow, TW31SR	P/2016/3221 0 0870/F/P6	Demolition of existing building and erection of new five-form entry primary school and 284 dwellings, including access, landscaping, servicing arrangements, cycle and car parking, with refuse and recycling facilities.	Approved 02/12/2016
London Borough of Hounslow	Former Hounslow House, 714-746 London Road, Hounslow, TW31PD	P/2016/3939 0 0707/714- 746/P21	Redevelopment of the site to provide buildings of varying height between 2 and 11 storeys above ground, comprising 293 residential units (Use Class C3) and 926sqm of flexible commercial floorspace (Use Class A1-A3 / B1 / D1) together with associated car parking, cycle parking, landscaping and infrastructure works.	Approved 19/06/2017
London Borough of Hounslow	1-83 High Street Hounslow, TW31RH	P/2017/3530 00610/1-83/P2	Erection of extension above existing retail parade (two storeys) ranging between two - eight storeys (maximum of ten storeys in total) to provide 156 One, two and three bedroom flats with associated access, amenity space and 8no. disabled car parking spaces. External alterations to shopfronts of Nos. 1-83 High Street and the change of use of No. 57 and 73 High Street from retail (Class A1) to provide residential access and service core (Class C3).	In progress received 16/08/2017
London Borough of Hounslow	Former Morrison's 8 Cavendish parade Bath Road Hounslow TW4 7DJ	P/2017/4277	Demolition of existing buildings and erection of four to seven storey buildings (plus eighth storey of stairway and lift overruns) to provide 176 residential units (Use	Approved with a legal agreement 29/06/2018

Local Authority	Site	Application No.	Development description	Status / Date
			Class C3) and 815sqm (GIA) retail floorspace (Use Class A1) with associated access, car and cycle parking, landscaping and other associated works.	
London Borough of Hounslow	Cargo Service Centre Ltd Bedfont Road Stanwell TW19 7LY	P/2018/2573	Construction of a new warehouse (B1(c)/B2/B8 uses) with ancillary offices, a decked car park, link bridge, cycle parking, drainage, landscaping, plant and associated ancillary works (alternative scheme).	Approved with a Legal Agreement 03/12/2018
London Borough of Hounslow	Vantage Logistics Centre Ariel Way Hounslow London TW4 6JW	P/2017/2824	Demolition of existing buildings and strictire and re-development comprising the construction of five industrial units with ancillary offices, means of access, car and cycle parking facilities, drainage, landscaping, plant and ancillary works.	Approved with a Legal Agreement 06/03/2018
London Borough of Hounslow	Segro Park, Heathrow, Ariel Way, Hounslow, London TW4 6JW	P/2018/1927	Re-development of the site comprising the construction of an industrial unit (B1(c)/B2/B8 uses) with ancillary offices, means of access, car and cycle parking facilities, drainage, landscaping, plant and ancillary works	Approved with a Legal Agreement 30/11/2018
London Borough of Hounslow	Units 2-3 and Units 6-7 Space Waye and 27 Central Way Feltham London TW14 0TH	P/2016/0574	Erection of three buildings for flexible Use Class B1(c) (light industry), B2 (general industry) and/or B8 (storage or distribution) purposes with ancillary B1(a) (office) floor space; service yards; vehicle and cycle parking; alterations to vehicular accesses; landscaping; boundary treatment; external lighting; plant and associated engineering works.	Approved with a legal agreement 19/05/2016
London Borough of Hounslow	Bedfont Trading Estate Bedfont Road East Bedfont Feltham London TW14 8EF	P/2014/0940	Redevelopment of existing industrial, storage and related uses to provide an industrial and warehouse estate with car parking and landscaping of 29,461sqm comprising B1c, B2 and B8 land uses with upper limit of 5000sqm on the combined B1c/B2 floorspace.	Approved with a Legal Agreement 23/07/2015
Spelthorne Borough Council				

Local Authority	Site	Application No.	Development description	Status / Date
Spelthorne Borough Council	London Irish Rugby Football Club, The Avenue, Sunbury on Thames	14/00275/FUL	Demolition of stand and clubhouse and erection of 194 residential units with associated parking, provision of new open space and construction of estate roads with access to be via the two accesses from The Avenue to also incorporate an alternative access for the existing Virgin Active Leisure Centre via the northern access.	Approved 26/08/2014
Spelthorne Borough Council	17-51 London Road, Staines TW18 4AE	16/01158/FUL	Redevelopment of the site to provide 5 buildings of varying height comprising 12,787 square metres of office floor space (Use Class B1a) and 253 residential units (Class C3), provision of a new landscaped area, vehicular access, car parking, cycle storage and energy centre.	Approved 18/10/2017
Spelthorne Borough Council	3 And 4 The Summit Centre, Hanworth Road, Sunbury On Thames, TW16 5DB	18/01004/PDO	Prior approval for the change of use from offices (Use Class B1a) to residential (Use Class C3) comprising 100 units consisting of 51 no. one bedroom units, 45 no. two bedroom units and 4 no. three bedroom units.	Prior Notification Office Approve 07/09/2018
London Borough of Hillingdon				
London Borough of Hillingdon	Former Nestle Factory The Former Nestle Factory, Nestles Avenue, Hayes, UB3 4RF	1331/APP/2017/1883	RECONSULTATION: Part demolition of existing factory buildings and associated structures, and redevelopment to provide 1,381 dwellings (Use Class C3), office, retail, community and leisure uses (Use Class A1/A3/A4/B1/B8/D1/D2), 22,663sq.m (GEA) of commercial floorspace (Use Classes B1c/B2/B8 and Data Centre (sui generis)), amenity and playspace, landscaping, allotments, access, service yards, associated car parking and other engineering works (amendments: provision of a basement under Block B increasing parking ration to 0.6; amendments to design and elevations of residential blocks and commercial units; provision of strip of land for Nestle Avenue multi modal link road widening scheme; landscape design changes;	Approved 28/06/2018

Local Authority	Site	Application No.	Development description	Status / Date
			updates to the Transport Assessment and Flood Risk Assessment)	
London Borough of Hillingdon	Bridge House Oxford Road, Uxbridge, UB8 1HS	40050/APP/2017/2438	Prior Approval Application for the change of use of Bridge House, Riverview House and Waterside House from office accommodation (Class B1) to 237 residential units (15 x Studio and 224 x 1-Bed) together with ancillary car parking, cycle storage and waste and recycling storage.	Prior approval granted 01/09/2017
London Borough of Hillingdon	Padcroft Works Bentinck Road & Tavistock Road, West Drayton, UB7 7RQ	45200/APP/2014/3638	Demolition of all existing buildings on the site enclosed by Bentinck Road and Tavistock Road (as shown outlined in red on the submitted application site plan) including Globe House, Globe Court, Padcroft Works, the former Dairy Crest dairy and TiGi Warehouse and comprehensive redevelopment to provide three buildings rising from three to eight storeys comprising 308 residential units, 175 sqm of Class B1 floorspace, public and private amenity space, hard and soft landscaping and lower ground floor parking space for 293 vehicles	Approved 10/12/2015
London Borough of Hillingdon	The Grand Union Office Park Packet Boat Lane Cowley UB8 2GH	1197/APP/2015/4164	Demolition of Block C and end of Block B and erection of four replacement buildings of five-storeys in height. Extensions to Blocks A and B to five-storeys. Excavation of basement for car parking; provision of landscaping and amenity space; enhancement of site boundaries including improved access to Grand Union Canal. Total provision of 144 residential units (32 replacing those already approved under permitted development rights in existing loft space of Blocks A and B), comprising 12 x studio, 51 x 1-bed, 53 x 2-bed, 28 x 3-bed; car parking provision of 251 spaces and cycle parking provision of 273 spaces	Approved 13/12/2016

Local Authority	Site	Application No.	Development description	Status / Date
London Borough of Hillingdon	St Andrews Park Hillingdon Road Uxbridge	585/APP/2015 /2657	Erection of 249 dwellings comprising 3no studio apartments, 92no. 1bed apartments, 130no. 2 bed apartments, 24no. 3 bed apartments together with associated parking and landscaping, and all details required by Conditions 2 and 3 relating to the reserved matters of layout, scale, appearance and landscaping.	Approved 27/01/2016
London Borough of Hillingdon	Former National Air Traffic Services Headquarters site, Porters Way, West Drayton	5107/APP/2009/2348	Proposed mixed-use redevelopment comprising: 773 dwellings comprising 12no. studios, 152 no. 1-bedroom flats, 316no. 2-bedroom flats, 21no. 2-bedroom houses, 23no. 3-bedroom flats, 181no. 3-bedroom houses, 59no. 4-bedroom houses and 9no. 5-bedroom houses; Class D1 Primary Healthcare facility including room for joint community use (up to 1085sqm gea); Class C2 Nursing Home (up to 3630sqm gea); Classes A1-A3 Shop units to complement Mulberry Parade (up to 185sqm gea, depending on size of Primary Healthcare facility); Class B1 Business units including site management office (up to 185sqm gea); Energy Centre (up to 220sqm gea) with combined heat and power unit; foul water pumping station; associated access roads from Porters Way (and excluding all access including pedestrian and bicycle access from Rutters Close); 1085 car parking spaces; cycle parking; public open space areas; cycleways and footpaths; and landscaping works (Outline Application)	Approved 07/10/2010
London Borough of Hillingdon	Padcroft Works Tavistock Road Yiewsley	45200/APP/2012/3082	Comprehensive redevelopment of site to provide three buildings of part 7 storeys and part 5 storeys comprising 208 residential units, 190 sq.m (approx) of Use Class B1 floorspace with associated public and private amenity space, hard and soft landscaping, lower ground floor parking for vehicles and bicycles (involving demolition of all existing buildings)	Approved 19/02/2017

Local Authority	Site	Application No.	Development description	Status / Date
London Borough of Hillingdon	Former Nestle Factory Nestles Avenue Hayes	1331/APP/2018/4243	Part demolition of existing factory buildings and associated structures, and redevelopment to provide 1,386 dwellings (Use Class C3), office, retail, community and leisure uses (Use Class A1/A3/A4/B1/B8/D1/D2), 22,663sqm (GEA) of commercial floorspace (Use Classes B1c/B2/B8 and Data Centre (Sui Generis)), amenity and playscape, landscaping, allotments, access, services yards, associated car parking and other engineering works 1331/APP/2017/1883 Conditions(s) 92	Undecided
London Borough of Hillingdon	Chailey Industrial Estate , Pump Lane Hayes UB3 3ND	2102/APP/2018/4231	Redevelopment of the site to provide three buildings ranging from 2 to 11 storeys in height delivering 333 residential units and 710 sq.m of ground floor commercial floorspace (Use Classes A1, A2, A3, B1, D1 or D2), including the provision of private and communal amenity areas, child play space, car parking, secure cycle parking, refuse storage areas and other associated development.	Undecided
London Borough of Hillingdon	Bourne Court Site, Bourne Court Ruislip	11891/APP/2018/3414	Redevelopment to provide 109 residential units in two blocks, together with associated access, car and cycle parking; communal and private amenity space; and landscaping.	Undecided
London Borough of Hillingdon	30/32 Blythe Road, Hayes UB3 1BY	68974/APP/2018/2146	Application for demolition of all buildings on site to enable redevelopment to provide 118 new residential units (Use Class C3) and commercial floor space (Use Class A1-A5 and B1) with a new vehicle access, associated vehicle and cycle parking, communal amenity space, child play space and associated landscaping and plant.	Undecided
London Borough of Hillingdon	Land at 3, 233-236 Nestles Avenue, Hayes UB3 4SB	73238/APP/2018/1145	Demolition of existing buildings, site clearance and redevelopment to provide a mixed use scheme,	Undecided

Local Authority	Site	Application No.	Development description	Status / Date
			including 457 residential units, 264 sqm (GEA) A1 retail use, 229 sqm (GEA) A3 cafe use and 2,273 sqm (GEA) B1 office, together with 237 car parking spaces and 1,070 cycle parking spaces, hard and soft landscaping, refuse and recycling facilities, and public and private amenity space.	
London Borough of Hillingdon	Comag Tavistock Road, Yiewsley UB7 7QE	24843/APP/2018/269	Demolition of existing buildings (Use Class B8) and erection of 104 self-contained (20 x 1-bedroom, 75 x 2-bedroom and 9 x 3-bedroom) units (Use Class C3), Community Space (Use Class D1), and the provision of car parking, associated landscaping, drainage and other ancillary work	Approved 13/03/2018
London Borough of Hillingdon	IAG Carco Campus, Sealand Road, Heathrow Airport TW6 3FD	50045/APP/2016/2081	Erection of a new 11,520 sq.m (GIA) cargo handling facility (B8 use), ancillary buildings totalling 330 sq.m and associated works including changes to site access and reconfiguration of landside and airside parking.	Approved 05/01/2017
London Borough of Hillingdon	Former Technicolor Site, 276 Bath Road Sipson UB7 0DP	35293/APP/2013/2709	Erection of 2 industrial/warehouse units incorporating 9,160sqm GIA within B1(c)/B2/B8 Use Classes with ancillary office space, associated car parking, landscaping and service yards.	Approved 28/04/2014
London Borough of Hillingdon	Unitair Centre, Great South West Road Feltham	49559/APP/2014/334	Outline application (all matters reserved) to provide up to 14,750sqm of B1c/B2/B8/Sui Generis (Car Showroom) uses (up to a maximum of 1,700 sqm of sui generis floorspace) with associated landscaping and access.	Approved 27/05/2014
London Borough of Hillingdon	Unit D, Prologis Distribution Park, Stockley Road West, Drayton UB7 9FN	18399/APP/2015/3759	New loading and unloading buildings to the rear of the main factory	Approved 15/01/2016
London Borough of Hillingdon	E C House, Swallowfield Way, Hayes UB3 1DQ	38065/APP/2014/2143	Re-development of the site to provide 5 industrial units (Use Class B1(c), B2 and B8) with associated parking,	Approved 13/10/2014

Local Authority	Site	Application No.	Development description	Status / Date
			servicing and landscaping (Involving demolition and refurbishment of existing units)	
London Borough of Hillingdon	Former EMI Site, Dawley Road, Hayes	8294/APP/2015/1406	Redevelopment of the site to provide 10,728sq metres of Class B1(c) and B2 (General Industrial) and B8 (Storage and Distribution) floorspace with associated parking, servicing, access and landscaping.	Approved 05/10/2015



APPENDIX 9.1

Population statistics

I Population statistics

I.1 Introduction

I.1.1 This Appendix provides statistics relating to **Chapter 9 ‘Community’**, **Chapter 10 ‘Economics and Employment’**, and **Chapter 12 ‘Health’**. All data included in the Appendix has been sourced from:

- The 2011 Census provided by the Office for National Statistics;
- Annual Population Surveys provided by NOMIS; and
- Public Health Profiles provided by Public Health England.

I.2 Inner Study Area community, economic and health statistics

Table 1 Population and age distribution in the Inner Study Area (Source: 2011 Census)

Community Area	Population	0-15 years old	16-74 years old	75+ years old
Bedfont	12701	22.2%	72.1%	5.7%
Brandshill	2590	23.2%	74.5%	2.3%
Colnbrook	1836	20.1%	76.9%	3.0%
Cranford	6764	20.7%	75.1%	4.2%
Cranford cross	1625	21.9%	74.3%	3.8%
Feltham north	11563	20.0%	73.3%	6.7%
Harlington	4671	18.2%	77.6%	4.1%
Harmondsworth	1849	19.1%	75.2%	5.7%
Hayes	14767	26.3%	70.0%	3.7%
Heston	36,159	22.7%	72.8%	4.5%
Hounslow (C+S)	26577	18.9%	75.8%	5.3%
Hounslow (W+H)	33837	23.0%	72.8%	4.3%
Iver & richings park	2354	17.8%	75.9%	6.2%
Longford	709	7.6%	90.5%	1.9%
Poyle	1731	16.2%	80.7%	3.1%
Sipson	973	22.9%	72.2%	4.8%
Stanwell	6296	18.0%	75.0%	7.0%
Stanwell Moor	1371	18.3%	78.8%	2.9%
West Drayton	16,742	28.6%	65.2%	6.2%
	TOTAL	Average	Average	Average

Community Area	Population	0-15 years old	16-74 years old	75+ years old
	185115	20.3%	75.2%	4.5%

Table 2 Distribution of ethnicity in the Inner Study Area (Source: 2011 Census)

Community Area	White	Mixed/ multiple ethnic groups	Asian/ Asian British	Black/ African/ Caribbean/ Black British	Other ethnic group
Bedfont	64.3%	3.7%	23.0%	6.8%	2.1%
Brandshill	49.2%	4.4%	35.0%	8.8%	2.6%
Colnbrook	74.0%	3.9%	14.7%	5.9%	1.5%
Cranford	25.8%	2.6%	61.7%	5.8%	4.2%
Cranford cross	30.2%	3.7%	54.5%	5.5%	6.0%
Feltham north	61.1%	3.9%	26.6%	5.9%	2.4%
Harlington	46.9%	4.6%	36.3%	8.1%	4.1%
Harmondsworth	61.7%	5.3%	25.1%	4.6%	3.2%
Hayes	31.8%	3.8%	47.6%	12.3%	4.6%
Heston	23.0%	2.7%	60.1%	9.3%	4.9%
Hounslow (C+S)	42.1%	3.7%	46.4%	4.5%	3.4%
Hounslow (W+H)	32.9%	3.9%	47.0%	12.5%	3.8%
Iver & richings park	65.1%	2.0%	29.6%	1.2%	2.1%
Longford	51.2%	4.1%	24.8%	14.5%	5.5%
Poyle	59.7%	3.3%	30.3%	4.8%	1.9%
Sipson	62.5%	3.9%	24.6%	5.8%	3.2%
Stanwell	80.0%	2.6%	13.4%	3.1%	0.9%
Stanwell Moor	78.5%	4.0%	13.6%	2.2%	1.8%
West Drayton	61.6%	5.7%	20.1%	9.2%	3.4%
	Average	Average	Average	Average	Average
	52.7%	3.8%	33.4%	6.9%	3.2%

Table 3 Percentage of households with dependents in the Inner Study Area (Source: 2011 Census)

Community Area	No adults in employment in household (%)	Dependent children in household: All ages (%)	One person in household with a long-term health problem or disability (%)
Bedfont	27.6%	35.6%	24.4%

Community Area	No adults in employment in household (%)	Dependent children in household: All ages (%)	One person in household with a long-term health problem or disability (%)
Brandshill	20.5%	40.3%	18.0%
Colnbrook	25.5%	30.4%	19.8%
Cranford	26.3%	40.5%	26.1%
Cranford cross	20.2%	40.3%	16.5%
Feltham north	28.8%	36.1%	26.1%
Harlington	23.4%	31.5%	19.8%
Harmondsworth	27.7%	32.5%	25.0%
Hayes	26.5%	47.2%	24.4%
Heston	29.4%	42.4%	27.2%
Hounslow (C+S)	23.2%	35.8%	21.5%
Hounslow (W+H)	31.1%	40.5%	27.6%
Iver & richings park	21.4%	34.6%	18.7%
Longford	21.8%	16.2%	14.2%
Poyle	16.6%	29.6%	14.0%
Sipson	26.4%	37.8%	19.7%
Stanwell	30.5%	28.6%	25.8%
Stanwell Moor	17.9%	31.7%	18.5%
West Drayton	35.6%	45.6%	25.4%
	Average	Average	Average
	25.3%	35.6%	21.7%

Table 4 Percentage of population providing unpaid care in Inner Study Area (Source: 2011 Census)

Community Area	Provides no unpaid care	Provides 1 to 19 hours unpaid care a week	Provides 20 to 49 hours unpaid care a week	Provides 50 or more hours unpaid care a week
Bedfont	91.1%	4.9%	1.4%	2.6%
Brandshill	91.9%	5.3%	1.5%	1.4%
Colnbrook	90.2%	6.8%	1.3%	1.7%
Cranford	91.3%	4.9%	1.8%	2.0%
Cranford cross	92.7%	4.8%	1.4%	1.1%

Community Area	Provides no unpaid care	Provides 1 to 19 hours unpaid care a week	Provides 20 to 49 hours unpaid care a week	Provides 50 or more hours unpaid care a week
Feltham north	90.7%	5.4%	1.5%	2.4%
Harlington	93.1%	3.9%	1.1%	1.9%
Harmondsworth	91.4%	5.1%	1.3%	2.2%
Hayes	91.0%	5.0%	1.8%	2.1%
Heston	89.8%	5.9%	2.0%	2.3%
Hounslow (C+S)	91.5%	5.4%	1.5%	1.7%
Hounslow (W+H)	91.2%	4.7%	1.9%	2.3%
Iver & richings park	89.1%	8.0%	1.2%	1.7%
Longford	93.4%	4.4%	1.3%	1.0%
Poyle	92.6%	5.1%	1.2%	1.0%
Sipson	94.6%	3.6%	0.9%	1.0%
Stanwell	90.3%	5.7%	1.6%	2.5%
Stanwell Moor	89.0%	6.9%	1.7%	2.5%
West Drayton	91.2%	5.6%	1.0%	2.2%
	Average	Average	Average	Average
	91.4%	5.3%	1.4%	1.9%

Table 5 Levels of self-reported health in the Inner Study Area (Source: PHE)

Community Area	Very good health	Good health	Fair health	Bad health	Very bad health
Bedfont	45.9%	36.3%	12.6%	3.9%	1.2%
Brandshill	46.6%	38.8%	11.4%	2.2%	1.0%
Colnbrook	45.4%	37.8%	11.4%	4.0%	1.5%
Cranford	45.5%	36.0%	13.3%	3.9%	1.3%
Cranford cross	46.5%	38.9%	11.3%	2.7%	0.7%
Feltham north	44.5%	35.9%	13.8%	4.2%	1.7%
Harlington	46.7%	38.9%	10.1%	3.4%	0.9%
Harmondsworth	46.4%	37.4%	11.8%	3.8%	0.7%
Hayes	48.4%	35.6%	11.6%	3.5%	1.0%
Heston	45.8%	35.5%	12.9%	4.3%	1.5%

Community Area	Very good health	Good health	Fair health	Bad health	Very bad health
Hounslow (C+S)	48.8%	36.5%	11.0%	3.0%	0.8%
Hounslow (W+H)	47.7%	33.7%	12.5%	4.9%	1.3%
Iver & richings park	50.2%	37.7%	9.6%	1.8%	0.9%
Longford	42.3%	40.1%	11.9%	3.8%	2.1%
Poyle	50.0%	37.0%	10.7%	2.0%	0.3%
Sipson	48.9%	34.9%	12.5%	2.6%	1.1%
Stanwell	41.8%	37.6%	14.5%	5.2%	1.0%
Stanwell Moor	46.1%	39.4%	9.8%	3.6%	1.1%
West Drayton	46.2%	36.9%	12.4%	3.3%	1.2%
	Average	Average	Average	Average	Average
	46.5%	37.1%	11.8%	3.5%	1.1%

Table 6 Distribution of housing type in the Inner Study Area (Source: 2011 Census)

Community Area	Houses (%)	Flats (%)	Owner Occupied	Socially Rented	Private Rent	Shared Ownership	Rent free	% of Households deprived in some dimension
Bedfont	66.7%	33.2%	48%	7.4%	26.9%	16.4%	1.1%	67.6%
Brandshill	70.6%	29.4%	55%	1.0%	12.8%	30.9%	0.7%	60.1%
Colnbrook	56.0%	43.8%	34%	4.9%	26.1%	34.0%	0.9%	68.1%
Cranford	73.5%	26.2%	54%	0.5%	17.1%	27.1%	1.2%	74.0%
Cranford cross	76.6%	23.4%	58%	0.4%	3.5%	37.5%	1.1%	65.7%
Feltham north	72.0%	27.8%	59%	1.1%	22.3%	16.0%	1.4%	68.4%
Harlington	48.4%	51.2%	47%	0.7%	12.5%	38.9%	1.3%	70.9%
Harmondsworth	83.7%	15.9%	57%	0.6%	16.6%	24.6%	1.6%	64.2%
Hayes	80.9%	19.1%	58%	1.1%	20.4%	19.9%	0.8%	70.0%
Heston	65.4%	34.4%	50%	0.8%	28.9%	18.4%	1.8%	74.1%
Hounslow (C+S)	66.9%	33.5%	56%	3.1%	11.0%	29.0%	1.0%	63.4%
Hounslow (W+H)	55.8%	44.3%	32%	1.0%	42.4%	22.7%	2.0%	75.8%
Iver & richings park	87.9%	12.1%	85%	0.6%	2.2%	11.3%	1.1%	42.4%
Longford	37.7%	62.3%	34%	0.0%	4.2%	59.4%	2.3%	72.9%
Poyle	69.7%	30.0%	56%	0.7%	3.0%	40.0%	0.1%	65.4%
Sipson	88.5%	11.3%	47%	0.6%	11.8%	39.4%	1.4%	62.2%
Stanwell	59.0%	40.9%	52.7%	3.3%	31.0%	12.0%	1.0%	70.1%
Stanwell Moor	84.2%	15.5%	73%	6.6	18%	1.05	0.75	60.3%
West Drayton	65.6%	34.0%	50%	1.1%	34.2%	13.9%	1.3%	70.5%

Community Area	Houses (%)	Flats (%)	Owner Occupied	Socially Rented	Private Rent	Shared Ownership	Rent free	% of Households deprived in some dimension
	Average	Average	Average	Average	Average	Average	Average	Average
	68.9%	31.0%	52.8%	36.3%	18.2%	31.4%	5.1%	66.6%

Table 7 Level of qualifications in Inner Study Area (Source: 2011 Census)

Community Area	No Formal Qualifications	Level 1	Level 2	Apprenticeship	Level 3	Level 4 +	Other
Bedfont	24.0%	17.3%	14.2%	2.5%	9.7%	20.2%	12.1%
Brandshill	16.2%	15.7%	14.0%	2.3%	11.7%	25.8%	14.3%
Colnbrook	19.6%	17.1%	15.0%	2.5%	10.8%	22.8%	12.2%
Cranford	18.3%	13.9%	11.1%	1.3%	9.0%	26.7%	19.7%
Cranford cross	12.8%	13.5%	10.5%	1.4%	9.9%	30.3%	21.6%
Feltham north	26.1%	15.6%	13.3%	2.4%	8.6%	21.1%	12.9%
Harlington	18.4%	14.1%	11.8%	2.6%	9.1%	25.5%	18.5%
Harmondsworth	20.7%	17.1%	13.8%	3.2%	10.3%	20.6%	14.3%
Hayes	22.0%	15.4%	13.2%	2.4%	9.6%	22.8%	14.6%
Heston	21.6%	13.7%	12.2%	1.4%	9.4%	24.8%	16.9%
Hounslow (C+S)	14.3%	10.6%	10.8%	1.6%	9.8%	37.8%	15.1%
Hounslow (W+H)	23.2%	12.8%	12.6%	1.4%	9.3%	24.6%	16.1%
Iver & richings park	11.8%	11.3%	14.9%	4.4%	13.5%	36.4%	7.7%
Longford	18.0%	14.0%	12.2%	1.6%	10.9%	26.3%	17.0%
Poyle	15.1%	15.2%	14.7%	2.5%	14.2%	24.8%	13.5%
Sipson	18.3%	17.4%	15.1%	2.5%	9.6%	25.5%	11.6%
Stanwell	27.8%	19.7%	14.9%	3.5%	9.4%	16.4%	8.3%

Community Area	No Formal Qualifications	Level 1	Level 2	Apprenticeship	Level 3	Level 4 +	Other
Stanwell Moor	20.6%	23.0%	16.4%	4.7%	11.1%	18.2%	6.0%
West Drayton	27.4%	17.0%	14.0%	3.4%	9.6%	18.0%	10.6%
	Average	Average	Average	Average	Average	Average	OTHER
	19.8%	15.5%	13.4%	2.5%	10.3%	24.7%	13.8%

Table 8 Occupation types in Inner Study Area (Source: 2011 Census)

Community Area	Managers, directors and senior officials	Professional occupations	Associate professional and technical occupations	Administrative and secretarial occupations	Skilled trades occupations	Sales and Services Occupations	Process, plant and machine operatives	Elementary occupations
Bedfont	7.3%	11.5%	9.8%	12.5%	16.1%	18.0%	9.5%	15.3%
Brandshill	7.5%	12.8%	9.9%	12.1%	15.1%	16.1%	10.0%	16.5%
Colnbrook	8.8%	11.8%	14.3%	12.0%	13.6%	16.8%	9.4%	13.4%
Cranford	7.0%	11.6%	8.7%	10.8%	12.3%	17.5%	10.7%	21.4%
Cranford cross	6.8%	9.5%	11.3%	12.3%	14.1%	16.3%	10.0%	19.6%
Feltham north	6.5%	10.9%	9.5%	12.5%	16.1%	17.9%	9.4%	17.2%
Harlington	8.1%	9.1%	9.3%	9.4%	13.8%	19.4%	10.5%	20.5%
Harmondsworth	7.8%	7.2%	10.7%	10.2%	16.1%	16.6%	13.4%	18.1%
Hayes	6.9%	11.6%	8.8%	10.9%	16.0%	18.2%	10.7%	16.8%
Heston	7.1%	12.1%	10.6%	11.8%	12.8%	18.9%	10.2%	16.5%
Hounslow (C+S)	7.5%	21.7%	11.9%	10.3%	14.7%	16.4%	5.1%	12.4%
Hounslow (W+H)	5.8%	12.5%	10.3%	10.7%	12.9%	19.1%	8.9%	19.9%
Iver & richings park	16.4%	19.0%	12.8%	13.5%	17.6%	10.7%	4.3%	5.8%

Community Area	Managers, directors and senior officials	Professional occupations	Associate professional and technical occupations	Administrative and secretarial occupations	Skilled trades occupations	Sales and Services Occupations	Process, plant and machine operatives	Elementary occupations
Longford	9.2%	7.8%	13.1%	8.9%	14.2%	16.7%	11.1%	18.9%
Poyle	8.2%	11.5%	11.2%	12.1%	15.4%	16.6%	11.1%	13.7%
Sipson	7.5%	10.9%	10.2%	7.9%	15.3%	17.8%	14.9%	15.5%
Stanwell	8.1%	9.4%	11.3%	13.9%	14.1%	17.2%	10.4%	15.6%
Stanwell Moor	9.7%	8.5%	10.5%	17.4%	12.3%	8.2%	13.1%	9.7%
West Drayton	7.6%	10.8%	9.5%	11.8%	20.2%	16.4%	9.7%	14.1%
	Average	Average	Average	Average	Average	Average	Average	Average
	8.1%	11.6%	10.7%	11.6%	14.9%	16.6%	10.1%	15.8%

Table 9 Economic Activity in Inner Study Area (Source: 2011 Census)

Community Area	Economically active	Economically active: Unemployed	Economically inactive	Economically inactive: Retired	Economically inactive: Looking after home or family	Economically inactive: Long-term sick or disabled
Bedfont	73.65%	4.89%	26.35%	8.87%	6.31%	3.49%
Brandshill	78.7%	6.1%	21.3%	7.3%	4.4%	2.5%
Colnbrook	77.3%	5.4%	22.7%	6.1%	5.0%	4.7%
Cranford	68.6%	5.2%	31.4%	9.3%	7.2%	3.5%
Cranford cross	76.7%	5.1%	23.3%	6.4%	5.8%	2.2%
Feltham north	71.50%	4.21%	28.50%	10.10%	5.33%	3.82%
Harlington	76.2%	5.0%	23.8%	7.6%	5.3%	2.4%
Harmondsworth	74.5%	3.8%	25.5%	10.0%	4.5%	3.8%

Community Area	Economically active	Economically active: Unemployed	Economically inactive	Economically inactive: Retired	Economically inactive: Looking after home or family	Economically inactive: Long-term sick or disabled
Hayes	69.82%	5.36%	30.18%	8.01%	7.09%	3.34%
Heston	65.8%	6.1%	34.2%	8.6%	7.8%	4.7%
Hounslow (C+S)	74.1%	4.4%	25.9%	8.5%	5.3%	2.3%
Hounslow (W+H)	66.5%	5.7%	33.5%	8.3%	7.8%	5.0%
Iver & richings park	75.0%	2.8%	25.0%	12.5%	4.3%	1.2%
Longford	64.7%	5.4%	35.3%	6.2%	2.0%	2.1%
Poyle	81.2%	4.9%	18.8%	6.9%	3.3%	1.7%
Sipson	78.1%	6.2%	21.9%	5.7%	6.5%	2.4%
Stanwell	73.4%	4.6%	26.6%	11.7%	4.2%	4.6%
Stanwell Moor	77.30%	2.82%	22.70%	10.12%	5.10%	2.55%
West Drayton	69.8%	5.5%	30.2%	8.8%	7.2%	4.0%
	Average	Average	Average	Average	Average	Average
	73.30%	4.93%	26.70%	8.48%	5.49%	3.17%

Table 10 Limitations to people's daily activity in Inner Study Area (Source: PHE)

Community Area	Activities limited a lot	Activities limited a little	Activities not limited	Activities limited a lot: Age 16 to 64	Activities limited a little: Age 16 to 64	Activities not limited: Age 16 to 64
Bedfont	7.3%	8.2%	84.5%	3.5%	4.7%	58.4%
Brandshill	5.6%	5.7%	88.6%	3.0%	3.8%	64.7%
Colnbrook	6.7%	6.1%	87.3%	3.9%	4.4%	64.6%
Cranford	7.2%	8.2%	84.6%	3.5%	4.7%	60.8%
Cranford cross	4.5%	5.4%	90.0%	2.4%	3.4%	64.6%

Community Area	Activities limited a lot	Activities limited a little	Activities not limited	Activities limited a lot: Age 16 to 64	Activities limited a little: Age 16 to 64	Activities not limited: Age 16 to 64
Feltham north	8.3%	8.4%	83.3%	3.5%	4.5%	58.4%
Harlington	5.3%	6.7%	88.0%	2.6%	4.0%	65.9%
Harmondsworth	6.8%	7.4%	85.8%	3.6%	4.4%	60.6%
Hayes	6.0%	7.2%	86.9%	3.3%	4.3%	57.4%
Heston	7.7%	7.9%	84.4%	4.1%	4.7%	58.2%
Hounslow (C+S)	5.5%	7.0%	87.5%	2.5%	3.6%	64.2%
Hounslow (W+H)	8.2%	8.5%	83.3%	4.6%	5.1%	57.7%
Iver & richings park	4.2%	7.7%	88.2%	1.5%	3.9%	62.4%
Longford	3.9%	6.1%	90.0%	3.4%	4.3%	78.3%
Poyle	3.5%	6.6%	89.9%	1.6%	4.4%	68.9%
Sipson	4.5%	6.8%	88.7%	2.7%	3.7%	62.1%
Stanwell	8.4%	9.2%	82.4%	4.0%	5.3%	58.1%
Stanwell Moor	5.8%	6.0%	88.3%	3.2%	3.5%	64.8%
West Drayton	6.2%	8.8%	85.1%	3.0%	4.3%	52.5%
	Average	Average	Average	Average	Average	Average
	6.1%	7.3%	86.7%	3.1%	4.3%	62.2%

Table 11 Households within the Inner Study Area with access to a vehicle

	All categories: Car or van availability	No cars or vans in household	1 car or van in household	2 cars or vans in household	3 cars or vans in household	4 or more cars or vans in household
Bedfont	4,859	1,238	2,293	1,042	212	74
Brandshill	138	22	63	44	10	4
Colnbrook	141	28.7	76.2	30.0	4.5	1.7
Cranford	122	33.1	49.2	27.5	9.5	3.2
Cranford cross	137	33.3	66.8	27.5	6.5	2.8
Feltham north	4,220	1,122	1,995	841	209	53
Harlington	133	44.7	64.9	17.6	3.9	1.6
Harmondsworth	131	27	56	35	9	4
Hayes	4,647	1,154	2,022	1,091	291	89
Heston	385	107	159	84	27	9
Hounslow (C+S)	4,664	1630.0	1924.5	833.5	202.0	74.0
Hounslow (W+H)	582	214.3	243.4	93.1	25.2	6.4
Iver & richings park	134	7	37	54	22	14
Longford	113	32	58	16	4	4
Poyle	144	19	75	37	12	2
Sipson	120	26	55	30	7	2
Stanwell	123	28.7	58.2	26.7	7.1	2.0
Stanwell Moor	138	9.3	59.0	49.5	12.8	7.0
West Drayton	774	210	345	167	39	14
	Total	Average	Average	Average	Average	Average
		27.6%	44.7%	20.9%	5.1%	1.7%

1.3 Wider Study Area community, economic and health statistics

Table 12 Population and age distribution in the Wider Study Area (Source: 2011 Census)

Borough	Population	0-15	16-74	75+
Elmbridge	130,875	21.30%	70.32%	8.39%
Runnymede	80,510	17.21%	74.27%	8.52%
Slough	140,205	23.94%	71.65%	4.41%
South Bucks	66,867	18.94%	71.49%	9.57%
Windsor and Maidenhead	144,560	19.83%	72.11%	8.06%

Borough	Population	0-15	16-74	75+
Ealing	338,449	20.35%	74.68%	4.97%
Hillingdon	273,936	20.77%	72.98%	6.25%
Hounslow	253,957	20.29%	74.88%	4.83%
Richmond upon Thames	186,990	19.75%	73.68%	6.56%
Wandsworth	306,995	16.61%	79.33%	4.06%
	Total	Average	Average	Average
	1,923,344	19.9%	73.5%	6.6%

Table 13 Distribution of ethnicity in the Inner Wider Area (Source: 2011 Census)

Borough	White	Mixed/ multiple ethnic groups	Asian/ Asian British	Black/ African/ Caribbean/ Black British	Other ethnic group
Elmbridge	90.3%	2.6%	5.4%	0.8%	1.0%
Runnymede	89.0%	2.1%	6.9%	1.1%	1.0%
Slough	45.7%	3.4%	39.7%	8.6%	2.6%
South Bucks	84.3%	2.4%	11.3%	1.1%	1.0%
Windsor and Maidenhead	86.1%	2.3%	9.6%	1.2%	0.8%
Ealing	49.0%	4.5%	29.7%	10.9%	6.0%
Hillingdon	60.6%	3.8%	25.3%	7.3%	3.0%
Hounslow	51.4%	4.1%	34.4%	6.6%	3.6%
Richmond upon Thames	86.0%	3.6%	7.3%	1.5%	1.6%
Wandsworth	71.4%	5.0%	10.9%	10.7%	2.1%
	Average	Average	Average	Average	Average
	71.4%	3.4%	18.1%	5.0%	2.3%

Table 14 Percentage of households with dependents in the Wider Study Area (Source: 2011 Census):

Borough	No adults in employment in household (%)	Dependent children in household: All ages (%)	One person in household with a long-term health problem or disability (%)
Elmbridge	27.2%	33.4%	19.4%
Runnymede	29.2%	27.7%	21.4%
Slough	24.6%	39.2%	22.4%
South Bucks	29.9%	30.5%	21.7%
Windsor and Maidenhead	26.6%	30.3%	19.8%
Ealing	26.5%	33.9%	22.8%

Borough	No adults in employment in household (%)	Dependent children in household: All ages (%)	One person in household with a long-term health problem or disability (%)
Hillingdon	28.7%	35.8%	23.9%
Hounslow	25.7%	34.5%	22.5%
Richmond upon Thames	24.7%	29.6%	18.6%
Wandsworth	21.3%	24.3%	17.2%
	Average	Average	Average
	26.4%	31.9%	21.0%

Table 15 Percentage of population providing unpaid care in Wider Study Area (Source: 2011 Census)

Borough	Provides no unpaid care	Provides 1 to 19 hours unpaid care a week	Provides 20 to 49 hours unpaid care a week	Provides 50 or more hours unpaid care a week
Elmbridge	91.1%	6.6%	0.8%	1.4%
Runnymede	90.8%	6.5%	1.0%	1.7%
Slough	91.7%	5.0%	1.4%	1.8%
South Bucks	89.7%	7.5%	1.1%	1.8%
Windsor and Maidenhead	90.8%	6.6%	1.0%	1.5%
Ealing	91.5%	5.2%	1.5%	1.8%
Hillingdon	90.5%	6.0%	1.4%	2.0%
Hounslow	91.2%	5.5%	1.4%	1.9%
Richmond upon Thames	91.5%	6.3%	0.9%	1.3%
Wandsworth	93.5%	4.3%	0.9%	1.3%
	Average	Average	Average	Average
	91.2%	6.0%	1.1%	1.7%

Table 16 Levels of self-reported health in the Wider Study Area (Source: PHE)

Borough	Very good health	Good health	Fair health	Bad health	Very bad health
Elmbridge	56.5%	31.0%	9.4%	2.5%	0.7%
Runnymede	51.3%	34.1%	10.9%	2.9%	0.7%
Slough	47.9%	36.0%	11.6%	3.5%	1.0%
South Bucks	52.4%	33.3%	10.5%	2.9%	0.8%
Windsor and Maidenhead	54.5%	32.2%	9.8%	2.7%	0.7%
Ealing	49.2%	34.5%	11.4%	3.8%	1.2%

Borough	Very good health	Good health	Fair health	Bad health	Very bad health
Hillingdon	48.8%	35.3%	11.5%	3.4%	1.0%
Hounslow	49.0%	35.1%	11.2%	3.6%	1.1%
Richmond upon Thames	57.3%	30.5%	8.9%	2.5%	0.8%
Wandsworth	57.4%	29.9%	8.9%	2.8%	0.9%
	Average	Average	Average	Average	Average
	52.4%	33.2%	10.4%	3.1%	0.9%

Table 17 Distribution of housing type in the Wider Study Area (Source: 2011 Census)

Borough	Houses (%)	Flats (%)	Owner Occupied	Socially Rented	Private Rent	Shared Ownership	Rent free	% of Households deprived in some dimension
Elmbridge	83.7%	16.3%	73.1%	0.7%	9.9%	15.1%	1.2%	42.4%
Runnymede	83.3%	16.7%	69.5%	1.0%	12.9%	15.2%	1.4%	50.8%
Slough	74.7%	25.3%	52.7%	1.4%	20.6%	24.3%	1.0%	65.1%
South Bucks	87.2%	12.8%	73.4%	1.5%	12.3%	11.4%	1.4%	46.2%
Windsor and Maidenhead	81.9%	18.1%	68.0%	0.6%	13.3%	16.2%	1.9%	45.6%
Ealing	71.0%	29.0%	51.1%	1.8%	18.1%	27.5%	1.5%	62.6%
Hillingdon	80.9%	19.1%	62.9%	1.3%	16.7%	18.1%	1.0%	59.9%
Hounslow	75.3%	24.7%	50.1%	2.4%	22.8%	23.4%	1.3%	62.7%
Richmond upon Thames	76.9%	23.1%	63.6%	0.8%	12.6%	21.8%	1.2%	42.4%
Wandsworth	67.3%	32.7%	45.5%	1.5%	20.3%	31.7%	1.0%	49.6%
	Average	Average	Average	Average	Average	Average	Average	Average
	78.2%	21.8%	61.0%	1.3%	16.0%	20.5%	1.3%	52.7%

Table 18 Level of qualifications in Wider Study Area (Source: 2011 Census)

Borough	No Formal Qualifications	Level 1	Level 2	Apprenticeship	Level 3	Level 4 +	Other Qualifications
Elmbridge	13.2%	10.1%	13.9%	2.2%	11.1%	43.9%	5.6%
Runnymede	18.3%	12.7%	14.4%	3.4%	15.1%	29.9%	6.1%
Slough	20.1%	14.7%	13.4%	2.2%	10.1%	25.8%	13.7%
South Bucks	16.5%	11.8%	14.8%	3.4%	11.1%	36.9%	5.5%
Windsor and Maidenhead	15.6%	11.6%	14.4%	3.0%	11.2%	38.4%	5.8%

Borough	No Formal Qualifications	Level 1	Level 2	Apprenticeship	Level 3	Level 4 +	Other Qualifications
Ealing	16.5%	9.9%	10.5%	1.4%	9.6%	37.0%	15.1%
Hillingdon	19.1%	14.0%	14.2%	2.9%	12.5%	28.0%	9.2%
Hounslow	17.3%	11.7%	11.5%	1.7%	9.8%	34.6%	13.4%
Richmond upon Thames	10.6%	7.4%	10.6%	1.5%	10.6%	53.0%	6.2%
Wandsworth	11.6%	6.6%	8.4%	1.0%	10.0%	53.6%	8.9%
	Average	Average	Average	Average	Average	Average	Average
	15.9%	11.1%	12.6%	2.3%	11.1%	38.1%	9.0%

Table 19 Occupation types in Wider Study Area (Source: 2011 Census)

Borough	Managers, directors and senior officials	Professional occupations	Associate professional and technical occupations	Administrative and secretarial occupations	Skilled trades occupations	Sales and Services Occupations	Process, plant and machine operatives	Elementary occupations
Elmbridge	17.1%	25.4%	17.0%	9.9%	11.0%	11.8%	2.8%	5.0%
Runnymede	12.0%	20.0%	13.6%	11.1%	15.8%	14.7%	4.4%	8.4%
Slough	7.3%	17.1%	10.5%	9.9%	15.2%	16.7%	8.9%	14.3%
South Bucks	16.9%	22.2%	14.9%	11.0%	14.3%	11.0%	3.8%	6.0%
Windsor and Maidenhead	15.0%	23.0%	16.8%	9.8%	12.8%	12.3%	3.6%	6.8%
Ealing	9.7%	22.0%	13.5%	9.5%	15.2%	13.7%	5.5%	10.9%
Hillingdon	9.1%	18.4%	12.4%	11.8%	16.1%	15.5%	6.6%	10.1%
Hounslow	9.3%	19.7%	13.2%	10.5%	13.3%	15.7%	6.2%	12.2%
Richmond upon Thames	16.2%	30.9%	19.9%	8.8%	7.9%	9.9%	2.1%	4.3%
Wandsworth	13.3%	30.7%	21.0%	9.3%	7.5%	10.3%	2.2%	5.6%
	Average	Average	Average	Average	Average	Average	Average	Average
	12.6%	22.9%	15.3%	10.2%	12.9%	13.2%	4.6%	8.4%

Table 20 Economic Activity in Wider Study Area (Source: 2011 Census)

Borough	Economically active	Economically active: Unemployed	Economically inactive	Economically inactive: Retired	Economically inactive: Looking after home or family	Economically inactive: Long-term sick or disabled
Elmbridge	73.4%	2.7%	26.6%	12.2%	6.4%	1.8%
Runnymede	71.6%	2.7%	28.4%	11.9%	3.9%	1.9%
Slough	73.5%	5.4%	26.5%	7.5%	6.5%	3.4%
South Bucks	72.3%	2.7%	27.7%	14.5%	5.1%	1.8%
Windsor and Maidenhead	74.5%	3.2%	25.5%	12.8%	4.8%	1.8%
Ealing	71.5%	5.2%	28.5%	8.3%	5.8%	3.6%
Hillingdon	70.8%	4.3%	29.2%	10.2%	5.2%	2.9%
Hounslow	72.5%	4.6%	27.5%	8.3%	5.9%	3.4%
Richmond upon Thames	75.5%	3.0%	24.5%	10.0%	5.1%	2.0%
Wandsworth	77.9%	3.8%	22.1%	6.2%	4.3%	2.9%
	Average	Average	Average	Average	Average	Average
	73.4%	3.8%	26.6%	10.2%	5.3%	2.6%

Table 21 Limitations to people's daily activity in Wider Study Area (Source: PHE)

Borough	Day-to-day activities limited a lot	Day-to-day activities limited a little	Day-to-day activities not limited	Day-to-day activities limited a lot: Age 16 to 64	Day-to-day activities limited a little: Age 16 to 64	Day-to-day activities not limited: Age 16 to 64
Elmbridge	5.1%	7.0%	87.9%	1.7%	2.9%	57.7%
Runnymede	5.9%	8.0%	86.1%	2.0%	3.5%	60.6%
Slough	6.1%	7.3%	86.6%	3.1%	4.4%	59.5%
South Bucks	5.9%	8.0%	86.1%	1.8%	3.1%	56.8%
Windsor and Maidenhead	5.5%	7.2%	87.3%	1.8%	3.0%	58.7%
Ealing	6.8%	7.4%	85.9%	3.3%	4.3%	61.4%
Hillingdon	6.6%	7.7%	85.7%	2.9%	4.0%	59.4%
Hounslow	6.5%	7.3%	86.2%	3.2%	4.1%	61.8%
Richmond upon Thames	4.9%	6.6%	88.5%	2.0%	3.1%	61.7%
Wandsworth	5.2%	6.0%	88.8%	2.6%	3.5%	68.5%

Borough	Day-to-day activities limited a lot	Day-to-day activities limited a little	Day-to-day activities not limited	Day-to-day activities limited a lot: Age 16 to 64	Day-to-day activities limited a little: Age 16 to 64	Day-to-day activities not limited: Age 16 to 64
	Average	Average	Average	Average	Average	Average
	5.9%	7.3%	86.9%	2.4%	3.6%	60.6%



APPENDIX II.1

Heritage gazetteer

I Heritage Gazetteer

I.1 Introduction

- I.1.1 An initial data-set has been acquired at this stage of the Proposed Development through a commercial search of the Greater London Historic Environment Record (GLHER).
- I.1.2 The National Heritage List for England (NHLE) has also been searched at this stage specific to designated heritage assets, along with informal reviews of other data sources.
- I.1.3 Following the GLHER search request and other data acquisition, data has been compiled into a gazetteer (see **Table I**, below).

Table I Initial heritage gazetteer

Scheduled Monuments			
List Entry	Name	NGR	
I002008	18th century garden feature at Hanworth Park	TQ 11257 71849	
I002042	Romano-British site 1000yds (910m) W of East Bedfont parish church	TQ 07560 73802	
I002043	Part of a causewayed enclosure, 632m north-east of Mayfield Farm	TQ 08030 73664	
I003807	Bronze Age settlement, W of Runnymede Bridge	TQ 01845 71935	
I005919	Roman camp, Matthew Arnold School's playing field, Staines	TQ 05353 70642	
I005920	Schoolhouse (Lord Knyvett's)	TQ 05995 74369	
I006944	Two concentric ditches showing as crop marks at Thorney	TQ 04077 79599	
I006995	Early medieval and medieval palace and associated monuments, Kingsbury	SU 99702 75101	
I006996	Windsor Castle	SU 96963 77028	
I007943	Ankerwyke Priory: a Benedictine nunnery with associated moat and fishponds	TQ 00415 72622	
I013168	Moated Royal Manorial site at Bear's Rails	SU 97344 73855	
I013173	Moated site at Tileplace, Old Windsor	SU 97823 74529	
I013358	Moated site at Moat Park, New Windsor	SU 95736 75254	
Parks and Gardens			
List Entry	Name	Grade	NGR
I000287	Osterley Park	II*	TQ 14414 78372
I000303	Great Fosters	II*	TQ 01405 69844
I000584	Eton College	II	SU 97054 78208
I000587	The Royal Estate, Windsor: Frogmore Gardens	I	SU9751876014

1000592	The Royal Estate, Windsor: Windsor Great Park	I	SU 98582 68851
1000603	Langley Park	II	TQ 00906 81782
1001290	Ditton Park	II	SU 99858 78078
1001434	The Royal Estate, Windsor: Windsor Castle And Home Park	I	SU 97679 76466

Ancient Woodland

Natural England ID	Name	Area (ha)
10433	-	2.34
10656	-	2.21
10662	-	0.50
10671	-	0.53
10674	-	0.88
11255	-	0.98
16096	-	7.84
18453	-	1.71
18955	-	1.04
18956	-	1.79
18999	-	3.46
19489	-	1.12
19490	-	0.20
37887	Long Coppice	20.76
41273	Old Windsor Wood	29.15
41274	Old Windsor Wood	2.61

Listed Buildings within Proposed Development

NHLE Entry	Name	Location	Grade	NGR
1194332	The Great Barn, Harmondsworth	Hillingdon, London, UB7	I	TQ0563277847
1080201	Church of St Mary, Harmondsworth	Hillingdon, London, UB7	II*	TQ 05695 77808
1280920	King Johns Palace	Colnbrook with Poyle, Slough, SL3	II*	TQ 02818 76974
1080118	K6 Telephone Kiosk in Front Of Five Bells Public House	Hillingdon, London, UB7	II	TQ0571277744
1080123	Harmondsworth Hall	Hillingdon, London, UB7	II	TQ 05725 77696
1080124	Wall and Gates to South Of Harmondsworth Hall	Hillingdon, London, UB7	II	TQ0573477687

1080125	Wall to West and North Of The Grange	Hillingdon, London, UB7	II	TQ0573677660
1080147	Old Mill House	Hillingdon, London, UB8	II	TQ 04988 81880
1080164	The King William Iv Public House	Hillingdon, London, UB7	II	TQ 07162 77922
1080185	The Shovel Inn	Hillingdon, London, UB8	II	TQ 05146 82289
1080199	Acacia House	Hillingdon, London, UB7	II	TQ0586177786
1080200	Howcroft (Rear Part Only)	Hillingdon, London, UB7	II	TQ0578577783
1080202	The Crown Public House	Hillingdon, London, UB7	II	TQ 05772 77740
1080217	The Lodge	Hillingdon, London, UB7	II	TQ 05946 77779
1080218	Wall to East Of The Lodge	Hillingdon, London, UB7	II	TQ 05960 77787
1080219	Lanz Farmhouse	Hillingdon, London, UB7	II	TQ 07085 77868
1080296	King Henry Public House the Stables	Hillingdon, London, UB7	II	TQ 05300 76957
1080297	Longford Close	Hillingdon, London, UB7	II	TQ 04863 76777
1080298	Flats 1-3 (Yeomans)	Hillingdon, London, UB7	II	TQ 04965 76853
1080299	King'S Bridge	Hillingdon, London, UB7	II	TQ 04758 76660
1164449	Huntsmoor Park Farmhouse	Iver, South Bucks, Buckinghamshire, SL0	II	TQ 04398 81323
1164451	The Red Lion Public House	Colnbrook with Poyle, Slough, SL3	II	TQ 02328 77191
1164470	Park House and Ye Olde George Public House	Colnbrook with Poyle, Slough, SL3	II	TQ 02705 77122
1164886	Former School (Now Colnbrook Youth Centre)	Colnbrook with Poyle, Slough, SL3	II	TQ 02730 77210
1180885	73 And 75, Iver Lane	Hillingdon, London, UB8	II	TQ 05153 82206
1187016	Milestone at Madbridge	Hillingdon, London, SL3	II	TQ 04088 76649
1187017	Callis Farmhouse	Spelthorne, Surrey, TW19	II	TQ 06142 74372
1187049	Hithermoor Farmhouse	Spelthorne, Surrey, TW19	II	TQ 03858 74435
1187050	Barn and Stables 30 Yards West of Hithermoor Farmhouse	Spelthorne, Surrey, TW19	II	TQ 03822 74438
1187057	Perry Green	Spelthorne, Surrey, TW19	II	TQ 05737 74390
1187059	Badminton House, Post Office, Adjoining House And Hampton House	Colnbrook with Poyle, Slough, SL3	II	TQ 02818 77019
1187060	Kenilworth And Adjoining House	Colnbrook with Poyle, Slough, SL3	II	TQ 02858 76992
1187061	Star and Garter Public House	Colnbrook with Poyle, Slough, SL3	II	TQ 02808 76997

I187062	Barn to King John's Palace	Colnbrook with Poyle, Slough, SL3	II	TQ 02801 76971
I187063	The Hollies	Colnbrook with Poyle, Slough, SL3	II	TQ 03100 76130
I192507	The White Horse Public House	Hillingdon, London, UB7	II	TQ 04934 76857
I192588	Weekly House	Hillingdon, London, UB7	II	TQ 04899 76767
I194310	The Vicarage Tower House	Hillingdon, London, UB7	II	TQ 05758 77786
I194343	The Five Bells Inn	Hillingdon, London, UB7	II	TQ0569877756
I204903	Barn 15 Yards West of Hithermoor Farmhouse	Spelthorne, Surrey, TW19	II	TQ 03839 74430
I204906	Old Oak Cottage	Spelthorne, Surrey, TW19	II	TQ 04076 74895
I204925	Yeoveney Manor Lodge (North Wing,South Wing, Coach House And Pineapple Capped Gate Pier) Yeoveney Manor Lodge	Spelthorne, Surrey, TW19	II	TQ 02607 72738
I204965	1, 2 And 3, Park Street	Colnbrook with Poyle, Slough, SL3	II	TQ 02793 77036
I204982	Fairmead And the Haven	Colnbrook with Poyle, Slough, SL3	II	TQ 02834 77008
I204986	The White Hart Inn	Colnbrook with Poyle, Slough, SL3	II	TQ 02876 76977
I205057	Windsor House	Colnbrook with Poyle, Slough, SL3	II	TQ 03252 76505
I244863	Royal Standard House	Colnbrook with Poyle, Slough, SL3	II	TQ 02481 77124
I268530	Technical Block A, Heathrow Airport	Hillingdon, London, TW6	II	TQ 09904 75971
I280897	City Post	Colnbrook with Poyle, Slough, SL3	II	TQ 02529 76395
I284985	Sipson House	Hillingdon, London, UB7	II	TQ 07846 77256
I286544	Barn to West Of Weekly House	Hillingdon, London, UB7	II	TQ 04882 76747
I286577	Longford Cottage	Hillingdon, London, UB7	II	TQ 05294 76903
I298897	The Croft	Spelthorne, Surrey, TW19	II	TQ 03990 74883
I298903	Abington	Colnbrook with Poyle, Slough, SL3	II	TQ 02849 76998
I298904	Colne Cottage	Colnbrook with Poyle, Slough, SL3	II	TQ 02886 76973
I298905	Poyle Farmhouse	Colnbrook with Poyle, Slough, SL3	II	TQ 03015 75980

1298921	Water-Pump Approximately 75 Yards East of The Punchbowl Inn	Colnbrook with Poyle, Slough, SL3	II	TQ 03364 76680
1298922	Stanwell Farmhouse	Spelthorne, Surrey, TW19	II	TQ 06878 74236
1313011	Horton Lodge	Horton, Windsor and Maidenhead, SL3	II	TQ 01356 76385
1317589	Church of St Thomas	Colnbrook with Poyle, Slough, SL3	II	TQ 02756 77248
1317656	Mill House and Tanhouse Farmhouse J R Swanston Plant And Engineer (Longford) Limited	Colnbrook with Poyle, Slough, SL3	II	TQ 02846 77152
1317757	34, High Street	Colnbrook with Poyle, Slough, SL3	II	TQ 02535 77136
1317805	Aberdeen House	Colnbrook with Poyle, Slough, SL3	II	TQ 02724 77076
1319362	Mildridge Farmhouse	Horton, Windsor and Maidenhead, SL3	II	TQ 01917 77124
1332717	Barn to South Of Huntsmoor Park Farmhouse	Iver, South Bucks, Buckinghamshire, SL0	II	TQ 04373 81301
1332745	Old School House	Colnbrook with Poyle, Slough, SL3	II	TQ 02757 77197
1358336	Queen River Cottage Willow Tree Cottage	Hillingdon, London, UB7	II	TQ 04936 76892
1358337	Orchard Cottage	Hillingdon, London, UB7	II	TQ 05069 76926
1358338	Wall to North West Of Weekly House	Hillingdon, London, UB7	II	TQ 04889 76770
1358366	The Sun House	Hillingdon, London, UB7	II	TQ 05716 77767
1358367	Manor Farmhouse	Hillingdon, London, UB7	II	TQ 05634 77769
1358368	The Gable Stores	Hillingdon, London, UB7	II	TQ 05721 77725
1358401	The Toll House, Cowley Lock	Hillingdon, London, UB8	II	TQ 05150 82222
1358410	25, Holloway Lane	Hillingdon, London, UB7	II	TQ 05988 77842
1358413	The Grange	Hillingdon, London, UB7	II	TQ0574477656
1358414	Wall To East Of The Grange	Hillingdon, London, UB7	II	TQ 05750 77633
1393676	War Memorial Cherry Lane Cemetery	Hillingdon, London, UB3	II	TQ 07944 78699
1451400	Mckay Trading Estate	Colnbrook with Poyle, Slough, SL3	II	TQ0332176030

Listed Buildings within core (1km) study area

NHLE Entry	Name	Location	Grade	NGR
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1080163	Church of St Peter And St Paul	Hillingdon, London, UB3	I	TQ 08800 78214
1117644	Church of St Michael	Horton, Windsor and Maidenhead, SL3	I	TQ 01474 75821
1117780	Mausoleum of The Duchess Of Kent	Windsor and Maidenhead, SL4	I	SU 97554 75915
1187042	Church of St Mary	Spelthorne, Surrey, TW19	I	TQ 05711 74136
1319304	Frogmore House	Windsor and Maidenhead, SL4	I	SU 97720 75974
1332743	Church of St Peter	Iver, South Bucks, Buckinghamshire, SL0	I	TQ 03978 81172
1181607	Old Mill House	Hillingdon, London, UB7	II*	TQ 05429 79082
1187031	Church of St Mary	Spelthorne, Surrey, TW18	II*	TQ 03056 71865
1193001	The Old Gatehouse	Hillingdon, London, UB7	II*	TQ 06171 79491
1193014	Walls to East And South Of Garden Of Number 28 (Coombe House)	Hillingdon, London, UB7	II*	TQ0610379463
1204875	Dunmore House	Spelthorne, Surrey, TW19	II*	TQ 05752 74189
1204896	Lord Knyvett's Adult Education Centre	Spelthorne, Surrey, TW19	II*	TQ 05994 74367
1204918	The Blue Anchor Public House	Spelthorne, Surrey, TW18	II*	TQ 03427 71528
1272281	Prince Alberts Dairy and Cottage	Windsor and Maidenhead, SL4	II*	SU 97902 75995
1286038	Southlands	Hillingdon, London, UB7	II*	TQ 05887 79170
1286366	Walls Around St Martin's Churchyard	Hillingdon, London, UB7	II*	TQ 06185 79549
1286371	Church of St Laurence	Hillingdon, London, UB8	II*	TQ0599482043
1319270	Adelaide Cottage	Windsor and Maidenhead, SL4	II*	SU 97988 76512
1319305	Gothic Ruin of Temple By Lake In Frogmore Gardens	Windsor and Maidenhead, SL4	II*	SU 97586 76074
1332738	Bridgefoot House	Iver, South Bucks, Buckinghamshire, SL0	II*	TQ 04089 81362
1358325	Church of St Martin	Hillingdon, London, UB7	II*	TQ 06163 79542
1358326	Wall Running South from The Old Gatehouse and West Along Front Of Gatehouse Nurseries	Hillingdon, London, UB7	II*	TQ0614779466
1358349	The Frays	Hillingdon, London, UB7	II*	TQ 05546 79319
1028940	I-I I, The Hythe	Runnymede, Surrey, TW18	II	TQ 03202 71443

1028941	The Swan Public House	Runnymede, Surrey, TW18	II	TQ 03242 71432
1028942	Remains of Bridge On River Thames Towpath (South Bank)	Runnymede, Surrey, TW18	II	TQ0330271419
1028945	The Jolly Farmer Public House	Runnymede, Surrey, TW18	II	TQ 03212 71418
1028955	Coal Tax Post Outside Counties End	Runnymede, Surrey, TW18	II	TQ 02767 71679
1067531	2 K6 Telephone Kiosks in Front Of Town Hall	Spelthorne, Surrey, TW18	II	TQ 03375 71502
1067584	Milestone 13 Miles from London	Hounslow, London, TW14	II	TQ0887573738
1067589	Bedfont House	Hounslow, London, TW14	II	TQ0832973515
1074922	Holmwood	Hounslow, London, TW14	II	TQ1065274421
1074923	The Farm (Mr Bennett)	Hounslow, London, TW14	II	TQ 08280 73495
1080119	Pair Of K6 Telephone Kiosks In Front Of Number 85, North Of Church Road, The Green	Hillingdon, London, UB7	II	TQ 05924 79550
1080122	The De Burgh Arms Public House	Hillingdon, London, UB7	II	TQ 06020 80131
1080129	1, Swan Road	Hillingdon, London, UB7	II	TQ 06043 79806
1080138	Elder Farmhouse	Hillingdon, London, UB3	II	TQ 08226 77417
1080149	Bridge Over River Crane	Hillingdon, London, UB3	II	TQ 10039 77159
1080176	Barn at Philpotts Yard	Hillingdon, London, UB7	II	TQ0584480907
1080184	Bridge of The Grand Union Canal Adjoining the Shovel Inn	Hillingdon, London, UB8	II	TQ 05125 82300
1080189	Cowley House	Hillingdon, London, UB8	II	TQ 05326 82634
1080195	Harlington Baptist Church	Hillingdon, London, UB3	II	TQ 08743 77602
1080196	The Dower House	Hillingdon, London, UB3	II	TQ 08842 77322
1080197	Forecourt Wall to The Dower House	Hillingdon, London, UB3	II	TQ0882177323
1080198	The White Hart Public House	Hillingdon, London, UB3	II	TQ 08729 77931
1080230	The Crown Public House	Hillingdon, London, UB8	II	TQ 05386 82437
1080231	The Beeches	Hillingdon, London, UB8	II	TQ 05333 82456
1080232	Old Vine Cottage	Hillingdon, London, UB8	II	TQ 05334 82594
1080235	1-4, Hogarth Close	Hillingdon, London, UB8	II	TQ0534882955
1080247	15, The Green	Hillingdon, London, UB7	II	TQ 05933 79490

1080248	Number 25, Including Wall and Stable Building Behind	Hillingdon, London, UB7	II	TQ 05926 79460
1080249	Elmsdale House	Hillingdon, London, UB7	II	TQ 05915 79411
1080250	The Old House	Hillingdon, London, UB7	II	TQ 05876 79305
1080251	Wall to East of Barn To South Of Avenue Cottage	Hillingdon, London, UB7	II	TQ 05919 79192
1080252	Forecourt Walls to West of Southlands	Hillingdon, London, UB7	II	TQ 05874 79174
1080253	Front Wall and Gates to Number 24	Hillingdon, London, UB7	II	TQ 05836 79408
1080273	The Bell House	Hillingdon, London, UB8	II	TQ 05999 82107
1080275	Wall and Gate Piers to North of The Old Gatehouse	Hillingdon, London, UB7	II	TQ 06175 79497
1080276	Walls to North and West of Land Of Gatehouse Nurseries	Hillingdon, London, UB7	II	TQ 06114 79522
1080277	Wall in Front of Numbers 30 To 36 (Even)	Hillingdon, London, UB7	II	TQ0605979469
1080305	Stansfield House	Hounslow, London, TW5	II	TQ 10568 77264
1080306	The Village Lock-Up (Also Known as The Round House)	Hounslow, London, TW5	II	TQ1034277029
1080324	Burlington House And Flanking Walls of Burlington House	Hounslow, London, TW14	II	TQ 08531 73679
1080325	Green Man Public House	Hounslow, London, TW14	II	TQ 10062 75251
1088096	Baber Bridge	Hounslow, London, TW14	II	TQ 11159 74550
1096132	Gates Monument at St Marys Church	Hounslow, London, TW14	II	TQ 08480 73704
1096133	Brick Chest Tomb South of Gates Monument At St Marys Church	Hounslow, London, TW14	II	TQ 08482 73700
1096134	Captain Millers Headstone at St Marys Church	Hounslow, London, TW14	II	TQ 08484 73666
1096135	Group of Three 18th Century Headstones St Marys Church	Hounslow, London, TW14	II	TQ 08466 73670
1096136	18Th Century Headstone St Marys Church	Hounslow, London, TW14	II	TQ 08486 73670
1096137	Headstone to Mary Taylor St Marys Church	Hounslow, London, TW14	II	TQ 08471 73672

1113383	Milestone at TQ 0137 7793	Colnbrook with Poyle, Slough, SL3	II	TQ 01373 77917
1117629	Cemetary Chapel	Datchet, Windsor and Maidenhead, SL3	II	SU 99705 77048
1117630	38, Ditton Road	Datchet, Windsor and Maidenhead, SL3	II	SU 99698 77041
1117631	The Royal Stag Public House	Datchet, Windsor and Maidenhead, SL3	II	SU 98800 77105
1117632	The Morning Star Public House	Datchet, Windsor and Maidenhead, SL3	II	SU 98669 77054
1117633	Manor Cottage and Manor Green Cottage	Datchet, Windsor and Maidenhead, SL3	II	SU 98756 77037
1117634	6 And 8, High Street	Datchet, Windsor and Maidenhead, SL3	II	SU 98688 77035
1117635	Charles Toller Antique Dealer	Datchet, Windsor and Maidenhead, SL3	II	SU 98631 76947
1117636	The Cottage	Datchet, Windsor and Maidenhead, SL3	II	SU 98645 76929
1117637	Holimans Platt	Datchet, Windsor and Maidenhead, SL3	II	SU 98622 76909
1117638	The Post House	Datchet, Windsor and Maidenhead, SL3	II	SU 98605 76867
1117639	Cedar House	Datchet, Windsor and Maidenhead, SL3	II	SU 99085 77010
1117640	Garden Wall to South And East Of Datchet House	Datchet, Windsor and Maidenhead, SL3	II	SU 98955 77182
1117641	Datchet Lodge	Datchet, Windsor and Maidenhead, SL3	II	SU 98566 76903
1117642	Little Court	Horton, Windsor and Maidenhead, SL3	II	TQ 01684 75666
1117643	The Old Rectory	Horton, Windsor and Maidenhead, SL3	II	TQ 01325 76122
1117645	The Five Bells Public House	Horton, Windsor and Maidenhead, SL3	II	TQ 01690 75853
1117754	Royal Gardens Lodge	Windsor and Maidenhead, SL4	II	SU 98138 75365
1117777	Frogmore House Stables	Windsor and Maidenhead, SL4	II	SU 97696 76043
1117779	Tea House to South of Frogmore House In Frogmore Grounds	Windsor and Maidenhead, SL4	II	SU 97807 75849
1117783	The Home Farmhouse	Windsor and Maidenhead, SL4	II	SU 98012 75914

1117784	The Aviary	Windsor and Maidenhead, SL4	II	SU 97838 75941
1117785	Adelaide Lodge	Windsor and Maidenhead, SL4	II	SU 97989 76508
1164384	Iver Croft	Iver, South Bucks, Buckinghamshire, SLO	II	TQ 03604 81296
1164635	Gate, Screen and Garden Walls To Bridgefoot House	Iver, South Bucks, Buckinghamshire, SLO	II	TQ 04076 81355
1164719	Delaforde Manor	Iver, South Bucks, Buckinghamshire, SLO	II	TQ 04099 82213
1164740	Thorney House	Iver, South Bucks, Buckinghamshire, SLO	II	TQ 03607 79203
1164809	Golborne Monument East of South Aisle Of St Peter's Church	Iver, South Bucks, Buckinghamshire, SLO	II	TQ 03991 81164
1164830	Colne Cottage	Iver, South Bucks, Buckinghamshire, SLO	II	TQ0391981132
1164843	The Tower Arms Public House	Iver, South Bucks, Buckinghamshire, SLO	II	TQ 04081 79466
1180724	Yiewsley Grange	Hillingdon, London, UB7	II	TQ0581580943
1180958	St George's Meadows	Hillingdon, London, UB7	II	TQ0583178994
1181370	Walls to North Of Church Of Saint Peter And Saint Paul	Hillingdon, London, UB3	II	TQ 08810 78229
1187015	The London Stone	Spelthorne, Surrey, TW18	II	TQ 02761 71786
1187018	Staines Bridge	Spelthorne, Surrey, TW18	II	TQ0320671535
1187027	Chapel at Welsh School	Spelthorne, Surrey, TW15	II	TQ 06595 72224
1187028	Railings and Gates Lodge To Welsh School	Spelthorne, Surrey, TW15	II	TQ 06448 72134
1187029	57 And 59, Church Street	Spelthorne, Surrey, TW18	II	TQ 03278 71783
1187030	Stainton House	Spelthorne, Surrey, TW18	II	TQ 03195 71830
1187032	Railings and Gate Piers To Nos 96 To 100 And 104	Spelthorne, Surrey, TW18	II	TQ 03162 71822
1187033	114, Church Street	Spelthorne, Surrey, TW18	II	TQ 03130 71820
1187034	Bridge Over River Colne	Spelthorne, Surrey, TW18	II	TQ 03325 71571
1187035	29, Clarence Street	Spelthorne, Surrey, TW18	II	TQ 03302 71596
1187036	Clarence House	Spelthorne, Surrey, TW18	II	TQ 03301 71586
1187037	35, Clarence Street	Spelthorne, Surrey, TW18	II	TQ 03285 71596
1187039	13, High Street	Spelthorne, Surrey, TW19	II	TQ 05625 74266
1187040	Brook Cottage, Boundary Walls and Iron Railings	Spelthorne, Surrey, TW19	II	TQ 05709 74257

I187041	Coachman's Cottage	Spelthorne, Surrey, TW19	II	TQ 05728 74159
I187043	Frances Paterson Tomb in St Mary's Churchyard	Spelthorne, Surrey, TW19	II	TQ 05750 74109
I187044	Charles Rowlls Tomb in St Mary's Churchyard	Spelthorne, Surrey, TW19	II	TQ 05700 74101
I187045	Forecourt Wall and Gate Piers Of Dunmore House	Spelthorne, Surrey, TW19	II	TQ 05744 74205
I187046	The Vicarage	Spelthorne, Surrey, TW19	II	TQ 05769 74194
I187047	Old Farm Guest House	Spelthorne, Surrey, TW19	II	TQ 05821 74242
I187048	Granary About 15 Yards East Of No 56	Spelthorne, Surrey, TW19	II	TQ 05826 74258
I187051	The Oast House	Spelthorne, Surrey, TW18	II	TQ 03999 71577
I187053	Staines Town Hall	Spelthorne, Surrey, TW18	II	TQ 03379 71482
I187054	Moor Cottage	Spelthorne, Surrey, TW19	II	TQ 02688 72661
I187056	Boundary Wall of Duncroft House	Spelthorne, Surrey, TW18	II	TQ 03070 71979
I187058	Gates Piers and Gates to Stanwell Place	Spelthorne, Surrey, TW19	II	TQ 05090 74274
I187068	Small Malthouse (To Rear of No 57 Church Street)	Spelthorne, Surrey, TW18	II	TQ 03294 71778
I188725	Fawns Manor	Hounslow, London, TW14	II	TQ 08473 73428
I189226	Staines Bridge	Runnymede, Surrey, TW18	II	TQ 03182 71507
I189407	Anne Boleyn Hotel	Runnymede, Surrey, TW18	II	TQ 03228 71414
I193679	Barn to South of Avenue Cottage	Hillingdon, London, UB7	II	TQ 05900 79199
I193735	The Olde Cottage	Hillingdon, London, UB7	II	TQ 05757 79338
I193946	The Old Cottage	Hillingdon, London, UB8	II	TQ 05474 81376
I194137	Maygood's Farmhouse	Hillingdon, London, UB8	II	TQ0538081904
I194154	The Old House	Hillingdon, London, UB8	II	TQ 05374 82392
I194165	Wall To North Of Front Garden Of The Beeches	Hillingdon, London, UB8	II	TQ0534782467
I194282	268-272, High Street	Hillingdon, London, UB3	II	TQ 08643 77588
I204676	Welsh School	Spelthorne, Surrey, TW15	II	TQ 06566 72179
I204681	21-27, Church Street	Spelthorne, Surrey, TW18	II	TQ 03393 71604
I204708	75, Church Street	Spelthorne, Surrey, TW18	II	TQ 03250 71799
I204720	Bosun's Hatch	Spelthorne, Surrey, TW18	II	TQ 03186 71840
I204729	Corner Hall	Spelthorne, Surrey, TW18	II	TQ 03112 71842
I204803	Milestone	Spelthorne, Surrey, TW19	II	TQ 05686 74251
I204809	The Swan Public House	Spelthorne, Surrey, TW19	II	TQ 05684 74234

I204814	Boundary Wall Between No 40B And Entrance to Coachman's Cottage	Spelthorne, Surrey, TW19	II	TQ 05724 74184
I204863	John Hodges Vault in St Mary's Churchyard	Spelthorne, Surrey, TW19	II	TQ 05726 74106
I204882	46 And 48, High Street	Spelthorne, Surrey, TW19	II	TQ 05774 74222
I205094	Former Staines West Station Moor House	Spelthorne, Surrey, TW18	II	TQ 02969 72180
I240382	Engine House, Thames Water Station	Spelthorne, Surrey, TW18	II	TQ0417372040
I240403	Building Adjoining Engine House to North East Thames Water Station	Spelthorne, Surrey, TW19	II	TQ0418972068
I240644	Marjory Kinnon School the Old School	Hounslow, London, TW14	II	TQ 09157 74531
I244624	Golf Cottage	Windsor and Maidenhead, SL4	II	SU 97962 76323
I250772	Monument to William And Elizabeth Brookes In Churchyard Of Church Of St Peter And St Paul	Hillingdon, London, UB3	II	TQ 08777 78220
I251377	Granary at TQ 0126 7883	Slough, SL3	II	TQ 01261 78847
I260802	Stable Block at Feltham Lodge, With Attached Walls to East And West	Hounslow, London, TW14	II	TQ 10734 74139
I272272	Albert Bridge Lodge	Windsor and Maidenhead, SL4	II	SU 98381 75646
I272282	Lodges Each Side Side of Albert Road South West of Shaw Farm Including Gates	Windsor and Maidenhead, SL4	II	SU 97460 75200
I281005	Henry Bullock Tomb in St Mary'S Churchyard	Spelthorne, Surrey, TW19	II	TQ 05716 74149
I284844	The Pheasant Public House	Hillingdon, London, UB3	II	TQ 08404 77398
I285085	Ha Ha Walls to South and South West Of Cranford House Stables	Hillingdon, London, UB3	II	TQ 10100 78056
I285225	Colne Mead	Hillingdon, London, UB7	II	TQ 05539 79060
I286043	24, The Green	Hillingdon, London, UB7	II	TQ 05817 79423
I286057	Wall to North Of Number 31	Hillingdon, London, UB7	II	TQ0592079416
I286058	33 And 33A, The Green	Hillingdon, London, UB7	II	TQ 05910 79398
I286076	27, The Green and Industrial Buildings Adjoining Behind Number 27	Hillingdon, London, UB7	II	TQ 05924 79443

1286104	I-11, The Green	Hillingdon, London, UB7	II	TQ0593279523
1286348	Walls In Front Of Numbers 52-58 (Even) And Along West End Of Property	Hillingdon, London, UB7	II	TQ0596279503
1298890	25 And 27, Clarence Street	Spelthorne, Surrey, TW18	II	TQ 03321 71587
1298891	33, Clarence Street	Spelthorne, Surrey, TW18	II	TQ 03293 71598
1298892	Public Library	Spelthorne, Surrey, TW18	II	TQ 03270 71608
1298893	44, 46 And 48, High Street	Spelthorne, Surrey, TW18	II	TQ 03540 71609
1298894	Windsor Cottage	Spelthorne, Surrey, TW19	II	TQ 05738 74242
1298895	40B, High Street	Spelthorne, Surrey, TW19	II	TQ 05742 74184
1298896	Anonymous Vault in St Mary'S Churchyard	Spelthorne, Surrey, TW19	II	TQ 05741 74104
1298898	2, Clarence Street	Spelthorne, Surrey, TW18	II	TQ 03391 71540
1298899	Fire Engine Shed	Spelthorne, Surrey, TW18	II	TQ 03365 71466
1298900	Duncroft House	Spelthorne, Surrey, TW18	II	TQ 03112 72015
1298901	Cheyne Cottage	Spelthorne, Surrey, TW19	II	TQ 05720 74299
1298902	The Wheatsheaf Inn and Wheatsheaf Cottages	Spelthorne, Surrey, TW19	II	TQ 05556 74250
1298926	77 And 79, Church Street	Spelthorne, Surrey, TW18	II	TQ 03244 71808
1298927	111 And 113, Church Street	Spelthorne, Surrey, TW18	II	TQ 03137 71856
1298928	George Hawkins Tomb in St Mary's Churchyard	Spelthorne, Surrey, TW18	II	TQ 03072 71847
1298929	15 And 17, Clarence Street	Spelthorne, Surrey, TW18	II	TQ 03366 71577
1312996	Dairy at Berkin Manor at North East Corner of House	Horton, Windsor and Maidenhead, SL3	II	TQ 01855 75962
1312998	The Old Council House	Datchet, Windsor and Maidenhead, SL3	II	SU 98808 77030
1313015	Ashgood Farmhouse	Horton, Windsor and Maidenhead, SL3	II	TQ 01675 75977
1313048	The Crown Public House and Attached Barn	Horton, Windsor and Maidenhead, SL3	II	TQ 01254 75964
1313081	Manor House Antiques the Manor House	Datchet, Windsor and Maidenhead, SL3	II	SU 98772 77032
1313082	Goodwyn House	Datchet, Windsor and Maidenhead, SL3	II	SU 98649 76974
1317691	Bridge Over Colne Brook	Iver, South Bucks, Buckinghamshire, SL0	II	TQ 04122 81346
1319267	Bridge from Island Leading to Duchess Of Kent'S Mausoleum	Windsor and Maidenhead, SL4	II	SU 97531 75938

1319269	Range of Cowsheds Stabling Etc To West Of The Home Farmhouse	Windsor and Maidenhead, SL4	II	SU 97955 75898
1319294	Nos 1 And 2 Double Cottages	Windsor and Maidenhead, SL4	II	SU 98478 76787
1319356	R S Mccoll, Newsagents	Datchet, Windsor and Maidenhead, SL3	II	SU 98785 77085
1319357	Church of St Mary	Datchet, Windsor and Maidenhead, SL3	II	SU 98817 77112
1319358	Ice House in Garden Of No. 60 Lawn Close	Datchet, Windsor and Maidenhead, SL3	II	SU 99305 77003
1319359	Milestone in Pavement Outside Church Cottage	Datchet, Windsor and Maidenhead, SL3	II	SU 98820 77076
1319360	Old Bridge House	Datchet, Windsor and Maidenhead, SL3	II	SU 98652 76798
1319361	Brookfield	Horton, Windsor and Maidenhead, SL3	II	TQ 01153 75895
1319363	Churchyard Wall to West Of Church Of St Michael	Horton, Windsor and Maidenhead, SL3	II	TQ 01454 75845
1323657	Pearmain Cottage	Old Windsor, Windsor and Maidenhead, SL4	II	SU 98344 74518
1323658	Church Cottage	Old Windsor, Windsor and Maidenhead, SL4	II	SU9834374495
1323659	The Hollies Walnut Cottage	Old Windsor, Windsor and Maidenhead, SL4	II	SU 98320 74650
1323662	Sheelin Cottage Upper Wycombe	Old Windsor, Windsor and Maidenhead, SL4	II	SU 98306 74872
1323663	Abbey Cottage Vine Cottage	Old Windsor, Windsor and Maidenhead, SL4	II	SU 98352 74788
1332737	90, High Street	Iver, South Bucks, Buckinghamshire, SL0	II	TQ 03564 81272
1332739	Old Timbers	Iver, South Bucks, Buckinghamshire, SL3	II	TQ 02231 78427
1332740	Dovecote at Delaford Manor	Iver, South Bucks, Buckinghamshire, SL0	II	TQ 04111 82162
1332744	Mulberry House the Vicarage	Iver, South Bucks, Buckinghamshire, SL0	II	TQ 03929 81070
1358318	Pates Manor	Hounslow, London, TW14	II	TQ 08512 73758
1358327	Wall in front of Numbers 40 To 50 (Even)	Hillingdon, London, UB7	II	TQ0599079491
1358345	Drayton Hall (Council Offices)	Hillingdon, London, UB7	II	TQ0641579439

I358346	Offices of The Valentine Varnish and Lacquer Company	Hillingdon, London, UB7	II	TQ0582280004
I358351	29, The Green	Hillingdon, London, UB7	II	TQ 05918 79433
I358352	Forecourt Walls to Number 31	Hillingdon, London, UB7	II	TQ0590579411
I358353	Avenue Cottage Avenue House (Flats 1-4)	Hillingdon, London, UB7	II	TQ 05916 79216
I358354	Walls to North and East of Garden Of Southlands	Hillingdon, London, UB7	II	TQ 05928 79142
I358355	Hope Cottage	Hillingdon, London, UB7	II	TQ 05812 79390
I358383	Wall to North of Maygood'S Farmhouse Garden	Hillingdon, London, UB8	II	TQ0538681916
I358384	Poplar Cottage	Hillingdon, London, UB8	II	TQ 05333 82539
I358391	Wall to South of Churchyard Of Church Of St Peter And St Paul	Hillingdon, London, UB3	II	TQ 08760 78213
I358403	Forecourt Wall to Number 85	Hillingdon, London, UB7	II	TQ0553279076
I358411	The Railway Arms Public House	Hillingdon, London, UB7	II	TQ 06003 80072
I358423	Barnacre	Hillingdon, London, UB8	II	TQ 05518 81375
I360959	Church of St Mary	Hounslow, London, TW14	II	TQ 08481 73684
I360961	Milestone 12 Miles from London	Hounslow, London, TW14	II	TQ1038074295
I376785	Numbers 1-72 And Community Hall	Hounslow, London, TW14	II	TQ0904373625
I376786	Summerhouse	Hounslow, London, TW14	II	TQ0902173676
I376787	Gate Piers and Walls	Hounslow, London, TW14	II	TQ0898173776
I378029	Coal Tax Post North Side East End	Runnymede, Surrey, TW18	II	TQ 03121 71472
I378033	Coal Tax Post at West End Of The Hythe On Traffic Island	Runnymede, Surrey, TW18	II	TQ 03146 71441
I378053	Old Bridge Cottage	Runnymede, Surrey, TW18	II	TQ0329971405
I378055	25 And 26	Runnymede, Surrey, TW18	II	TQ 03272 71392
I378056	The Young Elizabeth	Runnymede, Surrey, TW18	II	TQ 03248 71403
I389143	War Memorial in St Peters Churchyard	Iver, South Bucks, Buckinghamshire, SL0	II	TQ 03926 81175
I390714	Milestone	Spelthorne, Surrey, TW19	II	TQ 05883 72549
I393523	Stanwell War Memorial	Spelthorne, Surrey, TW19	II	TQ 05737 74222

1400162	Lecture Theatre Block, Brunel University	Hillingdon, London, UB8	II	TQ0602382688
1409790	Road Traffic Hazard Sign	Hillingdon, London, UB3	II	TQ0869677645
1427431	The Queen's Head	Hounslow, London, TW5	II	TQ1082577429
1428695	Roman Catholic Church Of St Catherine	Hillingdon, London, UB7	II	TQ0585279472
1440376	Staines War Memorial	Spelthorne, Surrey, TW18	II	TQ0338671529
1444965	Harlington War Memorial	Hillingdon, London, UB3	II	TQ0880778193
Listed Buildings within the wider (3km) study area				
NHLE Entry	Name	Location	Grade	NGR
1028921	Runnymede Park	Runnymede, Surrey, TW20	I	TQ 00214 71343
1117752	The Town Hall	Windsor and Maidenhead, SL4	I	SU 96823 76831
1117776	Windsor Castle Including All the Buildings Within the Walls	Windsor and Maidenhead, SL4	I	SU 97002 77033
1117781	The Royal Mausoleum	Windsor and Maidenhead, SL4	I	SU 97445 75940
1251379	Church of St Laurence	Slough, SL3	I	SU 98074 79094
1290278	Eton College	Eton, Windsor and Maidenhead, SL4	I	SU 96715 77868
1392556	Group Operations Room	Hillingdon, London, UB10	I	TQ 06548 83514
1028978	Church of Saint John the Baptist Lychgate	Runnymede, Surrey, TW20	II*	TQ 01277 71405
1079380	Liberty Cinema	Ealing, London, UB1	II*	TQ 12775 80331
1079381	Former Norwood Free School	Ealing, London, UB2	II*	TQ 13540 78671
1079419	Southall Manor House	Ealing, London, UB2	II*	TQ 12470 79400
1080111	Discotheque Royle	Hillingdon, London, UB8	II*	TQ 05895 83954
1080114	Hillingdon Court	Hillingdon, London, UB10	II*	TQ 06848 83829
1080148	The Crown and Treaty Inn	Hillingdon, London, UB8	II*	TQ0520484537
1080160	Church of St John	Hillingdon, London, UB8	II*	TQ 06914 82916
1080208	The Market House	Hillingdon, London, UB8	II*	TQ 05537 84107
1080233	Church of St Mary	Hillingdon, London, UB3	II*	TQ 09708 81077
1080340	Church of St Leonard	Hounslow, London, TW5	II*	TQ 13132 77498
1113384	2,4,6,8, St Marys Road	Slough, SL3	II*	TQ 00471 79491
1113387	12, 14, 16, 18, 20, 22, St Marys Road	Slough, SL3	II*	TQ 00466 79595

1117606	Church of St Andrew	Wraysbury, Windsor and Maidenhead, TW19	II*	TQ 00125 73942
1117676	Old Bank House (Brewery Office)	Windsor and Maidenhead, SL4	II*	SU 96822 77117
1117708	Church of St John The Baptist	Windsor and Maidenhead, SL4	II*	SU 96880 76793
1117728	Dial House	Windsor and Maidenhead, SL4	II*	SU 96991 76647
1117729	9-11, Park Street	Windsor and Maidenhead, SL4	II*	SU 96955 76663
1117730	20, Park Street	Windsor and Maidenhead, SL4	II*	SU 96960 76699
1164777	Dairy In Grounds Of Elk Meadows	Iver, South Bucks, Buckinghamshire, SL0	II*	TQ 03964 82968
1180516	Church of St Margaret	Hillingdon, London, UB8	II*	TQ 05525 84099
1181190	Church of St Dunstan	Hillingdon, London, UB3	II*	TQ 10160 78179
1189077	Church of St George	Hounslow, London, TW13	II*	TQ 11250 71880
1189321	Church of Saint John the Baptist	Runnymede, Surrey, TW20	II*	TQ 01308 71367
1189501	Church of St Mary	Ealing, London, UB2	II*	TQ 13491 78624
1205343	Ann Foorde's House	Windsor and Maidenhead, SL4	II*	SU 96998 76643
1205492	Hadleigh House	Windsor and Maidenhead, SL4	II*	SU 96916 76587
1210902	Statue of Henry Vi, Eton College	Eton, Windsor and Maidenhead, SL4	II*	SU 96699 77910
1210908	St Christopher's	Eton, Windsor and Maidenhead, SL4	II*	SU 96635 77800
1211362	42, High Street	Eton, Windsor and Maidenhead, SL4	II*	SU 96685 77462
1221042	5 And 6, Church Street	Windsor and Maidenhead, SL4	II*	SU 96863 76852
1251585	Upton Court	Slough, SL3	II*	SU 98037 79058
1261097	Church of St Dunstan	Hounslow, London, TW13	II*	TQ 09869 72260
1280741	12-16, Park Street	Windsor and Maidenhead, SL4	II*	SU 96932 76676
1280766	The Gate House	Windsor and Maidenhead, SL4	II*	SU 97018 76631
1281315	Church Rooms	Windsor and Maidenhead, SL4	II*	SU 96870 76839
1284903	Cedars House	Hillingdon, London, UB10	II*	TQ 06948 83003

1290001	Lower Chapel, Eton College	Eton, Windsor and Maidenhead, SL4	II*	SU 96500 77783
1290036	The Cock Pitt Cafe	Eton, Windsor and Maidenhead, SL4	II*	SU 96690 77411
1319297	Railway Bridge Carrying the Winsor Slough Line Over the Thames	Windsor and Maidenhead, SL4	II*	SU 96053 77289
1319319	Number 4 With Entrance to Black Lion Yard	Windsor and Maidenhead, SL4	II*	SU 97006 76638
1319325	St Georges School	Windsor and Maidenhead, SL4	II*	SU 96906 77209
1319337	The Old House Hotel	Windsor and Maidenhead, SL4	II*	SU 96740 77189
1376599	Commonwealth Air Forces Memorial	Runnymede, Surrey, TW20	II*	SU 99837 71942
1028902	Features of Formal Garden to South West of Ridgemead	Runnymede, Surrey, TW20	II	SU 98974 72436
1028920	Memorial Stone for Site of Roman Road	Runnymede, Surrey, TW20	II	TQ 01364 69958
1028924	Commemorative Urns at North End of Runnymede Meadows	Runnymede, Surrey, SL4	II	SU 99662 73141
1028925	Boat House North End of Runnymede Meadows Between Windsor Road and River Thames	Runnymede, Surrey, SL4	II	SU 99641 73217
1028943	20, 21 And 22	Runnymede, Surrey, TW18	II	TQ 03292 71385
1028944	23 And 24	Runnymede, Surrey, TW18	II	TQ 03282 71388
1028966	Milestone Opposite Dell Park Lodge	Runnymede, Surrey, TW20	II	SU 98464 72106
1028969	The Mews	Runnymede, Surrey, TW20	II	SU 99554 71922
1028971	Kings Arms	Runnymede, Surrey, TW20	II	TQ 00651 71310
1028972	Literary Institute	Runnymede, Surrey, TW20	II	TQ 01034 71323
1028973	53A and 54, High Street	Runnymede, Surrey, TW20	II	TQ 01088 71334
1028974	The Malt House	Runnymede, Surrey, TW20	II	TQ 01071 71424
1028975	72, High Street	Runnymede, Surrey, TW20	II	TQ 01220 71411
1028976	80, High Street	Runnymede, Surrey, TW20	II	TQ 01257 71435
1028977	The Red House	Runnymede, Surrey, TW20	II	TQ 01472 71571
1028979	Churchyard of Church Of Saint John The Baptist (Whyatt Tomb South Of Church)	Runnymede, Surrey, TW20	II	TQ 01294 71355

1028980	176, High Street	Runnymede, Surrey, TW20	II	TQ 00911 71250
1028981	178, High Street	Runnymede, Surrey, TW20	II	TQ 00897 71247
1031547	Barnespool Bridge	Eton, Windsor and Maidenhead, SL4	II	SU 96639 77741
1031548	Porny School	Eton, Windsor and Maidenhead, SL4	II	SU 96680 77654
1031549	Burning Bush	Eton, Windsor and Maidenhead, SL4	II	SU 96620 77944
1031550	Cemetery Chapel	Eton, Windsor and Maidenhead, SL4	II	SU 96319 78026
1031551	Our Lady of Sorrows Roman Catholic Church	Eton, Windsor and Maidenhead, SL4	II	SU 96584 77432
1031552	Cemetery Lychgate	Eton, Windsor and Maidenhead, SL4	II	SU 96304 77998
1031553	Burnham Thorpe	Eton, Windsor and Maidenhead, SL4	II	SU 96285 78024
1031592	Kennedy Memorial	Runnymede, Surrey, TW20	II	SU 99580 72778
1067847	Chest Tomb to Rebecca Bell, St Dunstons Churchyard	Hounslow, London, TW13	II	TQ 09846 72266
1067848	Chest Tomb to Dan Blake, St Dunstons Churchyard	Hounslow, London, TW13	II	TQ 09865 72273
1067849	Chest Tomb to Richard Ride and Family, St Dunstons Churchyard	Hounslow, London, TW13	II	TQ 09886 72263
1079330	Norwood Hall	Ealing, London, UB2	II	TQ 13455 78602
1079382	Church of St George	Ealing, London, UB1	II	TQ 12205 80570
1079397	196 And 198, Norwood Road	Ealing, London, UB2	II	TQ 13046 78653
1079411	The Water Tower	Ealing, London, UB1	II	TQ 12449 79798
1079580	North Alcove in Garden Of Tudor House	Hounslow, London, TW13	II	TQ 11252 71860
1079602	44-50, Bath Road	Hounslow, London, TW3	II	TQ 13431 75624
1080103	46-48, Windsor Street	Hillingdon, London, UB8	II	TQ 05471 84045
1080104	51, 52, 52A and 53, Windsor Street	Hillingdon, London, UB8	II	TQ 05494 84085
1080105	Hayes Town Hall	Hillingdon, London, UB3	II	TQ 09374 81139
1080107	Friends' Meeting House	Hillingdon, London, UB8	II	TQ 05663 84326
1080108	Wall on North and West Sides Of Small Graveyard Surrounding Friends' Meeting House	Hillingdon, London, UB8	II	TQ 05661 84337

1080115	Hillingdon House	Hillingdon, London, UB10	II	TQ 06524 83779
1080117	Three K6 Telephone Kiosks Outside Uxbridge London Regional Transport Station	Hillingdon, London, UB8	II	TQ0554684135
1080121	Benlow Works	Hillingdon, London, UB3	II	TQ 10109 79538
1080132	Grenedehar Perryfield	Hillingdon, London, UB10	II	TQ 07136 82906
1080133	Acacia House the Firs	Hillingdon, London, UB10	II	TQ 07147 82908
1080134	Beech Cottage Magnolia House the Chestnuts the Laurels	Hillingdon, London, UB10	II	TQ 07111 82923
1080135	Green Cottage Greenside	Hillingdon, London, UB10	II	TQ 07060 82892
1080136	Gate to South of Cedars House	Hillingdon, London, UB10	II	TQ 06947 82965
1080137	Walls to West and South of Hubbard's Farm Garden	Hillingdon, London, UB8	II	TQ 07564 81379
1080140	13 And 14, Windsor Street	Hillingdon, London, UB8	II	TQ 05481 84032
1080141	16, 16A, 17 And 17A, Windsor Street	Hillingdon, London, UB8	II	TQ 05472 84023
1080142	Entrance Gateway to Former Graveyard	Hillingdon, London, UB8	II	TQ 05434 83966
1080143	43-45, Windsor Street	Hillingdon, London, UB8	II	TQ 05460 84035
1080144	51 And 53, Montague Road	Hillingdon, London, UB8	II	TQ0597084276
1080145	Moorcroft Farmhouse	Hillingdon, London, UB8	II	TQ 07292 81554
1080152	26, Park Road	Hillingdon, London, UB4	II	TQ 09295 81829
1080153	Nurses Home In Grounds Of Hillingdon Hospital	Hillingdon, London, UB8	II	TQ 06978 81827
1080157	Cranford House Stables	Hillingdon, London, UB3	II	TQ 10113 78195
1080158	Walls To North Of Stables	Hillingdon, London, UB3	II	TQ 10119 78218
1080161	A W Smith and Sons the Conifir Café	Hillingdon, London, UB8	II	TQ 06830 82887
1080166	The Falcon Public House	Hillingdon, London, UB8	II	TQ0540884387
1080167	122 And 123, High Street	Hillingdon, London, UB8	II	TQ0541184373
1080168	127 And 128, High Street	Hillingdon, London, UB8	II	TQ 05425 84333
1080169	134 And 135, High Street	Hillingdon, London, UB8	II	TQ 05444 84296
1080170	Wall to East of Number 134	Hillingdon, London, UB8	II	TQ0545584309
1080171	The Crown and Sceptre Public House	Hillingdon, London, UB8	II	TQ0545184289
1080173	Norman Reeves Motors	Hillingdon, London, UB8	II	TQ 05808 83960
1080174	The Shrubbery	Hillingdon, London, UB8	II	TQ 05858 84010

1080180	15, Hillingdon Road	Hillingdon, London, UB10	II	TQ 06045 83203
1080181	16-19, Hillingdon Road	Hillingdon, London, UB10	II	TQ 06031 83214
1080182	24 And 25A, Hillingdon Road	Hillingdon, London, UB10	II	TQ 06007 83259
1080183	Church of St Andrew	Hillingdon, London, UB10	II	TQ 05958 83779
1080206	20, High Street	Hillingdon, London, UB8	II	TQ 05598 84045
1080207	25-27, High Street	Hillingdon, London, UB8	II	TQ0556784074
1080209	74 And 75, High Street	Hillingdon, London, UB8	II	TQ 05330 84441
1080210	Wall and Railings Above Former Mill Stream	Hillingdon, London, UB8	II	TQ 05301 84485
1080211	119, High Street	Hillingdon, London, UB8	II	TQ0540384397
1080212	Moorcroft	Hillingdon, London, UB8	II	TQ 07677 81618
1080213	House to North East of Moorcroft	Hillingdon, London, UB8	II	TQ 07703 81668
1080214	Stable and Coach house Building to North of Moorcroft	Hillingdon, London, UB8	II	TQ 07689 81652
1080215	Vine Cottage	Hillingdon, London, UB8	II	TQ 07696 81696
1080234	Lych Gate and Wall to South of Church of St Mary	Hillingdon, London, UB3	II	TQ 09700 81050
1080257	Whitehall	Hillingdon, London, UB3	II	TQ 09401 80613
1080274	Former Manor House Stables	Hillingdon, London, UB3	II	TQ 09812 81069
1080283	The Rectory	Hounslow, London, TW13	II	TQ 11568 71810
1080300	Heston Church Lych Gate	Hounslow, London, TW5	II	TQ 13099 77501
1080301	133, Heston Road	Hounslow, London, TW5	II	TQ 13124 77417
1080307	Red Lion Inn	Hounslow, London, TW13	II	TQ 10532 72843
1080312	Gate to The Lawn	Hounslow, London, TW3	II	TQ 13622 76362
1088097	Baber Auxiliary Bridge	Hounslow, London, TW14	II	TQ 11359 74613
1096071	Brentford Fountain Western International Market	Hounslow, London, UB2	II	TQ 10830 78667
1096907	Bell Road Methodist Church	Hounslow, London, TW3	II	TQ 13697 75440
1113381	The Harrow Public House	Slough, SL3	II	TQ 01244 79381
1113385	Houblone Tomb Approximately 1 Metre to East of North Chapel Of Church Of St. Mary (Q.V.)	Slough, SL3	II	TQ 00500 79542
1113386	Webb Tomb Approximately 12 Metres to South-West Of Nave Of Church Of St. Mary	Slough, SL3	II	TQ 00466 79514

1113388	Wall Approximately 5 Metres to East Of Langley Hall (Q.V.)	Slough, SL3	II	TQ 01144 79365
1117604	Greenwood	Wraysbury, Windsor and Maidenhead, TW19	II	TQ 01210 74243
1117605	The Old Vicarage	Wraysbury, Windsor and Maidenhead, TW19	II	TQ 00475 73280
1117627	Barn to South-West of Ditton Farmhouse	Datchet, Windsor and Maidenhead, SL3	II	TQ 00436 77719
1117628	Main Gatehouse and Bridge At Admiralty Compass Observatory, At Ditton Park	Datchet, Windsor and Maidenhead, SL3	II	TQ 00123 77959
1117646	Magna Carta House	Wraysbury, Windsor and Maidenhead, TW19	II	SU 99904 73005
1117647	Tithe Farm Cottage	Wraysbury, Windsor and Maidenhead, TW19	II	TQ 01072 74266
1117648	25, Victoria Street	Windsor and Maidenhead, SL4	II	SU 96771 76590
1117649	27, Victoria Street	Windsor and Maidenhead, SL4	II	SU 96765 76590
1117650	33-37, Victoria Street	Windsor and Maidenhead, SL4	II	SU 96741 76586
1117651	43 And 45, Victoria Street	Windsor and Maidenhead, SL4	II	SU 96723 76580
1117652	57, Victoria Street	Windsor and Maidenhead, SL4	II	SU 96581 76559
1117653	61A, 63 And 65, Victoria Street	Windsor and Maidenhead, SL4	II	SU 96568 76560
1117654	67, Victoria Street	Windsor and Maidenhead, SL4	II	SU 96561 76562
1117655	The Baptist Church	Windsor and Maidenhead, SL4	II	SU 96543 76550
1117656	71 And 73, Victoria Street	Windsor and Maidenhead, SL4	II	SU 96534 76559
1117658	135 And 136, Peascod Street	Windsor and Maidenhead, SL4	II	SU 96722 76850
1117661	93A and 94, Peascod Street	Windsor and Maidenhead, SL4	II	SU 96517 76699
1117662	Wall with Railings and Gates to Windsor Methodist Church	Windsor and Maidenhead, SL4	II	SU 96213 76612
1117663	Granary 50 Yds South-West of Ditton Farmhouse	Datchet, Windsor and Maidenhead, SL3	II	TQ 00442 77778

1117664	Nos. 12 And 12A, Thames Street, And No. 2 Curfew Yard	Windsor and Maidenhead, SL4	II	SU 96708 76972
1117665	Nos 13-16 Including Former No 17	Windsor and Maidenhead, SL4	II	SU 96696 76988
1117666	19, Thames Street	Windsor and Maidenhead, SL4	II	SU 96705 77015
1117667	22, Thames Street	Windsor and Maidenhead, SL4	II	SU 96718 77024
1117668	24 And 25, Thames Street	Windsor and Maidenhead, SL4	II	SU 96731 77035
1117669	28, Thames Street	Windsor and Maidenhead, SL4	II	SU 96747 77055
1117670	30, Thames Street	Windsor and Maidenhead, SL4	II	SU 96757 77067
1117671	42-45, Thames Street	Windsor and Maidenhead, SL4	II	SU 96789 77120
1117672	The Swan Public House	Windsor and Maidenhead, SL4	II	SU 96770 77152
1117673	Windsor Bridge	Windsor and Maidenhead, SL4	II	SU 96726 77245
1117675	William Iv Public House	Windsor and Maidenhead, SL4	II	SU 96793 77170
1117677	Prince Christian Victor of Schleswig-Holstein Monument	Windsor and Maidenhead, SL4	II	SU 96819 77104
1117678	1-3, Trinity Place	Windsor and Maidenhead, SL4	II	SU 96400 76522
1117679	6-9, Trinity Place	Windsor and Maidenhead, SL4	II	SU 96396 76491
1117680	10 And 11 Trinity Place	Windsor and Maidenhead, SL4	II	SU 96393 76472
1117681	14 And 15, Trinity Place	Windsor and Maidenhead, SL4	II	SU 96418 76445
1117682	Church of Holy Trinity	Windsor and Maidenhead, SL4	II	SU 96365 76434
1117683	18 And 19, Trinity Place	Windsor and Maidenhead, SL4	II	SU 96358 76505
1117686	Archway to Royal Mews	Windsor and Maidenhead, SL4	II	SU 97001 76664
1117687	29-33, Park Street	Windsor and Maidenhead, SL4	II	SU 97016 76657
1117688	Turret House	Windsor and Maidenhead, SL4	II	SU 97040 76646

1117689	Cambridge Gate and Park Street Gate	Windsor and Maidenhead, SL4	II	SU 97064 76636
1117690	27 And 28, Peascod Street	Windsor and Maidenhead, SL4	II	SU 96647 76767
1117691	33, Peascod Street	Windsor and Maidenhead, SL4	II	SU 96613 76742
1117692	The Hope Public House	Windsor and Maidenhead, SL4	II	SU 96469 76591
1117693	78-80, Peascod Street	Windsor and Maidenhead, SL4	II	SU 96476 76618
1117694	86 And 87, Peascod Street	Windsor and Maidenhead, SL4	II	SU 96483 76657
1117695	The Duke of Cambridge Public House	Windsor and Maidenhead, SL4	II	SU 96565 76733
1117696	39-51, St Leonards Street	Windsor and Maidenhead, SL4	II	SU 96450 76440
1117697	85, St Leonard's Street	Windsor and Maidenhead, SL4	II	SU 96428 76258
1117698	Edward VII Statue in Hospital Forecourt	Windsor and Maidenhead, SL4	II	SU 96298 75889
1117699	2, St Leonards Street	Windsor and Maidenhead, SL4	II	SU 96462 76573
1117700	The Stag and Hounds Public House and Adjoining Cottage	Windsor and Maidenhead, SL4	II	SU 95792 75590
1117701	11, Sheet Street	Windsor and Maidenhead, SL4	II	SU 96915 76637
1117702	17, Sheet Street	Windsor and Maidenhead, SL4	II	SU 96912 76606
1117703	27, Sheet Street (See Details for Further Address Information)	Windsor and Maidenhead, SL4	II	SU 96914 76557
1117704	29 And 31, Sheet Street	Windsor and Maidenhead, SL4	II	SU 96912 76546
1117705	2 And 4, Spinners Walk	Windsor and Maidenhead, SL4	II	SU 96439 76527
1117706	6, Spinners Walk	Windsor and Maidenhead, SL4	II	SU 96426 76528
1117707	5 And 6, Thames Street	Windsor and Maidenhead, SL4	II	SU 96722 76943
1117709	55, High Street	Windsor and Maidenhead, SL4	II	SU 96894 76741
1117710	Brunswick Terrace	Windsor and Maidenhead, SL4	II	SU 96905 76309

1117711	Brunswick Terrace	Windsor and Maidenhead, SL4	II	SU 96920 76210
1117712	81, Kings Road	Windsor and Maidenhead, SL4	II	SU 96920 76187
1117713	Queen Anne's Cottage	Windsor and Maidenhead, SL4	II	SU 96811 75551
1117714	Queen Anne's Gate Lodge	Windsor and Maidenhead, SL4	II	SU 96474 74993
1117715	Pickets House	Windsor and Maidenhead, SL4	II	SU 96852 76291
1117716	The Royal Adelaide Hotel	Windsor and Maidenhead, SL4	II	SU 96886 76196
1117717	Adelaide Terrace	Windsor and Maidenhead, SL4	II	SU 96907 76108
1117718	Gate piers and Forecourt Wall of Queens Terrace	Windsor and Maidenhead, SL4	II	SU 96933 75863
1117719	Crown Cottages	Windsor and Maidenhead, SL4	II	SU 96468 75045
1117724	76 And 78, Osborne Road	Windsor and Maidenhead, SL4	II	SU 96342 76099
1117725	84 And 86, Osborne Road	Windsor and Maidenhead, SL4	II	SU 96295 76119
1117726	Park Street Lodge	Windsor and Maidenhead, SL4	II	SU 97029 76622
1117727	3, Park Street	Windsor and Maidenhead, SL4	II	SU 97011 76635
1117731	7 And 8, Claremont Road	Windsor and Maidenhead, SL4	II	SU 96334 76465
1117732	2-11, Clarence Crescent	Windsor and Maidenhead, SL4	II	SU 96352 76697
1117733	6 And 8, Clarence Road	Windsor and Maidenhead, SL4	II	SU 96428 76575
1117734	10A, Clarence Road	Windsor and Maidenhead, SL4	II	SU 96417 76578
1117736	7 And 8, Datchet Road	Windsor and Maidenhead, SL4	II	SU 96900 77206
1117737	Windsor Riverside Station and Royal Waiting Room	Windsor and Maidenhead, SL4	II	SU 96878 77240
1117738	9-14, Gloucester Place	Windsor and Maidenhead, SL4	II	SU 96800 76111
1117739	58 And 60, Grove Road	Windsor and Maidenhead, SL4	II	SU 96547 76308
1117741	3, High Street	Windsor and Maidenhead, SL4	II	SU 96885 76708

1117742	4A and 5, High Street	Windsor and Maidenhead, SL4	II	SU 96876 76718
1117743	6 And 7, High Street	Windsor and Maidenhead, SL4	II	SU 96868 76727
1117744	8, High Street	Windsor and Maidenhead, SL4	II	SU 96862 76735
1117745	9 And 9A, High Street	Windsor and Maidenhead, SL4	II	SU 96851 76737
1117746	11, High Street	Windsor and Maidenhead, SL4	II	SU 96850 76754
1117747	Mistress Pages House	Windsor and Maidenhead, SL4	II	SU 96837 76769
1117748	Castle Hotel	Windsor and Maidenhead, SL4	II	SU 96807 76802
1117749	20, High Street	Windsor and Maidenhead, SL4	II	SU 96795 76821
1117750	25 And 26, High Street	Windsor and Maidenhead, SL4	II	SU 96778 76850
1117751	47-50, High Street	Windsor and Maidenhead, SL4	II	SU 96809 76857
1117753	Shaw Farmhouse	Windsor and Maidenhead, SL4	II	SU 97303 75446
1117755	Albert Cottage and Boathouse with balustrades	Windsor and Maidenhead, SL4	II	SU 98152 77076
1117756	Datchet Road Lodge and Gate Piers (Town Gate)	Windsor and Maidenhead, SL4	II	SU 96979 77275
1117757	Riding School with Upper Middle And Lower Courts	Windsor and Maidenhead, SL4	II	SU 97013 76783
1117758	Royal Stables House	Windsor and Maidenhead, SL4	II	SU 96949 76819
1117759	South West Gate and Lodge To St Albans Street	Windsor and Maidenhead, SL4	II	SU 96940 76745
1117760	1-29, Adelaide Square	Windsor and Maidenhead, SL4	II	SU 96818 76198
1117761	18 And 20, Adelaide Square	Windsor and Maidenhead, SL4	II	SU 96811 76164
1117762	1-48 Prince Consort Cottages	Windsor and Maidenhead, SL4	II	SU 96566 76226
1117763	49-55 And 56 Incorporating 57 Prince Consort Cottages	Windsor and Maidenhead, SL4	II	SU 96655 76210
1117764	Roman Catholic Church of St Edward	Windsor and Maidenhead, SL4	II	SU 96234 76476
1117765	Jubilee Obelisk	Windsor and Maidenhead, SL4	II	SU 96823 76618

1117766	The Coach House	Windsor and Maidenhead, SL4	II	SU 96815 76685
1117767	Stable and Coach House On North Side Of Yard Of The Coach House	Windsor and Maidenhead, SL4	II	SU 96808 76697
1117768	Western Cottage and Lych Gate	Windsor and Maidenhead, SL4	II	SU 96806 76681
1117769	5, Bachelor's Acre	Windsor and Maidenhead, SL4	II	SU 96696 76669
1117770	Clarence Hotel	Windsor and Maidenhead, SL4	II	SU9641476597
1117771	10, Castle Hill	Windsor and Maidenhead, SL4	II	SU 96830 76877
1117772	Agars Plough	Eton, Windsor and Maidenhead, SL4	II	SU 96990 78410
1117773	Castle Grill	Windsor and Maidenhead, SL4	II	SU 96852 76813
1117774	7, Church Street	Windsor and Maidenhead, SL4	II	SU 96867 76846
1117775	1-6, Claremont Road	Windsor and Maidenhead, SL4	II	SU 96301 76462
1117778	Frogmore Cottage in Frogmore Grounds	Windsor and Maidenhead, SL4	II	SU 97463 76191
1117782	Lodge North of Lych Gate from Drive To The Royal Mausoleum In Frogmore Grounds	Windsor and Maidenhead, SL4	II	SU 97412 76022
1162285	Barn To North East Of Southlands Manor	Denham, South Bucks, Buckinghamshire, UB9	II	TQ 03825 84697
1164603	Moat House	Iver, South Bucks, Buckinghamshire, SL0	II	TQ 01695 80456
1164747	Mansfield Farmhouse	Iver, South Bucks, Buckinghamshire, SL0	II	TQ 04013 83744
1164749	Dovecote East of Mansfield Farmhouse	Iver, South Bucks, Buckinghamshire, SL0	II	TQ 04042 83728
1166279	The Priory	Wexham, South Bucks, Buckinghamshire, SL3	II	TQ0009880345
1166307	Lodge to Manor House	Wexham, South Bucks, Buckinghamshire, SL3	II	TQ 00158 80366
1180711	274, High Street	Hillingdon, London, UB8	II	TQ0574883968
1180737	5 And 6, Hillingdon Road	Hillingdon, London, UB10	II	TQ 06106 83132
1180797	32, Hillingdon Road	Hillingdon, London, UB10	II	TQ0597383340

1180809	Church Cottage Precinct House St Andrew'S Vicarage	Hillingdon, London, UB10	II	TQ 05939 83750
1181128	The Prince of Wales Public House	Hillingdon, London, UB8	II	TQ 07034 81881
1181206	Curved Wall to South Of West End Of Stables	Hillingdon, London, TW5	II	TQ 10103 78152
1181303	The Cottage Hotel	Hillingdon, London, UB8	II	TQ 06832 82878
1181620	Glenthorne	Hillingdon, London, UB10	II	TQ 07109 82919
1181652	Highfield Cottage	Hillingdon, London, UB10	II	TQ 07164 82912
1181669	Chapels In Hillingdon Uxbridge Cemetery	Hillingdon, London, UB10	II	TQ 06502 82856
1181713	Wall and Coachhouse To North Of The Rosery	Hillingdon, London, UB8	II	TQ 08290 81942
1181759	18-20, Windsor Street	Hillingdon, London, UB8	II	TQ 05464 84014
1181763	39 And 40, Windsor Street	Hillingdon, London, UB8	II	TQ 05449 84017
1187026	Parish Church of St Matthew	Spelthorne, Surrey, TW15	II	TQ 07216 71508
1187052	229, Laleham Road	Spelthorne, Surrey, TW18	II	TQ 04222 70523
1187067	Church of St Hilda	Spelthorne, Surrey, TW15	II	TQ 06286 71706
1189244	Almshouses At Strodes College	Runnymede, Surrey, TW20	II	TQ 00897 71331
1189250	Red Lion Public House	Runnymede, Surrey, TW20	II	TQ 01051 71342
1189254	55 And 55A, High Street	Runnymede, Surrey, TW20	II	TQ 01103 71340
1189267	65, High Street	Runnymede, Surrey, TW20	II	TQ 01170 71383
1189295	Red Lion Public House	Ealing, London, UB1	II	TQ 13114 80324
1189315	Milestone at No 109	Runnymede, Surrey, TW20	II	TQ 01434 71514
1189347	Churchyard of Church of Saint John the Baptist (Chest Tomb Opposite West Door)	Runnymede, Surrey, TW20	II	TQ 01284 71370
1189350	Churchyard of Church of Saint John the Baptist 8 Headstones To Hubbard Family South Of West Front of Church	Runnymede, Surrey, TW20	II	TQ 01290 71357
1189353	169 And 170, High Street (See Details for Further Address Information)	Runnymede, Surrey, TW20	II	TQ 00975 71269
1189365	177, High Street	Runnymede, Surrey, TW20	II	TQ 00904 71248
1189378	Friars Lawn the Grange	Ealing, London, UB2+B185;J185	II	TQ 13271 78590
1189466	Feltham House	Hounslow, London, TW13	II	TQ 10618 72750

1189482	Manor Farm	Runnymede, Surrey, TW20	II	TQ 01415 71384
1189507	The Plough Public House	Ealing, London, UB2	II	TQ 13528 78620
1189553	Bull'S Bridge Number 21 Over Grand Union Canal and Grand Union Canal (Paddington Branch) Junction	Ealing, London, UB2	II	TQ 10692 79089
1189597	St John'S College Beaumont	Runnymede, Surrey, SL4	II	SU 98965 72648
1189614	1 And 3, Whitton Road (See Details for Further Address Information)	Hounslow, London, TW3	II	TQ 13827 75431
1189781	Two Lodges at North End of Runnymede Meadows	Runnymede, Surrey, SL4	II	SU 99658 73155
1189792	Commemorative Urns at Roundabout on Junction of A30 And A308	Runnymede, Surrey, TW20	II	TQ 01584 71890
1190019	Homestead Cottage	Runnymede, Surrey, TW20	II	TQ 01572 70152
1192942	213, Church Road	Hillingdon, London, UB3	II	TQ 09758 80911
1194461	18 And 19, High Street	Hillingdon, London, UB8	II	TQ 05615 84044
1204112	The Royal Free Schools	Windsor and Maidenhead, SL4	II	SU 96684 76656
1204118	7, Bachelor's Acre	Windsor and Maidenhead, SL4	II	SU 96689 76635
1204126	The Horse and Groom Public House	Windsor and Maidenhead, SL4	II	SU 96815 76874
1204154	The Ship Inn	Windsor and Maidenhead, SL4	II	SU 96862 76819
1204187	4, Church Street	Windsor and Maidenhead, SL4	II	SU 96859 76861
1204438	62-96, Grove Road	Windsor and Maidenhead, SL4	II	SU 96494 76312
1204502	1 And 2, High Street	Windsor and Maidenhead, SL4	II	SU 96892 76697
1204505	4, High Street	Windsor and Maidenhead, SL4	II	SU 96864 76699
1204510	Dairy Pavilion in Garden Of No 7	Windsor and Maidenhead, SL4	II	SU 96845 76711
1204517	10, High Street	Windsor and Maidenhead, SL4	II	SU 96853 76746
1204522	12, High Street	Windsor and Maidenhead, SL4	II	SU 96844 76759
1204535	15-17, High Street	Windsor and Maidenhead, SL4	II	SU 96827 76783

I204606	Windsor And Eton Central Station	Windsor and Maidenhead, SL4	II	SU 96603 76908
I204614	Market Cross House	Windsor and Maidenhead, SL4	II	SU 96820 76845
I204911	Church of St Peter	Spelthorne, Surrey, TW18	II	TQ 03754 71008
I205078	Obelisk to north of Railway Bridge	Spelthorne, Surrey, TW18	II	TQ 03637 71270
I205258	26-34, Kings Road	Windsor and Maidenhead, SL4	II	SU 96880 76260
I205260	48, Kings Road	Windsor and Maidenhead, SL4	II	SU 96888 76174
I205267	Albert Terrace	Windsor and Maidenhead, SL4	II	SU 96929 75909
I205375	23 And 24, Park Street	Windsor and Maidenhead, SL4	II	SU 96980 76684
I205436	Wellington Public House	Windsor and Maidenhead, SL4	II	SU 96538 76716
I205473	King Edward VII Memorial Hospital (Main Front Block)	Windsor and Maidenhead, SL4	II	SU 96314 75867
I205482	Elm Place	Windsor and Maidenhead, SL4	II	SU 96409 76346
I205489	22, Sheet Street	Windsor and Maidenhead, SL4	II	SU 96888 76605
I205507	York Place	Windsor and Maidenhead, SL4	II	SU 96886 76434
I205540	2, Thames Street	Windsor and Maidenhead, SL4	II	SU 96731 76928
I205551	7-9, Thames Street	Windsor and Maidenhead, SL4	II	SU 96718 76952
I205771	40A and 41, Thames Street	Windsor and Maidenhead, SL4	II	SU 96796 77107
I205777	56, Thames Street	Windsor and Maidenhead, SL4	II	SU 96759 77219
I205784	58, Thames Street	Windsor and Maidenhead, SL4	II	SU 96769 77201
I205795	King George V Memorial	Windsor and Maidenhead, SL4	II	SU 96823 77147
I205819	Hundred Steps Lodge	Windsor and Maidenhead, SL4	II	SU 96820 77090
I205837	4 And 5, Trinity Place	Windsor and Maidenhead, SL4	II	SU 96397 76507
I205959	20 And 21, Trinity Place	Windsor and Maidenhead, SL4	II	SU 96362 76520

I205965	The Windsor Almhouses	Windsor and Maidenhead, SL4	II	SU 96688 76616
I205972	Chariott'S Place - Chariotts Charity (East Berkshire College Annexe)	Windsor and Maidenhead, SL4	II	SU 96635 76642
I205986	17-21, Victoria Street	Windsor and Maidenhead, SL4	II	SU 96800 76588
I206021	69, Victoria Street	Windsor and Maidenhead, SL4	II	SU 96553 76562
I206029	23 And 25, William Street	Windsor and Maidenhead, SL4	II	SU 96579 76637
I210903	The Memorial Buildings, Eton College	Eton, Windsor and Maidenhead, SL4	II	SU 96594 77921
I210904	The New Schools, Eton College	Eton, Windsor and Maidenhead, SL4	II	SU 96625 77997
I210905	Front Court Railings and Side Court Railings, The New Schools, Eton College	Eton, Windsor and Maidenhead, SL4	II	SU 96622 77968
I210906	Eton School Stores (South Building)	Eton, Windsor and Maidenhead, SL4	II	SU 96620 77748
I210907	Gulliver's End	Eton, Windsor and Maidenhead, SL4	II	SU 96620 77777
I210909	Old St Christopher's	Eton, Windsor and Maidenhead, SL4	II	SU 96636 77813
I210942	Premises occupied by Alden And Blackwell (Booksellers)	Eton, Windsor and Maidenhead, SL4	II	SU 96630 77845
I210943	Durnford House Hawtrey House	Eton, Windsor and Maidenhead, SL4	II	SU 96619 77895
I210945	Eton College Boathouse	Eton, Windsor and Maidenhead, SL4	II	SU 96656 77244
I210946	Godolphin House	Eton, Windsor and Maidenhead, SL4	II	SU 96559 77967
I210947	Common Lane House (Front Portion Only)	Eton, Windsor and Maidenhead, SL4	II	SU 96573 77992
I210948	Angelo's House	Eton, Windsor and Maidenhead, SL4	II	SU 96588 78059
I210952	Brignell's Buildings	Eton, Windsor and Maidenhead, SL4	II	SU9670377438
I210953	New Inn	Eton, Windsor and Maidenhead, SL4	II	SU 96736 77453
I210955	5 And 6, High Street	Eton, Windsor and Maidenhead, SL4	II	SU 96653 77707
I210956	Midland Bank Limited	Eton, Windsor and Maidenhead, SL4	II	SU 96654 77700

1211011	13 And 14, High Street	Eton, Windsor and Maidenhead, SL4	II	SU 96660 77664
1211012	17 And 17A, High Street	Eton, Windsor and Maidenhead, SL4	II	SU 96667 77614
1211013	19, 20, 21 And 21A, High Street	Eton, Windsor and Maidenhead, SL4	II	SU 96669 77596
1211014	22 And 23, High Street	Eton, Windsor and Maidenhead, SL4	II	SU 96669 77582
1211015	24 And 25, High Street	Eton, Windsor and Maidenhead, SL4	II	SU 96670 77571
1211017	26 And 27, High Street	Eton, Windsor and Maidenhead, SL4	II	SU 96670 77561
1211018	28, High Street	Eton, Windsor and Maidenhead, SL4	II	SU 96670 77552
1211020	30, High Street	Eton, Windsor and Maidenhead, SL4	II	SU 96673 77532
1211021	38-40, High Street	Eton, Windsor and Maidenhead, SL4	II	SU 96680 77485
1211022	41, High Street	Eton, Windsor and Maidenhead, SL4	II	SU 96684 77471
1211363	Pillar Box	Eton, Windsor and Maidenhead, SL4	II	SU 96686 77418
1211364	50, High Street	Eton, Windsor and Maidenhead, SL4	II	SU 96692 77402
1211365	51, High Street	Eton, Windsor and Maidenhead, SL4	II	SU 96693 77395
1211366	58, High Street	Eton, Windsor and Maidenhead, SL4	II	SU 96699 77351
1211367	65-71, High Street	Eton, Windsor and Maidenhead, SL4	II	SU 96707 77293
1211403	The Crown and Cushion Public House	Eton, Windsor and Maidenhead, SL4	II	SU 96677 77343
1211404	87, High Street	Eton, Windsor and Maidenhead, SL4	II	SU 96677 77357
1211406	89 And 90, High Street	Eton, Windsor and Maidenhead, SL4	II	SU 96676 77373
1211407	92, High Street	Eton, Windsor and Maidenhead, SL4	II	SU 96674 77388
1211409	99 And 100, High Street	Eton, Windsor and Maidenhead, SL4	II	SU 96667 77429
1211419	109, High Street	Eton, Windsor and Maidenhead, SL4	II	SU 96658 77492
1211420	113 And 114, High Street	Eton, Windsor and Maidenhead, SL4	II	SU 96653 77528

I211421	118, 118A and 119, High Street	Eton, Windsor and Maidenhead, SL4	II	SU 96644 77600
I211422	121-123, High Street	Eton, Windsor and Maidenhead, SL4	II	SU 96643 77621
I211423	132 And 133, High Street	Eton, Windsor and Maidenhead, SL4	II	SU 96631 77696
I211447	134-137, High Street	Eton, Windsor and Maidenhead, SL4	II	SU 96628 77714
I211448	Keate House	Eton, Windsor and Maidenhead, SL4	II	SU 96532 77863
I211449	Jourdelays	Eton, Windsor and Maidenhead, SL4	II	SU 96605 77796
I211450	37 And 38, King Stable Street	Eton, Windsor and Maidenhead, SL4	II	SU 96754 77348
I211452	Westons	Eton, Windsor and Maidenhead, SL4	II	SU 96694 78009
I211453	The Wall, Eton College	Eton, Windsor and Maidenhead, SL4	II	SU 96774 78081
I211472	Tangier Mill House	Eton, Windsor and Maidenhead, SL4	II	SU 96813 77657
I211475	Pump Houses to North of Tangier Mill House	Eton, Windsor and Maidenhead, SL4	II	SU 96862 77703
I240343	Hanworth Park House	Hounslow, London, TW13	II	TQ 11389 72428
I240579	Former Officers Mess and Quarters to Hounslow Cavalry Barracks	Hounslow, London, TW4	II	TQ1197675734
I240615	Former Stable Ranges along the east and west side of Former Parade Ground to Hounslow Cavalry Barracks	Hounslow, London, TW4	II	TQ 11888 75692
I240631	Former Chapel to Hounslow Cavalry Barracks	Hounslow, London, TW4	II	TQ 11951 75533
I240633	The Keep (Armoury) To Hounslow Cavalry Barracks	Hounslow, London, TW4	II	TQ 11890 75517
I240696	The Rectory	Hounslow, London, TW5	II	TQ1059178066
I240801	Boundary Wall to Tudor House and Parr Court	Hounslow, London, TW13	II	TQ 11234 71855
I240802	Forecourt Wall to Tudor House	Hounslow, London, TW13	II	TQ 11232 71825
I240804	Garden Wall to East of Tudor House Grounds	Hounslow, London, TW13	II	TQ 11269 71799
I241073	Church of All Saints	Hounslow, London, TW13	II	TQ 11952 72673

I241237	Ticket Hall and Shops at Hounslow West Underground Station	Hounslow, London, TW3	II	TQ 12205 76193
I242732	The Gate House	Runnymede, Surrey, TW20	II	SU 97816 72256
I244628	The Garden House	Windsor and Maidenhead, SL4	II	SU 96970 76873
I244637	Range of Buildings on West Side Of Drive From North End To Gates	Windsor and Maidenhead, SL4	II	SU 96940 76870
I244668	Agars Plough	Eton, Windsor and Maidenhead, SL4	II	SU 97663 78285
I244861	Enterprise House	Hillingdon, London, UB3	II	TQ 09357 79619
I245132	Church of St Paul	Hounslow, London, TW3	II	TQ 12532 75982
I245888	35-42, Tangier Lane	Eton, Windsor and Maidenhead, SL4	II	SU 96779 77594
I246142	Outbuilding at Hubbards Farm	Hillingdon, London, UB8	II	TQ 07605 81375
I246234	War Memorial	Hounslow, London, TW5	II	TQ 13041 77524
I251380	Fryer Tomb Approximately 6 Metres to South of Chancel of Church of St Laurence	Slough, SL3	II	SU 98082 79086
I251382	Ramsden Tomb Approximately 18 Metres to South of Chancel of Church of St Laurence	Slough, SL3	II	SU 98078 79076
I251383	Style Tomb Approximately 13 Metres to South of South Aisle of Church of St Laurence	Slough, SL3	II	SU 98067 79074
I251384	Nash Tomb Approximately 12 Metres to South West of South Aisle of Church of St Laurence	Slough, SL3	II	SU 98043 79087
I251562	Chest Tomb Approximately 3 Metres to North of Chancel of Church Of St Laurence	Slough, SL3	II	SU 98084 79103
I251564	Pitt Tomb Approximately 13 Metres to South of Chancel of Church of St Laurence	Slough, SL3	II	SU 98082 79079
I251566	Style Tomb Approximately 8 Metres South of South Aisle of Church of St Laurence	Slough, SL3	II	SU 98069 79079

1251582	Style Tomb Approximately 11 Metres to South of South Aisle of Church of St Laurence	Slough, SL3	II	SU 98065 79077
1254413	Windsor Methodist Church	Windsor and Maidenhead, SL4	II	SU 96195 76592
1259876	Bishopsgate Cottage (Previously Listed in The Parish of Old Windsor-Royal Borough of Windsor And Maidenhead On 3.3.72. Now Listed in Egham As A Result of Boundary Changes)	Runnymede, Surrey, TW20	II	SU 97972 72277
1260544	The Hermitage	Hounslow, London, TW5	II	TQ 13160 76836
1260857	Boundary Wall Between Tudor House And Tudor Court	Hounslow, London, TW13	II	TQ 11280 71838
1260922	Former Coach Houses at North and South Ends of West Stable Range And North End Of East Stable Range To Hounslow Cavalry Barracks	Hounslow, London, TW4	II	TQ 11879 75631
1260937	Tower and Spire of former Church of St Catherine	Hounslow, London, TW13	II	TQ 10681 73217
1260971	103, Pears Road	Hounslow, London, TW3	II	TQ 14448 75754
1261098	The Vicarage	Hounslow, London, TW13	II	TQ 09872 72293
1262783	Chest Tomb Approximately 6 Metres to South West of South Aisle Of Church Of St Laurence	Slough, SL3	II	SU 98051 79089
1272255	Burford House	Windsor and Maidenhead, SL4	II	SU 96957 76769
1272274	Victoria Bridge Lodge	Windsor and Maidenhead, SL4	II	SU 97828 77463
1272414	Tombstone to Mr John Foot and Sons, St Dunstons Churchyard	Hounslow, London, TW13	II	TQ 09849 72277
1272415	Chest Tomb to John Evans, St Dunstons Churchyard	Hounslow, London, TW13	II	TQ 09843 72261
1272416	Tombstone to Ann And Joseph Pope, St Dunstons Churchyard	Hounslow, London, TW13	II	TQ 09890 72253
1280441	16 And 17, Trinity Place	Windsor and Maidenhead, SL4	II	SU 96357 76490

I280478	12 And 13, Trinity Place	Windsor and Maidenhead, SL4	II	SU 96403 76456
I280549	50 And 51, Thames Street	Windsor and Maidenhead, SL4	II	SU 96761 77161
I280668	Elibank House	Windsor and Maidenhead, SL4	II	SU 96404 76554
I280705	134 And 134A, Peascod Street	Windsor and Maidenhead, SL4	II	SU 96713 76844
I280711	The Merry Wives of Windsor	Windsor and Maidenhead, SL4	II	SU 96434 76326
I280732	83 And 84, Peascod Street	Windsor and Maidenhead, SL4	II	SU 96478 76639
I280762	80 And 82, Osborne Road	Windsor and Maidenhead, SL4	II	SU 96317 76109
I280775	7, Park Street	Windsor and Maidenhead, SL4	II	SU 96986 76648
I280784	The Three Tuns Hotel	Windsor and Maidenhead, SL4	II	SU 96845 76828
I280813	Hamilton Lodge	Windsor and Maidenhead, SL4	II	SU 96909 75827
I281141	24, High Street	Windsor and Maidenhead, SL4	II	SU 96782 76840
I281168	19, High Street	Windsor and Maidenhead, SL4	II	SU 96798 76816
I281221	3-8, Gloucester Place	Windsor and Maidenhead, SL4	II	SU 96813 76147
I281224	15-16, Gloucester Place	Windsor and Maidenhead, SL4	II	SU 96838 76122
I281362	Queen Victoria's Statue	Windsor and Maidenhead, SL4	II	SU 96790 76878
I284852	15, Windsor Street	Hillingdon, London, UB8	II	TQ 05485 84022
I284866	Large Barn to East of Hubbards Farmhouse	Hillingdon, London, UB8	II	TQ 07642 81392
I285057	The General Elliott Public House	Hillingdon, London, UB8	II	TQ 04920 83734
I285095	Bishopshalt Grammar School (North Wing)	Hillingdon, London, UB8	II	TQ 06935 82717
I285115	Cellars of Former Cranford House	Hillingdon, London, UB3	II	TQ 10077 78141
I285315	20 And 21, Hillingdon Road	Hillingdon, London, UB10	II	TQ 06022 83233
I285337	13 And 14, Hillingdon Road	Hillingdon, London, UB10	II	TQ 06059 83194
I285383	118, High Street	Hillingdon, London, UB8	II	TQ 05398 84407

1285413	Old Bank House	Hillingdon, London, UB8	II	TQ 05391 84350
1285418	76, High Street	Hillingdon, London, UB8	II	TQ0532284446
1285689	The Three Tuns Public House	Hillingdon, London, UB8	II	TQ0557484063
1285939	Garden Wall to West of Springwell House	Hillingdon, London, UB4	II	TQ 08888 81985
1286417	Parkfield Cottages Parkfield House	Hillingdon, London,	II	TQ 07598 82892
1286731	Brick Tower Shot Tower	Richmond upon Thames, London, TW2	II	TQ 12889 72844
1290000	Ballards House	Eton, Windsor and Maidenhead, SL4	II	SU 96573 77860
1290002	Savile House	Eton, Windsor and Maidenhead, SL4	II	SU 96668 77982
1290003	Wall Cottage Westons	Eton, Windsor and Maidenhead, SL4	II	SU 96719 78028
1290015	86, High Street	Eton, Windsor and Maidenhead, SL4	II	SU 96677 77350
1290016	88, High Street	Eton, Windsor and Maidenhead, SL4	II	SU 96676 77363
1290017	91, High Street	Eton, Windsor and Maidenhead, SL4	II	SU 96675 77383
1290018	98, High Street	Eton, Windsor and Maidenhead, SL4	II	SU 96673 77418
1290019	101, High Street	Eton, Windsor and Maidenhead, SL4	II	SU 96666 77436
1290021	110 And 110A, High Street	Eton, Windsor and Maidenhead, SL4	II	SU 96656 77506
1290022	117 And 117A, High Street	Eton, Windsor and Maidenhead, SL4	II	SU 96649 77551
1290023	Church of Saint John the Evangelist	Eton, Windsor and Maidenhead, SL4	II	SU 96575 77556
1290024	126-131, High Street	Eton, Windsor and Maidenhead, SL4	II	SU 96633 77677
1290037	52 And 52A, High Street	Eton, Windsor and Maidenhead, SL4	II	SU 96694 77387
1290038	62-64, High Street	Eton, Windsor and Maidenhead, SL4	II	SU 96702 77313
1290039	The George Inn	Eton, Windsor and Maidenhead, SL4	II	SU 96686 77300
1290215	18, High Street	Eton, Windsor and Maidenhead, SL4	II	SU 96668 77608

I290216	29 And 29A, High Street	Eton, Windsor and Maidenhead, SL4	II	SU 96671 77543
I290217	31-33, High Street	Eton, Windsor and Maidenhead, SL4	II	SU 96681 77526
I290260	Carter House Front Railings at Carter House	Eton, Windsor and Maidenhead, SL4	II	SU 96628 77860
I290262	The Waterman's Arms Public House	Eton, Windsor and Maidenhead, SL4	II	SU 96625 77270
I290280	Hodson's House	Eton, Windsor and Maidenhead, SL4	II	SU 96621 77827
I294002	Goose Green House	Runnymede, Surrey, TW20	II	TQ 01463 70104
I294110	Boat House at North End Of Runnymede Meadows Between Windsor Road And River Thames	Runnymede, Surrey, SL4	II	SU 99639 73191
I294301	179, High Street	Runnymede, Surrey, TW20	II	TQ 00887 71248
I294313	75 And 76, High Street	Runnymede, Surrey, TW20	II	TQ 01226 71423
I294447	South Alcove in Garden of Tudor House	Hounslow, London, TW13	II	TQ 11260 71837
I298907	Lock-Keeper's Cottage at Penton Hook Lodge)	Spelthorne, Surrey, TW18	II	TQ 04391 69522
I308997	Entrance Lodge (Park Stile Lodge) And Gates to Langley Park	Wexham, South Bucks, Buckinghamshire, SL3	II	TQ 01326 81002
I313022	The Perserverance Public House	Wraysbury, Windsor and Maidenhead, TW19	II	TQ 00580 74163
I313030	Downhams	Wraysbury, Windsor and Maidenhead, TW19	II	TQ 00530 73364
I313115	Seymour Tomb Adjoining South Transceptal Chapel of Church of St. Mary (Q.V.) To South	Slough, SL3	II	TQ 00489 79524
I313117	Langley Hall	Slough, SL3	II	TQ 01120 79360
I319268	Lych Gate from Drive to Royal Mausoleum In Frogmore Grounds	Windsor and Maidenhead, SL4	II	SU 97404 76010
I319287	The Crispin Public House	Windsor and Maidenhead, SL4	II	SU 96556 76307
I319289	14, High Street	Windsor and Maidenhead, SL4	II	SU 96832 76775
I319290	21-23, High Street	Windsor and Maidenhead, SL4	II	SU 96788 76831
I319291	Hart and Garter Hotel	Windsor and Maidenhead, SL4	II	SU 96740 76892

1319292	52, High Street	Windsor and Maidenhead, SL4	II	SU 96844 76806
1319293	Clock Cottage with Wagon Shed at Shaw Farm	Windsor and Maidenhead, SL4	II	SU 97330 75397
1319296	North Lodge and Gates and Screen Wall to South	Windsor and Maidenhead, SL4	II	SU 96944 76850
1319298	4 And 6, Adelaide Square	Windsor and Maidenhead, SL4	II	SU 96853 76174
1319299	22-32, Adelaide Square	Windsor and Maidenhead, SL4	II	SU 96785 76169
1319300	2 And 3, Castle Hill	Windsor and Maidenhead, SL4	II	SU 96810 76872
1319301	Castle Hill House	Windsor and Maidenhead, SL4	II	SU 96854 76883
1319302	Masonic Hall	Windsor and Maidenhead, SL4	II	SU 96883 76828
1319303	12 And 13, Church Street	Windsor and Maidenhead, SL4	II	SU 96844 76855
1319306	Kiosk to South East of Cottage In Frogmore Grounds	Windsor and Maidenhead, SL4	II	SU 97494 76138
1319307	101-103, Peascod Street	Windsor and Maidenhead, SL4	II	SU 96557 76728
1319308	140, Peascod Street	Windsor and Maidenhead, SL4	II	SU 96742 76863
1319309	1 And 3, Spinners Walk	Windsor and Maidenhead, SL4	II	SU 96426 76550
1319310	Knights Tavern	Windsor and Maidenhead, SL4	II	SU 96726 76936
1319311	10, Thames Street	Windsor and Maidenhead, SL4	II	SU 96713 76959
1319312	1, Kings Road	Windsor and Maidenhead, SL4	II	SU 96865 76397
1319313	Brunswick Terrace	Windsor and Maidenhead, SL4	II	SU 96913 76264
1319314	Bryn Brith	Windsor and Maidenhead, SL4	II	SU 96838 75600
1319315	Crown Cottages	Windsor and Maidenhead, SL4	II	SU 96533 75057
1319316	22, Kings Road	Windsor and Maidenhead, SL4	II	SU 96882 76300
1319317	50 And 52, Kings Road	Windsor and Maidenhead, SL4	II	SU 96894 76161

1319318	Queens Terrace	Windsor and Maidenhead, SL4	II	SU 96914 75867
1319320	8, Park Street	Windsor and Maidenhead, SL4	II	SU 96979 76651
1319321	21 And 22, Park Street	Windsor and Maidenhead, SL4	II	SU 96969 76693
1319322	9 And 10, Claremont Road	Windsor and Maidenhead, SL4	II	SU 96346 76474
1319323	2, Clarence Road	Windsor and Maidenhead, SL4	II	SU 96446 76574
1319324	10, Clarence Road	Windsor and Maidenhead, SL4	II	SU 96408 76579
1319326	Church of All Saints	Windsor and Maidenhead, SL4	II	SU 96566 76105
1319327	39 And 41, Victoria Street	Windsor and Maidenhead, SL4	II	SU 96730 76582
1319328	59 And 61, Victoria Street	Windsor and Maidenhead, SL4	II	SU 96575 76559
1319330	Ditton Farmhouse	Datchet, Windsor and Maidenhead, SL3	II	TQ 00442 77727
1319331	11, Thames Street	Windsor and Maidenhead, SL4	II	SU 96710 76965
1319332	18, Thames Street	Windsor and Maidenhead, SL4	II	SU 96701 77008
1319333	20 And 21, Thames Street	Windsor and Maidenhead, SL4	II	SU 96712 77021
1319334	23, Thames Street	Windsor and Maidenhead, SL4	II	SU 96723 77028
1319335	The Adam And Eve Public House	Windsor and Maidenhead, SL4	II	SU 96752 77061
1319336	Theatre Royal	Windsor and Maidenhead, SL4	II	SU 96755 77090
1319338	57, Thames Street	Windsor and Maidenhead, SL4	II	SU 96766 77207
1319339	22 And 23, Trinity Place	Windsor and Maidenhead, SL4	II	SU 96363 76536
1319341	26-32, Victoria Street	Windsor and Maidenhead, SL4	II	SU 96512 76585
1319342	The Two Brewers Inn	Windsor and Maidenhead, SL4	II	SU 97030 76649
1319343	Cambridge Lodge	Windsor and Maidenhead, SL4	II	SU 97044 76639
1319344	The Bakers Tavern	Windsor and Maidenhead, SL4	II	SU 96624 76747

1319345	The Criterion Public House	Windsor and Maidenhead, SL4	II	SU 96495 76586
1319346	81 And 82, Peascod Street	Windsor and Maidenhead, SL4	II	SU 96476 76630
1319354	Main Building, Courtyard Walls, Stable and Gatehouse Blocks, Admiralty Compass Observatory at Ditton Park	Datchet, Windsor and Maidenhead, SL3	II	TQ 00039 77920
1319355	Garden Walls and Summer House At Admiralty Compass Observatory At Ditton Park	Datchet, Windsor and Maidenhead, SL3	II	TQ 00090 77845
1319364	Ankerwyke Priory Ruins	Wraysbury, Windsor and Maidenhead, TW19	II	TQ 00410 72679
1319365	23, Victoria Street	Windsor and Maidenhead, SL4	II	SU 96778 76590
1319366	29 And 31, Victoria Street	Windsor and Maidenhead, SL4	II	SU 96755 76588
1319382	The George Inn	Wraysbury, Windsor and Maidenhead, TW19	II	TQ 00207 74120
1319383	Manor Farmhouse (Immediately North of Church)	Wraysbury, Windsor and Maidenhead, TW19	II	TQ 00157 74019
1321981	Milestone at SU 9999 7881	Slough, SL3	II	TQ 00004 78806
1321983	Chest Tomb Approximately 36 Metres to The North Of North Aisle Of Church Of St Mary	Slough, SL3	II	TQ 00455 79576
1323655	The Dower House	Old Windsor, Windsor and Maidenhead, SL4	II	SU 98138 73346
1323656	Ouseley Lodge	Old Windsor, Windsor and Maidenhead, SL4	II	SU 99131 73512
1323660	Rosemary Cottage	Old Windsor, Windsor and Maidenhead, SL4	II	SU9828274337
1323711	Uxbridge Lido	Hillingdon, London, UB8	II	TQ 06343 84680
1323712	Entrance Building Uxbridge Lido	Hillingdon, London, UB8	II	TQ 06346 84739
1323713	North Fountain Uxbridge Lido	Hillingdon, London, UB8	II	TQ 06345 84724
1323714	South Fountain Uxbridge Lido	Hillingdon, London, UB8	II	TQ 06342 84633
1323715	Grandstand Uxbridge Lido	Hillingdon, London, UB8	II	TQ 06372 84678
1332452	Norwood Hayes	Iver, South Bucks, Buckinghamshire, SL0	II	TQ 02767 82311

I332678	Southlands Manor	Denham, South Bucks, Buckinghamshire, UB9	II	TQ 03840 84679
I332716	Church of St Margaret	Iver, South Bucks, Buckinghamshire, SL0	II	TQ 02383 83218
I332729	Canal Bridge Number 184 To East of New Mills And Lock Attached	Denham, South Bucks, Buckinghamshire, UB9	II	TQ 05239 84803
I332742	White Cottage	Iver, South Bucks, Buckinghamshire, SL0	II	TQ 03627 83357
I358317	Hounslow Congregational Church	Hounslow, London, TW3	II	TQ 13920 75578
I358320	Cranford Park Bridge	Hounslow, London, UB3	II	TQ1033678108
I358339	Vicarage of St Leonards Parish Church Including St Leonards Lodge To Rear	Hounslow, London, TW5	II	TQ 13092 77468
I358356	Wall Along South East Side of Alley	Hillingdon, London, UB8	II	TQ 05474 84271
I358357	Botwell House	Hillingdon, London, UB3	II	TQ 09698 79936
I358370	10 And 11, High Street	Hillingdon, London, UB8	II	TQ 05644 84025
I358371	Midland Bank	Hillingdon, London, UB8	II	TQ0555884082
I358372	The Cedars	Hillingdon, London, UB8	II	TQ 05374 84379
I358373	Garden Walls to North and East of Number 118	Hillingdon, London, UB8	II	TQ0540184415
I358374	Walls to South and West of Little London Nursery	Hillingdon, London, UB8	II	TQ 07761 81736
I358375	Wall to South of Moorcroft	Hillingdon, London, UB8	II	TQ 07700 81580
I358377	Pringwell House And Cottage	Hillingdon, London, UB4	II	TQ 08914 81988
I358387	Wall to South of East End of Stables	Hillingdon, London, TW5	II	TQ 10135 78176
I358388	Garden Walls to West of Cranford House Stables	Hillingdon, London, UB3	II	TQ 10052 78232
I358389	The Red Lion Public House	Hillingdon, London, UB8	II	TQ 06810 82896
I358390	Church of St John	Hillingdon, London, UB8	II	TQ 04812 83512
I358394	126 And 126A, High Street	Hillingdon, London, UB8	II	TQ 05421 84342
I358395	129-133, High Street	Hillingdon, London, UB8	II	TQ 05434 84318
I358397	11 And 12, Hillingdon Road	Hillingdon, London, UB10	II	TQ 06070 83184
I358398	22 And 23, Hillingdon Road	Hillingdon, London, UB10	II	TQ 06016 83244
I358399	34, Hillingdon Road	Hillingdon, London, UB10	II	TQ 05965 83355
I358400	The Chestnuts	Hillingdon, London, UB10	II	TQ 06356 84313

I358405	Uxbridge Underground Station	Hillingdon, London, UB8	II	TQ 05599 84143
I358406	Lodge to Hillingdon Court	Hillingdon, London, UB10	II	TQ 06752 83913
I358408	2 K6 Telephone Kiosks Outside Post Office, South End of Windsor Street	Hillingdon, London, UB8	II	TQ 05448 84011
I358409	K6 Telephone Kiosk in Front of The Red Lion Public House And Elm Tree Cottage	Hillingdon, London, UB8	II	TQ 06849 82890
I358415	Gateway to Hillingdon Uxbridge Cemetery	Hillingdon, London, UB10	II	TQ 06512 82918
I358416	Garden Walls to East of Cedars House	Hillingdon, London, UB10	II	TQ 06934 83006
I358417	The Rosery	Hillingdon, London, UB8	II	TQ 08301 81937
I358419	10-12, Windsor Street	Hillingdon, London, UB8	II	TQ 05487 84040
I358420	21 And 21A, Windsor Street	Hillingdon, London, UB8	II	TQ 05460 84003
I358421	41 And 42, Windsor Street	Hillingdon, London, UB8	II	TQ 05447 84030
I358422	I, Moorcroft Lane	Hillingdon, London, UB8	II	TQ 07288 81628
I358442	50, Windsor Street	Hillingdon, London, UB8	II	TQ 05483 84075
I358443	The Queen's Head Public House	Hillingdon, London, UB8	II	TQ 05490 84102
I358444	Watts Hall (Old Meeting Congregational Church)	Hillingdon, London, UB8	II	TQ 05465 84367
I358688	Tudor Court	Hounslow, London, TW13	II	TQ 11325 71810
I358689	Fireplace Arches to West, South West Of Tudor House	Hounslow, London, TW13	II	TQ 11262 71816
I358754	Grove House	Ealing, London, UB1	II	TQ1300980573
I358764	Walls, Gates, Sluices and Bridge At Lock (90)	Ealing, London, UB2	II	TQ 13720 79378
I358800	Robins Memorial Approximately 12 Metres South Of Church Of St Mary	Ealing, London, UB2	II	TQ 13482 78604
I375623	Barrack Masters House (Building 3) Hounslow Barracks	Hounslow, London, TW4	II	TQ 12018 75512
I375624	Former Hospital (Building 41), Hounslow Barracks	Hounslow, London, TW4	II	TQ 12168 75732

I375625	Former Married Quarters (Building 16), Hounslow Barracks	Hounslow, London, TW4	II	TQ 12076 75579
I375626	Hardinge Block (Building 8), Hounslow Barracks	Hounslow, London, TW4	II	TQ 11814 75683
I375627	Medical Centre (Building 24), Hounslow Barracks	Hounslow, London, TW4	II	TQ 12124 75556
I375628	Naafi (Building 9), Hounslow Barracks	Hounslow, London, TW4	II	TQ 11840 75743
I378021	Tower Service Station	Runnymede, Surrey, TW20	II	TQ 00618 71396
I378022	The Railway Public House	Runnymede, Surrey, TW20	II	TQ 01020 71177
I378031	Churchyard of Church of Saint John the Baptist (Headstones Fixed Against North Wall of Church)	Runnymede, Surrey, TW20	II	TQ 01292 71376
I378032	Constitution Club	Runnymede, Surrey, TW20	II	TQ 01092 71314
I378046	Lodges on Roundabout at Junction of A30 And A308	Runnymede, Surrey, TW20	II	TQ 01578 71888
I378052	La Bonne Franquette	Runnymede, Surrey, TW20	II	TQ 00635 71310
I378054	17	Runnymede, Surrey, TW18	II	TQ 03313 71374
I378071	Ridgemead	Runnymede, Surrey, TW20	II	SU 98988 72458
I378072	North Lodge, West Lodge, East Lodge and Attached Walls (Within the Grounds of Ridgemead)	Runnymede, Surrey, TW20	II	SU 99065 72231
I379933	8, Station Road North	Runnymede, Surrey, TW20	II	TQ 00994 71236
I380214	Boundary Wall to Rear of Number 13-23 Boundary Wall To Rear Of Number 33-59	Hounslow, London, TW13	II	TQ 11152 71658
I390544	Parish Boundary Stone	Hounslow, London, TW4	II	TQ 11612 74767
I390547	Milestone Opposite Islay Gardens	Hounslow, London, TW4	II	TQ 1185574877
I390553	Offices and Workshops	Hounslow, London, TW3	II	TQ 14004 75306
I391571	Railway Bridge	Slough, SL3	II	SU 99734 79900
I391572	Railway Bridge	Slough, SL3	II	TQ 00332 79837
I392259	Ashford War Memorial	Spelthorne, Surrey, TW15	II	TQ 07008 71536
I392376	Cinema	Hillingdon, London, UB10	II	TQ 06039 83769
I392972	25, Frances Road	Windsor and Maidenhead, SL4	II	SU 96758 76244
I392975	1, Castle Hill	Windsor and Maidenhead, SL4	II	SU 96801 76868

1393114	Hangar, Heston Air Parks	Hounslow, London, TW5	II	TQ 11381 77633
1393206	Randall's Department Store	Hillingdon, London, UB8	II	TQ 05658 83957
1393360	Pair of K6 Telephone Kiosks	Windsor and Maidenhead, SL4	II	SU 96677 76881
1393361	K6 Telephone Kiosk	Windsor and Maidenhead, SL4	II	SU 96917 76726
1409816	K6 Telephone Kiosk, Clarence Road, Windsor	Windsor and Maidenhead, SL4	II	SU9636876601
1422617	The Angel Ph	Hillingdon, London, UB4	II	TQ0878681832
1428691	Roman Catholic Church of St Michael, Including Boundary Wall and Entrance Screen	Spelthorne, Surrey, TW15	II	TQ0696671499
1430723	Magna Carta Monument	Runnymede, Surrey, TW20	II	SU9975172696
1440943	Southall War Memorial	Ealing, London, UB2	II	TQ1247479442
1451218	Hillingdon Civic Centre and Integrated Hard Landscaping, Including Paving, Planters, Steps and Walls	Hillingdon, London, UB8	II	TQ0581183862
1455366	Featherstone Boys School War Memorial	Ealing, London, UB2	II	TQ1146478890
1456878	Langley War Memorial, Slough	Slough, SL3	II	TQ0117879331
1457400	Feltham War Memorial	Hounslow, London, TW13	II	TQ1055472952

Table 2 GLHER Monument Data

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
243	050260/00/00	Harmondsworth	Findspot	Roman	Coin (Roman)
287	050395/00/00	Cranford Moat	Findspot	Prehistoric	Hammerstone (Prehistoric); Flake (Prehistoric)
1704	050215/00/00	Harmondsworth La	Findspot	Iron Age	Pot (Late Bronze Age To Late Iron Age)
1708	050058/00/00	Harlington	Findspot	Lower Palaeolithic	Axe (Lower Palaeolithic)
1717	050778/00/00	Runway 1 (Either Side Of)	Ditch	Unknown	
1949	050377/00/00	Stanwell Rd	Field System; Ditch System	Prehistoric	
1951	050353/00/00	Park La	Moated Site	Medieval	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
1952	050815/00/00	Heston Aerodrome (Site Of)	Ring Ditch; Ring Ditch	Bronze Age	
1953	050445/00/00	Mayfield Farm	Findspot	Roman	Pot (Roman)
1959	050872/00/00	Hounslow Heath	Findspot	Neolithic	Arrowhead (Neolithic)
1961	050817/00/00	Heston Aerodrome (North Of)	Ring Ditch	Bronze Age	
1962	050816/00/00	Heston Aerodrome (Site Of)	Ditch System	Unknown	
2103	050370/00/00	Clockhouse La	Ring Ditch; Ring Ditch	Bronze Age	
2137	050225/00/00	Esso Compound	Ring Ditch	Bronze Age	
2138	050224/00/00	Esso Compound	Occupation Site	Roman	
2139	050223/00/00	Esso Compound	Settlement; Occupation Site; Settlement; Occupation Site; Occupation Site; Settlement	Iron Age	
2156	050818/00/00	Heston Aerodrome	Field System; Unassigned	Unknown	
2158	050821/00/00	Cygnets Ave (Site Of)	Enclosure	Unknown	
2161	050820/00/00	Cavalry Crescent (Site Of)	Ditch System	Unknown	
2162	050822/00/00	Cygnets Ave (Site Of)	Ditch System	Unknown	
2190	050203/00/00	Green Laallotments	Findspot	Early Bronze Age	Lithic Implement (Late Neolithic To Early Bronze Age)
2192	050118/00/00	Grand Pit	Findspot	Palaeolithic	Lithic Implement (Palaeolithic)
2193	050142/00/00	Cranford	Findspot	Mesolithic	Axe (Mesolithic)
2194	050157/00/00	Bath Rd (Near To)	Findspot	Neolithic	Axe (Neolithic)
2206	050165/00/00	Fawns Manor	Findspot	Neolithic	Axe (Neolithic)
2570	050812/00/00	Parkway (East Of The)	Ditch	Unknown	
2603	050031/00/00	North Hyde Aerodrome, Heston {Lithic Implements}	Findspot	Lower Palaeolithic	Lithic Implement (Lower Palaeolithic)
2605	050814/00/00	Parkway (East Of The)	Ditch	Unknown	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Findings
2617	050256/00/00	East Bedfont (Field Between)	Cemetery; Cemetery	Roman	
2626	050378/00/00	Spinney Drive (Centred On)	Field System; Ditch System; Ditch System; Field System	Prehistoric	
2637	050351/00/00	East Bedfont	Enclosure	Unknown	
2638	050805/00/00	Eastchurch Rd	Ditch	Unknown	
2639	050804/00/00	Grovestone Waye	Enclosure	Unknown	
2640	050803/00/00	Staines Rd (South Of)	Ring Ditch; Ring Ditch	Bronze Age	
2641	MLO2641	Roseville Road/Cranford Lane [Cranford Park], Cranford, Hillingdon {Medieval Ridge And Furrow}	Ridge And Furrow; Field System	Medieval	
2643	050807/00/00	Eastchurch Rd (East Of)	Ring Ditch; Ring Ditch	Bronze Age	
2648	050811/00/00	Avenue Park {Undated Ditches}	Ditch	Unknown	
2649	050809/00/00	Eastchurch Road/Eastern Perimeter Road, [Heathrow Airport] {Prehistoric Ring Ditch/Field System}	Ring Ditch; Field System	Early Bronze Age to Late Iron Age	
2652	050286/00/00	Stanwell Rd (Field Off)	Field System; Earthwork; Enclosure; Enclosure; Earthwork; Field System	Early Iron Age to Roman	
2662	050371/00/00	Clockhouse La	Ditch	Unknown	
2671	050062/00/00	Yiewsley	Findspot	Palaeolithic	Lithic Implement (Palaeolithic)
2679	MLO2679	Bath Road, Longford, Hillingdon {Prehistoric Pottery And Flint}	Findspot	Prehistoric	Worked Flint (Prehistoric); Pottery (Prehistoric)
2680	050406/00/00	Hatch La (Field East Of)	Findspot	Prehistoric	Find Unclassified (Prehistoric)
2684	050422/00/00	Dawley Manor Farm Gravel Workings	Findspot	Prehistoric	Flake (Prehistoric)

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
2686	050468/00/00	Yiewsley	Findspot	Neolithic	Axe (Neolithic)
2687	MLO2687	Sipson Lane, Harlington, Hillingdon {Neolithic Axe}	Findspot	Neolithic	Axe (Neolithic)
2689	050469/00/00	Broads Brick Works	Findspot	Neolithic	Flake (Neolithic)
2694	050773/00/00	Longford	Field System; Ditch	Unknown	
2702	050785/00/00	Grand Union Canal (Between The)	Ditch	Unknown	
2703	050783/00/00	Cranford La (North Of)	Enclosure	Unknown	
2731	050303/00/00	Cowley Station (Road Near)	Road	Roman	
2731	050303/00/00	Cowley Station (Road Near)	Road	Roman	
2912	050004/00/00	Odells Pit	Findspot	Palaeolithic	Lithic Implement (Palaeolithic)
2916	050019/00/00	Claytons Little Wonder Pit & Eastwoods Pit	Findspot	Palaeolithic	Lithic Implement (Palaeolithic)
2917	050018/00/00	Eastwoods Pitclaytons Little Wonder_Pit	Findspot; Findspot	Lower Palaeolithic	Axe (Lower Palaeolithic); Lithic Implement (Lower Palaeolithic)
2921	050059/00/00	West Drayton	Findspot	Palaeolithic	Lithic Implement (Palaeolithic)
2925	050131/00/00	West Drayton	Findspot	Palaeolithic	Lithic Implement (Palaeolithic)
2926	050130/00/00	Yiewsley	Findspot	Lower Palaeolithic	Axe (Lower Palaeolithic)
2927	050124/00/00	Sabeyson	Findspot	Lower Palaeolithic	Lithic Implement (Lower Palaeolithic)
2929	MLO2929	Rigby Lane, Dawley, Hillingdon {Palaeolithic Tools}	Findspot	Lower Palaeolithic	Lithic Implement (Lower Palaeolithic)
2935	MLO2935	The Island, Longford, Hillingdon {Mesolithic Axe}	Findspot	Mesolithic	Axe (Tool) (Mesolithic)
3009	051153/00/00	Holloway La	Trackway	Late Neolithic	
3219	MLO3219	Avondale Drive [Minet Country Park], Hayes,	Ditch; Ditch System; Field System	Unknown	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
		Hillingdon {Undated Ditches}			
3768	050263/00/00	Harmondsworth (70 Yds Sw Of Church)	Findspot	Roman	Building Material (Roman)
4512	050180/00/00	Beaudesert Mews	Findspot	Roman	Pot (Roman)
4512	050180/00/00	Beaudesert Mews	Findspot	Roman	Pot (Roman)
4513	050181/00/00	Beaudesert Mews	Findspot	Early Medieval/Dark Age	Pot (Early Medieval/Dark Age)
4522	050210/00/00	Beaudesert Mews (Formerly Gatehouse Nurseries)	Burial	Post Medieval	
4530	050241/00/00	Southall {Iron Age Coin}	Findspot	Middle Iron Age to Late Iron Age	Coin (Middle Iron Age To Late Iron Age)
4532	050246/00/00	St Lawrence Church	Occupation Site	Roman	
4544	MLO4544	St Pauls Close/M4, Harlington, Hillingdon {Medieval Moated Site}	Moated Site	Medieval	
4547	050485/00/00	Manor Farm	Manor House; Manor House	Medieval to Post Medieval	
4548	050486/00/00	Manor Farm	Moated Site	Medieval	
4594	050839/00/00	West Drayton Manor ?	Findspot	Medieval	Steelyard Weight (Medieval)
4601	MLO4601	The Island, Longford, Hillingdon {Medieval Water Mill}	Watermill	Medieval	
4617	050884/00/00	Caesar'S Camp	Enclosure	Late Iron Age to Roman	
6191	050349/00/00	Fernhill	Enclosure; Enclosure	Late Bronze Age to Late Iron Age	
6319	MLO6319	Roseville Road [Cranford House], Cranford, Hillingdon {17Th Century Manor House}	Manor House; Manor House	Post Medieval to World War Two	
6614	MLO6614	Manor Farm	Religious House; Alien Cell	Medieval	
7287	210075/00/00	Cowley Rd Uxbridge	House	Post Medieval	
7746	051190/00/00	413-419 Staines Rd	Plough Marks	Post Medieval	
7774	051191/00/00	Cranford La	Enclosure; Pit; Occupation Site	Late Bronze Age to Early Iron Age	Axe (Neolithic)

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Findings
7910	051192/00/00	Cranford La	Field System; Ditch	Roman	
8067	050962/00/00	M4Widening Scheme	Pit	Late Bronze Age	
8068	050963/00/00	Manor Farm	Ditch	Medieval	
10495	051159/00/00	Holloway Lane	Enclosure; Pit	Roman	
10507	051163/00/00	Holloway Lane	Quarry	Unknown	
10556	050022/00/00	Botwell	Findspot	Lower Palaeolithic	Lithic Implement (Lower Palaeolithic)
10561	050155/00/00	Caesars Camp	Pit; Occupation Site	Late Neolithic	
10563	050184/00/00	57 Money Lane	Findspot; Findspot	Lower Palaeolithic to Late Neolithic	Scraper (Tool) (Palaeolithic); Scraper (Tool) (Neolithic)
10566	MLO10566	Speedbird Way, Longford, Hillingdon {Enclosure Cropmarks}	Enclosure	Unknown	
10570	MLO10570	Bath Road [Duke Of Northumberland River], Longford, Hillingdon {Undated Gravel Pits}	Gravel Pit; Quarry	Unknown	
10571	050781/00/00	Harlington Village, [Field East Of]	Ditch System	Unknown	
10575	050446/00/00	Western International Market	Findspot	Prehistoric	Lithic Implement (Prehistoric)
10575	050446/00/00	Western International Market	Findspot	Prehistoric	Lithic Implement (Prehistoric)
10582	050403/00/00	Staines Road [100Yards North Of 12-Mile Stone]	Findspot; Findspot	Early Mesolithic to Late Neolithic	Axe (Mesolithic); Axe (Neolithic)
10587	050813/00/00	Parkway (East Of The)	Field System; Unassigned	Unknown	
10590	050806/00/00	Eastern Perimeter Road	Quarry; Pit	Unknown	
10596	MLO10596	Stanwell Road, [Fields South Of]/A30, East Bedfont {Prehistoric Causewayed Enclosure/Henge}	Causewayed Enclosure; Henge; Enclosure	Early Neolithic to Early Bronze Age	
10600	MLO10600	Bath Road, Longford, Hillingdon {Prehistoric Flint Blade}	Findspot	Prehistoric	Blade (Prehistoric)

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Findings
10614	050347/00/00	Harlington	Findspot	Early Medieval/Dark Age	Pot (Early Medieval/Dark Age)
10615	050568/00/00	Longford Moor	Findspot	Medieval to Post Medieval	Pot (Medieval To Post Medieval)
10620	050712/00/00	Swan Road	Manor House; Manor House	Medieval to Post Medieval	
11303	MLO11303	Roseville Road [Cranford Park], Cranford, Hillingdon {Site Of Moated Manor House}	Manor House; Moated Site	Medieval to Post Medieval	
11439	050674/00/00	Dudley Rd (Centred On)	Field System; Enclosure	Unknown	
12721	MLO12721	M4/Colnbrook Bypass, Heathrow, Hillingdon {Prehistoric Hammerstone}	Findspot	Prehistoric	Hammerstone (Prehistoric)
13794	MLO13794	Harmondsworth Lane [Home Farm], Harmondsworth, Hillingdon {Neolithic Ditch And Pit}	Ditch; Pit	Neolithic	Polished Axehead (Neolithic); Pottery (Late Neolithic)
13968	051030/00/00	Mayfield Farm	Hut; Gully; Round House (Domestic); Round House (Domestic); Gully; Hut	Iron Age	
13969	051032/00/00	Trys Site (Builders Yard)	Trackway; Ditch; Trackway; Ditch	Prehistoric	
13983	051033/00/00	Wraysbury River West Of	Enclosure; Enclosure	Prehistoric	
14031	052256/00/00	Horton Rd	Findspot	Palaeolithic	Scraper (Tool) (Palaeolithic)
14175	051038/00/00	Stanwell Rd	Ditch; Ditch	Prehistoric	
14464	051045/00/00	M4 Widening Scheme	Grubenhau	Early Medieval	
14922	050810/00/00	Faggs Rd (West Of)	Ditch System	Unknown	
17551	MLO17551	Holloway Lane, Harmondsworth, Hillingdon {Palaeolithic Axe}	Findspot	Palaeolithic	Axe (Palaeolithic)
17552	051160/00/00	Holloway La	Field System	Roman	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Findings
17711	MLO17711	Sipson Lane, Harlington, Hillingdon {Iron Age Coin}	Findspot	Middle Iron Age to Late Iron Age	Coin (Middle Iron Age To Late Iron Age)
17721	050823/00/00	Staines Rd (South Side Of)	Ring Ditch	Bronze Age	
17757	MLO17757	Western Perimeter Road/Wessex Road [Perry Oaks Sludge Works - Heathrow Airport], Hillingdon {Iron Age Settlement}	Field System; Fence?; Waterhole; Pit; Midden; Post Built Structure; Hut Circle Settlement; Metal Working Site; Gully; Granary?; Round House (Domestic); Hearth; Curvilinear Enclosure; Rectilinear Enclosure; Structure?; Post Hole; Wall?; Gate?; Enclosed Hu	Iron Age	Pottery (Iron Age); Burnt Flint (Iron Age); Animal Remains (Iron Age); Loomweight (Iron Age); Unidentified Object (Middle Iron Age To Late Iron Age); Slag (Middle Iron Age To Late Iron Age)
17992	051157/00/00	Holloway La	Trackway; Trackway	Late Bronze Age to Late Iron Age	
18452	050859/00/00	Boyers Pit	Findspot	Iron Age	Pot (Late Bronze Age To Late Iron Age)
18873	051152/00/00	Holloway Lane, Harmondsworth {Neolithic Occupation Site}	Settlement; Occupation Site	Late Neolithic	
19926	051031/00/00	Mayfield Farm	Field System	Roman	
20643	050436/00/00	Boyers Pit {Bronze Age Settlement}	Settlement; Plaque	Late Bronze Age	
20644	050782/00/00	Bath Rd (North Of)	Ditch System	Unknown	
22048	051156/00/00	Holloway Lane {Late Bronze Age Occupation Site}	Settlement; Enclosure; Occupation Site	Late Bronze Age	
22050	051158/00/00	Holloway La	Pit; Occupation Site; Occupation Site; Pit	Iron Age	
22055	050928/00/00	Duke Of Northumberlands River (On The)[Bedfont Powder Mills]{Post-	Corn Mill; Sword Factory; Gunpowder Works	Post Medieval to Modern	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
		Medieval Mill Complex}			
22193	051098/00/00	Cranford Lane, [Land South Of] {Prehistoric Settlement Site}	Settlement; Occupation Site	Late Bronze Age to Early Iron Age	
22194	051099/00/00	Cranford Lane, [Land South Of] {Roman Field Boundaries/Settlement?}	Field Boundary; Enclosure; Building	Roman	
22195	051100/00/00	Pioneer Plastics Container Factory	Gravel Pit; Pit	Post Medieval	
22552	MLO22552	St Peters Way/High Street [Dawley Manor Farm], Harlington, Hillingdon {Neolithic Axe}	Findspot	Neolithic	Axe (Neolithic)
22668	051154/00/00	Holloway La	Pit; Ring Ditch; Ring Ditch	Late Neolithic to Late Bronze Age	
22669	051155/00/00	Holloway La	Kill Site; Pit	Early Bronze Age	Animal Remains (Late Neolithic To Early Bronze Age); Pottery (Early Medieval/Dark Age); Pottery (Medieval); Pottery (Post Medieval)
22670	051161/00/00	Holloway La	Oven	Roman	
22671	051162/00/00	Holloway La	Grubenhau; Enclosure	Early Medieval	
22674	MLO22674	Harmondsworth Laane [Home Farm], Harmondsworth, Hillingdon {Anglo-Saxon Feature}	Feature	Early Medieval/Dark Age	Loomweight (Early Medieval/Dark Age)
22686	051119/00/00	Manor Farm	Findspot	Early Medieval/Dark Age	Pot (Early Medieval/Dark Age)
22687	051120/00/00	Mayfield Farm	Findspot	Late Neolithic to Early Bronze Age	Lithic Implement (Late Neolithic To Early Bronze Age)
22688	051121/00/00	Manor Farm	Pit; Pit	Prehistoric	
22690	051123/00/00	Manor Farm	Beam Slot; Building; Post Hole	Medieval	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Findings
22691	051124/00/00	Manor Farm	Ditch	Medieval	
22694	051127/00/00	27 St Martins Approach	Negative Evidence	Unknown	
22884	050779/00/00	Holloway Lasouth Of	Ridge And Furrow	Medieval	
22919	050036/00/00	Public Records Office (Formerly Munitions Fuse Factory)	Findspot	Lower Palaeolithic	Axe (Lower Palaeolithic)
22922	MLO22922	Western Perimeter Road, Longford, Hillingdon {Ring Ditch Cropmarks}	Ring Ditch	Unknown	
22940	050435/00/00	Clockhouse La (Hall & Co Gravel Pit)	Findspot	Middle Bronze Age	Palstave (Middle Bronze Age)
23217	MLO23217	Stanwell Moor Road [George Cross Gravel Pit], Heathrow, Hillingdon {Prehistoric Flake}	Findspot	Prehistoric	Flake (Prehistoric)
23218	050880/00/00	Caesars Camp	Settlement; Occupation Site	Late Bronze Age	
23283	050881/00/00	Caesars Camp	Settlement; Occupation Site; Occupation Site; Settlement	Iron Age	
23354	051029/00/00	Mayfield Farm	Fort; Enclosure	Late Bronze Age	
23367	051039/00/00	Stanwell Rd	Ring Ditch; Ring Ditch	Bronze Age	
23940	051136/00/00	Manor Ct	Pit; Occupation Site; Pit; Occupation Site	Prehistoric	Lithic Implement (Prehistoric); Lithic Implement (Early Mesolithic)
23941	051137/00/00	Manor Ct	Pit; Occupation Site; Pit; Occupation Site	Prehistoric	Pot (Prehistoric); Pot (Neolithic)
23942	051138/00/00	Manor Ct	Pit; Post Hole; Occupation Site	Roman	
23943	051139/00/00	Manor Ct	Pit; Post Hole	Early Medieval	
23944	051140/00/00	Manor Ct	Pit; Occupation Site	Medieval	
23946	MLO23946	Holloway Lane (No 15), Harmondsworth,	Ditch; Pit	Prehistoric	Pottery (Middle Bronze Age)

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
		Hillingdon {Bronze Age Pit}			
23947	MLO23947	Holloway Lane (No 15), Harmondsworth, Hillingdon {Grubenhaus}	Grubenhaus	Early Medieval/Dark Age	Pottery (Early Medieval/Dark Age)
23948	051145/00/00	Packet Boat La	Water Channel; Stream	Prehistoric	
23949	051146/00/00	Packet Boat La	Ditch; Ditch	Late Bronze Age to Early Iron Age	
24339	050780/00/00	M4 Motorway (Site Of)	Quarry; Pit; Structure	Unknown	
24350	050673/00/00	Sherborne Rd (Centred On)	Ditch System	Unknown	
24442	MLO24442	Bath Road [King'S Head Inn], Longford, Hillingdon {Saxon Grave Goods}	Burial?	Early Medieval/Dark Age	Necklace (Early Medieval/Dark Age); Urn (Early Medieval/Dark Age)
25134	050139/00/00	Cannons Land	Findspot	Mesolithic	Axe (Mesolithic)
25354	050182/00/00	Beauesert Mews	Manor	Medieval	
25355	050209/00/00	Beauesert Mews (Gatehouse Nurseries)	Manor House	Post Medieval	
25357	210539/00/00	Beavers La	Barracks	Post Medieval	
25608	050200/00/00	Streeters Pitsouth Of	Findspot	Early Bronze Age	Axe (Late Neolithic To Early Bronze Age)
25609	050196/00/00	Warwick Rd	Findspot	Early Bronze Age	Axe (Late Neolithic To Early Bronze Age)
25611	050185/00/00	Manor Farm	Findspot	Neolithic	Lithic Implement (Neolithic)
25612	050183/00/00	57 Money La	Findspot	Neolithic	Axe (Neolithic)
25613	050179/00/00	Beauesert Mews	Pit; Occupation Site	Neolithic	
25614	050178/00/00	M4 Motorway (Field North Of)	Findspot	Neolithic	Lithic Implement (Neolithic)
25615	050176/00/00	Streeters Pit	Findspot	Neolithic	Find Unclassified (Neolithic)
25616	MLO25616	St Peters Way/High Street, Harlington, Hillingdon {Neolithic Blade}	Findspot	Neolithic	Blade (Neolithic)

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Findings
25617	MLO25617	Western Perimeter Road [Heathrow Airport], Hillingdon {Neolithic Axe}	Findspot	Neolithic	Axe (Tool) (Neolithic)
25619	050167/00/00	Boyers Pit	Cremation Cemetery	Middle Bronze Age	Burial Urn (Middle Bronze Age); Jar (Middle Bronze Age)
25650	051178/00/00	Heathrowairport	Ditch	Unknown	
30532	050182/01/00	Beauesert Mews (Gatehouse Nurseries)	Kiln; Pit	Medieval	Building Material (Medieval)
30533	050182/04/00	Beauesert Mews (Gatehouse Nurseries)	Gully	Medieval	
30534	050182/06/00	Beauesert Mews (Gatehouse Nurseries)	Building; Post Hole	Medieval	
30535	050182/07/00	Beauesert Mews (Gatehouse Nurseries)	Courtyard	Medieval to Post Medieval	
30536	050209/01/00	Beauesert Mews (Gatehouse Nurseries)	Culvert; Culvert	Medieval to Post Medieval	
30552	050881/01/00	Caesars Camp	Rampart; Enclosure; Rampart; Enclosure; Enclosure; Rampart	Iron Age	
30553	050881/02/00	Caesars Camp	Hut; Hut	Iron Age	
32465	210334/02/00	Moor Laharmondsworth	Wall	Post Medieval	
32465	210334/02/00	Moor Laharmondsworth	Wall	Post Medieval	
32467	210244/01/00	High St	Outbuilding	Post Medieval	
35018	210116/03/00	The Greenwest Drayton	Barn	Post Medieval	
38340	050182/03/00	Beauesert Mews (Gatehouse Nurseries)	Ditch	Medieval	
38341	050209/02/00	Beauesert Mews (Gatehouse Nurseries)	Clock Tower	Medieval to Post Medieval	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Findings
52654	050928/01/00	Duke Of Northumberlands River (On The) [Bedfont Powder Mills] {Post-Medieval Mill Complex}	Corn Mill; Sword Factory; Gunpowder Works	Post Medieval	
52655	050928/02/00	Duke Of Northumberlands River (On The) [Bedfont Powder Mills]{Post-Medieval Mill Complex}	Gunpowder Works; Paper Mill	Post Medieval	
52658	050928/03/00	Baber Bridge (South Of)	Gunpowder Works	Post Medieval	
53343	051157/01/00	Holloway La	Findspot; Findspot	Iron Age	Brooch (Late Bronze Age To Early Iron Age); Brooch (Late Bronze Age To Late Iron Age)
53345	051122/01/00	Manor Farm	Grubenhuis; Ditch	Early Medieval	
53657	050182/02/00	Beaudesert Mews (Gatehouse Nurseries)	Cess Pit	Medieval	
53658	050209/03/00	30 Church Rd Back Garden Of	Stable	Medieval to Post Medieval	
54401	050182/05/00	Beaudesert Mews (Gatehouse Nurseries)	Pit	Medieval	
54771	050881/03/00	Caesar'S Camp	Temple	Iron Age	
57225	051028/00/00	Mayfield Farm	Henge; Earthwork; Henge; Earthwork	Neolithic	
58405	052276/00/00	Heathrow Longstay Car Park Sites 1-4	Unassigned; Unassigned; Unassigned	Prehistoric	
58406	052277/00/00	Heathrow Longstay Car Park Sites 1-4	Pit	Post Medieval	
58423	052281/00/00	Stanwell Rd	Drain	Post Medieval	
58490	MLO58490	Harmondsworth Lane [Home Farm], Harmondsworth, Hillingdon {Iron Age Pits And Ditch}	Pit; Ditch	Iron Age	Pottery (Iron Age); Worked Flint (Iron Age)
58492	MLO58492	Harmondsworth Lane [Home Farm], Harmondsworth,	Artefact Scatter	Roman to Medieval	Unidentified Object (Roman To Medieval)

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
		Hillingdon {Artefact Scatter}			
58506	MLO58506	Harmondsworth Lane [Home Farm], Harmondsworth, Hillingdon {Prehistoric Flint Scatter}	Flint Scatter	Lower Palaeolithic to Late Neolithic	Struck Flint (Palaeolithic); Axe (Tool) (Mesolithic); Microlith (Mesolithic); Worked Flint (Early Neolithic To Late Bronze Age)
58512	052303/00/00	Combined Operations Centre	Pit; Gully	Unknown	
58512	052303/00/00	Combined Operations Centre	Pit; Gully	Unknown	
58512	052303/00/00	Combined Operations Centre	Pit; Gully	Unknown	
58512	052303/00/00	Combined Operations Centre	Pit; Gully	Unknown	
58512	052303/00/00	Combined Operations Centre	Pit; Gully	Unknown	
58521	052304/00/00	Combined Operations Centre	Unassigned	Iron Age	
58521	052304/00/00	Combined Operations Centre	Unassigned	Iron Age	
58521	052304/00/00	Combined Operations Centre	Unassigned	Iron Age	
58521	052304/00/00	Combined Operations Centre	Unassigned	Iron Age	
58521	052304/00/00	Combined Operations Centre	Unassigned	Iron Age	
58560	052305/00/00	Combined Operations Centre	Plough Marks	Post Medieval	
58560	052305/00/00	Combined Operations Centre	Plough Marks	Post Medieval	
58560	052305/00/00	Combined Operations Centre	Plough Marks	Post Medieval	
58560	052305/00/00	Combined Operations Centre	Plough Marks	Post Medieval	
58560	052305/00/00	Combined Operations Centre	Plough Marks	Post Medieval	
58563	052306/00/00	Combined Operations Centre	Quarry	Post Medieval	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Findings
58563	052306/00/00	Combined Operations Centre	Quarry	Post Medieval	
58563	052306/00/00	Combined Operations Centre	Quarry	Post Medieval	
58563	052306/00/00	Combined Operations Centre	Quarry	Post Medieval	
58563	052306/00/00	Combined Operations Centre	Quarry	Post Medieval	
58961	052319/00/00	Beavers La Camp	Plough Marks	Post Medieval	
58962	052320/00/00	Beavers La Camp	Pit; Post Hole	Unknown	
58963	052321/00/00	Beavers La Camp	Stream	Unknown	
58977	MLO58977	Western Perimeter Road [Perry Oaks Sludge Works - Heathrow Airport], Hillingdon {Neolithic Monumental Landscape}	Enclosure; Pit; Post Hole; Ditch; Bank (Earthwork); Cursus; Ditch; Bank (Earthwork)?	Early Neolithic to Early Bronze Age	Pottery (Neolithic); Flake (Neolithic); Blade (Neolithic); Burin (Neolithic); Core (Neolithic); Animal Remains (Neolithic)
59023	052335/00/00	Prospect Park	Settlement; Settlement	Neolithic	
59024	052336/00/00	Prospect Park	Cultivation Soil	Bronze Age	
59025	052338/00/00	Prospect Park	Ditch	Unknown	
59169	MLO59169	Blair Close/Wyre Grove [Former Allotment Site], Hayes, Hillingdon {Prehistoric Finds}	Findspot	Prehistoric	Burnt Flint (Late Neolithic To Late Bronze Age); Struck Flint (Late Neolithic To Late Bronze Age); Pottery (Bronze Age)
59171	MLO59171	Blair Close/Wyre Grove [Former Allotment Site], Hayes, Hillingdon {Early Anglo-Saxon Features}	Ditch?; Pit; Grubenhaus	Early Medieval/Dark Age	Tile (Roman); Unidentified Object (Early Medieval/Dark Age); Pottery (Early Medieval/Dark Age)
59369	052369/00/00	Royal Nurseries	Findspot; Findspot; Findspot	Prehistoric	Lithic Implement (Prehistoric); Lithic Implement (Neolithic); Lithic Implement (Late Neolithic To Late Bronze Age)
59381	052370/00/00	Royal Nurseries	Unassigned	Prehistoric	
59403	052371/00/00	Royal Nurseries	Unassigned	Roman	
59404	052372/00/00	Royal Nurseries	Findspot	Medieval	Pot (Medieval)

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
59405	052373/00/00	Staines Rd	Negative Evidence	Unknown	
59429	052374/00/00	Perry Oaks Drive (Land North Of)	Water Channel	Unknown	
59548	MLO59548	Money Lane (Nos 54-60), West Drayton, Hillingdon, Ub7 {19Th-20Th Century Features}	Pit; Wall; Drain	Post Medieval to Modern	Brick (Post Medieval To Modern); Tile (Post Medieval To Modern); Pottery (Post Medieval To Modern)
59694	052385/00/00	Westmacott Drive	Drain	Post Medieval	
59695	052386/00/00	Westmacott Drive	Stream	Unknown	
59802	052394/00/00	Bedfont Rd	Linear Feature	Unknown	
59805	052395/00/00	Bedfont Rd	Ring Ditch	Unknown	
59806	052396/00/00	Bedfont La	Linear Feature	Unknown	
59807	052397/00/00	Bedfont La	Enclosure	Unknown	
59810	052399/00/00	Heathrow Airport	Linear Feature	Unknown	
59812	052400/00/00	Heathrow Airport	Ring Ditch	Early Bronze Age to Late Iron Age	
59819	052405/00/00	Airport Way	Enclosure	Unknown	
59821	052406/00/00	Airport Way	Linear Feature	Unknown	
59822	052407/00/00	Airport Way	Pit	Unknown	
59823	052408/00/00	Airport Way	Ring Ditch	Unknown	
59824	052409/00/00	Airport Way	Linear Feature	Unknown	
59828	052410/00/00	Airport Way	Enclosure	Unknown	
59833	052411/00/00	Heathrow Airport	Findspot	Mesolithic	Lithic Implement (Mesolithic)
59837	052412/00/00	Heathrow Airport	Findspot	Bronze Age	Pot (Late Neolithic To Late Bronze Age)
59845	210401/00/00	Bath Rd	Boundary Marker	Post Medieval	
59848	210402/00/00	Bath Rd	Boundary Marker	Post Medieval	
60143	MLO60143	Sipson Lane [Little Harlington Field], Hillingdon, Ub3 {Prehistoric Flints}	Flint Scatter	Prehistoric	Burnt Flint (Prehistoric); Struck Flint (Prehistoric)
60144	MLO60144	Sipson Lane [Little Harlington Field], Hillingdon, Ub3 {Post Medieval Artefact Scatter}	Artefact Scatter	Post Medieval	Clay Pipe (Smoking) (Post Medieval); Tile (Post Medieval); Handle (Post Medieval); Pottery (Post Medieval)

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Findings
60265	MLO60265	Thorney Mill Road [West Drayton Mill Wier], West Drayton, Hillingdon {Post Medieval Revetted Water Channels}	Water Channel; Revetment; Fence	Post Medieval	Flake (Prehistoric); Animal Remains (Post Medieval); Cbm (Post Medieval); Pottery (Post Medieval); Roof Tile (Post Medieval)
60266	MLO60266	Moor Lane [Prospect Park - British Airways Combined Business Centre], Harmondsworth, Hillingdon, Ub7 {Roman Pottery}	Findspot	Roman	Pottery (Roman)
60267	MLO60267	Moor Lane [Prospect Park - British Airways Combined Business Centre], Harmondsworth, Hillingdon, Ub7 {Undated Ditches}	Ditch	Unknown	
60268	MLO60268	Moor Lane [Prospect Park - British Airways Combined Business Centre], Harmondsworth, Hillingdon, Ub7 {Prehistoric Artefact Scatter}	Artefact Scatter	Prehistoric	Flake (Prehistoric); Burnt Flint (Prehistoric); Pottery (Prehistoric); Scraper (Tool) (Prehistoric); Arrowhead (Prehistoric); Knife (Prehistoric); Blade (Mesolithic); Core (Mesolithic); Microlith (Mesolithic); Pottery (Late Bronze Age); Pottery (Iron Age)
60270	MLO60270	Moor Lane [Prospect Park -British Airways Combined Business Centre], Harmondsworth, Hillingdon, Ub7 {Bronze Age Field System}	Cultivation Soil; Ditch; Post Built Structure; Post Hole; Pit; Beam Slot; Gully; Cremation; Ring Ditch	Bronze Age	Core (Bronze Age); Pottery (Early Bronze Age To Early Iron Age); Burial Urn (Middle Bronze Age); Human Remains (Middle Bronze Age)
60272	MLO60272	Moor Lane [Prospect Park - British Airways Combied Business Centre], Harmondsworth, Hillingdon, Ub7 {Neolithic Activity}	Hollow; Post Hole; Feature	Neolithic	Worked Flint (Neolithic); Pottery (Neolithic)

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
60273	MLO60273	Moor Lane [Prospect Park - British Airways Combined Business Centre], Harmondsworth, Hillingdon, Ub7 {Saxon Settlement}	Grubenhaus; Post Hole; Post Built Structure; Post Hole; Pit; Ditch; Hollow; Hearth?	Early Medieval/Dark Age	Pottery (Prehistoric); Cbm (Roman); Coin (Roman); Spindle Whorl (Early Medieval/Dark Age); Loomweight (Early Medieval/Dark Age); Whetstone (Early Medieval/Dark Age); Unidentified Object (Early Medieval/Dark Age); Bead (Early Medieval/Dark Age); Spearhead
60274	MLO60274	Moor Lane [Prospect Park - British Airways Combined Business Centre], Harmondsworth, Hillingdon, Ub7 {Undated Features}	Pit; Post Hole; Ridge And Furrow?	Early Bronze Age to Early Medieval/Dark Age	Pottery (Bronze Age); Pottery (Roman); Pottery (Early Medieval/Dark Age)
60275	MLO60275	Moor Lane [Prospect Park - British Airways Combined Business Centre], Harmondsworth, Hillingdon, Ub7 {Romano-British Cemetery}	Pit; Cemetery; Cremation; Inhumation	Roman	Pottery (Roman); Human Remains (Roman); Nail (Roman); Burial Urn (Roman)
60275	MLO60275	Moor Lane [Prospect Park - British Airways Combined Business Centre], Harmondsworth, Hillingdon, Ub7 {Romano-British Cemetery}	Pit; Cemetery; Cremation; Inhumation	Roman	Pottery (Roman); Human Remains (Roman); Nail (Roman); Burial Urn (Roman)
62456	MLO62456	Sealand Road [Heathrow Airport - Cargo Distribution Services Site], Hillingdon, Tw6 {Prehistoric Occupation Site}	Gully; Post Hole; Pit; Settlement; Ditch	Prehistoric	Blade (Prehistoric); Burnt Flint (Prehistoric); Flake (Prehistoric); Core (Prehistoric); Point (Late Mesolithic To Early Neolithic); Pottery (Late Bronze Age To Early Iron Age)
62719	MLO62719	High Street [Great Mills Site], Yiewley, Hillingdon, Ub7 {Post Medieval Century Water Channel}	Water Channel	Post Medieval	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
62820	MLO62820	Warkwick Road/Furzenham Road [Dra West Drayton], West Drayton, Hillingdon, Ub7 {Prehistoric Worked Flint}	Findspot	Prehistoric	Flake (Prehistoric)
62821	MLO62821	Warwick Road/Furzeham Road, [Dra West Drayton], West Drayton, Hillingdon, Ub7 {Medieval Pottery}	Findspot	Medieval	Pottery (Medieval)
62859	MLO62859	Western Perimeter Road [Perry Oaks Sludge Works], Harmondsworth, Hillingdon {Mesolithic Pits}	Pit; Palaeochannel	Mesolithic	Worked Flint (Mesolithic); Burnt Flint (Mesolithic)
63044	052496/00/00	Black Dog Public House	Dump	Post Medieval	
63110	052525/00/00	Gate House Nurseries, Church Rd ,	Pit	Medieval	
63111	052526/00/00	Gate House Nurseries, Church Rd ,	Ditch	Medieval	
63112	052527/00/00	Gate House Nurseries, Church Rd ,	Findspot	Medieval	Pot (Medieval)
63113	052528/00/00	Gate House Nurseries, Church Rd ,	Courtyard	Medieval	
63116	052529/00/00	Gate House Nurseries, Church Rd ,	Manor House	Post Medieval	
63118	052530/00/00	Gate House Nurseries, Church Rd ,	Drain	Post Medieval	
63120	052531/00/00	Gate House Nurseries, Church Rd ,	Clock Tower	Post Medieval	
63842	MLO63842	Sipson Lane [Wall Garden Farm], Harlington,	Pit?	Prehistoric	Flake (Prehistoric); Burnt Flint (Prehistoric)

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Findings
		Hillingdon, Ub7 {Prehistoric Pit}			
63843	MLO63843	Sipson Lane [Wall Garden Farm], Harlington, Hillingdon, Ub7 {Post Medieval Pits And Well}	Rubbish Pit; Well	Post Medieval	Pottery (Post Medieval); Wall Plaster (Post Medieval); Tile (Post Medieval); Animal Remains (Post Medieval); Clay Pipe (Smoking) (Post Medieval)
63843	MLO63843	Sipson Lane [Wall Garden Farm], Harlington, Hillingdon, Ub7 {Post Medieval Pits And Well}	Rubbish Pit; Well	Post Medieval	Pottery (Post Medieval); Wall Plaster (Post Medieval); Tile (Post Medieval); Animal Remains (Post Medieval); Clay Pipe (Smoking) (Post Medieval)
63844	MLO63844	Sipson Lane [Wall Garden Farm], Harlington, Hillingdon, Ub7 {Undated Ditch}	Ditch	Unknown	
64242	MLO64242	Porters Way [Former Council Depot And Allotments], West Drayton, Hillingdon, Ub7 {Post Medieval Pits And Ditches}	Rubbish Pit; Ditch; Foundation Trench?	Post Medieval	Cbm (Post Medieval); Pottery (Post Medieval); Animal Remains (Post Medieval)
64243	MLO64243	Porters Way, [Former Council Depot And Allotments], West Drayton, Hillingdon, Ub7 {Undated Postholes And Pit}	Post Hole; Stake Hole; Pit	Unknown	Burnt Flint (Unknown)
64430	052581/00/00	Sactuary Rd	Ditch	Prehistoric	
64431	052582/00/00	Sactuary Rd	Ditch	Post Medieval	
64432	052583/00/00	Sactuary Rd	Building	Post Medieval	
64456	MLO64456	Stanwell Moor Road/Bath Road [Pear Tree Farm], Longford, Hillingdon {Undated Water Channel}	Water Channel	Unknown	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Findings
64459	MLO64459	Stanwell Moor Road/Bath Road [Pear Tree Farm], Longford, Hillingdon {Post Medieval Pits And Postholes}	Pit; Post Hole	Post Medieval	
64478	MLO64478	Western Perimeter Road [Heathrow Airport - Perry Oaks Sludge Works], Hillingdon {Medieval Hamlet}	Barn?; Post Built Structure; Waterhole; Pit; Cultivation Soil; Ridge And Furrow; Boundary Ditch; Enclosure; Ditch; Hamlet	Early Medieval/Dark Age to Modern	Pottery (Medieval); Cbm (Medieval); Daub (Medieval); Vessel (Medieval); Slag (Medieval); Coin (Medieval); Jetton (Medieval); Oyster Shell (Medieval); Animal Remains (Medieval)
64492	MLO64492	Northwood Road/Bath Road [Heathrow Airport - Staff West Car Park], Longford, Hillingdon {Iron Age To 16Th Century Field System}	Field System; Ditch; Ditch; Field System	Early Iron Age to Post Medieval	
64493	MLO64493	Northwood Road/Bath Road [Heathrow Airport - Staff Car Park West], Longford, Hillingdon {Prehistoric Pit}	Pit	Prehistoric	
64494	MLO64494	Northwood Road/Bath Road [Heathrow Airport Staff Car Park], Longford, Hillingdon {Post Medieval Ditch And Water Channel}	Ditch; Water Channel	Post Medieval	
64495	MLO64495	Holloway Lane (No 15), Harmondsworth, Hillingdon {12Th-13Th Century Occupation Site}	Pit; Post Hole; Cess Pit; Fence?; Animal Burial	Medieval	Unidentified Object (Medieval); Coin? (Medieval); Animal Remains (Medieval); Pottery (Medieval)
64497	MLO64497	Holloway Lane (No 15), Harmondsworth, Hillingdon {Post Medieval Cut Features}	Quarry; Post Hole; Path	Post Medieval to Modern	Brick (Post Medieval)

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
64509	052617/00/00	Cowley Business Park	Ditch; Ditch	Prehistoric	
64510	052618/00/00	Cowley Business Park	Findspot	Prehistoric	Lithic Implement (Prehistoric)
65692	MLO65692	Cranford Lane, Harlington, Hillingdon, Ub3 {Neolithic Occupation Site}	Pit; Post Built Structure; Occupation Site; Cremation?; Hearth?; Post Hole	Early Neolithic to Middle Neolithic	Pottery (Neolithic); Leaf Arrowhead (Neolithic); Flake (Neolithic); Bead (Neolithic); Burin Spall (Neolithic); Blade (Neolithic); Scraper (Tool) (Neolithic); Human Remains (Neolithic); Polished Axehead (Middle Neolithic)
65693	MLO65693	Cranford Lane, Harlington, Hillingdon, Ub3 {Bronze Age Settlement And Associated Field System}	Sump; Ditch; Post Hole; Granary; Rubbish Pit; Cremation; Well; Bronze Working Site; Drove Road; Post Hole; Trackway; Cooking Pit; Fence; Post Built Structure; Field System; Hut Circle Settlement	Bronze Age	Human Remains (Bronze Age); Pottery (Early Bronze Age To Early Iron Age); Burnt Flint (Bronze Age); Scraper (Tool) (Bronze Age); Whetstone (Bronze Age); Animal Remains (Bronze Age); Urn (Bronze Age); Crucible (Bronze Age); Mould (Bronze Age)
65694	MLO65694	Cranford Lane, Harlington, Hillingdon, Ub3 {Roman Enclosures}	Rectilinear Enclosure; Enclosure; Well; Post Built Structure; Pit; Drove Road; Ditch	Roman	Bracelet (Roman); Pin (Roman); Gaming Piece (Roman); Quern (Roman); Shears (Roman); Unidentified Object (Roman); Reaping Hook (Roman); Chain (Roman); Double Spiked Loop (Roman); Pottery (Roman); Bead (Roman); Nail (Roman); Coin (Roman)
65695	MLO65695	Cranford Lane, Harlington, Hillingdon, Ub3 {Medieval - Post Medieval Ridge And Furrow}	Ridge And Furrow; Pit	Medieval to Post Medieval	Pottery (Medieval To Post Medieval)

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Findings
66100	MLO66100	Northern Perimeter Road/Western Perimeter Road/Bath Road [Duke Of Northumberland'S River], Hillingdon, Tw6 {Post Medieval Water Channel}	Sluice; Water Channel; Flood Deposit	Post Medieval	Pottery (Medieval To Post Medieval); Cbm (Post Medieval); Tile (Post Medieval)
66120	MLO66120	Northolt Road [Heathrow Airport - Staff West Car-Park], Longford, Hillingdon {Prehistoric Ditches And Pits}	Ditch; Pit	Prehistoric	Burnt Flint (Prehistoric); Unidentified Object (Prehistoric); Pottery? (Prehistoric); Flake (Early Mesolithic To Late Bronze Age); Blade (Early Mesolithic To Late Bronze Age); Unidentified Object (Iron Age)
66121	MLO66121	Northolt Road [Heathrow Airport - Staff West Car-Park], Longford, Hillingdon {Bedding Trenches}	Bedding Trench	Post Medieval	Tile (Post Medieval); Animal Remains (Post Medieval)
66122	MLO66122	Northolt Road [Heathrow Airport-Staff West Car-Park], Langford, Hillingdon {Medieval Field System}	Field System; Ditch	Medieval	Burnt Flint (Medieval); Pottery (Medieval); Flower Pot (Post Medieval)
66123	MLO66123	Northolt Road [Heathrow Airport - Staff West Car-Park], Langford, Hillingdon {19Th-20Th Century Orchard}	Orchard	Post Medieval to Modern	
66125	MLO66125	Neptune Road/Newall Road/ Northern Perimeter Road [Heathrow Airport], Hillingdon, Tw6 {Undated Features}	Gully; Pit?; Ditch	Unknown	Burnt Flint (Late Prehistoric); Cbm (Post Medieval)
66125	MLO66125	Neptune Road/Newall Road/ Northern Perimeter Road [Heathrow Airport], Hillingdon,	Gully; Pit?; Ditch	Unknown	Burnt Flint (Late Prehistoric); Cbm (Post Medieval)

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Findings
		Tw6 {Undated Features}			
66125	MLO66125	Neptune Road/Newall Road/Northern Perimeter Road [Heathrow Airport], Hillingdon, Tw6 {Undated Features}	Gully; Pit?; Ditch	Unknown	Burnt Flint (Late Prehistoric); Cbm (Post Medieval)
66126	MLO66126	Newall Road/Netley Road [Heathrow Airport], Hillingdon, Tw6 {Late Bronze Age Gully}	Gully	Late Bronze Age to Early Iron Age	Pottery (Late Bronze Age To Early Iron Age)
66418	052679/00/00	Esso West London Oil Terminal	Unassigned	Unknown	
66549	052682/00/00	Stanwell Rd	Field System; Ditch System	Roman	
66579	052689/00/00	Harlington	Findspot	Prehistoric	Lithic Implement (Prehistoric)
66663	052690/00/00	Southampton Rd	Negative Evidence	Unknown	
66678	MLO66678	Cranford Lane [Cranford Park], Cranford, Harlington, Hillingdon, Ub3 {Bronze Age Pits}	Cooking Pit; Rubbish Pit	Bronze Age	Burnt Flint (Bronze Age); Flake (Bronze Age); Unidentified Object (Bronze Age); Pottery (Late Bronze Age)
66678	MLO66678	Cranford Lane [Cranford Park], Cranford, Harlington, Hillingdon, Ub3 {Bronze Age Pits}	Cooking Pit; Rubbish Pit	Bronze Age	Burnt Flint (Bronze Age); Flake (Bronze Age); Unidentified Object (Bronze Age); Pottery (Late Bronze Age)
66679	MLO66679	Cranford Lane [Cranford Park], Cranford, Harlington, Hillingdon, Ub3 {Prehistoric Artefact Scatter}	Findspot	Late Prehistoric	Blade (Early Mesolithic To Late Bronze Age); Flake (Late Neolithic To Late Bronze Age); Loomweight (Iron Age)
67212	052716/00/00	St Dunstons Church	Findspot	Medieval	Pot (Medieval)
67214	210304/01/00	St Dunstons Church	Building	Post Medieval	
67215	052717/00/00	St Dunstons Church	Deposit Unclassified; Findspot	Post Medieval	Find Unclassified (Post Medieval)

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
67298	MLO67298	Church Road [St Martin'S Church], West Drayton, Hillingdon, Ub7 {Prehistoric Flints}	Findspot	Prehistoric	Flake (Prehistoric)
67299	MLO67299	Church Road [St Martin'S Church], West Drayton, Hillingdon, Ub7 {Brew Yard Wall}	Wall	Post Medieval	
67367	MLO67367	Colham Mill Road, West Drayton, Hillingdon, Ub7 {Early Medieval Wattle Hurdles, Stakes And Pits}	Pit; Revetment; Gully; Fence; Stake; Post Hole; Trackway; Peat; Path	Early Medieval/Dark Age to Post Medieval	Burnt Flint (Early Medieval/Dark Age); Pottery (Early Medieval/Dark Age To Medieval); Animal Remains (Medieval To Post Medieval)
67693	052739/00/00	Kingston La	Findspot	Prehistoric	Lithic Implement (Prehistoric)
67694	052740/00/00	Kingston La	Findspot	Roman	Pot (Roman)
67695	052741/00/00	Kingston La	Pit	Medieval	
67696	052742/00/00	Kingston La	Gully	Medieval	
67697	052743/00/00	Kingston La	Ditch	Post Medieval	
67698	052744/00/00	Kingston La	Post Hole	Unknown	
67808	052767/00/00	625-635 Sipson Rd	Findspot	Prehistoric	Burnt Flint (Prehistoric)
67843	MLO67843	Bath Road (No 450 And Rear Of 422-789), Longford, Hillingdon {Post Medieval Pits}	Pit?	Post Medieval	
67855	052777/00/00	Green La	Negative Evidence	Unknown	
68118	MLO68118	Bath Road [The Grove], Harmondsworth, Hillingdon {19Th Century Market Gardening}	Pit; Bedding Trench; Market Garden	Post Medieval to Modern	Pottery (Post Medieval); Clay Pipe (Smoking) (Post Medieval)
68121	MLO68121	Bath Road [The Grove], Harmondsworth, Hillingdon {Undated Ditch}	Boundary Ditch	Unknown	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Findings
68166	MLO68166	Nobel Drive [Ibis Hotel], Harlington, Hillingdon {Iron Age Agricultural Activity}	Ditch; Pit; Post Hole; Enclosure	Iron Age	Flake (Iron Age); Burin Spall (Iron Age); Burnt Flint (Iron Age); Pottery (Middle Iron Age To Late Iron Age)
68168	MLO68168	Nobel Drive [Ibis Hotel], Harlington, Hillingdon {Roman Ditch}	Ditch; Pit?	Roman	Flake (Roman); Coin (Roman)
68169	MLO68169	Nobel Drive [Ibis Hotel], Harlington, Hillingdon {Neolithic Pit}	Pit	Early Neolithic to Middle Neolithic	Arrowhead (Early Neolithic To Middle Neolithic)
68171	MLO68171	Nobel Drive [Ibis Hotel], Harlington, Hillingdon {Neolithic To Bronze Age Enclosure}	Enclosure; Ditch; Post Hole; Pit	Late Neolithic to Late Bronze Age	Flake (Late Neolithic To Late Bronze Age); Struck Flint (Late Neolithic To Late Bronze Age); Pottery (Late Neolithic To Late Bronze Age)
68171	MLO68171	Nobel Drive [Ibis Hotel], Harlington, Hillingdon {Neolithic To Bronze Age Enclosure}	Enclosure; Ditch; Post Hole; Pit	Late Neolithic to Late Bronze Age	Flake (Late Neolithic To Late Bronze Age); Struck Flint (Late Neolithic To Late Bronze Age); Pottery (Late Neolithic To Late Bronze Age)
68340	300137/00/00	North Hyde Rd (Nr Junction Of)	Anti Aircraft Gun Post	Post Medieval	
68486	052881/00/00	Holloway La	Findspot	Palaeolithic	Lithic Implement (Palaeolithic)
68516	052893/00/00	Harmondsworth La (Near)	Ring Ditch	Unknown	
68520	MLO68520	M4, Harmondsworth, Hillingdon {Prehistoric Flints}	Findspot	Prehistoric	Scraper (Tool) (Prehistoric); Worked Flint (Prehistoric)
68531	052898/00/00	Holloway La	Findspot	Roman	Pot (Roman)
68537	052902/00/00	Horton Rd (Near)	Findspot	Mesolithic	Lithic Implement (Mesolithic)
68540	052904/00/00	Eastwoods Pit	Findspot	Palaeolithic	Lithic Implement (Palaeolithic)
68542	052906/00/00	Eastwoods Pit	Findspot	Palaeolithic	Lithic Implement (Palaeolithic)

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
68560	052908/00/00	Bath Road, 567, Hillingdon {16Th Century Half-Timbered House}	House	Post Medieval to Modern	
68561	052909/00/00	High St (Near?)	House	Post Medieval	
68562	MLO68562	St Pauls Close, Harlington, Hillingdon {Medieval Building Material}	Findspot	Medieval	Building Material (Medieval)
68563	MLO68563	St Peters Way/M4 [Dawley Manor Farm], Harlington, Hillingdon {Medieval To Post Medieval Moated Farm}	Moated Site; Timber Framed Building; T Shape Plan; Storey; Timber Framed Building; Timber Framed Building; Farmhouse; Barn; Outbuilding	Medieval to Modern	
68566	MLO68566	Roseville Road/Southall Lane, Cranford, Hillingdon {Site Of A Medieval Village}	Deserted Settlement	Medieval to Post Medieval	
68567	052913/00/00	73 The Greenwest Drayton	House	Post Medieval	
68568	052914/00/00	Money Lanewest Drayton	House	Post Medieval	
68569	052915/00/00	Mill Rd West Drayton	House	Post Medieval	
68573	052919/00/00	St Peters Rd (Off)	Farmhouse	Post Medieval	
68574	052919/01/00	St Peters Rd (Off)	Barn	Post Medieval	
68614	052940/00/00	High Styiewsley	Settlement	Medieval	
68615	052941/00/00	Church Rd Cowley	Village	Medieval	
68616	052942/00/00	High Rd Packet Boat La	Settlement; Settlement	Medieval to Post Medieval	
68618	052943/00/00	Dawley Rd N Hyde Rd	Settlement	Medieval	
68624	052948/00/00	Dawley Rd	Settlement	Medieval	
68625	052949/00/00	Moor La	Settlement	Early Medieval to Medieval	
68627	052951/00/00	Heathrow	Settlement; Settlement	Medieval to Post Medieval	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
68631	MLO68631	Bath Road, Longford, Hillingdon {The Medieval Settlement Of Longford}	Settlement; Friends Meeting House; Bell Foundry	Medieval to Modern	
68635	052958/00/00	Sipson Rd Sipson	Settlement	Medieval	
68637	052960/00/00	Church Rd	Village	Medieval	
68638	052961/00/00	The Greenwest Drayton	Settlement; Settlement	Medieval to Post Medieval	
68640	052963/00/00	Mill Rd West Drayton	Mill; Mill	Medieval to Post Medieval	
68641	052964/00/00	Bath Rd Longford	Bridge; Bridge	Medieval to Post Medieval	
68642	MLO68642	Bath Road, Longford, Hillingdon {Medieval Bridge}	Bridge	Medieval	
68643	MLO68643	Bath Road, Longford, Hillingdon {Medieval To Post Medieval Mills}	Mill	Medieval to Post Medieval	
68644	052967/00/00	High Stharmondsworth (Near)	House; House	Medieval to Post Medieval	
68648	052971/00/00	Dagnall Crescent (N Of)	Manor House; Manor House	Medieval to Post Medieval	
68651	052974/00/00	Cowley Mill Road, Uxbridge	Mill	Medieval to Post Medieval	
68652	052975/00/00	Old Mill La (W Side) Cowley	Mill; Mill	Medieval to Post Medieval	
68654	052977/00/00	Church Rd Cowley	Manor House	Medieval	
68675	MLO68675	St Peters Way, Harlington, Hillingdon {Post Medieval Vicarage}	Timber Framed Building; Vicarage	Medieval to Modern	
68676	052981/00/00	Bath Rd Cranford	Bridge	Medieval	
68846	053059/00/00	Faggs Rd (S Of)	Chapel	Post Medieval	
68858	053069/00/00	Staines Rd East Bedfont	Settlement	Medieval	
68963	MLO68963	Bath Road (Nos 120-138) [Whitbread Marriott Hotel], Hayes, Hillingdon {Prehistoric Finds}	Findspot	Late Neolithic to Late Bronze Age	Blade (Late Neolithic); Pottery (Late Bronze Age)

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
68964	MLO68964	Bath Road (Nos 120-138) [Whitbread Marriott Hotel], Hayes, Hillingdon {Undated Ditch}	Ditch	Unknown	
69130	054132/00/00	Blunts Field	Findspot	Roman	Pot (Roman)
69131	054133/00/00	Blunts Field	Findspot	Unknown	Burnt Flint (Unknown)
71185	MLO71185	High Road [Cowley Retail Park] Yiewsley, Hillingdon {Prehistoric Finds}	Findspot	Prehistoric	Sherd (Prehistoric); Animal Remains (Prehistoric); Burnt Flint (Prehistoric)
71186	054217/00/00	Cowley Business Park, [Swan House/Kingfisher House], Cowley	Palaeochannel	Unknown	
71186	054217/00/00	Cowley Business Park, [Swan House/Kingfisher House], Cowley	Palaeochannel	Unknown	
71186	054217/00/00	Cowley Business Park, [Swan House/Kingfisher House], Cowley	Palaeochannel	Unknown	
71186	054217/00/00	Cowley Business Park, [Swan House/Kingfisher House], Cowley	Palaeochannel	Unknown	
71186	054217/00/00	Cowley Business Park, [Swan House/Kingfisher House], Cowley	Palaeochannel	Unknown	
71193	MLO71193	Western Perimeter Road, Longford, Hillingdon {Medieval Post Holes}	Stake Hole	Medieval	Pottery (Roman To Medieval)
71196	054223/00/00	Black Dog Public House	Pit	Medieval	
71234	054225/00/00	Sanctuary Rd	Negative Evidence	Unknown	
71276	MLO71276	Moor Lane [Moyson'S Yard], Harmondsworth, Hillingdon, Ub7 {Undated Ditch}	Ditch	Early Neolithic to Medieval	Animal Remains (Unknown)
71296	054240/00/00	Lufthansa Cargo Site	Negative Evidence	Unknown	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Findings
71645	MLO71645	Northern Perimeter Road [Heathrow Airport], Hillingdon, Tw6 {Undated Features}	Pit; Ditch; Quarry Pit?; Post Hole	Unknown	Burnt Flint (Prehistoric); Slag (Early Iron Age To Post Medieval); Cbm (Post Medieval); Pottery (Post Medieval)
71645	MLO71645	Northern Perimeter Road [Heathrow Airport], Hillingdon, Tw6 {Undated Features}	Pit; Ditch; Quarry Pit?; Post Hole	Unknown	Burnt Flint (Prehistoric); Slag (Early Iron Age To Post Medieval); Cbm (Post Medieval); Pottery (Post Medieval)
71645	MLO71645	Northern Perimeter Road [Heathrow Airport], Hillingdon, Tw6 {Undated Features}	Pit; Ditch; Quarry Pit?; Post Hole	Unknown	Burnt Flint (Prehistoric); Slag (Early Iron Age To Post Medieval); Cbm (Post Medieval); Pottery (Post Medieval)
71645	MLO71645	Northern Perimeter Road [Heathrow Airport], Hillingdon, Tw6 {Undated Features}	Pit; Ditch; Quarry Pit?; Post Hole	Unknown	Burnt Flint (Prehistoric); Slag (Early Iron Age To Post Medieval); Cbm (Post Medieval); Pottery (Post Medieval)
71645	MLO71645	Northern Perimeter Road [Heathrow Airport], Hillingdon, Tw6 {Undated Features}	Pit; Ditch; Quarry Pit?; Post Hole	Unknown	Burnt Flint (Prehistoric); Slag (Early Iron Age To Post Medieval); Cbm (Post Medieval); Pottery (Post Medieval)
71645	MLO71645	Northern Perimeter Road [Heathrow Airport], Hillingdon, Tw6 {Undated Features}	Pit; Ditch; Quarry Pit?; Post Hole	Unknown	Burnt Flint (Prehistoric); Slag (Early Iron Age To Post Medieval); Cbm (Post Medieval); Pottery (Post Medieval)
71645	MLO71645	Northern Perimeter Road [Heathrow Airport], Hillingdon, Tw6 {Undated Features}	Pit; Ditch; Quarry Pit?; Post Hole	Unknown	Burnt Flint (Prehistoric); Slag (Early Iron Age To Post Medieval); Cbm (Post Medieval); Pottery (Post Medieval)
71645	MLO71645	Northern Perimeter Road [Heathrow Airport], Hillingdon, Tw6 {Undated Features}	Pit; Ditch; Quarry Pit?; Post Hole	Unknown	Burnt Flint (Prehistoric); Slag (Early Iron Age To Post Medieval); Cbm (Post Medieval); Pottery (Post Medieval)
71645	MLO71645	Northern Perimeter Road [Heathrow Airport], Hillingdon, Tw6 {Undated Features}	Pit; Ditch; Quarry Pit?; Post Hole	Unknown	Burnt Flint (Prehistoric); Slag (Early Iron Age To Post Medieval); Cbm (Post Medieval); Pottery (Post Medieval)
71677	MLO71677	Bath Road [Airport Gate - Norman Hay Site], Harmondsworth, Hillingdon {Prehistoric Ditch}	Ditch	Late Prehistoric	Burnt Flint (Late Prehistoric); Pottery (Roman)

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Findings
71678	MLO71678	Bath Road [Airport Gate - Norman Hay Site], Harmondsworth, Hillingdon {Roman Or Saxon Ditch}	Ditch	Roman to Early Medieval/Dark Age	Cbm (Roman To Early Medieval/Dark Age)
71679	MLO71679	Bath Road [Airpost Gate - Norman Hay Site], Harmondsworth, Hillingdon {Saxon Pits}	Pit	Early Medieval/Dark Age	Loomweight (Roman)
71680	MLO71680	Bath Road [Airport Gate - Norman Hay Site], Harmondsworth, Hillingdon {Medieval Gully And Postholes}	Gully; Post Hole	Medieval	Pottery (Medieval)
71815	MLO71815	Bedfont Road [Cargo Point Development], Spelthorne Borough, Hillingdon, Surrey {Middle Bronze Age Field System}	Field System; Ditch; Enclosure; Post Hole	Middle Bronze Age	Leaf Arrowhead (Neolithic); Animal Remains (Middle Bronze Age); Pottery (Middle Bronze Age)
71821	MLO71821	Bedfont Road, [Cargo Point Development], Spelthorne Borough, Hillingdon, Surrey {Medieval Activity}	Field System; Enclosure; Pit; Drove Road; Boundary Ditch; Gully; Well; Post Built Structure; Post Hole	Medieval	Blade (Neolithic); Bead (Medieval); Animal Remains (Medieval); Pottery (Medieval); Roof Tile (Medieval); Quern (Medieval); Pottery (Post Medieval); Brick (Post Medieval)
71825	MLO71825	Wise Lane, [Townmead School], West Drayton, Hillingdon {Prehistoric Deposits}	Pit?; Flood Deposit; Hollow; Trackway; Drove Road; Gully; Ditch; Hearth	Late Bronze Age to Early Iron Age	Burnt Flint (Prehistoric); Flake (Late Bronze Age To Early Iron Age); Side Scraper (Late Bronze Age To Early Iron Age)
71825	MLO71825	Wise Lane, [Townmead School], West Drayton, Hillingdon {Prehistoric Deposits}	Pit?; Flood Deposit; Hollow; Trackway; Drove Road; Gully; Ditch; Hearth	Late Bronze Age to Early Iron Age	Burnt Flint (Prehistoric); Flake (Late Bronze Age To Early Iron Age); Side Scraper (Late Bronze Age To Early Iron Age)
71826	MLO71826	Wise Lane [Townmead School], West Drayton,	Ditch; Flood Deposit; Pit	Unknown	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Findings
		Hillingdon {Undated Features}			
71826	MLO71826	Wise Lane [Townmead School], West Drayton, Hillingdon {Undated Features}	Ditch; Flood Deposit; Pit	Unknown	
71826	MLO71826	Wise Lane [Townmead School], West Drayton, Hillingdon {Undated Features}	Ditch; Flood Deposit; Pit	Unknown	
71827	MLO71827	Wise Lane [Townmead School], West Drayton, Hillingdon {Roman Ditch}	Ditch	Roman	Nail (Roman); Pottery (Roman)
71829	MLO71829	Wise Lane [Townmead School], West Drayton, Hillingdon {Post Medieval Pit And Ditch}	Pit?; Ditch; Post Hole	Post Medieval	Pottery (Post Medieval); Roof Tile (Post Medieval); Nail (Post Medieval); Brick (Post Medieval); Bottle (Post Medieval)
71829	MLO71829	Wise Lane [Townmead School], West Drayton, Hillingdon {Post Medieval Pit And Ditch}	Pit?; Ditch; Post Hole	Post Medieval	Pottery (Post Medieval); Roof Tile (Post Medieval); Nail (Post Medieval); Brick (Post Medieval); Bottle (Post Medieval)
71871	MLO71871	Shepiston Lane, [Comfort Inn], Hayes, Hillingdon, Ub3 {19Th-20Th Century Building}	Buried Soil; Wall; Floor; Building; Foundation Trench	Post Medieval to Modern	Pottery (Medieval); Tile (Post Medieval); Brick (Post Medieval)
71994	MLO71994	Sipson Lane [Imperial College Sports Ground], Hillingdon, Ub3 {Paleolithic Flint}	Findspot	Palaeolithic	Flake (Palaeolithic)

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Findings
71995	MLO71995	Sipson Lane [Imperial College Sports Ground], Harlington {Neolithic Activity}	Ditch; Enclosure; Pit	Neolithic	Handaxe (Neolithic); Knife (Neolithic); Arrowhead (Neolithic); Pottery (Neolithic); Flake (Early Neolithic To Late Bronze Age); Burnt Flint (Neolithic); Blade (Neolithic); Core (Neolithic); End Scraper (Neolithic)
71995	MLO71995	Sipson Lane [Imperial College Sports Ground], Harlington {Neolithic Activity}	Ditch; Enclosure; Pit	Neolithic	Handaxe (Neolithic); Knife (Neolithic); Arrowhead (Neolithic); Pottery (Neolithic); Flake (Early Neolithic To Late Bronze Age); Burnt Flint (Neolithic); Blade (Neolithic); Core (Neolithic); End Scraper (Neolithic)
71995	MLO71995	Sipson Lane [Imperial College Sports Ground], Harlington {Neolithic Activity}	Ditch; Enclosure; Pit	Neolithic	Handaxe (Neolithic); Knife (Neolithic); Arrowhead (Neolithic); Pottery (Neolithic); Flake (Early Neolithic To Late Bronze Age); Burnt Flint (Neolithic); Blade (Neolithic); Core (Neolithic); End Scraper (Neolithic)
71995	MLO71995	Sipson Lane [Imperial College Sports Ground], Harlington {Neolithic Activity}	Ditch; Enclosure; Pit	Neolithic	Handaxe (Neolithic); Knife (Neolithic); Arrowhead (Neolithic); Pottery (Neolithic); Flake (Early Neolithic To Late Bronze Age); Burnt Flint (Neolithic); Blade (Neolithic); Core (Neolithic); End Scraper (Neolithic)

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Findings
71995	MLO71995	Sipson Lane [Imperial College Sports Ground], Harlington {Neolithic Activity}	Ditch; Enclosure; Pit	Neolithic	Handaxe (Neolithic); Knife (Neolithic); Arrowhead (Neolithic); Pottery (Neolithic); Flake (Early Neolithic To Late Bronze Age); Burnt Flint (Neolithic); Blade (Neolithic); Core (Neolithic); End Scraper (Neolithic)
71996	MLO71996	Sipson Lane [Imperial College Sports Ground], Hillingdon, Ub3 {Iron Age Activity}	Ditch; Round House; Square Enclosure; Enclosure; Gully	Iron Age	Pottery (Iron Age); Slag (Iron Age)
71996	MLO71996	Sipson Lane [Imperial College Sports Ground], Hillingdon, Ub3 {Iron Age Activity}	Ditch; Round House; Square Enclosure; Enclosure; Gully	Iron Age	Pottery (Iron Age); Slag (Iron Age)
71997	MLO71997	Sipson Lane [Imperial College Sports Ground] Hillingdon, Ub3 {Bronze Age Occupation}	Enclosure; Occupation Site; Cemetery; Cremation; Ditch; Post Hole; Pit; Well?; Drove Road; Post Built Structure	Bronze Age	Flake (Early Neolithic To Late Bronze Age); Scraper (Tool) (Bronze Age); Lithic Implement (Bronze Age); Fabricator (Bronze Age); Pottery (Bronze Age); Loomweight (Bronze Age); Burial Urn (Bronze Age); Human Remains (Early Bronze Age); Plank (Middle Bronze)
71998	MLO71998	Sipson Lane [Imperial College Sports Ground] Hillingdon, Ub3 {Romano-British Settlement}	Round House; Enclosure; Inhumation; Cremation; Trackway; Quarry; Building Platform; Pit; Post Hole; Well; Midden; Gully	Early Iron Age to Roman	Pottery (Iron Age); Tile (Roman); Human Remains (Roman); Flagon (Roman); Unidentified Object (Roman); Coin (Roman); Armlet (Roman); Nail (Roman); Blade? (Roman); Horseshoe? (Roman)
71999	MLO71999	Sipson Lane [Imperial College Sports Ground] Hillingdon, Ub3 {Saxon Pit}	Pit	Early Medieval/Dark Age	Pottery (Early Medieval/Dark Age); Slag (Early Medieval/Dark Age)

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Findings
72000	MLO72000	Sipson Lane [Imperial College Sports Ground] Hillingdon, Ub3 {Post Medieval And Modern Features}	Fence; Field Boundary; Drain	Post Medieval to Modern	Clay Pipe (Smoking) (Post Medieval); Unidentified Object (Post Medieval To Modern)
72001	MLO72001	Sipson Lane [Imperial College Sports Ground] Hillingdon, Ub3 {Medieval Features}	Ditch; Field System; Well?; Enclosure; Ridge And Furrow	Medieval	Plank (Medieval); Pottery (Medieval); Slag (Medieval); Peg (Medieval)
72105	054359/00/00	Hayes By-Pass	Flood Deposit	Unknown	
72106	054360/00/00	Hayes By-Pass	Land Surface	Unknown	
72235	MLO72235	Bath Road (No 140) [Radisson Edwardian Hotel], Hayes, Harlington {Undated Ditch}	Ditch	Unknown	
72372	054379/00/00	Heathrow Airport	Shelter	Post Medieval	
72509	054391/00/00	Boeing Way (Bulls Bridge Area)	Landfill Site	Post Medieval	
72551	054403/00/00	Accomodation La West	Landfill Site	Post Medieval	
72552	054404/00/00	Accomodation La East	Landfill Site	Post Medieval	
72553	MLO72553	Colnbrook Bypass/Accommodation Lane, Longford, Hillingdon {Modern Landfill}	Landfill Site	Modern	
72554	MLO72554	Accomodation Lane East/Stanwell Moor Road, Longford, Hillingdon {Modern Landfill Site}	Landfill Site	Modern	
72555	054407/00/00	Old Bath Rd South Of	Landfill Site	Post Medieval	
72556	054408/00/00	Old Bath Rd South Of	Landfill Site	Post Medieval	
72561	054413/00/00	Moor Lasouth Of	Landfill Site	Post Medieval	
72562	MLO72562	Colnbrook Bypass [Willow Piggeries], Longford, Hillingdon {Modern Landfill}	Landfill Site	World War Two to Modern	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
72563	054415/00/00	Accomodation La (Home Farm)	Landfill Site	Post Medieval	
72564	054416/00/00	Moor La (Wise Lane Farm)	Landfill Site	Post Medieval	
72566	MLO72566	M4 [Crane Meadows], West Drayton, Hillingdon {20Th Century Landfill}	Landfill Site	Modern	
72567	054419/00/00	Cranford Lasouth Of	Landfill Site	Post Medieval	
72568	054420/00/00	Cranford La	Landfill Site	Post Medieval	
72570	054422/00/00	Shepiston La (Frogsditch Farm)	Landfill Site	Post Medieval	
72574	054426/00/00	Cranford Lanorth Of	Landfill Site	Post Medieval	
72576	054428/00/00	Stockleywest Of (Holiday Inn Golf Club)	Landfill Site	Post Medieval	
72577	054429/00/00	Stockley Rd West Of	Landfill Site	Post Medieval	
72578	054430/00/00	Holloway Lasouth	Landfill Site	Post Medieval	
72579	054431/00/00	Holloway Lanorth	Landfill Site	Post Medieval	
72580	054432/00/00	Laurel Lanorth Of	Landfill Site	Post Medieval	
72581	054433/00/00	Lavender Rise	Landfill Site	Post Medieval	
72582	054434/00/00	Thorney Mill Rd	Landfill Site	Post Medieval	
72584	054436/00/00	Cowley La	Landfill Site	Post Medieval	
72585	054437/00/00	Packet Boat La South Of	Landfill Site	Post Medieval	
72586	054438/00/00	Packet Boat La (British Waterways Site)	Landfill Site	Post Medieval	
72589	MLO72589	St Peters Wway/High Street, Harlington, Hillingdon {19Th-20Th Century Landfill}	Landfill Site	Modern	
72590	MLO72590	Sipson Lane [Imperial College Sports Ground], Harlington, Hillingdon {20Th Century Landfill}	Landfill Site	Modern	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Findings
72591	MLO72591	Sipson Lane/Victoria Lane/M4 [Wall Garden Farm/Nine Elms Farm/Rmc Land], Hillingdon {Post Medieval Activity}	Ditch; Pit; Post Hole	Post Medieval to Modern	Pottery (Post Medieval); Brick (Post Medieval); Wine Bottle (Post Medieval); Window Glass (Post Medieval); Slag (Post Medieval)
72595	054447/00/00	Stockley Rd East	Landfill Site	Post Medieval	
72597	054449/00/00	Horton Rd	Landfill Site	Post Medieval	
72599	054451/00/00	Thorney Mill Rd	Landfill Site	Post Medieval	
72601	054452/00/00	Trout La	Landfill Site	Post Medieval	
72602	054453/00/00	Trout La (The Lizzard S)	Landfill Site	Post Medieval	
72604	MLO72604	Uxbridge Road/Springfield Road/Avondale Drive [Minet Country Park], Hayes, Hillingdon {20Th Century Landfill Site}	Landfill Site	Modern	
72605	054456/00/00	Heathrow Airport (Runway)	Landfill Site	Post Medieval	
72606	054457/00/00	Cranford Lane, [West Of] {19Th/20Th Century Landfill}	Landfill Site	Post Medieval to World War Two	
72607	MLO72607	Perry Oaks Drive [Perry Oaks Sludge Works], Heathrow, Hillingdon {Modern Landfill}	Landfill Site	Modern	
72613	054464/00/00	Shepiston La Frogsditch Farm	Landfill Site	Post Medieval	
72614	054465/00/00	Bath Rd (Land At Rear Of Airport Bowl)	Landfill Site	Post Medieval	
72615	054466/00/00	Iver La	Landfill Site	Post Medieval	
72620	054471/00/00	Stockley Rd	Landfill Site	Post Medieval	
72621	054472/00/00	Scylla Rd	Landfill Site	Post Medieval	
72622	054473/00/00	Hatton Cross	Landfill Site	Post Medieval	
72623	054474/00/00	Cranford Lane, [East Of] {19Th/20Th Century Landfill Site}	Landfill Site	Modern	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
72624	054475/00/00	Horton Rd	Landfill Site	Post Medieval	
72625	054476/00/00	Stanwell Moor Rd	Landfill Site	Post Medieval	
72626	054477/00/00	Stanwell Moor Rd (Spout Arch)	Landfill Site	Post Medieval	
72627	054478/00/00	Eggsley Farm	Landfill Site	Post Medieval	
72629	054480/00/00	Clockhouse Lane, (West Of), East Bedfont {20Th Century Landfill Site}	Landfill Site	Modern	
72630	054481/00/00	Clockhouse Lane (East Of), [Bedfont Pit], East Bedfont {20Th Century Landfill Site}	Landfill Site	Modern	
72631	054482/00/00	Bedfont Rd Bedfont Urban Farm	Landfill Site	Post Medieval	
72632	054483/00/00	Bedfont Lane, [Bedfont Lakes North East] {20Th Century Landfill}	Landfill Site	Modern	
72633	054484/00/00	Clockhouse Lane, [Bedfont Lakes North West], East Bedfont {20Th Century Landfill Site}	Landfill Site	Modern	
72643	054494/00/00	Bedfont Rd West Of Vineyard Nurseries	Landfill Site	Post Medieval	
72645	054496/00/00	Kilross Rd	Landfill Site	Post Medieval	
72646	054497/00/00	Blenheim Park	Landfill Site	Post Medieval	
72647	054498/00/00	Shakespear Ave Feltham Arena	Landfill Site	Post Medieval	
72648	054499/00/00	Central Way	Landfill Site	Post Medieval	
72649	054500/00/00	Fairway Clo St Albans Farm West	Landfill Site	Post Medieval	
72650	054501/00/00	Green La St Albans Farm East	Landfill Site	Post Medieval	
72651	054502/00/00	Hounslow Heath Golf Course	Landfill Site	Post Medieval	
72652	054503/00/00	Hounslow Heath Southern Part Of Golf Course	Landfill Site	Post Medieval	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
72653	054504/00/00	Hounslow Heath Adjacent To Golf Course	Landfill Site	Post Medieval	
72654	054505/00/00	Hounslow Heath	Landfill Site	Post Medieval	
72655	054506/00/00	Hounslow Heath	Landfill Site	Post Medieval	
72656	054507/00/00	The Causeway	Landfill Site	Post Medieval	
72657	054508/00/00	Great South West Road, [North Of], Cranford {19Th/20Th Century Landfill Site}	Landfill Site	Modern	
72658	054509/00/00	Chinchilla Drive (Beavers Farm Estate)	Landfill Site	Post Medieval	
72660	054511/00/00	Southall Lane, [Airlinks], Heston {Modern Landfill Site}	Landfill Site	Modern	
72671	054521/00/00	Hounslow Heath	Landfill Site	Post Medieval	
72673	054523/00/00	Bedfont Rd	Landfill Site	Post Medieval	
72677	054526/00/00	Hatton Cross Hatton Farm 1	Landfill Site	Post Medieval	
72679	054527/00/00	Hatton Cross Hartton Farm 2	Landfill Site	Post Medieval	
72680	054528/00/00	Hayes Rd	Landfill Site	Post Medieval	
72684	054529/00/00	Stanwell Rd	Landfill Site	Post Medieval	
72685	054530/00/00	Faggs Rd	Landfill Site	Post Medieval	
72703	054548/00/00	Midsummer Ave	Landfill Site	Post Medieval	
72707	054552/00/00	Bedfont Lane, Feltham {20Th Century Landfill}	Landfill Site	Modern	
72708	054553/00/00	Peacock Ave Fairholm School	Landfill Site	Post Medieval	
72709	054554/00/00	Dudley Rd Ex Urban Farm	Landfill Site	Post Medieval	
72710	054555/00/00	Hounslow Heath Western Part Of Golf Course	Landfill Site	Post Medieval	
72711	054556/00/00	Cranford La	Landfill Site	Post Medieval	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
72712	054557/00/00	Convent Way, Heston {Modern Landfill Site}	Landfill Site	Modern	
72713	054558/00/00	Bedfont Clo	Landfill Site	Post Medieval	
72720	054565/00/00	Green La	Landfill Site	Post Medieval	
72721	054566/00/00	Church Rd Lower Park Farm	Landfill Site	Post Medieval	
73022	MLO73022	Hayes Road, Southall, Ealing {19Th Century? Canal Bridge}	Bridge	Post Medieval to Modern	
73036	MLO73036	Stockley Road [Stockley Bridge], Stockley, Hillingdon {19Th Centruy Bridge}	Bridge	Post Medieval to Modern	
73037	MLO73037	Iron Bridge Road, Yiewsley, Hillingdon {Site Of A Canal Bridge}	Bridge	Post Medieval to World War Two	
73038	MLO73038	Rigby Lane, Hayes, Hillingdon {19Th Century Bridge}	Bridge	Post Medieval to Modern	
73039	MLO73039	Trout Road, Yiewsley, Hillingdon {19Th Century Bridge}	Bridge	Post Medieval to Modern	
73040	MLO73040	Packet Boat Lane, Yiewsley, Hillingdon {19Th Century Aqueduct}	Aqueduct	Post Medieval to Modern	
73041	MLO73041	Packet Boat Lane, Yiewsley, Hillingdon {19Th Century Canal Aqueduct}	Aqueduct	Post Medieval to Modern	
73042	MLO73042	Horton Bridge Road [Horton Bridge], Yiewsley, Hillingdon {19Th Century Bridge}	Bridge	Post Medieval to Modern	
73043	MLO73043	High Street [Colham Bridge], Yiewsley, Hillingdon {19Th Century Bridge}	Bridge; Canal Bridge?	Post Medieval to Modern	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Findings
73044	MLO73044	Packet Boat Lane, Cowley Peachey, Hillingdon {19Th Century Bridge}	Bridge	Post Medieval to Modern	
73045	MLO73045	Benbow Way, Cowley, Hillingdon {19Th Century Bridge}	Bridge	Post Medieval to Modern	
73050	MLO73050	Iver Lane, Cowley, Hillingdon {Canal Lock}	Canal Lock	Post Medieval to Modern	
73134	054628/00/00	North Hyde Lane, Heston {Medieval Settlement}	Settlement; Village	Medieval	
73150	054644/00/00	High St	Settlement; Hamlet; Hamlet; Settlement	Medieval to Post Medieval	
73301	MLO73301	Western Perimeter Road [Heathrow Airport Terminal 5], Hillingdon {Saxon Activity}	Post Built Structure; Aisled Hall House?; Pit; Waterhole; Grubenhau?	Roman to Early Medieval/Dark Age	Pottery (Early Medieval/Dark Age); Brooch (Early Medieval/Dark Age); Animal Remains (Early Medieval/Dark Age); Spindle Whorl (Early Medieval/Dark Age); Bead (Early Medieval/Dark Age); Finger Ring (Early Medieval/Dark Age); Bell (Early Medieval/Dark Age)
73316	054665/00/00	Hatton	Settlement	Medieval	
73398	MLO73398	High Street (No 364), Harlington, Hillingdon {Post Medieval Fence Line}	Ditch; Post Hole	Medieval to Post Medieval	Pottery (Roman); Pottery (Medieval To Post Medieval); Nail (Post Medieval)

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Findings
73505	MLO73505	Harmondsworth Lane [Home Farm], Harmondsworth, Hillingdon {Bronze Age Settlement And Field System}	Pit; Well; Settlement; Cremation; Field System; Fence; Ditch; Post Hole; Stake Hole; Drove Road; Cooking Pit; Rubbish Pit	Bronze Age	Flake (Prehistoric); Burin Spall (Prehistoric); Core (Prehistoric); Blade (Prehistoric); Burnt Flint (Prehistoric); Bowl (Neolithic); Human Remains (Middle Bronze Age To Late Bronze Age); Burial Urn (Middle Bronze Age); Pottery (Late Bronze Age)
73506	MLO73506	Harmondsworth Lane [Home Farm], Hillingdon {Post Medieval Field System}	Field System; Ditch; Pit; Animal Burial	Post Medieval	
73517	MLO73517	Dawley Road [Dawley Park - Former Thorn-Emi Site], Hayes {Prehistoric Flint}	Findspot	Prehistoric	Struck Flint (Prehistoric)
73517	MLO73517	Dawley Road [Dawley Park - Former Thorn-Emi Site], Hayes {Prehistoric Flint}	Findspot	Prehistoric	Struck Flint (Prehistoric)
73590	054704/00/00	2 Spinney Drive	Gully; Gully	Prehistoric	
73591	054705/00/00	2 Spinney Drive	Findspot	Medieval	Pot (Medieval)
73665	054706/00/00	Mayfield Farm	Findspot	Bronze Age	Find Unclassified (Late Neolithic To Late Bronze Age)
73666	054707/00/00	Mayfield Farm	Occupation Site; Occupation Site; Occupation Site	Early Iron Age to Roman	
73667	054707/01/00	Mayfield Farm	Pit; Pit; Pit	Early Iron Age to Roman	
73668	054707/02/00	Mayfield Farm	Ditch; Ditch; Ditch	Early Iron Age to Roman	
73669	054707/03/00	Mayfield Farm	Kiln; Oven; Oven; Kiln; Kiln; Oven	Early Iron Age to Roman	
73670	054708/00/00	Mayfield Farm	Drain	Post Medieval	
73785	054716/00/000	Bedfont Rd	Pit	Bronze Age	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Findings
73786	054717/00/000	Bedfont Rd	Pit; Pit	Bronze Age	
73787	054718/00/000	Bedfont Rd	Ditch; Ditch	Bronze Age	
73805	MLO73805	Sipson Lane [Imperial Collage Sports Ground], Hillingdon, Ub3 {Undated Cut Features}	Ditch; Ditch; Post Hole	Roman	Burnt Flint (Prehistoric); Pottery (Prehistoric); Worked Flint (Early Neolithic To Late Bronze Age)
73805	MLO73805	Sipson Lane [Imperial Collage Sports Ground], Hillingdon, Ub3 {Undated Cut Features}	Ditch; Ditch; Post Hole	Roman	Burnt Flint (Prehistoric); Pottery (Prehistoric); Worked Flint (Early Neolithic To Late Bronze Age)
73805	MLO73805	Sipson Lane [Imperial Collage Sports Ground], Hillingdon, Ub3 {Undated Cut Features}	Ditch; Ditch; Post Hole	Roman	Burnt Flint (Prehistoric); Pottery (Prehistoric); Worked Flint (Early Neolithic To Late Bronze Age)
73805	MLO73805	Sipson Lane [Imperial Collage Sports Ground], Hillingdon, Ub3 {Undated Cut Features}	Ditch; Ditch; Post Hole	Roman	Burnt Flint (Prehistoric); Pottery (Prehistoric); Worked Flint (Early Neolithic To Late Bronze Age)
73806	MLO73806	Sipson Lane [Imperial Collage Sports Ground], Hillingdon {Saxon Building}	Grubenhau; Post Hole	Early Medieval/Dark Age	Pottery (Roman); Pottery (Early Medieval/Dark Age); Loomweight (Early Medieval/Dark Age)
73807	MLO73807	Sipson Lane [Imperial Collage Sport Ground], Hillingdon {Iron Age And Romano-British Pottery}	Artefact Scatter	Early Iron Age to Roman	Pottery (Early Iron Age To Roman)
73990	054051/00/000	106 High St	Town Hall	Post Medieval	
74004	054733/00/000	132-138 High Street Cranford	Building; Buried Land Surface	Post Medieval	
74046	MLO74046	Sheffield Road [Heathrow Airport - Hilton Hotel And Matrix Site], Hillingdon {World War II Buried Surface}	Land Surface	World War Two	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Findings
74196	054752/00/000	Bedfont Rd Psatrianglesiteeastbedfont	Pit; Vessel; Findspot	Bronze Age	Boat Unclassified (Late Neolithic To Late Bronze Age)
74197	054753/00/000	Bedfont Rd Psatrianglesiteeastbedfont	Ditch; Pit	Middle Palaeolithic to Roman	
74237	MLO74237	Western Perimeter Road, [Stanwell Cursus], Hillingdon, Tw6 {Neolithic Cursus Monument}	Cursus; Timber Avenue; Post Hole; Bank (Earthwork); Ditch	Early Neolithic to Early Bronze Age	Burnt Flint (Early Neolithic To Late Bronze Age); Pottery (Neolithic); Flake (Neolithic); Blade (Neolithic); Burin (Neolithic); Core (Neolithic); End Scraper (Neolithic); Thumb Nail Scraper (Neolithic); Scraper (Tool) (Neolithic); Knife (Neolithic); Anim
74238	MLO74238	Western Perimeter Road/Wessex Road/Perry Oaks Drive [Heathrow Airport - Perry Oaks Sludge Works], Hillingdon, Tw6 {Bronze Age Settlement}	Ditch; Boundary Ditch; Bank (Earthwork); Gully; Enclosure; Field System; Round Barrow?; Trackway; Enclosed Settlement; Waterhole; Post Built Structure; Fence; Post Hole; Palisaded Settlement; Gully; Boundary Ditch; Round House (Domestic); Well; Rubbish P	Bronze Age	Arrowhead (Early Bronze Age); Bowl (Bronze Age); Drinking Vessel (Bronze Age); Jar (Bronze Age); Thumb Nail Scraper (Bronze Age); Bead (Early Bronze Age); Quern (Bronze Age); Hammerstone (Bronze Age); Polisher (Bronze Age); Sharpener (Bronze Age); Potter
74239	MLO74239	Western Perimeter Road [Heathrow Airport - Perry Oaks Sludge Works], Hillingdon, Tw6 {Late Iron Age To Roman Farmstead}	Waterhole; Field System; Boundary Ditch; Pit; Round House (Domestic); Rectilinear Enclosure; Ditch; Farmstead; Cremation; Well; Drove Road; Building; Foundation Trench?; Gully; Revetment;	Late Iron Age to Roman	Brooch (Late Iron Age To Roman); Spindle Whorl (Late Iron Age To Roman); Pottery (Late Iron Age To Roman); Animal Remains (Late Iron Age To Roman); Sling Shot (Roman); Key (Locking) (Roman); Coin (Roman); Bead (Roman); Human Remains (Roman); Daub (Roman)

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Findings
			Enclosure; Post Hole		
74239	MLO74239	Western Perimeter Road [Heathrow Airport - Perry Oaks Sludge Works], Hillingdon, Tw6 {Late Iron Age To Roman Farmstead}	Waterhole; Field System; Boundary Ditch; Pit; Round House (Domestic); Rectilinear Enclosure; Ditch; Farmstead; Cremation; Well; Drove Road; Building; Foundation Trench?; Gully; Revetment; Enclosure; Post Hole	Late Iron Age to Roman	Brooch (Late Iron Age To Roman); Spindle Whorl (Late Iron Age To Roman); Pottery (Late Iron Age To Roman); Animal Remains (Late Iron Age To Roman); Sling Shot (Roman); Key (Locking) (Roman); Coin (Roman); Bead (Roman); Human Remains (Roman); Daub (Roman)
74243	MLO74243	Western Perimeter Road [Heathrow Airport - [Perry Oaks Sludge Works], Hillingdon {Post Medieval Activity}	Water Channel; Cultivation Soil; Ditch; Trackway; Field Boundary; Parish Boundary; Quarry?	Medieval to Post Medieval	Pottery (Post Medieval); Bridle Bit (Post Medieval); Clay Pipe (Smoking) (Post Medieval); Hoe (Post Medieval); Knife (Post Medieval); Horseshoe (Post Medieval); Musket Ball (Post Medieval); Shears (Post Medieval); Sickle (Post Medieval); Unidentified Obj
74427	MLO74427	The Crescent (Nos 78-80), Harlington, Hillingdon, Ub3 {Late Bronze To Iron Age Pit}	Pit; Ditch; Gully	Early Bronze Age to Early Iron Age	Flake (Late Prehistoric); Pottery (Neolithic); Burnt Flint (Late Prehistoric); Pottery (Middle Bronze Age); Pottery (Late Bronze Age To Early Iron Age)

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Findings
74428	MLO74428	The Crescent (Nos 78-80), Harlington, Hillingdon, Ub3 {Medieval Activity}	Ditch; Gully; Post Hole	Medieval	Pottery (Medieval)
74429	MLO74429	The Crescent (Nos 78-80), Harlington, Hillingdon, Ub3 {Post Medieval To Modern Features}	Gully; Pit; Post Hole	Post Medieval to Modern	
74445	054787/00/000	Baber Bridge (Southof)	Watermill	Post Medieval	
74492	054811/00/000	Grand Union Canal	Wharf	Post Medieval	
74998	MLO74998	High Street [Former Radley'S Garage], Harmondsworth, Hillingdon, Ub7 {Medieval Activity}	Quarry Pit; Post Hole; Rubbish Pit; Ditch; Fence?	Medieval	Struck Flint (Early Neolithic To Late Bronze Age); Pottery (Early Medieval/Dark Age To Medieval); Animal Remains (Medieval); Cbm (Medieval); Knife (Medieval); Unidentified Object (Medieval)
74999	MLO74999	High Street [Former Radley'S Garage], Harmondsworth, Hillingdon, Ub7 {Post Medieval Activity}	Post Hole; Rubbish Pit; Ditch; Well; Bedding Trench	Post Medieval	Burnt Flint (Early Neolithic To Late Bronze Age); Pottery (Early Medieval/Dark Age To Medieval); Roof Tile (Medieval To Post Medieval); Animal Remains (Post Medieval); Pottery (Post Medieval); Unidentified Object (Post Medieval); Lock (Post Medieval); Ri

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Findings
75165	MLO75165	Colnbrook Bypass, [Immigration Detention Centre], Harmondsworth, Hillingdon {Late Bronze Age Settlement}	Hedge; Ditch; Occupation Site; Pit	Middle Bronze Age to Late Bronze Age	Blade (Early Mesolithic To Late Neolithic); Burnt Flint (Late Bronze Age); Whetstone? (Late Bronze Age); Animal Remains (Late Bronze Age); Pottery (Late Bronze Age); Flake (Late Bronze Age); Core (Late Bronze Age); Scraper (Tool) (Late Bronze Age); Potte
75165	MLO75165	Colnbrook Bypass, [Immigration Detention Centre], Harmondsworth, Hillingdon {Late Bronze Age Settlement}	Hedge; Ditch; Occupation Site; Pit	Middle Bronze Age to Late Bronze Age	Blade (Early Mesolithic To Late Neolithic); Burnt Flint (Late Bronze Age); Whetstone? (Late Bronze Age); Animal Remains (Late Bronze Age); Pottery (Late Bronze Age); Flake (Late Bronze Age); Core (Late Bronze Age); Scraper (Tool) (Late Bronze Age); Potte
75165	MLO75165	Colnbrook Bypass, [Immigration Detention Centre], Harmondsworth, Hillingdon {Late Bronze Age Settlement}	Hedge; Ditch; Occupation Site; Pit	Middle Bronze Age to Late Bronze Age	Blade (Early Mesolithic To Late Neolithic); Burnt Flint (Late Bronze Age); Whetstone? (Late Bronze Age); Animal Remains (Late Bronze Age); Pottery (Late Bronze Age); Flake (Late Bronze Age); Core (Late Bronze Age); Scraper (Tool) (Late Bronze Age); Potte
75379	MLO75379	Sipson Road, Harlington, Hillingdon {Late Iron Age To Roman Settlement}	Settlement	Late Iron Age to Roman	
75487	MLO75487	Bedfont Road [Cargo Point Development], Spelthorne Borough, Hillingdon, Surrey {Undated Features}	Ditch; Pit; Post Hole	Unknown	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Findings
75747	MLO75747	Sipson Road, Harlington, Hillingdon {Neolithic Activity}	Occupation Site	Neolithic	
75863	MLO75863	New Road (No 99) Harlington London Borough Of Hillingdon Ub3 {Prehistoric Pits}	Linear Feature; Post Hole; Pit	Prehistoric	Blade (Prehistoric); Burnt Flint (Prehistoric); Arrowhead (Neolithic); Pottery (Late Bronze Age To Early Iron Age)
75885	MLO75885	St Peters Way [Harlington Hospice], Harlington, Hillingdon, Ub3 {Post Medieval Pit And Ditch}	Pit; Ditch	Post Medieval	Pottery (Early Medieval/Dark Age); Pottery (Medieval); Cbm (Post Medieval); Pottery (Post Medieval); Glass (Post Medieval); Unidentified Object (Post Medieval)
75991	MLO75991	Sipson Road [International Business Training Centre], Sipson, Hillingdon {Bronze Age To Iron Age Ditch}	Ditch	Late Bronze Age to Early Iron Age	Pottery (Late Bronze Age To Early Iron Age); Pottery (Medieval)
76056	MLO76056	Tarmac Way, [Sewage Treatment Works], Hillingdon {Neolithic Ditch}	Ditch	Neolithic	Flake (Prehistoric); Blade (Neolithic)
76063	MLO76063	Western Perimeter Road [Perry Oaks Sludge Disposal Works], Hillingdon {1930'S Sludge Works}	Sewage Works; Pumping Station	Modern	
76065	MLO76065	High Street (Nos 477-499), Harlington, Hillingdon {Undated Cut Features}	Pit; Stake Hole; Ditch	Unknown	Burnt Flint (Prehistoric); Pottery (Late Bronze Age To Early Iron Age)
76070	MLO76070	Station Road (No 191) [St Martins Vicarage], West Drayton, Hillingdon {Roman Pottery}	Findspot	Roman	Sherd (Roman)
76179	MLO76179	Page Road, East Bedfont	Subsoil; Soil Horizon	Medieval to Post Medieval	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Findings
76372	MLO76372	Stanwell Moor Road [Bedfont Court Estate], Hillingdon {1930'S Council Housing Estate}	House; Bay; Storey; Gable; Weatherboard; Eave; Chimney Stack; Staircase; Fireplace; Living Room; Kitchen; Toilet; Bathroom; Bedroom; Landing; Truss; Vent; Window; Gutter; Housing Estate; Piggery; Furnace; Shed	Modern	
76465	MLO76465	Sipson Road, Harlington, Hillingdon {Medieval Activity}	Occupation Site	Medieval	
76516	MLO76516	Cranford Lane, Harlington, Hillingdon, Ub3 {Iron Age Structure And Pits}	Structure; Pit; Post Hole; Beam Slot	Iron Age	Pottery (Iron Age)
76524	MLO76524	Bedfont Road [Cargo Point Development], Spelthorne Borough, Hillingdon, Surrey {Post Medieval Roadside Ditches}	Road; Ditch	Post Medieval	Roof Tile (Post Medieval)
76531	MLO76531	Moor Lane [Moyson'S Yard], Harmondsworth, Hillingdon, Ub7 {Post Medieval Pits And Pond}	Pit; Pond	Post Medieval	
76926	MLO76926	Tarmac Way, [Sewage Treatment Works], Hillingdon {12Th-13Th Century Ditches And A Pit}	Ditch; Pit	Medieval	Flake (Prehistoric); Pottery (Medieval)
76927	MLO76927	Tarmac Way [Sewage Treatment Works], Hillingdon {Undated Gullies}	Gully	Unknown	Tile (Unknown)
76930	MLO76930	The Crescent (Nos 78-80), Harlington, Hillingdon {Romano-British Ditches}	Ditch	Roman	Pottery (Roman)

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Findings
76931	MLO76931	The Crescent (Nos 78-80), Harlington, Hillingdon, Ub3 {Undated Features}	Ditch; Post Hole; Pit	Unknown	
76932	MLO76932	The Crescent (Nos 78-80), Harlington, Hillingdon, Ub3 {Neolithic To Early Bronze Age Flints}	Flint Scatter	Early Neolithic to Early Bronze Age	Blade (Early Neolithic To Early Bronze Age); Core (Early Neolithic To Early Bronze Age); Point (Early Neolithic To Early Bronze Age); Knife (Early Neolithic To Early Bronze Age); Scraper (Tool) (Early Neolithic To Early Bronze Age); Flake (Late Neolithic
76933	MLO76933	Sipson Road [International Business Training Centre], Sipson, Hillingdon {Post Medieval Features}	Ditch; Post Hole; Fence	Post Medieval	
76934	MLO76934	Sipson Road [International Business Training Centre], Sipson, Hillingdon {Undated Features And Possible Roman Ditch}	Ditch; Ditch; Animal Burial; Post Hole; Pit	Roman	Animal Remains (Unknown)
76936	MLO76936	Colnbrook Bypass [Immigration Detention Centre], Harmondsworth, Hillingdon {Undated Features}	Pit; Ditch; Post Hole; Round House	Unknown	
76936	MLO76936	Colnbrook Bypass [Immigration Detention Centre], Harmondsworth, Hillingdon {Undated Features}	Pit; Ditch; Post Hole; Round House	Unknown	
76937	MLO76937	Colnebrook Bypass [Immigration Detention Centre], Harmondsworth, Hillingdon {Roman Pit}	Pit	Roman	Pottery (Roman)

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Findings
76943	MLO76943	Colnbrook Bypass [Immigration Detention Centre], Harmondsworth, Hillingdon {Saxon Features}	Ditch; Post Hole; Pit	Early Medieval/Dark Age	Worked Flint (Prehistoric); Burnt Flint (Prehistoric); Core (Prehistoric); Scraper (Tool) (Prehistoric); Cbm (Roman); Whetstone (Early Medieval/Dark Age); Pottery (Early Medieval/Dark Age)
76943	MLO76943	Colnbrook Bypass [Immigration Detention Centre], Harmondsworth, Hillingdon {Saxon Features}	Ditch; Post Hole; Pit	Early Medieval/Dark Age	Worked Flint (Prehistoric); Burnt Flint (Prehistoric); Core (Prehistoric); Scraper (Tool) (Prehistoric); Cbm (Roman); Whetstone (Early Medieval/Dark Age); Pottery (Early Medieval/Dark Age)
76943	MLO76943	Colnbrook Bypass [Immigration Detention Centre], Harmondsworth, Hillingdon {Saxon Features}	Ditch; Post Hole; Pit	Early Medieval/Dark Age	Worked Flint (Prehistoric); Burnt Flint (Prehistoric); Core (Prehistoric); Scraper (Tool) (Prehistoric); Cbm (Roman); Whetstone (Early Medieval/Dark Age); Pottery (Early Medieval/Dark Age)
76945	MLO76945	New Road (No 99), Hillingdon, Ub3 {19Th Century Pits, Well And Wall}	Wall; Well; Pit	Post Medieval	
76947	MLO76947	Church Road (No 42), West Drayton, Hillingdon, Ub7 {Post Medieval Wall And Make Up Layers}	Makeup Layer; Wall	Post Medieval	Cbm (Post Medieval); Pottery (Post Medieval); Oyster Shell (Post Medieval)
76963	ML076963	Eastchurch Road [Heathrow Airport - Snowbase], Hillingdon {19Th Century Country House}	Pit; Wall; Porch?; Country House	Post Medieval to World War Two	Pottery (Post Medieval); Cbm (Post Medieval To World War Two)
76985	MLO76985	Mayfield Farm Constructed Wetland Project	Channel	Early Mesolithic	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Findings
76987	MLO76987	Mayfield Farm Constructed Wetland Project	Field System	Middle Bronze Age to Late Bronze Age	
76988	MLO76988	Mayfield Farm Constructed Wetland Project	Structural Remnant; Pit	Middle Bronze Age to Late Bronze Age	
76989	MLO76989	Mayfield Farm Constructed Wetland Project	Field Drain; Animal Pen	Post Medieval to Modern	
77090	MLO77090	Bedfont Court [Heathrow Airport - Stockpiling And Processing Area], Hillingdon {Bronze Age Or Medieval Field System}	Pit; Post Hole; Ditch; Trackway; Field System; Field System; Ditch; Pit; Post Hole; Trackway	Early Bronze Age to Medieval	Flake (Early Neolithic To Late Bronze Age); Burnt Flint (Early Bronze Age To Medieval); Animal Remains (Early Bronze Age To Medieval); Pottery (Middle Bronze Age To Late Bronze Age); Cbm (Medieval To Post Medieval)
77091	MLO77091	Bedfont Court, [Heathrow Airport - Stockpiling And Processing Area], Hillingdon {Neolithic - Bronze Age Paleochannel}	Palaeochannel; Pit	Neolithic	Flake (Neolithic); Scraper (Tool) (Neolithic)
77436	MLO77436	Bedfont Court [Mineral Extraction Site], Hillingdon {Mesolithic Postholes}	Post Hole; Stake	Mesolithic	
77467	MLO77467	Vickers Way, Hounslow	Negative Evidence	Unknown	
77549	MLO77549	High Street (Nos 339-353), Harlington, Hillingdon {Post Medieval Building And Associated Features}	Stake Hole; Post Hole; Pit; Ditch; Bedding Trench; Foundation Trench; Footing; Wall; Butchers Shop; Orchard; Garden Soil	Post Medieval to Modern	Pottery (Medieval); Pottery (Post Medieval); Clay Pipe (Smoking) (Post Medieval); Brick (Post Medieval); Roof Tile (Post Medieval)
77864	MLO77864	Bedfont Court [Proposed Mineral Extraction Site], Hillingdon {Post Medieval Enclosure}	Enclosure; Ditch; Path	Post Medieval	Cbm (Post Medieval)

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Findings
77865	MLO77865	Bedfont Court [Mineral Extraction Site], Hillingdon {Bronze Age Settlement}	Ditch; Post Hole; Post Built Structure?	Bronze Age	Burnt Flint (Bronze Age); Core (Bronze Age); Flake (Bronze Age); Pottery (Middle Bronze Age)
77866	MLO77866	Bedfont Court [Mineral Extraction Site], Hillingdon {Iron Age Wattle Structure}	Structure	Late Bronze Age to Middle Iron Age	
77875	MLO77875	Cranford Bridge To Rectory Farm Pipeline, Bath Road Sewer [Avenue Park] {Late Bronze Age To Early Iron Age Settlement}	Settlement; Pit; Ditch; Gully	Late Bronze Age to Early Iron Age	Pottery (Late Bronze Age To Early Iron Age); Animal Remains (Late Bronze Age To Early Iron Age); Daub (Late Bronze Age To Early Iron Age); Burnt Flint (Late Bronze Age To Early Iron Age)
77876	MLO77876	Sipson Road, Harlington, Hillingdon, {Post Medieval Activity}		Undated	Unknown
78058	MLO78058	Cranford Bridge To Rectory Farm Pipeline, Bath Road Sewer [Rectory Farm] {Undated Features}	Ditch; Gully	Unknown	
78059	MLO78059	Cranford Bridge To Rectory Farm Pipeline, Bath Road Sewer [Avenue Park] {Undated Quernstone}	Findspot	Medieval to Post Medieval	Quern (Medieval To Post Medieval)
78060	MLO78060	Cranford Bridge To Rectory Farm Pipeline, Bath Road Sewer [Avenue Park] {Medieval And Post Medieval Pottery And Peg Tiles}	Findspot	Medieval to Post Medieval	Peg Tile (Medieval To Post Medieval); Pottery (Medieval To Post Medieval)
78172	MLO78172	High Street (No 367-371), Harlington, Hillingdon {Post Medieval Walls And A Pit}	Pit; Wall	Post Medieval to Modern	Cbm (Post Medieval)

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Findings
78246	MLO78246	Hayes Road [Western International Market] {Neolithic Post Hole And Gully}	Post Hole	Neolithic	Flake (Early Mesolithic To Early Neolithic); Pottery (Early Neolithic); Pottery (Early Neolithic)
78247	MLO78247	Hayes Road [Western International Market] {Bronze Age Cremation Cemetery}	Cremation; Cremation Cemetery	Middle Bronze Age to Late Bronze Age	Burial Urn (Middle Bronze Age To Late Bronze Age); Human Remains (Middle Bronze Age To Late Bronze Age); Human Remains (Middle Bronze Age To Late Bronze Age); Burial Urn (Middle Bronze Age To Late Bronze Age)
78248	MLO78248	Hayes Road [Western International Market] {Iron Age Pit}	Pit	Middle Iron Age	Pottery (Middle Iron Age); Daub (Middle Iron Age)
78249	MLO78249	Hayes Road [Western International Market] {Medieval/Post Medieval Earthworks}	Ditch; Post Hole; Pit; Gully	Medieval to Post Medieval	Roof Tile (Medieval To Post Medieval); Cbm (Medieval); Animal Remains (Medieval)
78249	MLO78249	Hayes Road [Western International Market] {Medieval/Post Medieval Earthworks}	Ditch; Post Hole; Pit; Gully	Medieval to Post Medieval	Roof Tile (Medieval To Post Medieval); Cbm (Medieval); Animal Remains (Medieval)
78250	MLO78250	Hayes Road [Western International Market] {Post-Medieval Agricultural Earthworks}	Field Drain; Gully; Pit	Post Medieval	Pottery (Post Medieval); Clay Pipe (Smoking) (Post Medieval)
78250	MLO78250	Hayes Road [Western International Market] {Post-Medieval Agricultural Earthworks}	Field Drain; Gully; Pit	Post Medieval	Pottery (Post Medieval); Clay Pipe (Smoking) (Post Medieval)
81963	MLO81963	K6 Telephone Kiosk In Front Of Five Bells Public House	Telephone Box	Modern	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
81964	MLO81964	Pair Of K6 Telephone Kiosks In Front Of Number 85, North Of Church Road, The Green	Telephone Box	Modern	
81966	MLO81966	Benlow Works	Concrete Framed Building; Organ Factory	Modern	
81967	MLO81967	The De Burgh Arms Public House	Public House; Public House; Public House	Post Medieval	
81968	MLO81968	Harmondsworth Hall	House; House; Club	Post Medieval	
81969	MLO81969	Wall And Gates To South Of Harmondsworth Hall	Gate Pier; Gate; Gate Pier; Wall	Post Medieval	
81970	MLO81970	Wall To West And North Of The Grange	Wall; Wall	Post Medieval	
81981	MLO81981	The Sun House	Timber Framed House	Medieval to Post Medieval	
81982	MLO81982	Manor Farmhouse	Villa	Post Medieval	
81983	MLO81983	The Gable Stores	Shop; Shop	Post Medieval	
82523	MLO82523	Bull'S Bridge Number 21 Over Grand Union Canal And Grand Union Canal (Paddington Branch) Junction	Canal Bridge	Post Medieval	
84951	MLO84951	1 Swan Road	House; House; House	Post Medieval	
84961	MLO84961	Elder Farmhouse	Farmhouse; Timber Framed House; Farmhouse	Medieval to Post Medieval	
84970	MLO84970	Old Mill House	Mill House; Mill House	Post Medieval	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
84972	MLO84972	Park Lane, Cranford, Hillingdon/Hounslow {18Th Century Bridge}	Road Bridge; Pier	Post Medieval to Modern	
84972	MLO84972	Park Lane, Cranford, Hillingdon/Hounslow {18Th Century Bridge}	Road Bridge; Pier	Post Medieval to Modern	
84980	MLO84980	Roseville Road [Cranford Park], Cranford, Hillingdon {18Th Century Stables}	Wall; Stable	Post Medieval to Modern	
84981	MLO84981	Roseville Road [Cranford Park], Cranford, Hillingdon {18Th Century Walls}	Wall	Post Medieval to Modern	
84986	MLO84986	St Peters Way [Church Of St Peter And St Paul], Harlington, Hillingdon {Medieval Parish Church}	Moulding; Battlement; Voussoir; Jamb; Capital; Parish Church; Nave; Doorway; Aisle; Font; Chancel; Arch; Tower; Vestry; Porch; Sanctuary; Floor; Easter Sepulchre; Niche; Commemorative Brass; Commemorative Monument; Pew; Nook Shaft; Effigy; Stained Glass;	Medieval to Modern	
84987	MLO84987	The King William Iv Public House	Hall House; Public House	Medieval to Modern	
85007	MLO85007	Bridge Of The Grand Union Canal Adjoining The Shovel Inn	Canal Bridge	Post Medieval	
85008	MLO85008	The Shovel Inn	House; Public House	Post Medieval	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
85012	MLO85012	Cowley House	House; House; House	Post Medieval to Modern	
85018	MLO85018	Harlington Baptist Church	Baptist Chapel	Post Medieval	
85019	MLO85019	The Dower House	House; House	Medieval to Post Medieval	
85020	MLO85020	Forecourt Wall To The Dower House	Wall; Gate Pier; Forecourt	Post Medieval	
85021	MLO85021	The White Hart Public House	Public House; Public House; Public House	Post Medieval	
85022	MLO85022	Acacia House	House; House; Date Stone; House	Post Medieval	
85023	MLO85023	Howecroft (Rear Part Only)	Timber Framed House; House	Medieval to Modern	
85024	MLO85024	Church Of St Mary	Parish Church	Medieval to Modern	
85025	MLO85025	The Crown Public House	Public House	Post Medieval	
85040	MLO85040	The Lodge	House; Railings; Gate	Post Medieval	
85041	MLO85041	Wall To East Of The Lodge	Wall; Wall	Post Medieval	
85042	MLO85042	Sipson Road/Wykeham Close, Sipson, Hillingdon {Site Of An 18Th Century House}	Villa; Fanlight	Post Medieval to Modern	
85043	MLO85043	Lanz Farmhouse	Farmhouse; Timber Framed House; Farmhouse	Post Medieval	
85054	MLO85054	The Crown Public House	Timber Framed Building; Public	Medieval to Post Medieval	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
			House; Public House		
85055	MLO85055	The Beeches	House; House	Post Medieval to Modern	
85056	MLO85056	Old Vine Cottage	Timber Framed House; House; House; House	Post Medieval to Modern	
85059	MLO85059		Coach House; Stable; Garage; Shop	Post Medieval to Modern	
85071	MLO85071	15 The Green	Timber Framed House; Shop	Post Medieval	
85072	MLO85072	Number 25, Including Wall And Stable Building Behind	Timber Framed House; Wall; Stable; House; Public House; Brewery	Post Medieval to Modern	
85073	MLO85073	Elmsdale House	House	Post Medieval	
85074	MLO85074	The Old House	House	Post Medieval	
85075	MLO85075	Wall To East Of Barn To South Of Avenue Cottage	Wall	Post Medieval	
85076	MLO85076	Forecourt Walls To West Of Southlands	Gate; Wall; Forecourt	Post Medieval	
85077	MLO85077	Front Wall And Gates To Number 24	Wall; Gate; Wall	Post Medieval	
85097	MLO85097	The Bell House	Villa; Vicarage; House	Post Medieval	
85099	MLO85099	Wall And Gate Piers To North Of The Old Gatehouse	Wall; Gate Pier; Gate	Medieval to Post Medieval	
85100	MLO85100	Walls To North And West Of Land Of Gatehouse Nurseries	Wall; Wall	Medieval to Post Medieval	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
85101	MLO85101	Wall In Front Of Numbers 30 To 36 (Even)	Wall; Gate	Post Medieval	
85103	MLO85103	King Henry Public House And The Stables	Public House; Timber Framed House; Date Stone; House; Stable	Medieval to Post Medieval	
85104	MLO85104	Longford Close	House; House	Post Medieval	
85105	MLO85105	Flats 1-3 (Yeomans)	Timber Framed House; Apartment	Medieval to Post Medieval	
85106	MLO85106	Bath Road [King'S Bridge], Longford, Hillingdon, Ub7 {19Th Century Bridge}	Bridge; Arch; Parapet; Plaque	Post Medieval to Modern	
85115	MLO85115	Monument At North Western End Of General Roys Survey Base	Commemorative Monument; Plaque; Cannon	Post Medieval	
85117	MLO85117	The White Horse Public House	Hall House; Public House	Medieval to Post Medieval	
85118	MLO85118	Weekly House	House	Post Medieval	
85127	MLO85127	The Old Gatehouse	Gatehouse; Gatehouse; Manor House	Medieval to Modern	
85128	MLO85128	Walls To East And South Of Garden Of Number 28 (Coombe House)	Wall	Medieval	
85132	MLO85132	Barn To South Of Avenue Cottage	Timber Framed Barn; Timber Framed Barn	Post Medieval	
85133	MLO85133	The Olde Cottage	Timber Framed House; House; Stable	Medieval to Post Medieval	
85136	MLO85136	The Old Cottage	Wealden House; Wealden House	Medieval to Post Medieval	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
85140	MLO85140	Maygood'S Farmhouse	Farmhouse; Farmhouse; Farmhouse; Garage	Post Medieval to Modern	
85141	MLO85141	The Old House	House	Post Medieval	
85142	MLO85142	Wall To North Of Front Garden Of The Beeches	Garden Wall; Garden Wall	Post Medieval	
85143	MLO85143	272 High Street	House; House	Post Medieval	
85144	MLO85144	The Vicarage And Tower House	Vicarage; House	Post Medieval	
85145	MLO85145	High Street [Manor Farm], Harmondsworth, Hillingdon, Ub7 {15Th Century Barn}	Aisled Barn; Threshing Barn; Crown Strut; Aisle; Purlin; Raking Strut	Medieval to Modern	
85146	MLO85146	The Five Bells Inn	Inn; Inn; Inn	Post Medieval	
85151	MLO85151	Yiewsley Grange	Timber Framed House; House; House; House; Ballroom; Barn	Post Medieval to Modern	
85156	MLO85156	73 Iver Lane	House	Post Medieval	
85158	MLO85158	St George'S Meadows	Jettied House; Farmhouse; House; Farmhouse; Farmhouse	Medieval to Post Medieval	
85161	MLO85161	Church Of St Dunstan	Church; Commemorative Monument; Commemorative Monument; Church	Medieval to Post Medieval	
85162	MLO85162	Roseville Road [Cranford Park], Cranford, Hillingdon {17Th-18Th Centruy Wall}	Wall; Courtyard?	Post Medieval to Modern	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
85164	MLO85164	St Peters Way [Church Of St Peter And St Paul], Harlington, Hillingdon {16Th-17Th Century Wall}	Wall; Coping	Medieval to Post Medieval	
85166	MLO85166	Fray'S Cottage And Old Mill House	House; Mill House	Post Medieval	
85174	MLO85174	St Peters Way [Church Of St Peter And St Paul], Harlington, Hillingdon {19Th Century Tombstone}	Tombstone; Gable; Shrine; Boss; Finial; Cross	Post Medieval to Modern	
85179	MLO85179	Technical Block A, Heathrow Airport	Aircraft Hangar; Office; Engineering Workshop	Modern	
85181	MLO85181	The Pheasant Public House	Public House	Post Medieval	
85186	MLO85186	Sipson House	House; Railings; House	Post Medieval	
85188	MLO85188	Roseville Road [Cranford Park], Cranford, Hillingdon {Ha Ha Wall}	Ha Ha; Wall	Post Medieval to Modern	
85190	MLO85190	Roseville Road [Cranford Park], Cranford, Hillingdon {Cellars To The Former Cranford House}	Cellar; Vault; Pier; Capital	Post Medieval to Modern	
85192	MLO85192	Colne Mead	Villa; Garage	Post Medieval to Modern	
85207	MLO85207	Southlands	House; House	Post Medieval to Modern	
85208	MLO85208	24 The Green	House; House	Post Medieval	
85209	MLO85209	Wall To North Of Number 31	Boundary Wall	Post Medieval	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
85210	MLO85210	15 The Green	Timber Framed House; House; House; House	Medieval to Post Medieval	
85211	MLO85211	15 The Green	Timber Framed Building; Warehouse; Building; Brewery; Wax Factory; Public House	Post Medieval	
85215	MLO85215	Walls In Front Of Numbers 52-58 (Even) And Along West End Of Property	Wall; Wall	Medieval to Post Medieval	
85216	MLO85216	Walls Around St Martin'S Churchyard	Wall	Medieval to Post Medieval	
85217	MLO85217	Church Of St Lawrence	Church; Church; Church; Commemorative Brass; Church; Church	Medieval to Modern	
85219	MLO85219	Barn To West Of Weekly House	Barn	Post Medieval	
85221	MLO85221	Longford Cottage	Timber Framed House	Medieval to Post Medieval	
85233	MLO85233	Church Road [St Martin'S Church], West Drayton, Hillingdon, Ub7 {Medieval To Post Medieval Parish Church}	Tower; Quoin; Aisle; Stair Turret; Cupola; Bay; Clerestory; Parish Church; Chancel; Nave; Tracery; Piscina; Crypt; Pier; Font; Arcade; Commemorative Brass; Burial Vault; Niche; Arcade; Commemorative Monument; Porch; Arch; Doorcase; Window	Medieval to Modern	
85234	MLO85234	Wall Running South From The Old Gatehouse And West Along Front	Wall	Medieval	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
		Of Gatehouse Nurseries			
85235	MLO85235	Wall In Front Of Numbers 40 To 50 (Even)	Wall; Wall	Medieval to Post Medieval	
85237	MLO85237	Queen River Cottage And Willow Tree Cottage	House	Post Medieval	
85238	MLO85238	Orchard Cottage	Timber Framed House; Timber Framed House; House	Medieval to Post Medieval	
85239	MLO85239	Wall To North West Of Weekly House	Wall	Post Medieval	
85240	MLO85240	Drayton Hall (Council Offices)	House; House; House; House; Hotel; Local Government Office	Post Medieval to Modern	
85241	MLO85241	Offices Of The Valentine Varnish And Lacquer Company	Industrial Building; Office; Office; Industrial Building	Post Medieval	
85244	MLO85244	The Frays	Open Hall House; Jettied House; House; House; House; House	Medieval to Modern	
85246	MLO85246	29 The Green	Timber Framed Building; Public House; Building; Brewery; Workers Hostel; Office; Wax Factory	Post Medieval to Modern	
85247	MLO85247	Forecourt Walls To Number 31	Wall; Forecourt	Post Medieval	
85248	MLO85248	Avenue Cottage And Avenue House (Flats 1-4)	Jettied House; House; House; Apartment	Medieval to Post Medieval	
85249	MLO85249	Walls To North And East Of Garden Of Southlands	Garden Wall; Garden Wall	Post Medieval	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
85250	MLO85250	Hope Cottage	House	Post Medieval	
85265	MLO85265	Wall To North Of Maygood'S Farmhouse Garden	Garden Wall	Post Medieval	
85266	MLO85266	Poplar Cottage	House; House; House	Post Medieval	
85269	MLO85269	Roseville Road [Cranford Park], Cranford, Hillingdon {18Th Century Wall}	Wall	Post Medieval to Modern	
85270	MLO85270	Roseville Road [Cranford Park], Cranford, Hillingdon {17Th-18Th Century Garden Wall}	Garden Wall	Post Medieval	
85273	MLO85273	St Peters Way [Church Of St Peter And St Paul], Harlington, Hillingdon {18Th Century Wall}	Wall; Buttress	Post Medieval to Modern	
85283	MLO85283	The Toll House, Cowley Lock	Toll House; Office	Post Medieval	
85285	MLO85285	Forecourt Wall To Number 85	Wall; Forecourt; Gate Pier	Post Medieval	
85292	MLO85292	25 Holloway Lane	Timber Framed House; House; House	Post Medieval to Modern	
85293	MLO85293	The Railway Arms Public House	Public House; Railings	Post Medieval	
85296	MLO85296	Wall To East Of The Grange	Wall	Post Medieval	
85305	MLO85305	Barnacre	Timber Framed House; House	Post Medieval	
85316	MLO85316	Staies Road (No 134) [Holmwood], North	Detached House; Pilaster; Fanlight; Cornice; Frieze	Post Medieval to Modern	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
		Feltham, Hounslow {1820'S House}			
85317	MLO85317	The Farm (Mr Bennett)	House; House	Post Medieval	
85398	MLO85398	Stansfield House	House; Gate Pier	Post Medieval	
85399	MLO85399	Round House And The Village Lock Up	Lock Up	Post Medieval	
85418	MLO85418	Burlington House And Flanking Walls Of Burlington House	Date Stone; Garden Wall; Bollard; House	Post Medieval	
85419	MLO85419	Green Man Public House	Stable; Public House; Public House; Hiding Place	Post Medieval	
85432	MLO85432	Steam Farm Lane [Mission Church Of St Mary], Hatton, Hounslow {Possible 17Th Century Church}	Mission Church; Timber Framed Building	Post Medieval to Modern	
85473	MLO85473	Milestone 13 Miles From London	Road; Milestone; Milestone	Roman to Post Medieval	
85474	MLO85474	Bedfont House	House; House; Conservatory	Post Medieval	
85482	MLO85482	Brentford Fountain Western International Market	Railings; Horse Trough; Drinking Fountain; Lamp Post; Drinking Fountain; Lamp Post; Railings	Post Medieval to Modern	
85484	MLO85484	Gates Monument At St Marys Church	Chest Tomb	Post Medieval	
85485	MLO85485	Brick Chest Tomb South Of Gates Monument At St Marys Church	Chest Tomb	Post Medieval	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
85486	MLO85486	Captain Millers Headstone At St Marys Church	Gravestone; Commemorative Monument	Post Medieval	
85487	MLO85487	Group Of Three 18Th Century Headstones St Marys Church	Gravestone; Gravestone; Gravestone	Post Medieval	
85488	MLO85488	18Th Century Headstone St Marys Church	Gravestone	Post Medieval	
85489	MLO85489	Headstone To Mary Taylor St Marys Church	Gravestone	Post Medieval	
85496	MLO85496	Baber Bridge	Date Stone; Road Bridge	Post Medieval	
85497	MLO85497	Baber Auxiliary Bridge	Date Stone; Road Bridge	Post Medieval	
85507	MLO85507	Cranford Park Bridge	Road Bridge; Road Bridge	Post Medieval to Modern	
85511	MLO85511	Fawns Manor	Manor House; Cross Wing House; House; Timber Framed House; Manor House; House	Medieval to Post Medieval	
85588	MLO85588	Former Officers Mess And Quarters To Hounslow Cavalry Barracks	Officers Quarters; Officers Mess; Barracks	Post Medieval	
85589	MLO85589	Former Stable Ranges Along The East And West Side Of Former Parade Ground To Hounslow Cavalry Barracks	Dormitory; Stable; Barracks; Stable	Post Medieval	
85590	MLO85590	Former Chapel To Hounslow Cavalry Barracks	Chapel; Barracks; Barracks; Dormitory	Post Medieval	
85591	MLO85591	The Keep (Armoury) To Hounslow Cavalry Barracks	Armoury; Barracks	Post Medieval	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
85592	MLO85592	Marjory Kinnon School And The Old School	School	Post Medieval	
85596	MLO85596	The Rectory	Vicarage; Vicarage; Vicarage; Vicarage	Post Medieval to Modern	
85648	MLO85648	Stable Block At Feltham Lodge, With Attached Walls To East And West	Stable; Wall	Post Medieval	
85661	MLO85661	Former Coach Houses At North And South Ends Of West Stable Range And North End Of East Stable Range To Hounslow Cavalry Barracks	Coach House; Fodder Store; Barracks	Post Medieval	
85748	MLO85748	Pates Manor	Gabled House; Manor House; Jettied House; Cross Wing House; Manor House; Manor House; Manor House; Coat Of Arms	Medieval to Post Medieval	
85750	MLO85750	The Prkway, Cranford, Hillingdon/Hounslow {18Th Century Road Bridge}	Road Bridge; Pier	Post Medieval to Modern	
85793	MLO85793	Church Of St Mary	Church; Church; Commemorative Brass; Wall Monument; Table Tomb; Gravestone; Named Tree; Church; Church	Medieval to Post Medieval	
85794	MLO85794	Milestone 12 Miles From London	Road; Milestone; Milestone	Roman to Post Medieval	
85802	MLO85802	Numbers 1-72 And Community Hall	Bungalow; Community Centre; Almshouse	Modern	
85803	MLO85803	Summerhouse	Summerhouse; Timber Framed Building	Modern	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
85804	MLO85804	Gate Piers And Walls	Gate Pier; Wall	Unknown	
85805	MLO85805	Barrack Masters House (Building 3) Hounslow Barracks	Officers Quarters; Barracks	Post Medieval	
85806	MLO85806	Former Hospital (Building 41), Hounslow Barracks	Military Hospital; Sergeants Mess; House	Post Medieval to Modern	
85807	MLO85807	Former Married Quarters (Building 16), Hounslow Barracks	Officers Quarters; Officers Quarters	Post Medieval to Modern	
85808	MLO85808	Hardinge Block (Building 8), Hounslow Barracks	Barracks	Post Medieval	
85809	MLO85809	Medical Centre (Building 24), Hounslow Barracks	Military Hospital	Post Medieval	
85810	MLO85810	Naafi (Building 9), Hounslow Barracks	Canteen; Sergeants Mess; Reading Room; Canteen; Reading Room; Sergeants Mess	Post Medieval to Modern	
85827	MLO85827	Stained Road, Hounslow Heath, {Parish Boundary Stone, 1812}	Boundary Stone	Post Medieval to Modern	
85830	MLO85830	Staines Road, Hounslow, {Milestone Opposite Islay Gardens, 1834}	Milestone	Post Medieval to Modern	
97882	MLO97882	Victoria Lane, [Rmc Land], Harlington, Hillingdon {Mesolithic Worked Flint}	Flint Scatter	Mesolithic	Worked Flint (Mesolithic)
97888	MLO97888	Sipson Lane/Victoria Lane/M4 [Wall Garden Farm/Nine Elms Farm/Rmc Land], Hillingdon {Undated Cut Features}	Post Built Structure; Enclosure; Ditch; Well; Pit; Post Hole; Gully; Field System	Unknown	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Findings
97975	MLO97975	Sipson Lane [Imperial College Sports Ground], Harlington, Hillingdon {Undated Gullies}	Gully	Unknown	Burnt Flint (Unknown)
98197	MLO98197	Ismbard Close [Brunel University], Uxbridge, Hillingdon, Ub8	Boundary Ditch	Post Medieval	Pottery (Medieval); Cbm (Post Medieval); Pottery (Post Medieval); Bottle (Post Medieval)
98215	MLO98215	Western Perimeter Road, [Perry Oaks Sludge Works], Harmondsworth, Hillingdon {Palaeolithic Flints}	Findspot	Palaeolithic	Flake (Palaeolithic); Axe (Tool) (Palaeolithic); Awl (Palaeolithic); Scraper (Tool) (Palaeolithic); Animal Remains (Palaeolithic)
98320	MLO98320	Old Mill Lane [Old Hill House Estate], Crowley, Uxbridge {Two Possible Post-Medieval Gullies}	Gully	Post Medieval	
98324	MLO98324	Heathrow Airport [Proposed E3 Car Park Extension], Hillingdon {Middle Bronze Age Field System, Flint And Pottery Sherds}	Boundary Ditch; Pit; Post Hole; Ditch	Middle Bronze Age	Pottery (Bronze Age); Worked Flint (Bronze Age)
98325	MLO98325	Heathrow Airport [Proposed E3 Car Park Extension], Hillingdon {Post Medieval Boundary Ditches And Features}	Post Hole; Ditch; Drainage Ditch	Post Medieval to Modern	Blade (Mesolithic); Pottery (Post Medieval)
98397	MLO98397	Trout Road, West Drayton, Hillingdon, Ub7 {Mesolithic Blade}	Findspot	Mesolithic	Blade (Mesolithic)
98497	MLO98497	Bath Road (No 567), Longford, Hillingdon, Ub7 {Medieval Ditches}	Ditch; Enclosure; Drainage Ditch; Post Hole?	Early Medieval/Dark Age to Medieval	Animal Remains (Early Medieval/Dark Age To Medieval); Pot (Early Medieval/Dark Age To Medieval)

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Findings
98498	MLO98498	Bath Street (No 567), Longford, Hillingdon, Ub7 {Post Medieval Ditches And Rubbish Pits}	Ditch; Post Hole; Well?; Pit; Cess Pit; Structure?; Soakaway?	Medieval to Modern	Vertebrate Remains (Medieval To Post Medieval); Pottery (Medieval To Post Medieval); Oyster Shell (Medieval To Post Medieval); Tile (Medieval To Post Medieval); Plant Macro Remains (Post Medieval)
98505	MLO98505	Bourne Avenue/Stockley Road [Rof Hayes], Hayes, Hillingdon {World War Two Royal Ordnance Factory And Records Office}	Pond; Boundary Fence; Royal Ordnance Factory; Machine House; Aisle; Arcade; Truss; Beam; Rail; Crane; Air Raid Shelter; Toilet; Canteen; Kitchen; Surgery; Shed; Garage; Workshop; Military Police Section House; Office; L Shape Plan; Boiler House; Storehou	Modern	
98507	MLO98507	Great South-West Road, [Hatton Cross Centre], Hatton Cross, Heathrow, Hillingdon {Site Of Post Medieval Farm}	Farm; Farm Building	Post Medieval to Modern	
98512	MLO98512	Bath Road, Longford, Hillingdon{Possible Middle Bronze Age To Early Iron Age Occupation Site}	Gully; Post Hole; Pit; Field System; Ditch; Waterhole; Structure?; Boundary Ditch; Ditched Enclosure; Enclosure; Round House (Domestic); Cremation; Occupation Site?; Stake Hole; Inhumation	Early Bronze Age to Early Iron Age	Pot (Middle Bronze Age); Human Remains (Middle Bronze Age); Animal Remains (Early Iron Age); Burnt Flint (Early Iron Age); Human Remains (Early Iron Age)
98513	MLO98513	Bath Road, Longford , Hillingdon {Roman Period Boundary Ditch}	Boundary Ditch; Ditch	Roman	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Findings
98514	MLO98514	Bath Road, Longford, Hillingdon {Post Medieval Boundary Ditch And Pits}	Ditch; Boundary Ditch; Pit	Post Medieval	
98514	MLO98514	Bath Road, Longford, Hillingdon {Post Medieval Boundary Ditch And Pits}	Ditch; Boundary Ditch; Pit	Post Medieval	
99407	MLO99407	Hayes Road [Western International Market] {Bronze Age/Early Iron Age Agricultural Features/Post Holes}	Gully; Post Hole; Pit; Boundary Ditch; Enclosure	Late Bronze Age to Early Iron Age	Pottery (Late Bronze Age)
99409	MLO99409	Hayes Road [Western International Market] {Late Neolithic/Bronze Age Penannular Ditched Enclosure}	Curvilinear Enclosure; Ditched Enclosure	Late Neolithic to Late Bronze Age	
99413	MLO99413	Hayes Road [Western International Market] {Late Neolithic Ditches And Pits}	Pit; Ditch	Late Neolithic	Burnt Flint (Late Neolithic); Plant Remains (Late Neolithic); Pottery (Late Neolithic To Early Bronze Age)
99415	MLO99415	Hayes Road [Western International Market] {Iron Age Settlement Features}	Round House (Domestic); Pit; Structure	Iron Age	Slag (Iron Age); Pottery (Early Iron Age To Middle Iron Age)
99422	MLO99422	Hayes Road [Western International Market] {Roman Agricultural Features}	Pit; Ditch; Post Built Structure; Gully	Roman	Pottery (Roman); Burnt Flint (Roman); Daub (Roman); Animal Remains (Roman)
99425	MLO99425	Hayes Road [Western International Market] {Anglo-Saxon Settlement Features}	Hall House; Grubenhous; Enclosed Settlement; Ditched Enclosure; Post Built Structure	Early Medieval/Dark Age	Pottery (Early Medieval/Dark Age)
99438	MLO99438	Hayes Road [Western International Market] {Second World War	Aircraft Obstruction; Anti Landing Obstacle	World War Two	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
		Anti-Glider Obstacles}			
99541	MLO99541	Sipson Road, Harlington, Hillingdon {Bronze Age Field System}	Field System	Bronze Age	
100449	MLO100449	Trout Road/High Street, Yiewsley, London Ub7 {Post Medieval Brick Walls}	Wall; Surface; Pit?; Structure; Demolition Layer	Post Medieval to Modern	
100470	MLO100470	Harlington [Rmc Land], Hillingdon {Mesolithic Flints}	Findspot	Mesolithic	End Scraper (Mesolithic)
100471	MLO100471	Sipson Lane/Victoria Lane/M4 [Nine Elms Farm/Wall Garden Farm/Rmc Land], Hillingdon {Neolithic Activity}	Pit; Flint Scatter; Ditch; Gully; Waterhole; Field System	Neolithic	Pottery (Neolithic); Blade (Neolithic); Burnt Flint (Neolithic); Animal Remains (Neolithic); Core (Neolithic); Scraper (Tool) (Neolithic); Plant Remains (Neolithic); Flake (Neolithic); Arrowhead (Neolithic); Knife (Neolithic); Worked Flint (Neolithic)
100472	MLO100472	Sipson Lane/Victoria Lane/M4 [Wall Garden Farm/Nine Elms Farm/Rmc Land], Hillingdon {Middle Bronze Age To Early Iron Age Field System}	Post Built Structure; Gully; Ditch; Curvilinear Enclosure?; Pit; Field System; Waterhole; Hearth	Early Bronze Age to Early Iron Age	Pottery (Bronze Age); Animal Remains (Early Bronze Age To Late Iron Age); Knife (Bronze Age); Burnt Flint (Bronze Age); Plant Remains (Bronze Age); Point (Bronze Age)

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
100473	MLO100473	Sipson Lane/ Victoria Lane/M4 [Wall Garden Farm/Nine Elms Farm/Rmc Land], Hillingdon {Saxon To Early Medieval Settlement}	Findspot; Pit; Post Hole; Ditch; Well; Pit Alignment; Field System; Waterhole; Trackway; Enclosure; Grave; Sump	Early Medieval/Dark Age to Medieval	Butchered Animal Remains (Early Medieval/Dark Age); Pottery (Early Medieval/Dark Age To Medieval); Plant Remains (Early Medieval/Dark Age); Bead (Early Medieval/Dark Age); Brooch (Early Medieval/Dark Age); Knife (Early Medieval/Dark Age); Quern (Early Me
100473	MLO100473	Sipson Lane/ Victoria Lane/M4 [Wall Garden Farm/Nine Elms Farm/Rmc Land], Hillingdon {Saxon To Early Medieval Settlement}	Findspot; Pit; Post Hole; Ditch; Well; Pit Alignment; Field System; Waterhole; Trackway; Enclosure; Grave; Sump	Early Medieval/Dark Age to Medieval	Butchered Animal Remains (Early Medieval/Dark Age); Pottery (Early Medieval/Dark Age To Medieval); Plant Remains (Early Medieval/Dark Age); Bead (Early Medieval/Dark Age); Brooch (Early Medieval/Dark Age); Knife (Early Medieval/Dark Age); Quern (Early Me
100474	MLO100474	Sipson Lane/Victoria Lane/M4 [Wall Garden Farm/Nine Elms Farm/Rmc Land], Hillingdon {Roman Settlement And Field System}	Pit; Ditch; Waterhole; Drove Road; Revetment; Corn Drying Oven; Post Built Structure; Gully; Trackway; Well; Gravel Pit; Rubbish Pit; Boundary Ditch; Field System; Settlement	Late Iron Age to Roman	Pottery (Late Iron Age To Roman); Animal Remains (Roman); Brooch (Roman); Burnt Flint (Roman); Worked Flint (Roman); Ladder (Roman); Stool (Roman); Stake (Roman); Net Float (Roman); Structural Timber (Roman); Plank (Roman); Cbm (Roman); Vessel (Roman); N

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
100475	MLO100475	Sipson Lane/Victoria Lane/M4 [Wall Garden Farm/Nine Elms Farm/Rmc-Land], Hillingdon {Medieval Activity}	Findspot; Field System; Ditch; Enclosure; Trackway; Waterhole; Well; Pit	Medieval	Daub (Early Medieval/Dark Age To Medieval); Loomweight (Early Medieval/Dark Age To Medieval); Quern (Early Medieval/Dark Age To Medieval); Coin (Early Medieval/Dark Age); Roof Tile (Medieval); Pottery (Medieval); Animal Remains (Medieval); Plant Remains
100477	MLO100477	Sipson Lane [Wall Garden Farm], Harlington, Hillingdon, Ub7 {Middle Palaeolithic Bout-Coupe}	Findspot	Middle Palaeolithic	Handaxe (Middle Palaeolithic)
100508	MLO100508	Park Lane (No 1-6), Hounslow, Tw5 {Late Bronze Age/Early Iron Age Ring Ditch}	Ring Ditch	Late Bronze Age to Early Iron Age	Worked Flint (Prehistoric); Pottery (Late Bronze Age To Early Iron Age)
100509	MLO100509	Park Lane (No 1-6), Hounslow, Tw5 {Roman Pit}	Pit	Roman	Pottery (Roman); Roof Tile (Roman)
100855	MLO100855	Park Road, Stanwell, Hillingdon {Saxon Activity}	Gully; Ditch; Pit	Early Medieval/Dark Age	Slag (Early Medieval/Dark Age); Animal Remains (Early Medieval/Dark Age); Unidentified Object (Early Medieval/Dark Age); Pottery (Early Medieval/Dark Age)
101157	MLO101157	Bedfont Lane, [Bedfont Lakes South] {20Th Century Landfill}	Landfill Site	Modern	
101158	MLO101158	Staines Road, (North Of) [Heathrow Oil Terminal], West Bedfont {20Th Century Landfill}	Landfill Site	Modern	
101433	MLO101433	Bath Road, Madbridge, Longford Moor, Hillingdon	Milestone	Post Medieval to Modern	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Findings
		{18Th Century Milestone}			
102808	MLO102808	Areodrome Way, [Heston Air Parks], Heston, Hounslow {Grade II Listed 1929 Hanger}	Aircraft Hangar; Aisle; Staircase; Skylight; Tiebeam; Pier	Modern	
103015	MLO103015	Shepiston Lane [Cherry Lane Cemetery], Hayes, Hillingdon, Ub3 {War Memorial}	War Memorial; Gravestone	World War Two to Modern	
103130	MLO103130	Cleveland Road [Brunel University], Uxbridge, Hillingdon {1960'S Lecture Theatre Block}	Lecture Theatre; Pier	Modern	
103167	MLO103167	Clockhouse Lane, Feltham, Hounslow {Paleolithic Mammalian Fossils}	Findspot	Palaeolithic	Animal Remains (Palaeolithic)
103511	MLO103511	Southampton Road, [Heathrow Airport - World Cargo Site], Hillingdon {Palaeolithic Tools}	Findspot	Middle Palaeolithic to Upper Palaeolithic	Blade (Middle Palaeolithic To Upper Palaeolithic)
103552	MLO103552	High Street, Harlington, Hillingdon {Early 20Th Century Road Traffic Sign}	Road Sign	Modern	
103849	MLO103849	Roseville Road/Cranford Lane/M4 [Cranford Park], Cranford, Hillingdon {17Th Century Parkland}	Pleasure Garden; Icehouse; Public Park	Post Medieval to Modern	
103963	MLO103963	Shepiston Lane [Cherry Lane Cemetery] Harlington, Hillingdon, Ub3 ILL {20Th Century Cemetery}	Cemetery; Garden	Modern	
103964	MLO103964	Victoria Lane [Victoria Lane Burial Ground] Harlington,	Cemetery	Post Medieval to Modern	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
		Hillingdon, Ub3 5Dw {19Th Century Cemetery}			
103966	MLO103966	Harmondsworth Road [West Drayton Cemetery] West Drayton, Hillingdon, Ub7 9Js {20Th Century Cemetery}	Cemetery; Cemetery Lodge	World War Two to Modern	
103967	MLO103967	Bedfont Road, Feltham [Bedfont Cemetery And St Mary'S Burial Ground], Hounslow, Tw14 8Bf {19Th Century Cemetery}	Cemetery; Lych Gate	Post Medieval to Modern	
103991	MLO103991	Harmondsworth Road [Yiewsley And West Drayton War Memorial] West Drayton, Hillingdon, Ub7 9Js {War Memorial}	War Memorial	Modern	
104450	MLO104450	High Street, [Avenue Park] Cranford, Hounslow, Tw5 {Public Park On Former Country House Grounds}	Country Estate; Childrens Playground; Public Park; Athletics Track; River	Post Medieval to Modern	
104479	MLO104479	High Street, Cowley [Cowley Recreation Ground], Hillingdon, Ub8 {Former Parkland Of Cowley Hall}	Landscape Park; Public Park; Bowling Green	Post Medieval to Modern	
104588	MLO104588	Grand Union Canal (Slough Arm/Fray'S River), Hillingdon {Ww2 Pillbox}	Pillbox	World War Two to Modern	
104589	MLO104589	Denbigh Drive (Nos.14-16 Even Rear Of), Hayes, Hillingdon {Ww2 Pillbox}	Pillbox	World War Two to Modern	
104649	MLO104649	Church Road [St Martin'S Churchyard] West Drayton, Hillingdon,	Churchyard	Medieval to Modern	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
		Ub7 7Pt {Medieval Churchyard}			
104871	MLO104871	Trout Lane Path, Yiewsley, Hillingdon {19Th Century Canal Aqueduct}	Footbridge	Post Medieval to Modern	
105601	MLO105601	West Drayton.	Pillbox	World War Two to Modern	
105607	MLO105607	Trout Road, West Drayton.	Pillbox	World War Two to Modern	
105769	MLO105769	Baber Bridge, Staines Road (A315), North Feltham.		1939 to 2050	
105788	MLO105788	Site Of The Former Royal Ordnance Factory At Dawley, Now The Public Record Office, Hayes	Pillbox	World War Two to Modern	
105789	MLO105789	Site Of The Former Royal Ordnance Factory At Dawley, Now The Public Record Office, Hayes	Pillbox	World War Two to Modern	
105790	MLO105790	Site Of The Former Royal Ordnance Factory At Dawley, Now The Public Record Office, Hayes	Pillbox	World War Two to Modern	
105791	MLO105791	Site Of The Former Royal Ordnance Factory At Dawley, Now The Public Record Office, Hayes	Pillbox	World War Two to Modern	
105793	MLO105793	Site Of The Former Royal Ordnance Factory At Dawley, Now The Public Record Office, Hayes	Pillbox	World War Two to Modern	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
105794	MLO105794	Site Of The Former Royal Ordnance Factory At Dawley, Now The Public Record Office, Hayes	Pillbox	World War Two to Modern	
105795	MLO105795	Site Of The Former Royal Ordnance Factory At Dawley, Now The Public Record Office, Hayes	Pillbox	World War Two to Modern	
105796	MLO105796	Site Of The Former Royal Ordnance Factory At Dawley, Now The Public Record Office, Hayes	Pillbox	World War Two to Modern	
105801	MLO105801	West Drayton Railway Sidings.		1939 to 2050	
105816	MLO105816	In Front Garden Of No.28, Benbow Way, Cowley, Nr. Uxbridge.	Pillbox	World War Two to Modern	
105818	MLO105818	Uxbridge Flint Brick Co., Cowley Bridge Works [Now Cape Boards Ltd.], Iver Lane, Uxbridge.	Pillbox	World War Two to Modern	
105819	MLO105819	Uxbridge.	Defended Building	World War Two to Modern	
107521	MLO107521	123 High Street [The Queen'S Head], Cranford, Hounslow, London, Tw5 9Pb {Inter War Pub}	Public House; Bar; Panelling; Fireplace; Casement; Gable	Modern to Unknown	
107548	MLO107548	Cemetery, Chapel, Site Of [Hatton Cemetery] (Fagg Road) (Hounslow)	Chapel; Churchyard	Post Medieval	
107579	MLO107579	Cranford Bridge To Rectory Farm Pipeline, Bath Road	Findspot	Prehistoric	Worked Flint (Prehistoric)

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
		Sewer [Avenue Park] {Prehistoric Worked Flint}			
107580	MLO107580	Bath Road (A4)/The Parkway (A312)/High Street/Cranford Lane [Rectory Farm], Cranford, Hounslow {Undated Linear Features}	Linear Feature	Unknown	
107752	MLO107752	Recreation Road/Florence Road/The Common, Southall [Southall Recreation Ground], Ealing, Ub2 5Ja {Early 19Th Century Recreation Ground}	Public Park; Bandstand; Swimming Pool; Tennis Court; Childrens Playground	Modern	
107773	MLO107773	The Green (No. 20), West Drayton, Hillington, Ub7 {Roman Catholic Church Of St Catharine}	Roman Catholic Church	Post Medieval	
108031	MLO108031	Grovestile Way, Bedfont, Feltham, Hounslow, Tw14 8Ey {War Memorial}	War Memorial	Modern	
108336	MLO108336	Heathrow Airport (S Of Longford) Temporary Record		Undated	Unknown
108680	MLO108680	Church Road, Station Road, Drayton Green, [Drayton Hall Park], Hillingdon, Ub7 7Ps {Mid 20Th Park On Former Estate Grounds}	Public Park; Walled Garden	Modern	
108747	MLO108747	St Peter'S Way, Harlington [St Peter And St Paul'S Churchyard And Harlington Burial Ground], Hillingdon, Ub3 5Ly {Medieval	Churchyard; Cemetery; War Memorial	Medieval to Modern	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
		Churchyard/19Th C Cemetery}			
108760	MLO108760	Pinkwell Lane/Carnarvon Drive/Waltham Avenue [Pinkwell Park], Hillingdon, Ub3 1Tf {1930S Public Park}	Recreation Ground; Bowling Green; Bowling Green Pavilion	Modern	
108775	MLO108775	Harlington War Memorial	War Memorial	Modern to Unknown	
108806	MLO108806	Cranford Park, Via Roseville Road, Cranford [St Dunstan'S Churchyard], Hillingdon, Ub3 {Medieval Churchyard}	Churchyard; Lych Gate	Medieval to Modern	
108825	MLO108825	Church Road, Cowley [St Laurence Churchyard], Hillingdon, Ub8 3Nb {Medieval Churchyard}	Churchyard; Lych Gate; War Memorial	Medieval to Modern	
108832	MLO108832	High Street, Harmondsworth Village, [St Mary'S Churchyard And Harmondsworth Burial Ground], Hillingdon, Ub7 {Medieval Churchyard}	Churchyard; Tomb; Cemetery	Medieval to Modern	
108836	MLO108836	The Green, West Drayton, [Southlands Arts Centre Grounds], Hillingdon, Ub7 7Pn {Public Gardens}	Country Estate; Walled Garden; Public Garden; Arts Centre; Knot Garden; Pond	Post Medieval to Modern	
108849	MLO108849	The Green, West Drayton [West Drayton Green], Hillingdon, Ub7 9Fn {Village Green}	Village Green	Medieval to Modern	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
108852	MLO108852	Ivanhoe Road/Ravensdale Road/Rosemary Avenue, Hounslow West [Beaversfield Park], Hounslow, Tw4 {Public Park}	Public Park; Bowling Green; Tennis Court; Childrens Playground; Herbaceous Border; Commemorative Monument; Putting Green; Maze	Modern	
108853	MLO108853	Staines Road/Bedfont Green Close, East Bedfont [Bedfont Green], Hounslow, Tw14 {Medieval Village Green}	Village Green	Medieval to Modern	
108853	MLO108853	Staines Road/Bedfont Green Close, East Bedfont [Bedfont Green], Hounslow, Tw14 {Medieval Village Green}	Village Green	Medieval to Modern	
108853	MLO108853	Staines Road/Bedfont Green Close, East Bedfont [Bedfont Green], Hounslow, Tw14 {Medieval Village Green}	Village Green	Medieval to Modern	
108854	MLO108854	Hatton Road, Bedfont [Bedfont Recreation Ground], Hounslow, Tw14 9Qs {1930S Recreation Ground}	Recreation Ground; Bowling Green; Tennis Court; Paddling Pool; Childrens Playground; Sports Pavilion; Sports Ground	Modern	
108875	MLO108875	Staines Road/River Gardens [Donkey Wood], Hounslow, Tw4 {1930S Public Park}	Gunpowder Works; Public Park; Wood	Post Medieval to Modern	
108880	MLO108880	Staines Road, East Bedfont [Fairholme Estate], Hounslow, Tw14 {1930S Housing With Communal Gardens}	Housing Estate; Community Garden; Sundial	Modern	

Monument ID (MLO)	Pref. Ref.	Name	Monument Type	Period Range	Finds
108884	MLO108884	Hounslow Road / Harlington Road West, Feltham, [Feltham Park], Hounslow, Tw14 {1930S Public Park}	Pond; Public Park; Recreation Ground	Post Medieval to Modern	
108889	MLO108889	Staines Road/Hanworth Road [Hounslow Heath], Hounslow, Tw4 {Ancient Commonland, Now Nature Reserve}	Common; Country Park; Nature Reserve	Medieval to Modern	
108892	MLO108892	Hayes Road [Western International Market- New Trading Unit] Southall Hounslow Ub2 5Yg {19Th Century Land Drain}	Drain	Post Medieval	
108931	MLO108931	Hatton Road, East Bedfont [St Mary The Virgin Churchyard], Hounslow, Tw14 {Medieval Churchyard}	Churchyard; Topiary Garden; Chest Tomb; Gravestone	Medieval to Modern	
108978	MLO108978	Western Road [Featherstone Boys School War Memorial] Southall Ealing Ub2 5Jt {1921 First World War Memorial}	War Memorial	Modern to Unknown	

Table 3 GLHER Event Data

Event ID	Name	Event Type
ELO17709	[Manor Farm Barn], Harmondsworth, Hillingdon: Conservation Management Plan	Management Survey
ELO17503	Bath Road (No 276-278) Sispon UB7 0DQ London Borough of Hillingdon: Archaeological Intervention	Evaluation
ELO17326	High Street, Manor Farm Barn, Manor Court, Harmondsworth, Hillingdon: Dendrochronological Analysis of Oak Structural Timbers and Boards	Dendrochronological Survey

Event ID	Name	Event Type
ELO17325	Manor Farm, Harmondsworth, London Borough of Hillingdon: Archaeological Investigations	Excavation
ELO9677	Broadview Estate, [TNT Building], Hounslow, Desk Based Assessment	Desk Based Assessment
ELO9583	Sheffield Road, [Heathrow Airport - Hilton Hotel and Matrix Site], Hillingdon: Evaluation (Phase II)	
ELO9583	Sheffield Road, [Heathrow Airport - Hilton Hotel and Matrix Site], Hillingdon: Evaluation (Phase II)	
ELO9559	North Hyde Gardens, [Bull's Bridge Power Station], Hayes, Hillingdon: Geoarchaeological Investigation	Borehole Survey
ELO9559	North Hyde Gardens, [Bull's Bridge Power Station], Hayes, Hillingdon: Geoarchaeological Investigation	Borehole Survey
ELO9540	Cranford Lane, [Old Barn], Harlington, Hillingdon: Watching Brief	Watching Brief
ELO8932	Holloway Lane	Excavation
ELO6094	STANWELL MOOR	Watching Brief
ELO5195	MANOR FARM	Excavation
ELO5194	M4 WIDENING SCHEME	Watching Brief
ELO5191	HARLINGTON	Unsystematic Fieldwalking Survey
ELO5189	BEAUDESERT MEWS	Excavation
ELO4750	Try's Site (rear of)	Trial Trench
ELO4629	St Dunstan's Church	Watching Brief
ELO4628	STANWELL RD	Trial Trench
ELO4609	Heathrow Airport, Terminal 4 Fuel Pipeline	Watching Brief
ELO4605	413-419 STAINES RD	Trial Trench
ELO4574	Heathrow Airport Car Park 2000	Watching Brief
ELO4567	Heathrow Airport, Heathrow Cargo Multi-Storey Car Park	Trial Trench
ELO4488	Heathrow Airport Cargo Terminal Fuel Tanks	Watching Brief
ELO4273	Bath Road, [Peggy Bedford Public House], Longford, Hillingdon, UB7: Evaluation	Trial Trench
ELO4178	Heathrow Airport, Terminal 5 (North West Entrance Site)	Trial Trench
ELO4104	The Triangle Site	Trial Trench

Event ID	Name	Event Type
ELO3996	Manor Farm	Open Area Excavation
ELO3995	Manor Farm	Watching Brief
ELO3994	Mayfield Farm	Open Area Excavation
ELO3845	Lufthansa Cargo Warehouse Development	Trial Trench
ELO3609	Holloway Lane	Open Area Excavation
ELO3608	Holloway Lane	Open Area Excavation
ELO3607	Holloway Lane	Open Area Excavation
ELO3606	Holloway Lane	Open Area Excavation
ELO3605	Holloway Lane	Watching Brief
ELO3551	Northern Perimeter Road, [Heathrow Airport], Hillingdon, TW6: Watching Brief	Watching Brief
ELO3485	Gate House Nurseries	Open Area Excavation
ELO3248	Esso West London Oil Terminal	Trial Trench
ELO3035	Auto Diesels Site (former)	Open Area Excavation
ELO3019	Cranford Lane, [land south of]	Open Area Excavation
ELO2898	Blunt's Field	Trial Trench
ELO2840	BEDFONT RD	Trial Trench
ELO14833	Cranford Park [St Dunstan's Church], Hillingdon: Historic Building Recording	Historic Building Recording
ELO13192	Western Perimeter Road/Stanwell Moor Road/Southern Perimeter Road/Eastchurch Road [Heathrow Airport], Harlington, Hillingdon: Desk Based Assessment	Desk Based Assessment
ELO12534	St Mary the Virgin, Harmondsworth (Survey and Site Visit)	Site Visit
ELO12391	Heathrow Airport, World Cargo Site Excavation 1995	Excavation
ELO3551	Northern Perimeter Road, [Heathrow Airport], Hillingdon, TW6: Watching Brief	Watching Brief
ELO11456	Inner Ring East [Heathrow Airport], Hillingdon: Desk Based Assessment	Desk Based Assessment
ELO17336	Burlington Close, [Burlington House], Feltham, Hounslow, TW14 8JU: Archaeological Watching Brief	
ELO8241	Green Lane [London School Of Economics], Northwood, HA6: Desk Based Assessment	Desk Based Assessment
ELO584	The Parkway, Cranford, Hillingdon: Watching Brief	Watching Brief

Event ID	Name	Event Type
ELO4316	Moor Lane, [Prospect Park - British Airways Combined Business Centre], Harmondsworth, Hillingdon, UB7: Evaluation	Auger Survey; Test Pit; Trial Trench
ELO4316	Moor Lane, [Prospect Park - British Airways Combined Business Centre], Harmondsworth, Hillingdon, UB7: Evaluation	Auger Survey; Test Pit; Trial Trench
ELO4316	Moor Lane, [Prospect Park - British Airways Combined Business Centre], Harmondsworth, Hillingdon, UB7: Evaluation	Auger Survey; Test Pit; Trial Trench
ELO4316	Moor Lane, [Prospect Park - British Airways Combined Business Centre], Harmondsworth, Hillingdon, UB7: Evaluation	Auger Survey; Test Pit; Trial Trench
ELO4316	Moor Lane, [Prospect Park - British Airways Combined Business Centre], Harmondsworth, Hillingdon, UB7: Evaluation	Auger Survey; Test Pit; Trial Trench
ELO3551	Northern Perimeter Road, [Heathrow Airport], Hillingdon, TW6: Watching Brief	Watching Brief
ELO3551	Northern Perimeter Road, [Heathrow Airport], Hillingdon, TW6: Watching Brief	Watching Brief
ELO3551	Northern Perimeter Road, [Heathrow Airport], Hillingdon, TW6: Watching Brief	Watching Brief
ELO3551	Northern Perimeter Road, [Heathrow Airport], Hillingdon, TW6: Watching Brief	Watching Brief



APPENDIX 14.1

Waste Appraisal Methodology

I Waste Appraisal Methodology

I.1 Introduction

- I.1.1 This report sets out the proposed scope, content and assessment approach for undertaking a waste appraisal in the Environmental Impact Assessment (EIA) for the proposed Heathrow Western Hub (herein ‘the Proposed Development’). The assessment will focus on the potential effect of waste generation from the construction phase and occupation of the Proposed Development once developed.
- I.1.2 The project description is provided in **Chapter 3: ‘The Proposed Development’**.
- I.1.3 This section includes the following:
- A description of the context of waste in relation to the Proposed Development;
 - A description of policy and legislation with relevance to waste; and
 - An overview of the proposed approach to waste assessment for the Environmental Impact Assessment (EIA) process.

I.2 Context

- I.2.1 The Construction, Demolition and Excavation (CD&E) sector is the largest contributing sector to the total waste generation in the UK. The UK generated 202.8 million tonnes of waste in 2014; 59% of this was generated from CD&E activities. The Government keeps progress towards the 2020 targets set in the National Waste Management Plan for England in 2013 under review by monitoring actual recycling rates and by modelling future recycling. The recovery rate from non-hazardous construction and demolition waste in the UK in 2014 was 89.9% (Defra & Government Statistical Service, 2018). This already exceeds the 2020 target of recovering at least 70% by weight, of non-hazardous construction and demolition waste.
- I.2.2 During the construction phase of the Proposed Development it is anticipated that there will be large quantity and variety of waste streams that can be generated including:
- Excavated material;
 - Demolition waste, including extensive variety of wastes associated with the removal of the displaced uses;
 - Waste timber;
 - Plastics and other packaging;
 - Mortar / concrete;
 - Metal;
 - Various crushed stone;
 - Bricks; and
 - Other aggregate materials.
- I.2.3 During the operational phase, it is anticipated that the generation of a variety of waste arisings will require frequent waste collections and disposal contracts for waste streams including:

- Municipal Solid Waste (MSW) from passengers and staff;
- Co-mingled or separated recyclable wastes (e.g. plastics, glass, food);
- Segregated Compostable and biodegradable waste;
- Commercial wastes;
- Waste from aircraft flights (deplaned waste or ‘quarantine waste’); and
- Hazardous and industrial waste (i.e. oils, solvents).;

I.2.4 It is anticipated that the Proposed Development will include upgraded and new waste recycling centres. This is expected to include a resource recovery centre to promote re-use and recycling of airport wastes, areas to receive sweepings from runway, apron and highway cleaning and enhanced management of aircraft cabin waste.

I.3 Planning and Legislation

I.3.1 This section presents a summary of the key waste planning policy that is associated with the Proposed Development.

I.3.2 In terms of waste, UK legislation is underpinned by several international (e.g. European Union (EU) agreements). Following the 2016 referendum on UK withdrawal from the EU, the UK will continue to be committed to EU agreements until finalisation of the withdrawal agreement and / or until two years after initiation of Article 50 of the Treaty on European Union (TEU). Following withdrawal, the exact nature of amendments to UK legislation which had an origin in EU law will depend on the agreements made with the EU and the extent to which EU measures continue to apply (e.g. achieve trading agreements) as well as the ongoing political agendas of the UK government.

I.3.3 The scope of the assessment of waste was informed by the policy and legislation detailed in **Table I**.

Table I Policy and legislation relevant to waste assessment

Relevant policy / legislation	Relevance to assessment
EU Waste Framework Directive (Directive 2008/98/EC, ‘rWFD’)	<p>Sets the basic concepts and definitions related to waste management, such as definitions of waste, recycling, recovery. It explains when waste ceases to be waste and becomes a secondary raw material (so called end-of-waste criteria), and how to distinguish between waste and by-products.</p> <p>The Directive lays down some basic waste management principles: it requires that waste be managed without endangering human health and harming the environment, and in particular without risk to water, air, soil, plants or animals, without causing a nuisance through noise or odours, and without adversely affecting the countryside or places of special interest.</p> <p>It introduces the concept of the waste hierarchy and provides a direction for the management of waste by applying a priority order to the management of waste.</p> <p>It incorporates provisions on hazardous waste and waste oils and includes two new recycling and recovery targets to be achieved by 2020: 50% preparing for re-use and recycling of certain waste materials from households and other origins similar to households, and 70% preparing for re-use, recycling and other recovery of construction and demolition waste.</p> <p>The Directive requires that Member States adopt waste management plans and waste prevention programmes.</p>

Relevant policy / legislation	Relevance to assessment
	<p>Much of the requirements of the rWFD are implemented by UK or English legislation (for example the Environmental Permitting Regulations). The provisions to sever the legislative links with the rWFD in such legislation will be confirmed as the UK progresses its negotiations for leaving the EU.</p>
<p>EU Landfill Directive (Directive 1999/31/EC on the landfill of waste, 'LFD')</p>	<p>According to the waste management hierarchy, landfilling is the least preferable option and should be limited to the necessary minimum. Where waste needs to be landfilled, it must be sent to landfills which comply with the requirements of Directive 1999/31/EC on the landfill of waste.</p> <p>The objective of the LFD is to prevent or reduce as far as possible negative effects on the environment, in particular on surface water, groundwater, soil, air, and on human health from the landfilling of waste by introducing stringent technical requirements for waste and landfills.</p> <p>The Landfill Directive defines the different categories of waste (municipal waste, hazardous waste, non-hazardous waste and inert waste) and applies to all landfills, defined as waste disposal sites for the deposit of waste onto or into land.</p> <p>A standard procedure for the acceptance of waste in a landfill is laid down so as to avoid any risks.</p>
<p>Environmental Protection Act 1990 Part II – Controlled Waste and Duty of Care</p>	<p>This is the UK Act of Parliament that makes provision for the management of wastes to avoid pollution.</p> <p>It sets the rules for the management of controlled wastes and identifies the waste Duty of Care, which places an obligation on person who imports, produces, carries, keeps, treats or disposes of controlled waste, including householders, commercial producers and industrial producers of waste.</p>
<p>A Green Future: Our 25 Year Plan to Improve the Environment, (Defra, 2018)</p>	<p>The Government's environment plan sets out our goals for improving the environment within a generation and leaving it in a better state. In terms of waste management, it seeks to minimise waste, reuse materials and manage materials at the end of their life to minimise the impact on the environment, by:</p> <ul style="list-style-type: none"> • working towards the ambition of zero avoidable waste by 2050. • working to a target of eliminating avoidable plastic waste by end of 2042. • meeting all existing waste targets – including those on landfill, reuse and recycling – and developing ambitious new future targets and milestones. • seeking to eliminate waste crime and illegal waste sites over the lifetime of this Plan, prioritising those of highest risk. Delivering a substantial reduction in litter and littering behaviour. • significantly reducing and where possible preventing all kinds of marine plastic pollution – in particular material that came originally from land
<p>The Strategy for Hazardous Waste Management in England 2010</p>	<p>The 'Strategy for hazardous waste management in England' (2010) sets out the principles for the management of hazardous waste and helps waste producers and managers:</p> <ul style="list-style-type: none"> • make the right decisions about their waste • identify the available treatment facilities available
<p>The National Planning Policy for Waste 2014</p>	<p>The Government published the National Waste Planning Policy 2014 for England as a replacement of Planning Policy Statement 10 (Planning for Sustainable Waste Management – 2011): The policy maintains the core principles of the 'plan led' approach, with a continued focus of moving waste up the waste hierarchy.</p> <p>It requires local planning authorities to have regard to its policies when discharging their responsibilities to the extent that they are appropriate to waste management.</p> <p>Increasingly local authorities are working together in partnerships to deliver full and efficient waste services; a requirement of the duty to cooperate in section 110 of the</p>

Relevant policy / legislation	Relevance to assessment
	<p>Localism Act 2011. The document sets out detailed waste planning policies to facilitate a more sustainable and efficient approach to resource use and management, for example by ensuring the design and layout of new infrastructure complements sustainable waste management.</p> <p>When determining planning applications for non-waste development, the Policy requires that local planning authorities should, to the extent appropriate to their responsibilities, ensure that:</p> <ul style="list-style-type: none"> • The likely impact of proposed, non-waste related development on existing waste management facilities, and on sites and areas allocated for waste management, is acceptable and does not prejudice the implementation of the waste hierarchy and/or the efficient operation of such facilities; • New, non-waste development makes sufficient provision for waste management and promotes good design to secure the integration of waste management facilities with the rest of the development; and • The handling of waste arising from the construction and operation of development maximises reuse/recovery opportunities and minimises off-site disposal.
National Waste Management Plan for England 2013	<p>The National Planning Policy Framework (NPPF), which was published in March 2012, does not contain specific waste policies. Paragraph 5 indicates that waste policy will be set out in the National Waste Management Plan for England. In terms of achieving sustainable development, the NPPF identifies that minimising waste and pollution is a fundamental part of the environmental role of the planning system.</p> <p>The key aim of the Waste Management Plan for England was to set a direction towards a zero-waste economy as part of the transition to a sustainable economy. In particular, this means using the “waste hierarchy” (waste prevention, re-use, recycling, recovery and finally disposal as a last option) as a guide to sustainable waste management.</p> <p>The Waste Management Plan for England was a high-level document which is non-site specific. It evaluated how it would support implementation of the objectives and provisions of the revised Waste Framework Directive (rWFD).</p> <p>The rWFD established the principle of ‘proximity’. This is within the context of the requirement on Member States to establish an integrated and adequate network of waste disposal facilities for recovery of mixed municipal waste collected from private households. The requirement included where such collection also covers waste from other producers.</p> <p>The plan identified the measures to be taken to ensure that by 2020 at least 70% by weight of construction and demolition waste is subjected to material recovery.</p>
Waste Prevention Programme for England 2013	<p>The Government developed Waste Prevention Programme for England in 2013 to set out the key roles and actions which should be taken to move towards a more resource efficient economy. As well as describing the actions the government is taking to support this move, it also highlights actions businesses, the wider public sector, the civil society and consumers can take to benefit from preventing waste. Using resources more efficiently, designing and manufacturing products for optimum life and repairing and reusing more items could save money and provide opportunities for economic growth at the same time as improving the environment.</p>
The Environmental Permitting (England and Wales) Regulations 2016	<p>The Environmental Permitting (England and Wales) Regulations 2016 (“the 2016 Regulations”) consolidate and replace the Environmental Permitting (England and Wales) Regulations 2010 (S.I. 2010/675) (“the 2010 Regulations”), which had been amended 15 times.</p> <p>The 2016 Regulations set out an environmental permitting and compliance regime that applies to various activities and industries, including the management of waste.</p> <p>The environmental permitting regime is a common framework for applying for, receiving, varying, transferring and surrendering permits, along with compliance, enforcement and appeals arrangements. It rationalises the previous permitting and</p>

Relevant policy / legislation	Relevance to assessment
	compliance regimes into a common framework that is easier to understand and simpler to use. A key component is that it allows applicants that would otherwise require several permits for activities falling under various regulations on a single site to complete a single application, and to be issued with one permit. The framework introduces different levels of control, based on risk: exclusions (very low risk activities which may be undertaken without any permit), exemptions (lower risk activities which may be undertaken after registering, which is free), standard rules permits (standard requirements and conditions for the relevant activities are set out so that applicants can determine in advance whether the permit is applicable to their proposals) and bespoke permits (permits written specifically for activities which are unique or of higher risk).
The Waste (England and Wales) Regulations 2011	<p>The 2011 Waste Regulations transposes the rWFD in England and Wales. In addition, it reduced the fragmentation of waste legislation to some extent and so it streamlines and replaces some waste regulation, in particular the subordinate legislation relating to the registration of waste carriers and brokers and to the “duty of care”.</p> <p>Key provisions in the rWFD were implemented by the Waste regulations:</p> <p>Waste hierarchy: legal requirement the waste hierarchy for waste prevention and management in legislation and policy.</p> <p>Separate collections (household waste): set up separate collection (as a minimum) for paper, metal, plastic and glass by 2015, “where technically environmentally and economically practicable and appropriate”.</p> <p>Separate collections (private companies): From 1 January 2015: (1) businesses which collect waste paper, metal, plastic or glass need to collect such waste separately; and (2) businesses which collect, transport or receive separately collected waste paper, metal, plastic or glass should ensure that such waste is not mixed with other waste.</p> <p>Waste carrier and broker registration: Registration is required for all those that “normally and regularly transport waste, whether the waste is produced by them or others”. The Regulations introduced a new two-tier system for registration.</p>
Hazardous Waste Regulations 2005 (as amended)	<p>Waste is generally considered hazardous if it (or the material or substances it contains) are harmful to humans or the environment.</p> <p>All producers and holders of hazardous waste are obliged to ensure that the hazardous waste does not cause harm or damage.</p> <p>All producers and holders of waste are obliged to know whether their waste is classified as hazardous or non-hazardous.</p> <p>The hazardous waste regulations identify the administrative provisions for handling hazardous waste.</p> <p>The regulations also make it illegal to mix a hazardous waste with either non-hazardous or another hazardous waste</p>

1.3.4 Particular attention will be paid to the National Waste Management Plan for England 2013; the National Waste Strategy and the Waste Regulations (England and Wales) 2011, which implement the Waste Hierarchy (**Table**), which must be followed when assessing the management of wastes.

Table 2: The waste hierarchy*.

Waste Hierarchy	Relevant Activity
Prevention	Using less material in design and manufacture, keeping products for longer, re-use, using less hazardous materials.
Preparing for re-use	Checking, cleaning, repairing, refurbishing, whole items or spare parts.

Waste Hierarchy	Relevant Activity
Recycling	Turning waste into a new substance or product, including composting if it meets quality protocols.
Other recovery	Includes anaerobic digestion, incineration with energy recovery, gasification and pyrolysis which produce energy (fuels, heat and power) and materials from waste, some backfilling.
Disposal	Landfill and incineration without energy recovery.

*Table reproduced from the Defra website (<https://www.gov.uk/waste-legislation-and-regulations>)

Airports National Policy Statement

- I.3.5 The Airports National Policy Statement (ANPS) provides advice on the management of resources and waste in paragraphs 5.135 to 5.146 inclusive.
- I.3.6 It makes specific requirements for the assessment of waste materials and directs the application “to set out the arrangements that are proposed for managing any waste produced in the application for development consent. The arrangements described should include information on the proposed waste recovery and disposal system for all waste generated by the development. The applicant should seek to minimise the volume of waste sent for disposal unless it can be demonstrated that the alternative is the best overall environmental, social and economic outcome when considered over the whole lifetime of the project. “
- I.3.7 In doing so, it requires that the assessment should set out a comprehensive suite of mitigations to eliminate or significantly reduce the risk of adverse impacts associated with resource and waste management.
- I.3.8 The APNS recognises that the Lakeside Energy from Waste Facility will be removed (as a consequence of the HAL DCO Project). It states that the effect of removing this facility upon capacity for treatment of waste will require assessment.

Local Context

- I.3.9 The Proposed Development is within the administrative area of London Borough of Hillingdon (LBH). However, there are eight other local authorities within 4km of the airport). These are:
- London Borough of Hounslow;
 - London Borough of Ealing;
 - London Borough of Richmond upon Thames;
 - Spelthorne Borough Council;
 - Runnymede Borough Council;
 - The Royal Borough of Windsor and Maidenhead;
 - Slough Borough Council; and
 - South Bucks District Council.
- I.3.10 The planning policies associated with LBH are outlined below.
- I.3.11 The Development Plan for the LBH forms the statutory basis for planning decisions and consists of:

1. The Hillingdon Local Plan: Part 1 – Strategic Policies (adopted 2012);
 2. The Extant 2007 Saved Unitary Development Plan policies (will be adopted as the Hillingdon Local Plan: Part 2);
 3. The West London Waste Plan; and
 4. The London Plan consolidated with alterations since 2011 (published in March 2015).
- 1.3.12 The assessment of waste impacts and their subsequent management is a key aspect of the approach to consenting any development. The ‘Local Plan: Part 1 – Strategic Policies’ for LBH recognises this in Policy EMI 1: Sustainable Waste Management, which would form the basis for the waste assessment for the Proposed Development. The Policy states that:
- The Council will require all new development to address waste management at all stages of a development's life from design and construction through to the end use and activity on site, ensuring that all waste is managed towards the upper end of the waste hierarchy.
 - The Council will follow the waste hierarchy by promoting the reduction of waste generation through measures such as bioremediation of soils and best practice in building construction. The Council will promote using waste as a resource and encouraging the re-use of materials and recycling.
 - The Council will also support opportunities for energy recovery from waste and composting where appropriate. The Council will safeguard existing waste sites unless compensatory provision can be made.
 - The Council will seek to maximise the use of existing waste management sites through intensification or co-location of facilities.”
- 1.3.13 The West London Waste Plan (adopted 2015), includes six west London Boroughs (Brent, Ealing, Harrow, Hillingdon, Hounslow and Richmond upon Thames) and the Old Oak Common and Park Royal Development Corporation (OPDC). The Plan recognises the need for a well-developed waste sector and plans for the future management of waste produced in these areas up to 2031. Policies contained in the Plan support site development and promote sustainable management of waste, by giving priority to waste reduction, recycling and composting. The Plan also identifies suitable sites for development of new facilities, while safeguarding existing waste facilities within west London.
- 1.3.14 The 2016 London Plan consolidated with alterations since 2011) contains four specific policies relating to Waste in Chapter Five:
- Policy 5.16 Waste net self-sufficiency, which strives to manage as much of London’s waste within London as practicable, working towards managing the equivalent of 100% of London’s waste within London by 2026; create positive environmental and economic impacts from waste processing; and work towards zero biodegradable or recyclable waste to landfill by 2026. In relation the Proposed Development, the Plan requires “encouraging the reuse of and reduction in the use of materials” ...” *exceeding recycling and reuse levels in construction, excavation and demolition (CE&D) waste of 95 per cent by 2020*” and “*improving London’s net self-sufficiency through reducing the proportion of waste exported from the capital over time*”.
 - Policy 5.17 Waste capacity – the Plan supports the need to increase waste processing capacity in London. It states that the Mayor will work with London boroughs and waste

authorities to identify opportunities for introducing new waste capacity, including strategically important sites for waste management and treatment, and resource recovery parks/consolidation centres, where recycling, recovery and manufacturing activities can co-locate. Paragraph 5.86 states “Waste processing facilities, including materials recycling facilities and depots, inert waste recycling plants, composting facilities, waste treatment and energy recovery facilities, and reprocessing of recyclables, should be well designed. They need not be bad neighbours and could be a source of new products and new jobs. They should be developed and designed in consultation with local communities, taking account of health and safety within the facility, the site and adjoining neighbourhoods. Developments for manufacturing related to recycled waste, deriving fuel from waste and recovering value from residual waste should be supported. Where movement of waste is required, priority should be given to facilities for movement by river or rail. Opportunities to provide combined heat and power and combined cooling, heat and power should be taken wherever possible (see Policies 5.5, 5.6 and 5.8). Developments adjacent to waste management sites should be designed to minimise the potential for disturbance and conflicts of use. “ This will be relevant to any proposed waste management facility that will be built (or removed) as a consequence of the Proposed Development.

- Policy 5.18 Construction, excavation and demolition waste, which states that major development sites are required to recycle CE&D waste on-site, wherever practicable, supported through planning conditions. It stipulates that LDFs should require developers to produce site waste management plans to arrange for the efficient handling of CE&D waste and materials. A combination of on-site mobile facilities on construction sites, effective use of existing waste processing sites and, where appropriate, safeguarded wharves, and the provision of recycling facilities at aggregate extraction sites, should be capable of meeting the anticipated future requirement within London to achieve a more beneficial re-use of this material in line with the 95% target provided in Policy 5.16.
- Policy 5.19 Hazardous waste requires that Development proposals that would result in the loss of existing sites for the treatment and/or disposal of hazardous waste should not be permitted unless compensatory hazardous waste site provision has been secured in accordance with Policy 5.17.

1.3.15 A draft new London Plan was published by the Mayor for consultation in December 2017 and a Draft new London Plan was published by the Mayor in August 2018 to include minor changes. Greater London Authority officers are currently registering all representations received and preparing a report which will summarise the main issues, prior to an Examination in Public of the London Plan. The Draft London Plan is a material consideration in planning decisions, which will gain more weight as it moves through the adoption process.

1.3.16 The following new policies will be relevant to the Proposed Development. These policies provide similar requirements to those described above, with more specific issues identified:

Policy S17 Reducing waste and supporting the circular economy

- This relates to waste reduction, increases in material re-use and recycling, and reductions in waste going for disposal. It requires:
- ensuring that there is zero biodegradable or recyclable waste to landfill by 2026

- meeting or exceeding the recycling targets b) construction, and demolition and excavation waste – 95 per cent by 2020
- It requires that a Circular Economy Statement should be submitted, to demonstrate:
 1. how all materials arising from demolition and remediation works will be re-used and/or recycled
 2. how the proposal's design and construction will enable building materials, components and products to be disassembled and re-used at the end of their useful life
 3. opportunities for managing as much waste as possible on site
 4. adequate and easily accessible storage space to support recycling and re-use
 5. how much waste the proposal is expected to generate, and how and where the waste will be handled.
- When it is intended to export waste to landfill outside of London, it will be important to show that the receiving authority has the capacity to deal with waste over the lifetime of the development. This will also help receiving authorities plan for future needs.

Policy SI8 Waste capacity and net waste self-sufficiency

- In order to manage London's waste sustainably:
 1. the equivalent of 100 per cent of London's waste should be managed within London (i.e. net self-sufficiency) by 2026
 2. existing waste management sites should be safeguarded (see Policy SI9 Safeguarded waste sites)
 3. the waste management capacity of existing sites should be optimised
 4. new waste management sites should be provided where required
 5. environmental, social and economic benefits from waste and secondary materials management should be created.
- The following are particularly encouraged – development proposals which: contain proposals to effectively deal with CD&E waste on site and minimise export to landfill.

Policy SI9 Safeguarded waste sites

- Existing waste sites should be safeguarded and retained in waste management use.
- The proposed loss of an existing waste site will only be supported where appropriate compensatory capacity is made within London that must at least meet, and should exceed, the maximum achievable throughput of the site proposed to be lost.

Policy SI10 Aggregates

- An adequate supply of aggregates to support construction in London will be achieved by encouraging re-use and recycling of construction, demolition and excavation waste within London.

1.3.17 Driving waste up the Waste Hierarchy is an integral part of the National Waste Management Plan for England And National Planning Policy for Waste. It is also a legal requirement to consider the waste hierarchy to identify the best waste management options for waste. Therefore, alongside the assessment of the potential impact of the waste, the mitigation and waste management measures proposed would be based on the principle of moving waste up the hierarchy and this has a direct impact on the construction and operation of the Proposed Development. This would be particularly significant during construction where site clearance, demolition of any existing structures, excavation, the proposed use of excavated material as fill and the waste created by site workers would need to be carefully managed to avoid significant adverse impacts, particularly in this urban site where space would be an important consideration.

1.4 Waste Standards and Guidance

1.4.1 The waste assessment will be guided and informed by additional standards and guidance documents, including:

- CIRIA Publication C741: Environmental Good Practice on Site Guide (Fourth Edition) (Charles & Edwards, 2015);
- The Definition of Waste: Development Industry Code of Practice (the CoP) (Version 2) (CL:AIRE, 2011);
- Guidance on applying the Waste Hierarchy (Defra, June 2011);
- Guidance on applying the waste hierarchy to hazardous waste (Defra, Nov 2011)
- Technical Guidance WM3: Waste Classification - Guidance on the classification and assessment of waste (Joint Agencies, 2018);
- Guidance on Waste recovery plans and permits (EA, 2016);
- Waste & Resources Action Programme (WRAP) Aggregates Quality Protocol (Environment Agency, 2015);
- Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Defra, 2009); and
- Model Procedures for the Management of Land Contamination (Contaminated Land Report (CLR) 11) (EA, 2004).

1.5 Approach to Assessment

1.5.1 Wastes will be an inevitable consequence associated with the construction and operational phases of the Proposed Development.

1.5.2 The waste hierarchy sets a priority order for dealing with waste to determine the most sustainable management option for all wastes prior to removal from where they are produced or held. Driving waste up the waste hierarchy is an integral part of the National Waste Management Plan for England 2013 and National Planning Policy for Waste 2014. It is also a legal requirement to demonstrate that the waste hierarchy has been considered before it is recovered or disposed.

- 1.5.3 There is no industry accepted method for assessing the implications of waste during construction or operation. However, an assessment of wastes will be required following the principles identified in The National Planning Policy for Waste 2014 to demonstrate that:
- The likely impact of the Proposed Development on existing waste management facilities, and on sites and areas allocated for waste management, is acceptable and does not prejudice the implementation of the waste hierarchy and / or the efficient operation of such facilities;
 - The Proposed Development makes sufficient provision for waste management and promotes good design to secure the integration of waste management facilities with the rest of the development; and
 - The handling of waste arising from the construction and operation of Proposed Development maximises reuse / recovery opportunities, and minimises off-site disposal.
- 1.5.4 The proposed approach will examine the management of waste arising from the construction and operational phases of the Proposed Development. The proposed assessment methodology would involve assessing the estimated generic quantities of the various waste streams generated and the potential waste management options in accordance with the waste hierarchy and assessing the impact in the context of the capacity of local and regional waste infrastructure.
- 1.5.5 Opportunities for managing waste in accordance with the waste hierarchy would be identified. Measures to ensure compliance with National Legislation would be identified, particularly relating to requirements associated with the management of any contaminated material.
- 1.5.6 The waste assessment would cover the following:
- **High-Level Waste Regulatory Constraints Assessment** – to provide a detailed overview of the regulatory constraints associated with managing construction, demolition and excavation waste in accordance with the waste hierarchy to maximise waste reduction, recycling and waste recovery on site.
 - **Baseline Assessment** – identification of current waste management practices and the availability / capacity of local and regional waste infrastructure. This will include an assessment of treatment capacity in the absence of the Lakeside Energy from Waste Facility associated to the HAL DCO Project.
 - **Construction Phase Assessment** – identification of the predicted types and quantities of waste that would be produced during construction; proposed waste management measures to reduce impacts on receiving waste management infrastructure in accordance with the waste hierarchy. Mitigation measures during construction will be proposed and detailed.
 - The BRE's (Building Research Establishment) SMART Waste data report (2013) will be used to estimate volumes of waste arisings from the construction phase of the proposed development, where specific quantities are unknown. BRE produced the SMART Waste data report by assessing actual data from approximately 10,000 completed new build, refurbishment and other civil engineering projects. The data will be assessed to establish:
 - Likely remedial methods to be used for dealing with contaminated soils (if any);

- Likely quantities of contaminated materials (if any);
 - Likely quantities of other (inert) soils;
 - Possible onsite treatment methods (if required);
 - Likely quantities of major construction materials; and
 - Likely generation (if any) of special hazardous wastes.
- **Pre-construction Site Waste Management Plan (SWMP)** – quantification of estimated waste arisings and would identify potential savings and measures to minimise waste. Record any decision given to materials resource efficiency in designing and planning the construction, taken before the SWMP was drafted on the nature of the project; its design; and the construction method or materials employed, to minimise the quantity of waste produced on site. This includes cost-saving elements in design. For each waste produced, the SWMP will identify the proposed waste management option, including re-use, recycling, recovery or disposal. The SWMP will include provision for responsible personnel and their associated roles, waste reduction methods, waste recycling and reuse methods, disposal options and policy compliance. This will be incorporated into the Construction Environmental Management Plan (CEMP), along with the recommendations from the waste assessment to promote waste minimisation at source for demolition and construction.
 - **Operational Phase Assessment** – identification of the predicted types and quantities of waste that would be produced during operation; waste storage requirements; proposed waste management measures to reduce impacts on receiving waste management infrastructure in accordance with the waste hierarchy.
- I.5.7 The waste assessment would be delivered in the form of a Waste Technical Report to be included in the EIA as a technical appendix of the Land Quality Chapter of the ES. The Waste Technical Report would comprise the elements described above. and are.
- I.5.8 Although the construction phase in particular is likely to produce significant quantities of waste, mitigation for waste management is generally provided via tertiary mitigation in the form of waste management statutory duties, good / best construction practices and the use of non-regulatory principles (such as the CL:AIRE Definition of Waste – Code of Practice (CoP)) that promote reuse or recovery.
- I.5.9 The effect of wastes during construction and operation occur off-site when waste is removed from the development. As such, effects are largely limited to the waste facilities operated by waste management companies. Effects caused by movements of vehicles transporting waste to these facilities will be dealt with in the Transport Assessment, Air Quality Assessment and Noise and Vibration Assessment.
- I.5.10 Waste management facilities are required by the conditions of their environmental permit to ensure that wastes are dealt with in accordance with best available techniques in a manner that prevent unacceptable harm to human health or the environment. There is a requirement that a responsible contractor producing waste as part of the construction process will follow their legal obligation under the Waste Duty of Care to ensure wastes are only transferred to an authorised party; and that wastes are transferred to authorised facilities.

- I.5.11 There is an established network of waste infrastructure in the South East of England and the Greater London area that provide a wide range of recovery and disposal options for wastes that will not be recovered as part of the construction process during construction.
- I.5.12 Overall, it is considered that potential environmental impacts associated with waste will be managed by regulatory obligations, good and best practice construction processes; and the use of non-regulatory principles. However, due to the quantities and types of waste that are likely to be produced, it is recommended that 'Waste' is included in the formal EIA process but presented in the form of a Technical Report, which is appended to the Land Quality ES Chapter.

I.6 References

Defra & Government Statistical Service (2018) UK Statistics on Waste. Available at:
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/746642/UK_Statistics_on_Waste_statistical_notice_October_2018_FINAL.pdf [Accessed: 27/11/2018].



APPENDIX 17.1

Surface Access Study: Stage 1a Summary

I Surface Access Study: Stage Ia Summary

I.1 Overall Passenger Travel

I.1.1 The Civil Aviation Authority (CAA) and Heathrow Airport Limited (HAL) survey passengers annually to determine how they travel to and from Heathrow Airport. In 2017, approximately 80 million passengers per annum (mppa) arrived and departed from Heathrow Airport. Circa. 36% of these, were passengers transferring between planes and the remaining 64% were passengers arriving or leaving the airport by all forms of ground transportation. **Figure I** shows how passengers travel to and from Heathrow Airport. Around 39% of passengers currently use public transport to access Heathrow Airport, as opposed to 61% of passengers who travel by car or taxi.

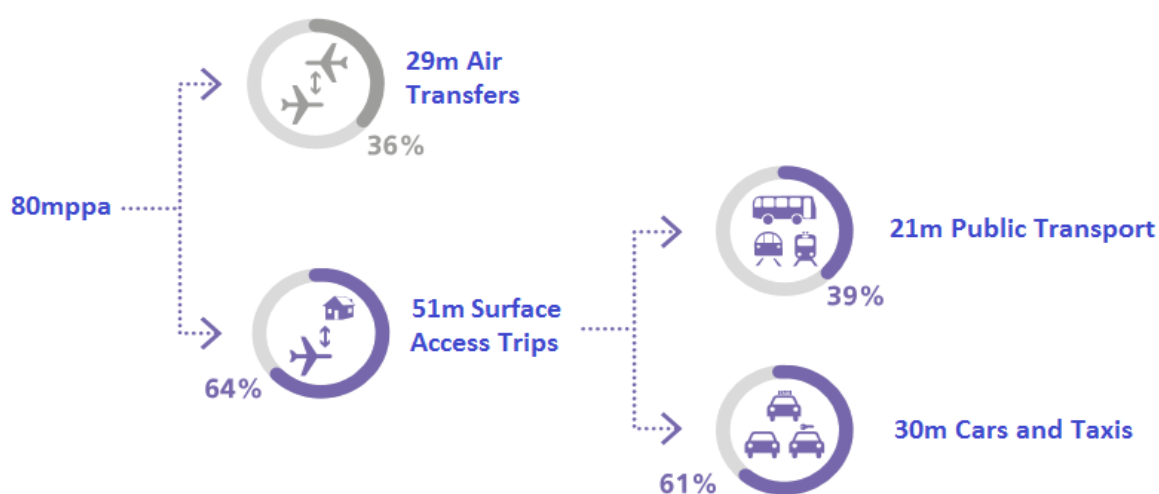


Figure I Passenger travel choices in 2018 (Source: Source: CAA passenger Surveys)

I.2 Mode and Origins / Destinations

I.2.1 An overall breakdown of the mode of transport used for surface access includes:

- Private car = 12m per annum;
- Hire car = 2m per annum;
- Taxi = 16m per annum;
- Local bus and coach = 6m per annum;
- Underground = 9m per annum; and
- Rail = 6m per annum.

I.2.2 The demand and method of travel varies depending on where people are travelling to and from. Of those passengers travelling to or from Heathrow Airport, around half come from London and the East. Due to better public transport options from London and the East, almost half of these people use public transport compared to 30% or less from the other directions:

- London and the east = 26m per annum (48% by public transport);

- The east = 5m per annum (21% by public transport);
- The west = 10m per annum (32% by public transport); and
- The north = 10m per annum (29% by public transport).

1.3 Travel Patterns Over Time

1.3.1 Travel patterns to and from Heathrow Airport have changed considerably over time, as presented in **Figure 2**. Travel by public transport has doubled since 1990 from ten million passengers to 21 million passengers. The introduction of new services such as the Heathrow Express and TfL Rail have had significant impacts on choosing public transport as a mode of travel.

1.3.2 The proportion of passengers travelling by car has remained relatively stable over the past 25 years however, the use of taxi and private car hire has significantly increased.

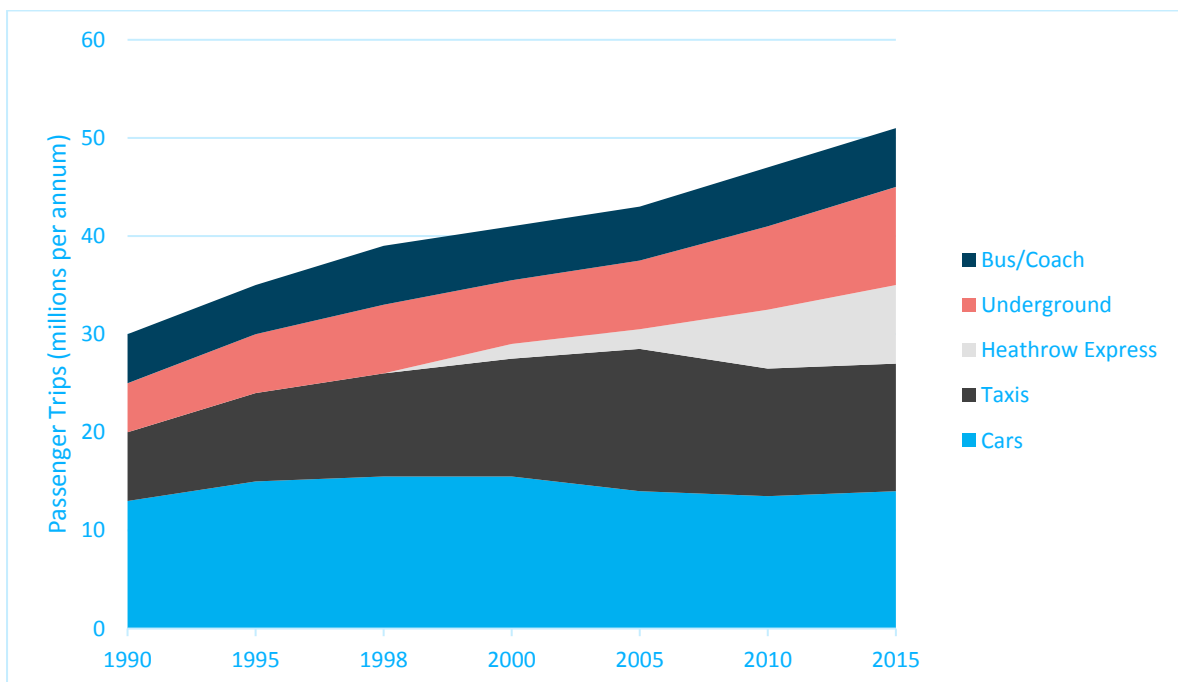


Figure 2 Passenger transport choices over time (Source: CAA Passenger Surveys)

1.3.3 Public transport mode share has risen steadily from 33% to 39% between 1991 and 2016¹. The introduction of new services such as the Heathrow Express have had the biggest impact. In addition, the introduction of the Oyster Card has made public transport more accessible.

1.3.4 The proportion of passengers travelling to and from Heathrow Airport by private car or hire car has fallen from 42% in 1990 to 28% in 2015, in spite of surface access passenger demand rising from 30 million in 1990, to 49 million in 2015. Alongside this, there has been an increase in the proportion of passengers travelling to Heathrow Airport by taxi and private car hire.

1.3.5 The success of public transport is a direct reflection of the availability of sustainable choices. In locations where viable public transport alternatives exist, there is generally a much higher level of public transport use as shown in **Table I**. In central London, over 60% of passengers utilise public transport, likely as a result of the high availability of public transport options such

¹ Mode share is the percentage of people who take that mode of transport to/from Heathrow

as the Piccadilly Line and TfL Rail. The Elizabeth Line is planned to begin service to Heathrow Airport from December 2019.

Table 1 Car and public transport journey times to Heathrow Airport from various locations (Source: CAA Analysis)

Location	PT Journey Time (m)	Car Journey Time (m)	% PT Trips
Tower Hamlets	57	68	68
Westminster	48	45	56
Hammersmith	40	25	49
Guildford	103	44	9
Camden	46	49	69
Reading	70	49	29
Bristol	162	118	50

1.4 Daily Trips

- 1.4.1 The travel patterns outlined in **Table 1** equate to a quarter of a million passengers per day at Heathrow Airport. There are currently 221,000 trips generated by Heathrow Airport, of which 133,000 are surface access trips and 88,000 are employee commuting trips. This represents a split of 60:40 between passengers and employees.
- 1.4.2 **Table 4.2** shows a comparison of Heathrow Airport mode share versus other well-known airports, based on slightly older data (circa 2015). The data suggests Heathrow Airport is performing above average in terms of public transport usage. **Table 2** also suggests those airports with good public transport connections best achieve surface access travel by public transport.

Table 2 Surface access trips comparison between different UK and Europe airports (Source: IATA Surveys)

Airport	MPPA	2way Pax/ Hr	% Road	% PT
Heathrow	75.7	8,640	62	38
Gatwick	30	3,420	56	44
Stansted	18.7	2,130	49	51
Luton	6.8	780	68	32
London City	1.5	170	79	21
Manchester	19.7	2,250	82	18
Birmingham	9.1	1,040	87	13
Madrid Barajas International	50.4	5,750	65	35
Amsterdam- Schiphol	63.6	7,260	60	40
Charles de Gaulle	65.9	7,520	57	43
Ataturk International	60.2	6,870	75	25
LAX	45.8	5,230	95	5
San Francisco	30.4	3,470	87	13
San Diego	11.1	1,270	91	9
San Jose	7.13	810	92	8
Ontario	5.4	620	81	19
Toronto	17.1	1,959	88	12
Kuala Lumpur International	52.6	6,000	59	41
Jakarta Soekarno-Hatta International	55	6,280	85	15

1.5 Freight and Logistics

- 1.5.1 Heathrow Airport is a major employment site and a key airport for the import and export of

goods. Maintaining this economic activity requires regular freight and logistics deliveries. The vast majority of airport-related goods are transported by road with some use of rail freight.

I.5.2 Heathrow generates 13,000 daily freight and logistics trips consisting of:

- Handling air cargo and mail: 9,000 vehicles per day (69%);
- Servicing the airport: 1,500 vehicles per day (12%); and
- Servicing the aircraft: 2,500 vehicles per day (19%).

I.5.3 Identifying freight vehicles related solely to Heathrow Airport can be challenging. This is due to the wider freight and logistics activities that surround Heathrow Airport but are not necessarily directly related to the airport. Many freight and logistics companies are attracted to the area because of the excellent access to the strategic road network and central London. In addition to this, the availability of affordable light industrial land at locations such as Poyle, and the Park Royal Industrial estate are also advantageous.

I.5.4 Freight movements can cause problems for local people such as vehicles using inappropriate routes and parking in residential areas. This is due to a lack of planning of strategic land use and a lack of facilities in the area for HGV drivers. Longer-term solutions to improve facilities and more integrated transport and land use planning would be required to tackle some of the existing issues.

I.6 Rail Transport

I.6.1 There is a good choice of public transport options with express rail services into London. These include the Heathrow Express, TfL Rail and the London Underground Piccadilly Line, as shown in **Figure 3**.

I.6.2 The Heathrow Express rail service offers a non-stop, 15 min service to central London four times an hour and it is complemented by TfL Rail (formerly, 'Heathrow Connect' until 20th May 2018), a stopping service operating every 30 minutes that serves employee and passenger catchments in West London.

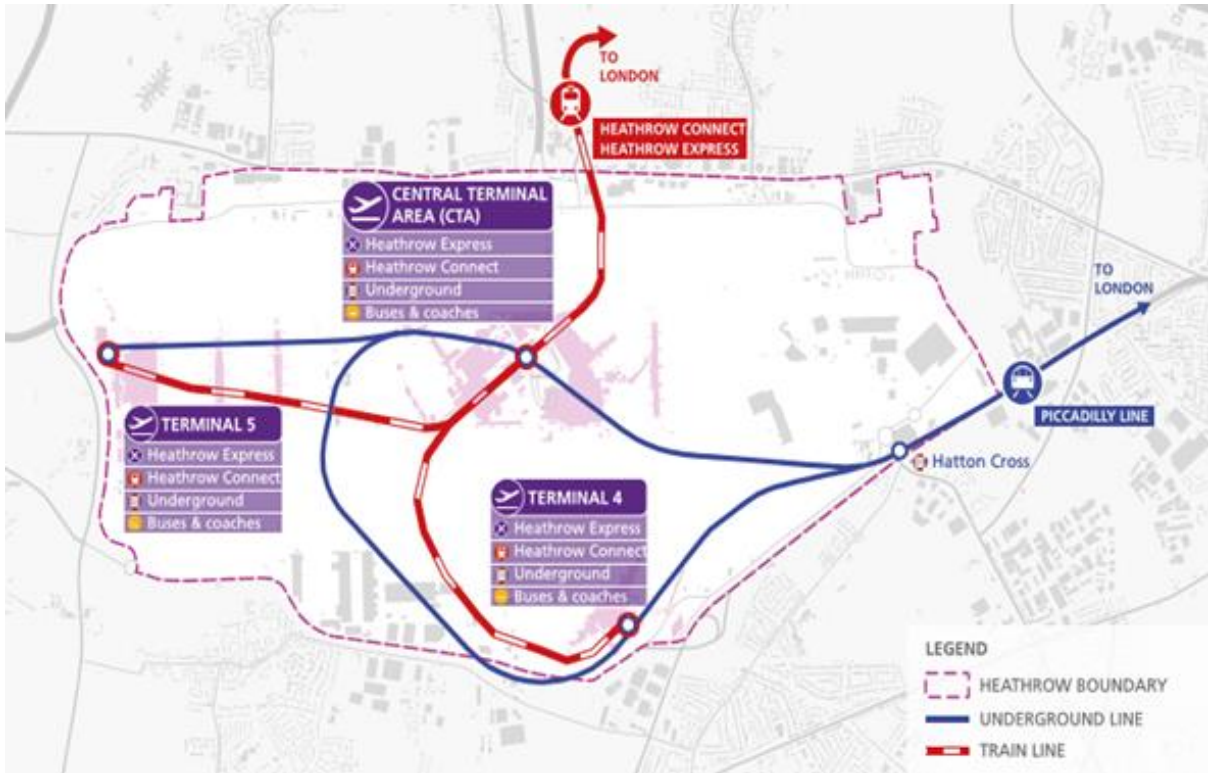


Figure 3 Direct rail routes to Heathrow Airport (Source Transport for London)

1.6.3 The Piccadilly Line offers a lower cost public transport alternative for both passengers and employees. Trains depart from Heathrow Airport every five minutes towards Central London and beyond to North London. Trains run through the night on Friday and Saturday on the Piccadilly Line, providing 24-hour weekend services, as shown in **Figure 4**.

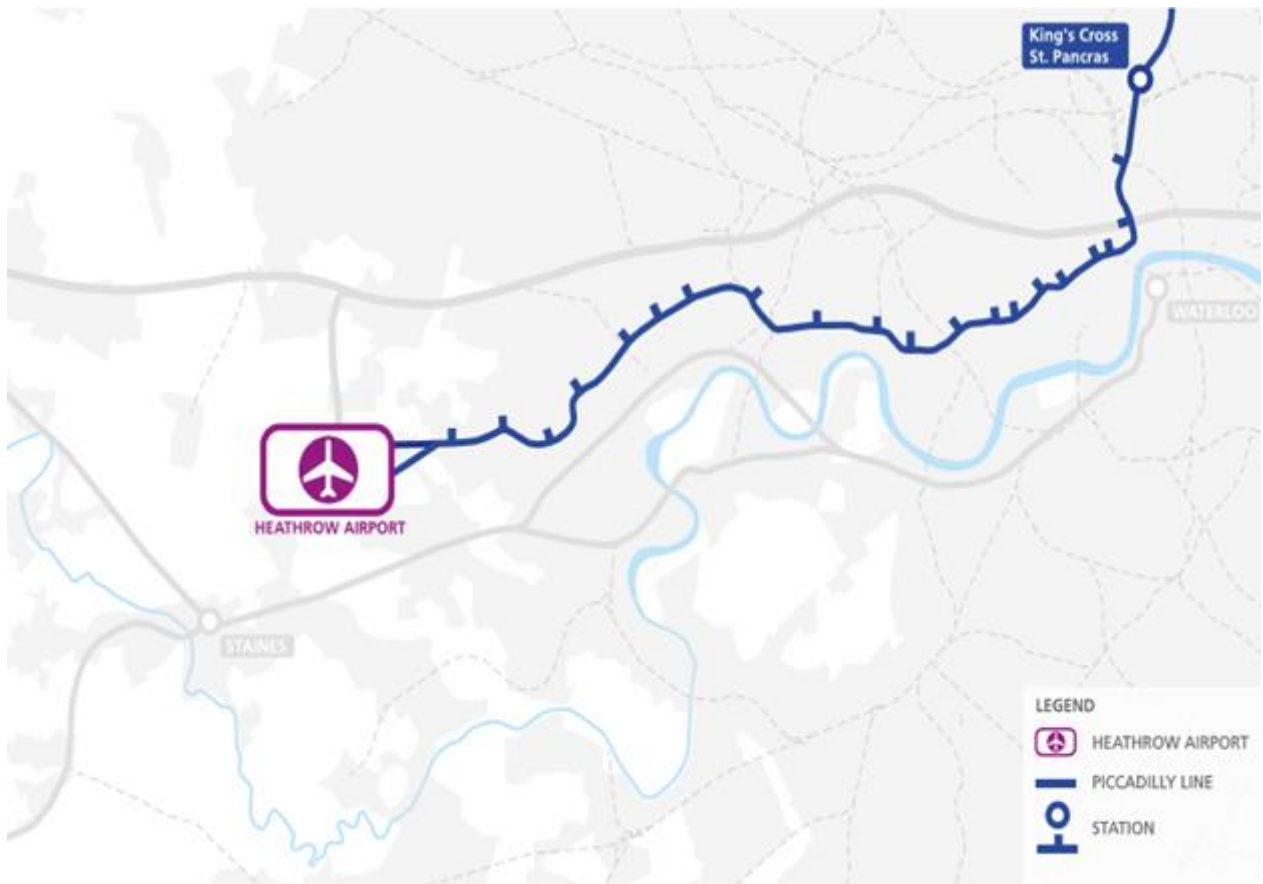


Figure 4 The Piccadilly Line Route (Source: Transport for London)

1.6.4 The combination of these services provides 18 trains per hour from Heathrow Airport to central London at peak times. This gives a two-way capacity of 22,400 passengers per hour as shown in **Table 3**.

Table 3 Estimated Rail Capacity Provision Today (Per Direction) (Source: PDFH and Transport for London)

Rail Service	Trains	Capacity / Hour	Total Capacity/ Hour
	Per Hour (tph)	(sitting)	(sitting and standing)
Heathrow Express	4	1,800	1,800
TfL Rail	2	700	1,200
Piccadilly Underground Line	12	3,300	8,200
Totals	18	5,800	11,200

1.6.5 **Table 3** also includes the effects of background passenger trips on the railway network which is not directly related to trips to/from Heathrow Airport.

1.7 Road Transport

1.7.1 Heathrow Airport has excellent connections to the strategic road network. Heathrow Airport has direct access to the M25 and M4 and connections to M1, M3 and M40 close by. Important local access is provided by A4 and A30 routes. **Figure 5** shows the existing road network.



Figure 5 Existing road network (Source: Transport for London)

1.7.2 Highways England is planning a number of road improvements as outlined in the Road Investment Strategy (RIS 1) which covers England’s motorways and strategic roads during the 2015 to 2020 period. RIS 2, which covers planned road investment post 2020, is currently under development. **Table 4** summarises the committed road schemes.

Table 4 Highways England Planned Road Improvements

Scheme	Description	Status	Timescales
M4 Junctions 3 to 12	Making the M4 a 'smart motorway' between Junctions 3 and 12	Under construction	2017 Start
M25 Wisley Interchange	Improvements to Junction 10 of the M25	Committed change	2019/2020 start
M25 Junctions 10 to 16	Improvements to the M25 between junction 10 and junction 16	Committed change	2020 start

Source: Highways England

1.7.3 The road plans would need to be reflected in the emerging surface access study as the work progresses. In particular, these would need to be incorporated into a future year Reference Case for any transport modelling.

1.8 Parking

1.8.1 Heathrow Airport Ltd controls around 41,000 on-airport car parking spaces, with approximately 25,000 spaces for passengers and 16,000 for staff. An additional 12,500 spaces are operated by external agents including British Airways.

1.8.2 Parking numbers are monitored on an annual basis and this specifies a maximum of 42,000

airport controlled parking spaces. This does not affect external provision under London Borough controls. Parking provision is shown in **Figure 6**.



Figure 6 Parking at Heathrow Airport today (Source: Transport for London)

1.8.3 Using published statistics, it is useful to compare Heathrow Airport against other airports. **Table 5** shows the average parking rate of Heathrow Airport compared to other airports in the UK. Heathrow Airport has a much lower parking rate reflecting the significant dependency on public transport for surface access.

Table 5 Parking Comparison Against Other UK Airports (Source: IATA Surveys)

Airport	MPPA	Spaces per MPPA	Total Spaces
Heathrow	75.7	517	39,137
Gatwick	30	1,074	32,220
Stansted	18.7	3,591	67,152
Luton	6.8	2,880	19,584
London City	1.5	1,510	2,265
Birmingham	9.1	1,725	15,698
Manchester	19.7	947	18,656
Edinburgh	2.7	1,147	3,097
Glasgow	5.01	494	2,475

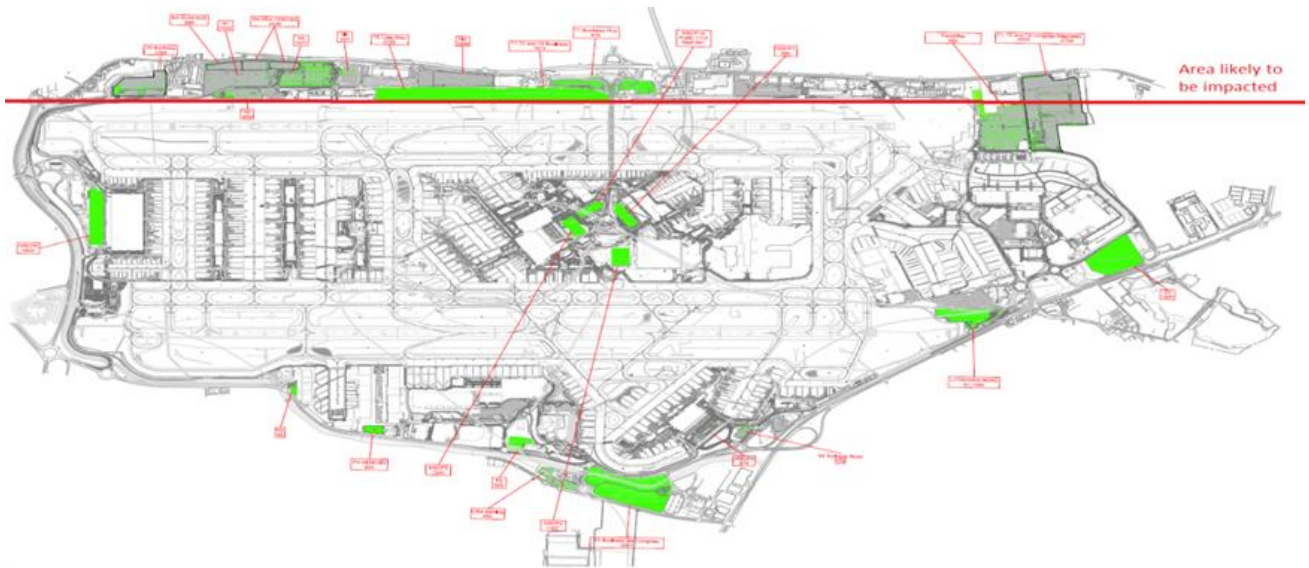


Figure 7 Airport Controlled Parking at Heathrow Airport (Source: Heathrow Airport Ltd.)

1.8.4 Tenanted parking areas are shown above the coloured line in **Figure 8**.

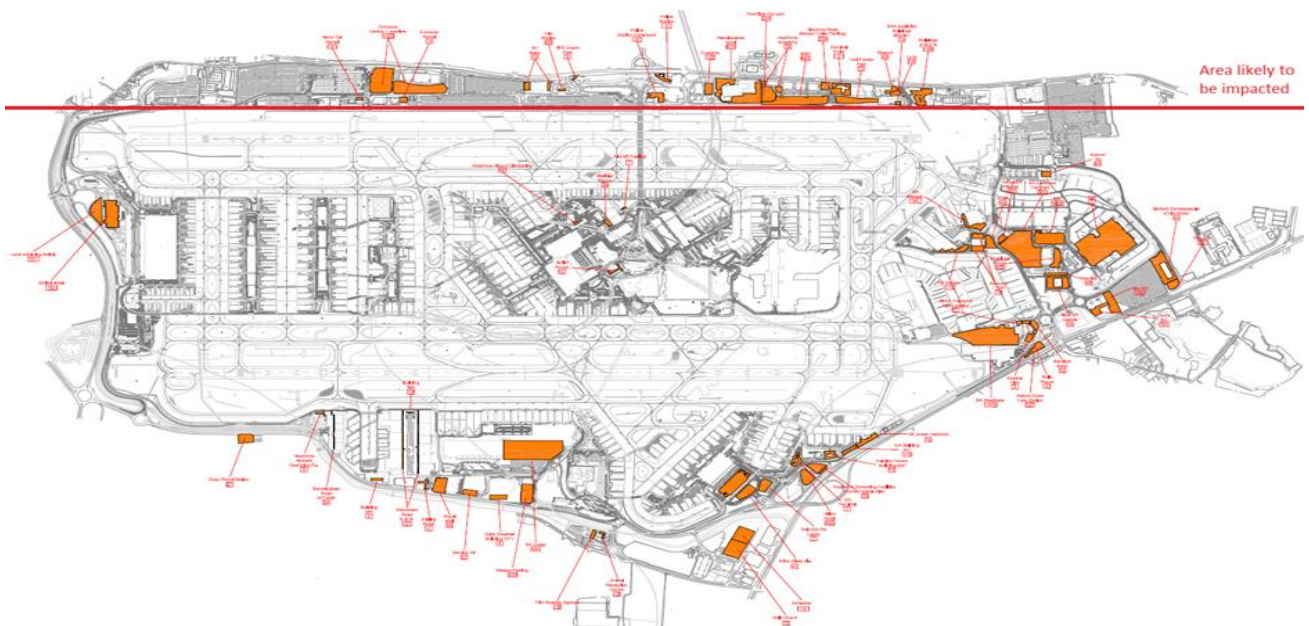


Figure 8 Tenanted Parking at Heathrow Airport (Source: Heathrow Airport Ltd.)

1.9 Local Bus

1.9.1 Local bus services play an important role at Heathrow Airport by providing a dense network of local transport links as shown in **Figure 9**. This connectivity often allows access to and from areas not served by rail or London Underground. There are 24 bus routes that currently serve Heathrow Airport at a combined frequency of around 67 buses per hour. This includes 23 routes that provide early morning or 24-hour services, allowing employees who work shifts, access to public transport options.

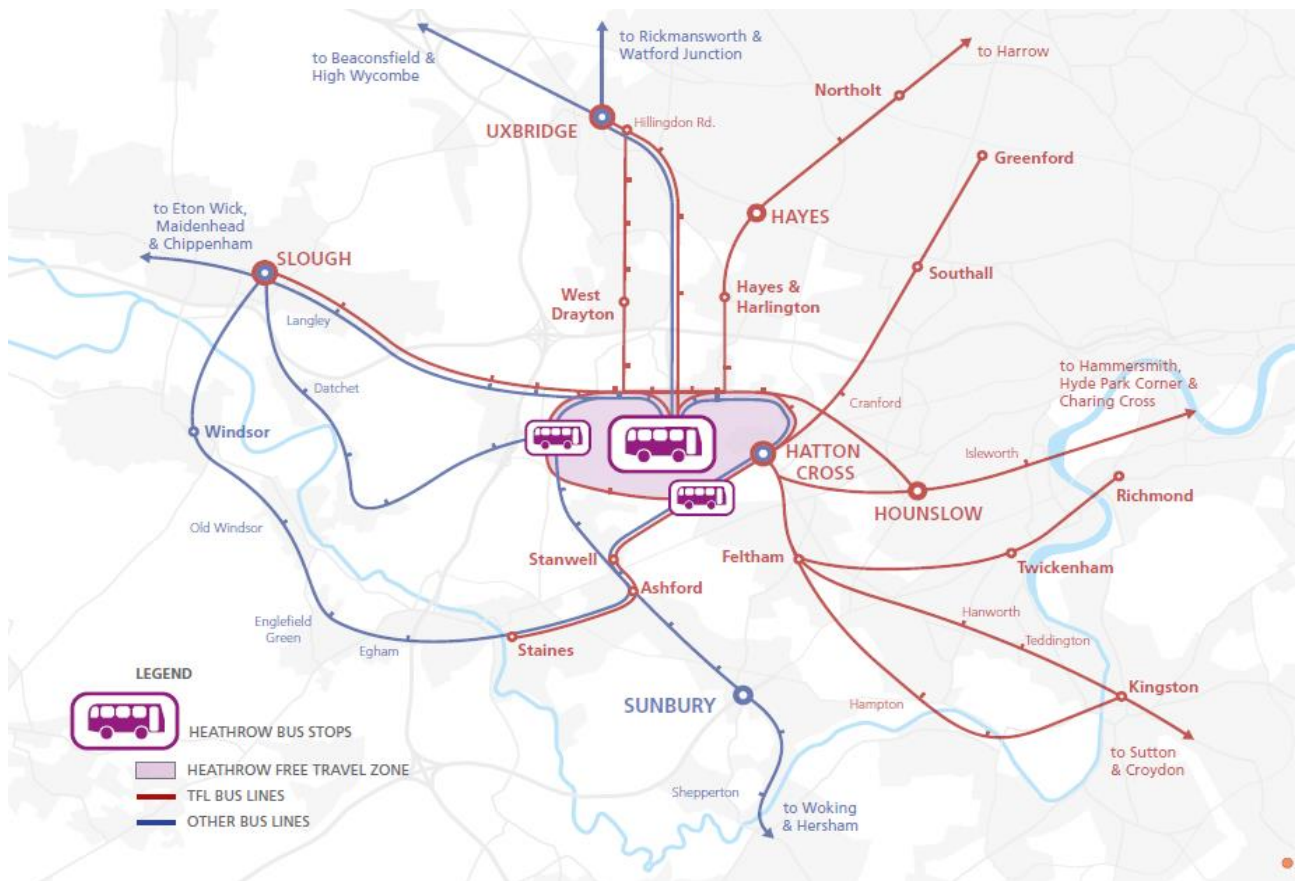


Figure 9 Local Bus Services (Source: Transport for London)

1.10 Daily Vehicle Trips Composition

1.10.1 The total number of vehicles travelling to or from Heathrow Airport is estimated to be 143,000 vehicles per day, which includes cars, taxis, buses, coaches and lorries. An overall breakdown of the mode of transport used for surface access by vehicles includes:

- Private car = 81,000 per day (56%);
- Hire car and Taxi = 44,000 per day (31%);
- Local bus = 4,000 per day (3%);
- Coach = 1,000 per day (1%); and
- Goods vehicles = 13,000 per day (9%).

1.10.2 Heathrow Airport related traffic is a preliminary estimate for an average day in 2016.

1.11 Motorways and Trunk Roads

M3 Motorway

1.11.1 The M3 is a motorway linking the south-east of London with Surrey, Hampshire and the south-west. The motorway passes within 6km of the south-west of Heathrow Airport with the principal point of access towards Heathrow Airport from J2 / M25 J12.

1.11.2 The M3 between J1 and J3 is dual three lanes, passing through J2, which is the interchange with the M25 (J12). The M3 eastbound through the junction has two lanes, the westbound

carriageway reduces from two to one lane as it passes through the interchange.

1.11.3 J2 is a complex four way, two level interchange sometimes referred to as a “Whirlpool”. The interchange allows free flow movements in all directions with all slip roads including two traffic lanes. Each lane is assumed to be 3.65m wide. **Table 6** shows the geometric details.

Table 6 Summary of Existing Geometry and Dimensional Aspects of the M3

Link	Lanes	Lane Width (m) ⁽¹⁾	Min Radius (m) ⁽²⁾	Max Design Speed (kph) ⁽³⁾	Posted Speed Limit (kph)
M3 Eastbound	3 (2 through interchange)	3.65	2880	120	112
M3 Westbound	3 (1 through interchange)	3.65	2880	120	112 (80 through interchange)
West to North	2	3.65	385	100	70
West to South	2	3.65	155	60	80 ⁽⁴⁾
East to South	2	3.65	205	70	112
East to North	2	3.65	155	60	112
North to East	2	3.65	285	85	112
North to West	2	3.65	155	60	80
South to West	2	3.65	345	85	112
South to East	2	3.65	165	60	112
M25 Northbound	3	3.65	>2880	120	112
M25 Westbound	3	3.65	>2880	120	112

(1) Estimated lane width

(2) Radius estimated from Google Earth mapping

(3) TD9/93 Design Speed implied from measured geometry, super-elevation not assessed

(4) Advisory

1.11.4 This section of the M3 is currently being upgraded under the Highways England’s Managed Motorways programme. The works are scheduled for completion in late 2018.

M4 Motorway

1.11.5 The M4 is a motorway linking London with the west of England and South Wales. The motorway passes within 1.5km to the north of Heathrow Airport with the principal point of access towards Heathrow Airport from J4 via a motorway standard spur commonly known as the M4 Heathrow Spur (Tunnel Road).

1.11.6 The M4 between J3 and J4 and through J4 is dual three lanes. Eastbound, the junction overbridge marks the start of a 60mph speed limit. J4 is a two bridge roundabout with the motorway passing over a signalised roundabout below. The roundabout has been heavily modified and signalised to increase capacity. All entries to the roundabout are signal controlled and the circulating carriageway separates leaving and circulating traffic at each exit.

1.11.7 Between J4 and J4b (M25 J15), the motorway widens on each side. Eastbound, the motorway gains a lane from the South/ North to East M25 J15/4b slip road to become four lanes. The lane gain is lost as part of the eastbound exit slip at J4. Westbound the motorway gains a lane from the westbound entry slip road at J4 to become 4 lanes. The lane gain is lost as the East to South/North slip road at the M25 J15/J4b interchange. **Table 7** shows the geometric details.

Table 7 Summary of Existing Geometry and Dimensional Aspects of the M4

Link	Lanes	Lane Width (m) ⁽¹⁾	Min Radius (m) ⁽²⁾	Max Design Speed (kph) ⁽³⁾	Posted Speed Limit (kph)
M4 Eastbound	3	3.65	>2880	120	112 (100 east of junction)
M4 Westbound	3	3.65	>2880	120	112
Westbound exit	2 (2 at stop line + left slip)	3.65	>2880	120	112
Westbound entry	2	3.65	>2880	120	100
Eastbound exit	3 (2 at stop line + 2 lane left slip)	3.65	>2880	120	112
Eastbound entry	2	3.65	>2880	120	112
Stockley Road northbound (exit)	5	3.65	>2880	120	80
Stockley Road southbound (entry)	4 (3 at stop line + 2 lane left slip)	3.65	>2880	120	80
M4 Spur Southbound	3 (+ bus lane)	3.65	1050	120	80
M4 Spur Northbound	3	3.65	1050	120	80
Circulating Carriageway			65		80

(1) Estimated lane width

(2) Radius estimated from Google Earth mapping

(3) TD9/93 Design Speed implied from measured geometry, super-elevation not assessed

(4) Advisory

1.11.8 Between J4b and J5, the motorway is four lanes in each direction. Eastbound, a lane is gained from the J5 eastbound entry slip road to become 4 lanes. The lane gain is lost as the West to North/ South slip road at M25 J15/J4b. Westbound, the motorway gains a lane from the South/North to West entry slip road at M25 J15/J4b to become 4 lanes. The lane gain is lost as the eastbound exit slip road to J5. To the west of J5, the motorway is dual 3 lanes.

1.11.9 The section of the M4 is currently being upgraded under the Highways England's Managed Motorways programme. The works are scheduled for completion in late 2021-22.

M4 Heathrow Spur/ Tunnel Road

1.11.10 The spur from the M4 J4 towards Heathrow Airport is some 1.4km long. The road is dual three lanes with a southbound off-side bus lane.

1.11.11 The Spur terminates at a roundabout on the north side of the existing north runway. The roundabout does not have a full circulating carriageway, with the southern section reserved for emergency services only. Access to Heathrow Airport is via a tunnel beneath the north runway to Terminals 2 and 3 and the central airport campus. Access to local roads, including the Northern Perimeter Road and A4 Bath Road is provided for vehicles using the spur and

leaving Heathrow Airport via the East and West Ramps.

I.11.12 The northbound section of the Spur and the westbound on slip road at J4 are being upgraded together with improvements for walking and cycling.

M25 Motorway

I.11.13 The M25 is an orbital motorway which circles the Greater London area. It connects with all motorway, trunk road and major road routes serving the north, east, south and west of England. The motorway passes within 1km of the existing Terminal 5 and provides a direct route to Terminal 5 via a dedicated junction.

I.11.14 The motorway varies in width in the section between J12 and J16 but is basically dual 4 lanes. A number of lane gain and drops increase the width in places and parallel link roads provide access to local roads and allow the dedicated access to Terminal 5 (J14b) to be fitted in between J14 and J15.

I.11.15 Through J12, the motorway is dual 4 lanes. Between J12 and J13, the motorway is effectively 5 lanes wide northbound and 5 lanes wide southbound. One lane of the northbound carriageway is a lane gain from the J12 northbound slip road, which is lost at J13 as the northbound exit slip. Southbound, the motorway is 4 lanes wide through J13, picking up a lane gain from the J13 southbound entry slip which develops further south to a 3 lane main line and 2 lane drop for the J12 southbound exit slip road.

I.11.16 J13 is a two bridge junction with the motorway passing over. The circulating carriageway below is signal controlled with a spiral lane configuration. J13 provides access to local roads serving Staines and Wraysbury. The junction also picks up link roads which connect the A30 Egham by-pass with the A30 Staines by-pass running parallel to the M25 which shares the northbound exit slip road and the southbound entry slip road. **Table 8** shows the geometric details.

Table 8 Summary of Existing Geometry and Dimensional Aspects of the M25

Link	Lanes	Lane Width (m) ⁽¹⁾	Min Radius (m) ⁽²⁾	Max Design Speed (kph) ⁽³⁾	Posted Speed Limit (kph)
M25 Northbound	4	3.65	1020	120	112
M25 Southbound	4	3.65	1020	120	112
Northbound exit (A30)	4	3.65	>2880	120	112
Northbound entry	2	3.65	>2880	100	65
Southbound exit	4	3.65	>2880	100	112
Southbound entry	1	3.65	2880	120	112
A30 Staines Bypass eastbound (exit)	2	3.65	410	100	112
A30 Staines Bypass westbound (entry)	2 + left slip	3.65	410	100	112
Heron Lake Road Westbound (exit)	1	3.65	150	60	50
Heron Lake Road Eastbound (entry)	1 (3 at stop line)	3.65	150	60	50
Circulating Carriageway	3	3.65	90	n/a	100

(1) Estimated lane width

(2) Radius estimated from Google Earth mapping

- (3) TD9/93 Design Speed implied from measured geometry, super-elevation not assessed
 (4) Advisory

1.11.17 J13 to J14 is 4 dual lanes. Northbound the motorway picks up a lane gain northbound from the J13 northbound exit slip road which is lost as the northbound exit slip road at J14. Southbound the motorway picks up a lane gain from the J14 southbound entry slip road and Terminal 5 Access Road southbound slip road onto the M25. This runs parallel to the M25 southbound carriageway before joining the M25 and is lost as the J13 southbound exit slip road.

1.11.18 J14 is a two bridge junction with the circulating carriageway at a high level and motorway passing below. All entries to the roundabout are signalised. The roundabout provides local access towards Horton, Colnbrook and Poyle. Leaving eastbound from the roundabout, the A3113 is a dual carriageway which links with the A3044 Stanwell Moor Road, the Southern Perimeter Road and the Western Perimeter Road. The northbound M25 entry slip road is taken on an offline trajectory over the J14a south to east slip road to move the point of entry to the M25 north of J14a. The single lane slip road merges with the Terminal 5 Access Road west to north slip road, before passing under the Terminal 5 Access Road to join the M25 northbound.

1.11.19 The M25 southbound exit slip is picked up to north of J14a and runs as a parallel link road to J14. The Terminal 5 Access Road north to east slip road diverges before the slip road passes beneath the Access Road and the east to south slip road before terminating at the J14 high level roundabout.

1.11.20 The M25 northbound exit slip road splits from the Terminal 5 Access Road south to west slip road diverging on the offside. The 2 lane slip road terminates at the high level J14 roundabout.

1.11.21 The M25 southbound entry slip road merges with the Terminal 5 Access Road west to south slip road before joining the M25 southbound. **Table 9** shows the geometric details.

Table 9 Summary of the Existing Geometry and Dimensional Aspects of the M25

Link	Lanes	Lane Width (m) ⁽¹⁾	Min Radius (m) ⁽²⁾	Max Design Speed (kph) ⁽³⁾	Posted Speed Limit (kph)
M25 Northbound	4	3.65	1440	120	112
M25 Southbound	4	3.65	1440	120	112
Northbound exit	2	3.65	2880	120	112
Northbound entry	1	3.65	360	100	65
Southbound exit	2	3.65	360	100	112
Southbound entry	1	3.65	2880	120	112
A3113 Eastbound (exit)	2	3.65	265	85	112
A3113 Westbound (entry)	2 (3 at stop line)	3.65	145	60	112
Horton Road Westbound (exit)	1	3.65	445	100	50
Horton Road Eastbound (entry)	1 (3 at stop line)	3.65	135	60	50
Circulating Carriageway	3	3.65	80	n/a	100

- (1) Estimated lane width.
 (2) Radius estimated from Google Earth mapping.
 (3) TD9/93 Design Speed implied from measured geometry, superelevation not assessed.

- I.11.22 The M25 between J14 – J14a (Terminal 5 Access Road) is basically a dual 4 lane motorway. Whilst the Terminal 5 Access road crosses the M25 as J14a, the entry and exit slips are spread between J13 and J15.
- I.11.23 Between J14a and J15, the motorway reduces from 4 lanes to 3 lanes at J15. Northbound the M25 picks up two lanes, one each from the J14 northbound entry slip road and the Terminal 5 Access Road northbound entry slip road, making it effectively 6 lanes wide. The 3 nearside lanes are lost as the J15 south to west slip road and south to east slip road. Southbound, the M25 is 3 lanes through J15. It picks up 3 lanes, being 2 lanes from the J15 east to south slip road and 1 lane from the west to south slip road. Towards J14a, 2 lanes are lost to the southbound exit to Terminal 5 Access Road and a parallel link which is the J14 southbound exit slip road.
- I.11.24 J14a provides access to and from the Terminal 5 Access Road. The junction is a modified 3 way – 2 level “Trumpet”. The M25 northbound exit (south to east) is shared with the M25 J14 exit slip road, an offside diverge takes the 2 lane slip road beneath the high level J14 roundabout before climbing in a long right hand curve to pass over the M25, reducing to one lane as it crosses the M25 then merging with the north to east slip road. The slip road, terminates at a roundabout with the Western Perimeter Road (estimated 90m Inscribed Circle Diameter (ICD)).
- I.11.25 The M25 southbound exit slip road (north to east) is shared with the exit slip road to J14. A nearside diverge takes the 2 lane slip road in a left hand curve, reducing to one lane as it merges with the south to west slip road before terminating at the roundabout junction with the Western Perimeter Road. **Table 10** shows the geometric details.

Table 10 Summary of Existing Geometry and Dimensional Aspects of the M25

Link	Lanes	Lane Width (m) ⁽¹⁾	Min Radius (m) ⁽²⁾	Max Design Speed (kph) ⁽³⁾	Posted Speed Limit (kph)
M25 Northbound	4	3.65	2040	120	112
M25 Southbound	4	3.65	2040	120	112
West to North	1	3.65	65	Loop ⁽⁴⁾	65
West to South	2	3.65	200	70	65
North to West	2	3.65	185	70	65
South to West	1	3.65	285	85	65

(1) Estimated lane width

(2) Radius estimated from Google Earth mapping

(3) TD9/93 Design Speed implied from measured geometry, superelevation not assessed

(4) Loop as defined in TD22/06

- I.11.26 The Terminal 5 Access Road basically provides a dual carriageway which terminates at a roundabout junction with the Western Perimeter road. The Terminal Access Road passes over the A3055 Stanwell Moor Road and has no connection to the road.
- I.11.27 J15 is a four level, four way interchange taking the M25 over the M4 with free flow slip roads connecting all directions. The M25 and M4 are both dual 3 lanes through the junction. The eight slip roads vary between 1 or two lanes and pass at a low level beneath the M4 or high level above the M25. **Table 11** shows the geometric details.

Table 11 Summary of Existing Geometry and Dimensional Aspects of the M25

Link	Lanes	Lane Width (m) ⁽¹⁾	Min Radius (m) ⁽²⁾	Max Design Speed (kph) ⁽³⁾	Posted Speed Limit (kph)
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M25 Northbound	4 (3 through junction)	3.65	1440	120	112
M25 Southbound	4 (3 through junction)	3.65	1440	120	112
West to North	2	3.65	215	70	70
West to South	1	3.65	155	60	65 ⁽⁴⁾
East to South	2	3.65	620	70	112
East to North	1	3.65	140	60	65 ⁽⁴⁾
North to East	2	3.65	265	85	112
North to West	1	3.65	145	60	65 ⁽⁴⁾
South to West	1	3.65	445	100	112
South to East	1	3.65	135	60	65 ⁽⁴⁾
M4 Eastbound	4 (3 through junction)	3.65	2880	120	112
M4 Westbound	4 (3 through junction)	3.65	2880	120	112

- (1) Estimated lane width
(2) Radius estimated from Google Earth mapping
(3) TD9/93 Design Speed implied from measured geometry, super-elevation not assessed
(4) Advisory

1.11.28 The M25 is programmed to be upgraded to a Smart Motorway. Northbound J10 – J16 is being considered for hard shoulder running. A scheme is under preparation and work is programmed to start in 2021 or 2022.

1.12 All Purpose Roads

A3113 Trunk Road

- 1.12.1 The A3113 is a dual carriageway with a minimum curve radius estimated at 600m, implying a 120kph design speed. The road is signed with a 50mph speed limit.
- 1.12.2 It is designated as a Trunk Road and links the M25 J14 to the Southern and Western Perimeter roads. The eastern end of the link is a roundabout junction (estimated ICD 100m) at a part signalised roundabout junction with Stanwell Moor Road and the Southern Perimeter Road.
- 1.12.3 The Southern Perimeter Road has a short (225m) link to a roundabout junction (estimated ICD 80m) with the Western Perimeter Road. The exit to the Western Perimeter Road forms a sharp curve (estimated 40m radius which takes the Western Perimeter Road through 90 degrees to travel north along the western airfield boundary.
- 1.12.4 The link is the only direct route between the off-site servicing and maintenance facilities in the Poyle area to the western and southern boundaries of Heathrow Airport. The A3113 also links to the A3044 Stanwell Moor Road, providing a direct route north to Bath Road and the A4.

1.13 Non-Motorways and Trunk Roads

Western Perimeter Road

- 1.13.1 The Western Perimeter Road is a single carriageway road which connects the Southern Perimeter Road and gives access to the A3113 link towards the M25. The road runs close and parallel to the western boundary of the airfield giving access to freight and maintenance facilities on the airfield. The road meets the Terminal 5 Access Road at a roundabout to the

north of Terminal 5. The roundabout also provides access to parking, airside facilities, Terminal 5 drop-off and pick up bus and taxi services. The Western Perimeter Road continues north around the airfield boundary, then east along the northern boundary, eventually becoming the Northern Perimeter Road.

- I.13.2 The southern end of the road, at the roundabout junction with the Southern Perimeter Road has a tight estimated 40m radius bend which is the tightest radius on the road. A speed limit of 30mph is applied. The road has two northbound lanes and one southbound lane which reduces to one lane in each direction at a traffic signal junction some 100m south of the terminal building which provides access to the airfield.
- I.13.3 At the roundabout junction with the Terminal 5 Access Road, the northbound carriageway joins and leaves the roundabout. The southbound carriageway passes beneath the roundabout in a tunnel, with slip roads providing access to and egress from Terminal 5 drop-off, pick-up and parking facilities only. There is no direct route from the southbound carriageway to the Terminal 5 Access Road.
- I.13.4 To the north of the roundabout the Western Perimeter Road is formed of two parallel single carriageway sections which continues around the northern perimeter of the airfield. The two carriageways join to the east of the access to the Heathrow Airport POD Parking site for Terminal 5.

A3044 Stanwell Moor Road

- I.13.5 The A3044 Stanwell Moor Road is a dual carriageway which runs north to south parallel to the Western Perimeter Road and the western boundary of the airfield. It has no connections with any other road or Terminal 5 between the A3113 roundabout and a roundabout junction with Bath Road at the north west corner of the airfield. At this junction, there is a bus and cycle only access to the Western Perimeter Road. The A3044 continues north from here to a traffic signal controlled junction on the A4 Bath Road.
- I.13.6 The smallest radius along the road is estimated at 450m, suggesting a 100kph design speed. A speed limit of 50mph is posted on the road.

A4 Bath Road (Colnbrook Bypass)

- I.13.7 The A4 Bath Road runs parallel to the northern boundary of the airfield some 250 – 300m to the north. The A4 is mainly dual carriageway, with priority and signalised junctions serving adjacent residential, commercial and hotel properties. To the west, the A4 meets the A3044 Stanwell Moor Road at a signalised junction to the north-west of the airfield, continuing westwards to join the M4 at junction 5. The A4 passes over the M4 Heathrow Spur, a signalised junction to the east of the crossing at Nene Road provides access to the Spur Road and tunnel to the central campus. The junction also allows access to the Northern Terminal Road.

Bath Road

- I.13.8 Bath Road is a single carriageway road which runs between the A4 Bath Road and the roundabout junction with A3044 Stanwell Moor Road and provides local access to residential, commercial and hotel sites. Bath Road continues westwards, crossing the M25 towards Poyle, where it joins Poyle Road.

I.14 Rail Network

I.14.1 There are currently two rail services serving Heathrow Airport. The internal rail network runs entirely underground and enters Heathrow Airport from the north.

Heathrow Express

I.14.2 A direct rail link runs from London Paddington Station to Terminal 2 & 3 and Terminal 5. The service runs every 15 minutes with journeys to Terminals 2 & 3 taking 15 minutes and 21 minutes to Terminal 5. Trains operate between 05:00 and 23:25 every day.

Local Rail Services

I.14.3 There is a good choice of public transport options with express rail services into London. These include the Heathrow Express, TfL Rail and the London Underground Piccadilly Line.

I.14.4 The Heathrow Express rail service offers a non-stop, 15 min service to central London four times an hour and it is complemented by TfL (formerly, 'Heathrow Connect' until 20th May 2018), a stopping service operating every 30 minutes. A stopping service is provided between London Paddington and Heathrow Airport Terminal 2 & 3 and Terminal 4. Trains operate between 05:00 and midnight every day leaving every 30 minutes with a journey time varying between 31 and 49 minutes.

I.14.5 There is currently one underground line serving Heathrow Airport. The Piccadilly Line runs from central London calling at all stations en-route to stations at Terminal 2 & 3, Terminal 4 and Terminal 5. Trains operate approximately every 10 minutes between 05:00 and midnight weekdays and Sundays with a 24 hour service on Fridays and Saturdays.

I.14.6 The Piccadilly Line offers a lower cost public transport alternative for both passengers and employees. Trains depart from Heathrow Airport every five minutes towards Central London and beyond to North London. Trains run through the night on Friday and Saturday on the Piccadilly line, providing 24-hour weekend services.

I.14.7 The combination of these services provides 18 trains per hour from Heathrow Airport to central London at peak times. This gives a two-way capacity of 22,400 passengers per hour as shown in **Table 12**.

Table 12 Estimated Rail Capacity Provision Today (Per Direction) (Source: PDFH and Transport for London)

Rail Service	Trains	Capacity / Hour	Total Capacity/ Hour
	Per Hour (tph)	(sitting)	(sitting and standing)
Heathrow Express	4	1,800	1,800
TfL Rail	2	700	1,200
Piccadilly Underground Line	12	3,300	8,200
Totals	18	5,800	11,200

I.14.8 **Table 12** also includes the effects of background passenger trips on the railway network which is not directly related to trips to/from Heathrow Airport.

Pod Parking Transit Link

I.14.9 A car park to the north of the airfield, between the Western Perimeter Road and A4 Bath Road has a direct transit link known as Heathrow Airport POD. The transit link runs overhead from the car park, crossing the Western Perimeter Road to travel around the airfield boundary, terminating at Terminal 5.

I.15 Emerging Transport Schemes

Western Rail Link to Heathrow Airport

- I.15.1 Network Rail has proposed to submit a DCO application for an improved rail link from Reading and the west to Heathrow Airport. The proposed scheme is predicted to improve accessibility to Heathrow Airport from the west, south-west, south wales and west midlands. The scheme would reduce congestion for rail passengers at Paddington by providing a direct route from Reading and Slough.
- I.15.2 The scheme would provide a fast alternative to current journeys made by car, bus and coach, offering the potential to encourage mode shift from travel by vehicle to rail for travellers and employees. The scheme would also remove the need for passengers travelling from the west to use existing rail services from Paddington to Heathrow. Reading has good access to the midlands which has the potential to reduce the number of journeys made via the north London rail termini across London to Paddington or on the Piccadilly Line. The opening of the Elizabeth Line in 2019 would offer an attractive rail route to those travelling from the east side of London.
- I.15.3 The scheme proposes trains using the existing Great Western Main Line (GWML) from Reading to a twin track surface spur east of Langley station. The spur travels south-east, descending in tunnel to join existing rail lines beneath Terminal 5. Major infrastructure elements include a tunnelled crossing to take the spur beneath the existing GWML and approximately 4km of twin tunnel to take the rail link beneath terminal 5.
- I.15.4 It is understood that the proposed scheme is predicated on providing improved access to the existing airport and is not related to proposals to increase capacity at Heathrow Airport. Construction cost is currently estimated at £1bn.
- I.15.5 Network Rail has prepared a preliminary assessment of the construction requirements for the Western Rail Link. The proposed West Campus encroaches into an area near Bedford Court where a portal is planned a Tunnel Boring Machine (TBM) together with a cut and cover tunnel section and site compound. Furthermore, the area is identified as a permanent flood storage area for Western Rail Link. There is potential for conflict between the two schemes during construction and in the location of the flood storage area which requires further attention.
- I.15.6 It is estimated that some 233,000 cubic meters of spoil would be removed by road. A number of roads identified for removal or realignment are identified as local construction access for the Bedford Court site including A3113, Stanwell Moor Road, Bath Road and Lakeside Road on the NWR site. The timing of the use of these roads and any alternative routes provided as part of the Western Campus scheme needs to be co-ordinated.

Heathrow Southern Railway

- I.15.7 Heathrow Southern Railway proposes to improve access from Surrey and Hampshire to Heathrow Airport and onwards towards Old Oak Common and Paddington. As well as providing better and more convenient access towards Heathrow Airport from the south-west, the proposal links with the Elizabeth Line and HS2 at Old Oak Common and provides an alternative and more direct route to Paddington, avoiding the need to travel via Waterloo.
- I.15.8 As connectivity between Hampshire and Surrey to the west side of London is currently poor, many journeys are undertaken by road using the A3, M3 and M25. A more direct rail

connection would encourage mode shift away from road to rail with consequent benefits to congestion and the environment.

- I.15.9 The scheme considers several options to consider infrastructure improvements already identified by Network Rail to improve future capacity on the South Western Main Line (SWML), including new flyovers at Woking and Basingstoke and station enhancements at Guildford. New tunnels are proposed to avoid level crossings in the Egham and Staines area and some 8 miles of new railway to link SWML, the existing Heathrow Terminal 5 station and GWML.
- I.15.10 A private company licenced by the Office of Rail and Road (ORR) is proposed to finance, construct and operate the railway, with estimated capital costs of up to £1.3 to £1.6bn.
- I.15.11 A feasibility study undertaken by Network Rail in 2015 indicates high to very high value for money parameters serving Heathrow Airport with both two or three runways. The study suggests that improved southern access to Heathrow Airport could beneficially be linked to the expansion of Heathrow.
- I.15.12 A subsequent 2017 update of modelling and appraisal undertaken for the 2015 feasibility study reduced some value for money parameters, however the overall conclusion for options tested by the study was that they provided high value for money.
- I.15.13 Both schemes offer opportunity to encourage mode shift from road to rail and could contribute towards aspirations for there to be no overall increase in road traffic as a result of expansion at Heathrow Airport.
- I.15.14 Heathrow Southern Railway has not developed any details on construction requirement, however it seems likely that similar issues relating to tunnelling, site compounds and construction access would need to be considered.

Elizabeth Line

- I.15.15 The Elizabeth Line would provide direct services from London and the east to Heathrow Airport currently planned from December 2019. The service would run six times an hour, however, only two trains are currently scheduled to serve Terminal 5. This may be increased to four trains if demand increases. Elizabeth Line trains would be operated by TfL, bringing all the benefits of Oyster fares to travellers.

Underground

- I.15.16 Under the New Tube for London programme TfL are planning signalling improvements and new rolling stock for the Piccadilly Line which could increase capacity by 60% allowing up to 27 trains per hour to operate by 2025. With current rolling stock approaching the end of its economic life, it is anticipated that new trains would be rolled out from 2023.

I.16 Digital Transport Baseline

Background

- I.16.1 A Strategic Digital Transport Baseline (SDTB) would be developed to assist in data review and analysis.

Overview of the SDTB

Software Platform

- I.16.2 The SDTB was built in the Cube Voyager software to process and present area-wide travel patterns. A brief description of the software is presented in this section.
- I.16.3 Cube is an International transportation modelling suite of tools, which also covers all aspects related to transportation planning, engineering, and land-use. With an open platform, Cube allows the building, calibration and testing of transport baselines of any type. Further details are available at <http://www.citilabs.com>.
- I.16.4 The software is a land-use/transport analysis tool that have been developed and applied internationally by the Citilabs software manufacturer. It has been used for planning literally thousands of major developments and master plans across the world. This work includes projects commissioned by Governments, Municipality's as well as the private sector.
- I.16.5 The SDTB is able to be used to determine changes in trip distribution and assignment of trips to/from and through the HWH site. The assignment is based on link capacity restraint. Capacity per hour and vehicle speed/flow relations are based on statistics and algorithms previously available.
- I.16.6 Cube has been successfully used to deliver transport modelling projects across the globe for a number of sectors and infrastructure (roads, rail, aviation, maritime, freight). This range of expertise provides comfort that the Cube software is at the forefront of the latest developments and industry trends.

Baseline Architecture

- I.16.7 In developing the SDTB, a strategic network was setup from a suitable CAD and GIS file of the HWH study area covering the strategic network. Network coding was assisted by observations in virtual earth maps provided by Google or Bing Maps.
- I.16.8 SDTB is an incremental demand and assignment baseline. SDTB uses a matrix estimation technique which allowed the development of origin-destination (OD) trips in the HWH site area based on the transport survey observations collected in the earlier parts of the study.
- I.16.9 Trip matrix estimation was applied and the base trip matrices were calibrated and validated to observed count data information from ATC and rail surveys. This ensured an independent validation as the data used to check the SDTB validation was different from the data used to build the OD trip matrices. The assignment was calibrated to the same set of counts data, and an appropriate software application was set up to allow for efficient baseline runs and maintain consistent levels of analysis.

Application Manager

- I.16.10 To facilitate the baseline operations, an appropriate analysis application was set up in Cube's application manager. A Cube application manager assists in running the SDTB. This was in particular the case for the distribution and assignment procedures. The trip matrices created in the trip matrix estimation process provide base year OD trip information for the presentation and quantification of existing travel patterns within the Proposed Development. **Figure 10** presents SDTB.

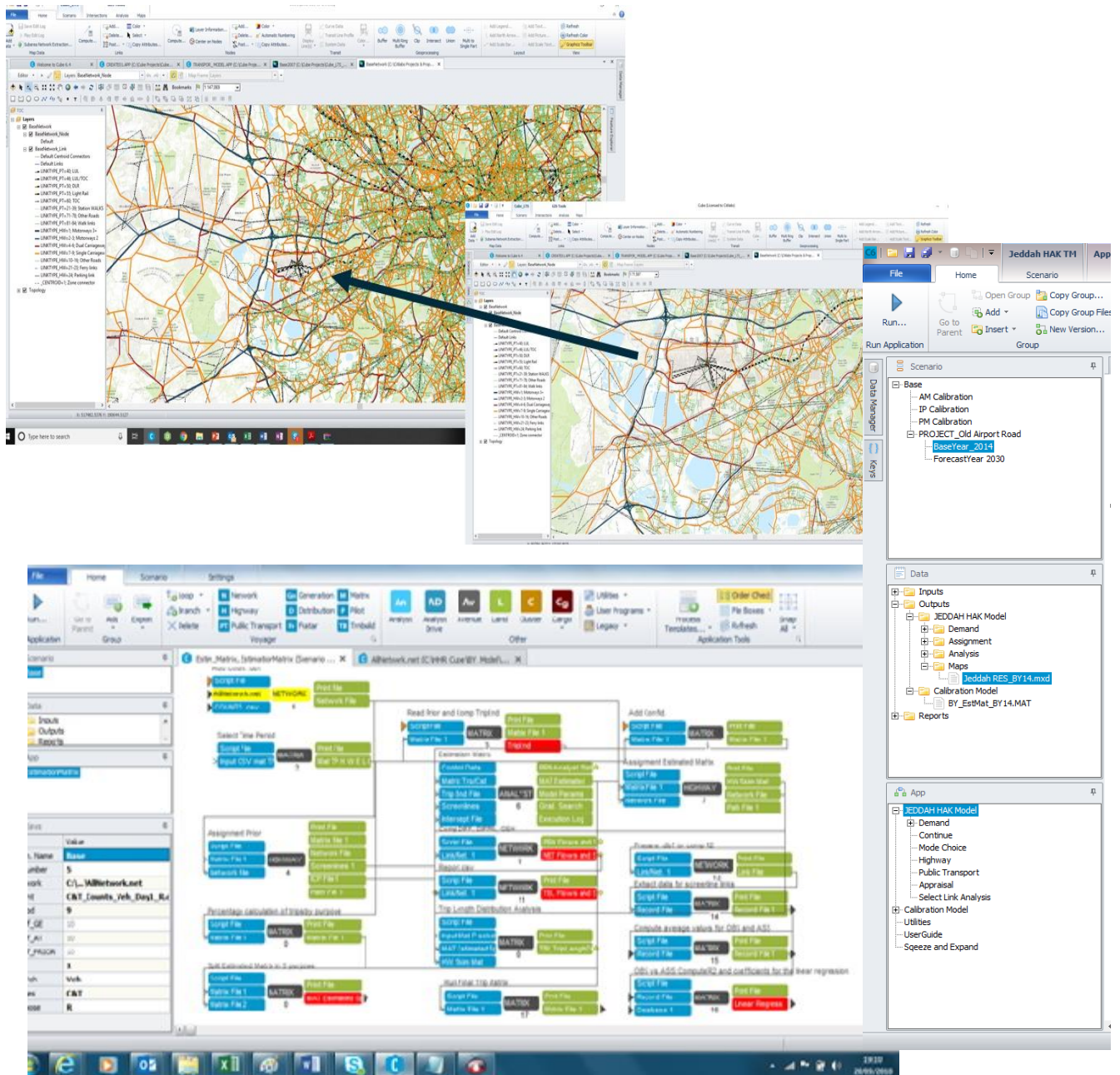


Figure 10 SDTB Application Manager

I.16.11 SDTB with all its tools and data is held in a Cube ‘catalog’. The catalog provides scenario management tools for keeping control of the baseline database, its data and outputs. The first (inset right, top) part of the catalog is the scenario tree. Here the projects are defined with their planning horizons and alternatives. The second (inset right, middle) part of the catalog provides a detailed overview of the essential data used in the baseline and the outputs that are created. The user can easily pick input and output data in table and map formats for the chosen (highlighted) scenario. The third (inset right, bottom) part of the catalog shows the baseline structure in tree format. There are two baselines, one main baselines for existing travel patterns and one for trip matrix estimation.

I.16.12 As can be seen in **Figure 10**, the strategic transport network covers the whole of the HWH

site. Trips that start, end or pass through the HWH study area are included.

Assignment of Trips

I.16.13 The highway and public transport assignments are sequential, i.e. the effects of congestion delays in the network are used in the transport assignments. The assignment is a link based capacity restraint algorithms. It is run until an accepted level of equilibrium is achieved using the volume averaging procedure. The number of iterations needed would depend on levels of flow and therefore likely to be higher for the future year.

Data Management

I.16.14 Data are stored in various files and databases. All data used can be accessed from the interfaces. The main input and output data can be opened from the scenario manager's data pane which is organized to make easy access to data for editing and viewing purposes.

I.16.15 Outputs can be saved into Excel files on a layer-by-layer basis so the built up of different trip types and journey purposes can be seen for each layer consisting of trips by mode, time period, trip purpose, vehicles or persons flows, station-to-station link section journey, and origin-destination (OD) tables. This is a transparent and detailed approach, but naturally means a lot of data to process.

Trip Purposes and Time Periods

I.16.16 SDTB was setup to analyse trips across three (3) time periods in the data analysis. This provides a more refined estimation of the total build-up of trips over the day. There are estimated expansion factors based on the seasonal trends data to expand the flows to Daily, Weekly, Monthly and Annual.

I.16.17 In addition, the transport data gathering identified different trip purposes which may exhibit different levels of sensitivity in travel choices. Hence, SDTB processes the data across various trip purposes to provide a more refined analysis of the drivers of demand.

I.16.18 Adding up the individual trip types gives the overall total travel volume. This provides a more refined analysis of the travel patterns.

Link Types and Characteristics

I.16.19 Various different types of road and rail links are included in the strategic network along the corridor. The intention was not to define the dense local network but rather focus on the strategic corridor along which movements which reflect the HWH study area. As such, the following link types were considered:

- Highway roads (various standards, e.g. Motorways, Trunk Roads, Arterial road, Major collector road, etc);
- Railway lines;
- Bus/coach routes; and
- Zone connectors.

I.16.20 Speeds and capacities for links were sourced from published information. Capacity is derived from the type of link. Speed/flow relationships determine the resulting speed for the link at various times given the flow on the link, although for a strategic corridor network like the HWH area. The type of speed/flow curves used in the SDTB comes from research undertaken

over decades by Rahmi Akcelic at the University in Melbourne, Australia. **Figure 11** below shows example Akcelic speed/flow curves. These curves are considered appropriate for the large study area.

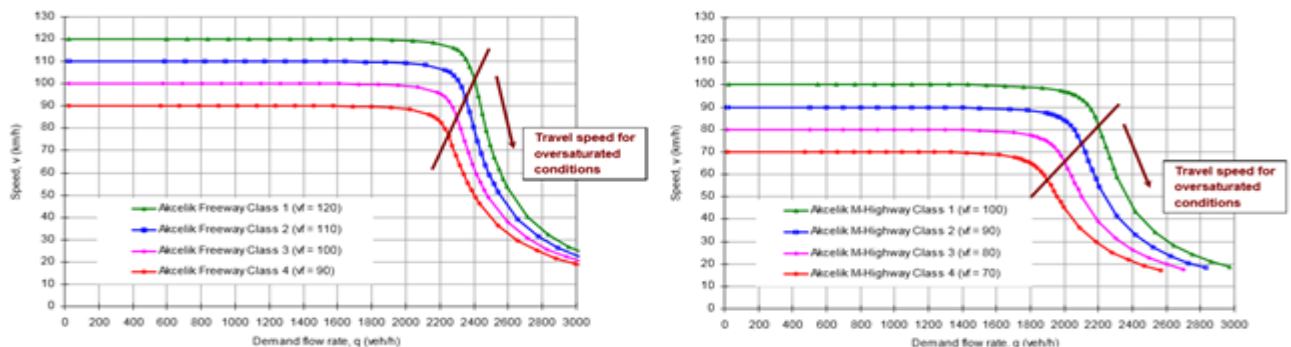


Figure 11 Example Speed/Flow Relationships

Trip Matrix Estimation

I.16.21 Trip matrix estimation was necessary to construct the origin-destination (OD) movements through the HWH study area using the data gathered. These formed the base OD trip matrices from the observed surveys. A separate calibration and validation exercise was then carried out to match the OD matrices to independent count information also gathered during the data collection. The estimation process was set up using the Cube software which has specific software designed for the development of OD matrices from raw data. The process is described below.

Principles of Matrix Estimation

I.16.22 The collected vehicle and passenger interview information were input into the Cube model to construct base OD trip matrices. The software looks at possible routes that goes through each observed survey location point. The OD information is balanced using in an iterative way until the best match between observed information and estimated OD flows is obtained.

Seed Matrices

I.16.23 The data gathered from the information collection work provided trip information split by journey purposes and modes of travel. This data was collated into observed OD tables by time period, mode of travel and trip purposes, and the data obtained from the individual count locations were merged together to give a series of overall observed OD matrices within the HWH study area.

I.16.24 Any identified gaps in the OD tables were infilled using standard Fratar/Furness trip distribution methods. The Fratar/Furness process was run for five iterations for each time period, to reach a good level of statistical fit. The resultant OD tables were then used as the 'seed' matrices for the matrix estimation process.

Time Periods

I.16.25 To reflect better the variations of movements throughout the day, the matrix estimation was set up to assign trips over the three time periods during an average weekday. Applying appropriate expansion factors to each of the time periods provides the daily, weekly, monthly and annual OD movements and flows.

Zoning System and Networks

I.16.26 The transport zone system and networks were established which was utilised throughout the transport OD interviews. This allowed recording the place of origin and destination of observed movements. Details of the zone system used as shown in **Figure 12**.

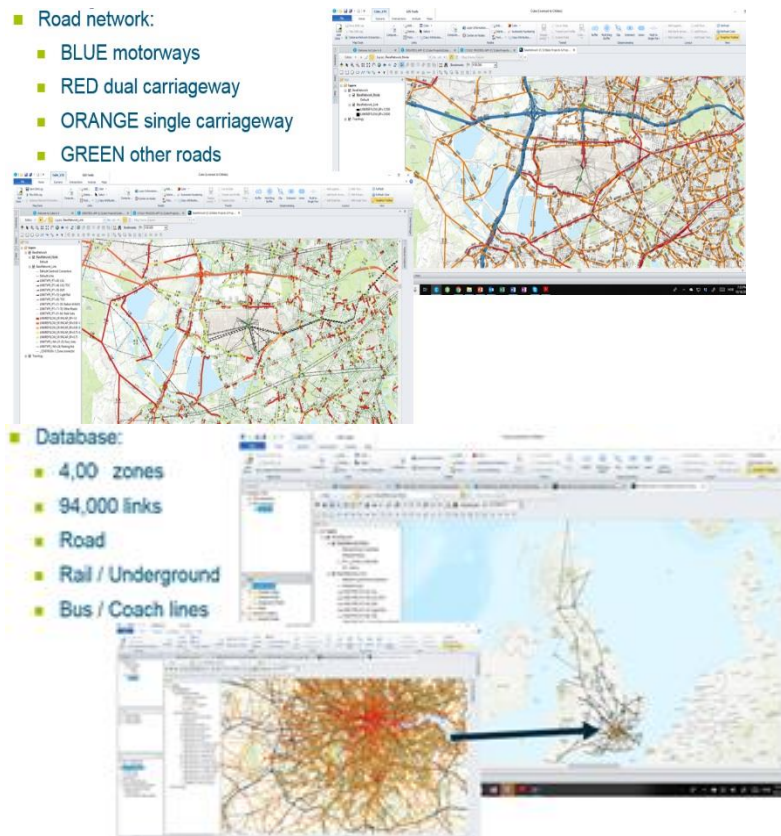


Figure 12 SDTB Local Network

I.16.27 For car / taxi trips, OD matrices were coded for trips made by both vehicles and passenger equivalents, which allows for an estimation of the average vehicle occupancy levels. For bus and rail trips, the OD matrices for these modes were obviously only coded for passenger trips.

Calibration and Validation

Calibration

I.16.28 The resultant OD matrices were calibrated by adjusting them to reflect the observed base counts. This was undertaken by time period and mode for a more refined analysis. This process was an iterative exercise until suitable matches were derived.

Validation Process

I.16.29 In order to confirm the accuracy of the resultant OD movements, a series of statistical goodness-of-fit checks were made. This included checking the assigned flows against the observed flows from the observed counts to confirm suitably close estimation.

I.16.30 The assigned flows were compared to observed flows using the GEH statistic and R-squared

calculation, as recommended in International guidance. The validation checks were undertaken for the three main peak hour time periods as the statistical validation procedures are only designed for peak hour tests.

I.16.31 The R-squared calculation process is well known so it is not proposed to describe it here, however the form of the GEH statistic is described as follows:

$$GEH = \sqrt{\frac{(V_2 - V_1)^2}{(V_1 + V_2)/2}}$$

V1 is the observed value and V2 is the modelled value.

Validation Results

I.16.32 The validation tests of the OD matrices after matrix estimation are summarised in **Table 13** and **Table 14** outlines the Weekend and Weekday scenarios, respectively. The comparison was undertaken against 244 observed counts within the HWH study area over the three peak hour time periods. Although some counts were at the same locations they were nonetheless for different modes or trip purposes and hence still provided an important statistical check. The validation was carried out separately for each mode (car/taxi, bus and rail) to provide a refined statistical goodness-of-fit test.

I.16.33 International modelling standards were used to undertake the analysis. The international standards use the GEH statistical measurement and recommend a minimum of 85% of all GEH measurements to be less than the required criteria. For strategic models covering a large geographical area such as the HWH study area, a GEH criteria value of 10.0 is a suitable level of accuracy and was used. This value is comparable to 95% statistical confidence intervals.

I.16.34 In addition to the GEH test, the standard adjusted R2 statistical value was also calculated. International modelling standards suggest an adjusted R2 statistical value of greater than 0.75 is desirable for large areas such as the HWH study area.

Table 13 Summary of Validation Tests (Weekend Scenario)

GEH < 10.0	Morning (AM) Peak Hour	Lunch Time (LT) Peak Hour	Evening (PM) Peak Hour
Cars and Taxis (Person Trips)	98% (network ave = 2.7)	98% (network ave = 2.6)	100% (network ave = 2.6)
Bus	100% (network ave = 1.0)	100% (network ave = 1.5)	100% (network ave = 0.8)
Rail	100% (network ave = 1.3)	100% (network ave = 0.5)	100% (network ave = 1.0)
Adj R ² Values	0.98	0.99	0.97

Table 14 Summary of the Validation Tests (Weekday Scenario)

GEH < 10.0	Morning (AM) Peak Hour	Lunch Time (LT) Peak Hour	Evening (PM) Peak Hour
Cars and Taxis (Person Trips)	100% (network ave = 2.2)	100% (network ave = 2.4)	98% (network ave = 3.4)
Bus	94%	100%	94%

	(network ave = 2.4)	(network ave = 1.2)	(network ave = 2.7)
Rail	100% (network ave = 1.6)	100% (network ave = 0.8)	100% (network ave = 1.2)
Adj R ² Values	0.97	0.98	0.98

I.16.35 **Tables 9.1** and **9.2** outline the final overall performance of the assignment model against the validation criteria, across different time periods and travel modes. As can be seen all time periods significantly exceed the minimum tests criteria which demonstrates a high level statistical goodness-of-fit and provides confidence in the derived OD matrices.

I.16.36 Similarly, **Figure 13** shows the scatter plot of assigned flows in SDTB versus observed counts with the overall best-fit linear regression line. This also shows a close correlation.

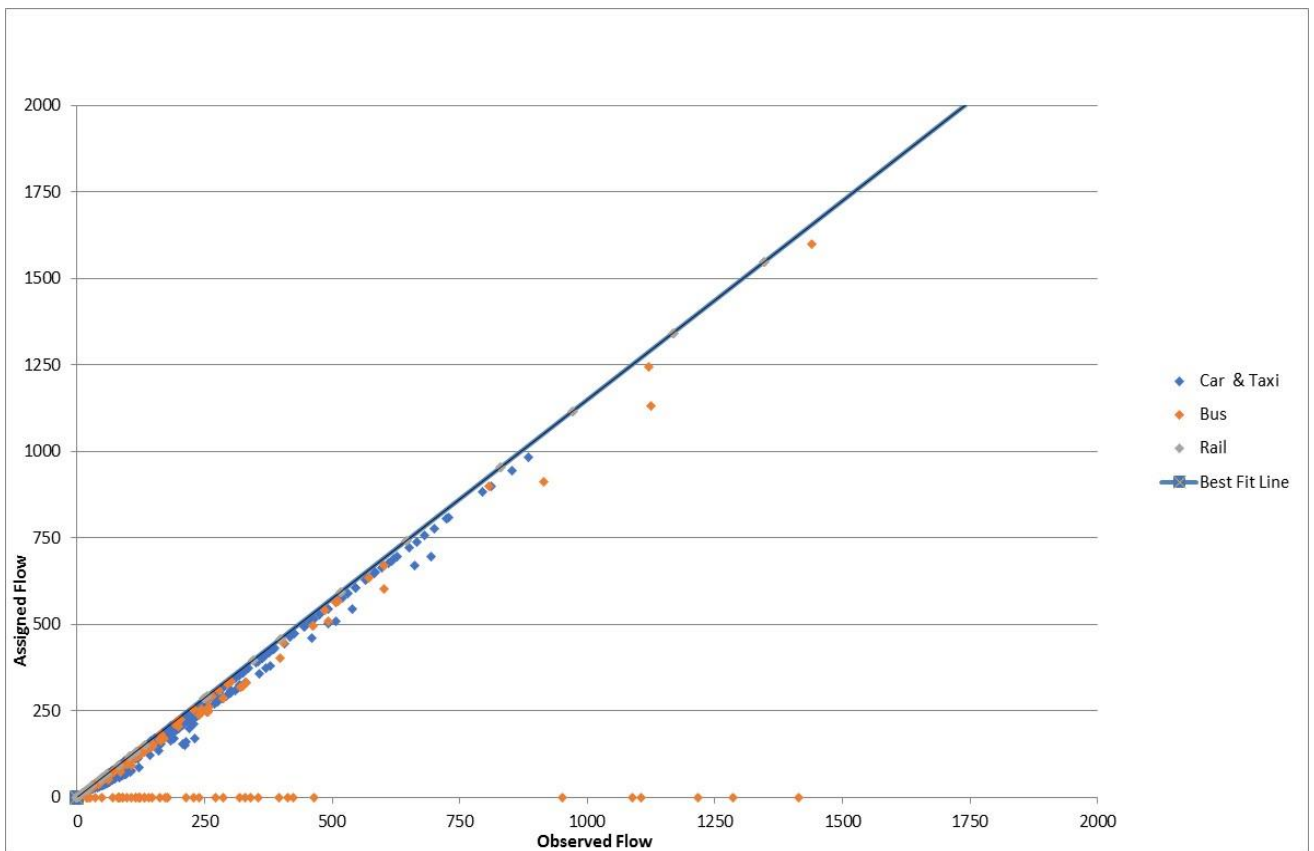


Figure 13 Best-Fit Linear Regression of the Observed Versus Assignment Flows

Network Transport Baseline

I.16.37 The final network-wide SDTB was collated using the Transport Baseline. **Figure 14** outlines the finalised road network around the Proposed Development. **Figure 15** shows the finalised rail network around the Proposed Development. **Figures 16, 17 and 18** shows the level of traffic congestion levels analysis for the three time periods.

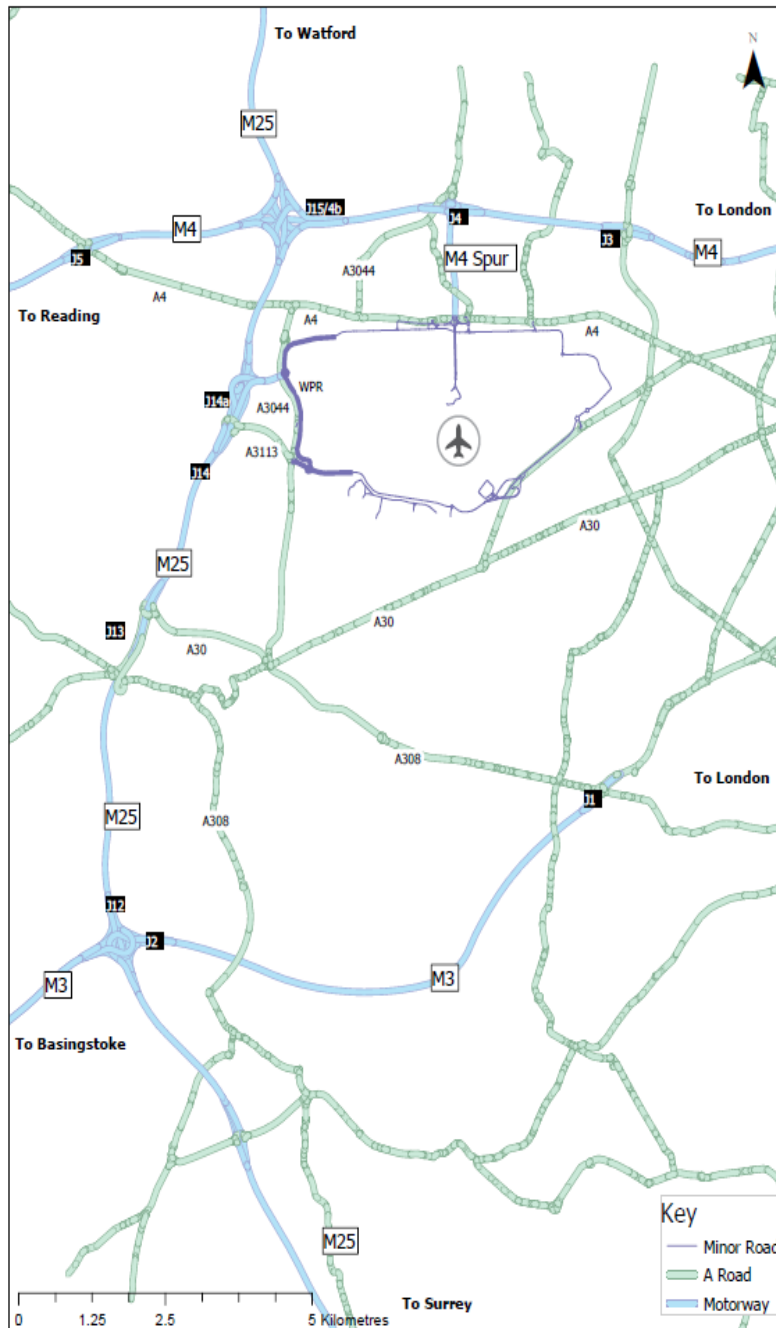


Figure 14 Finalised Road Network Around the HWH Site

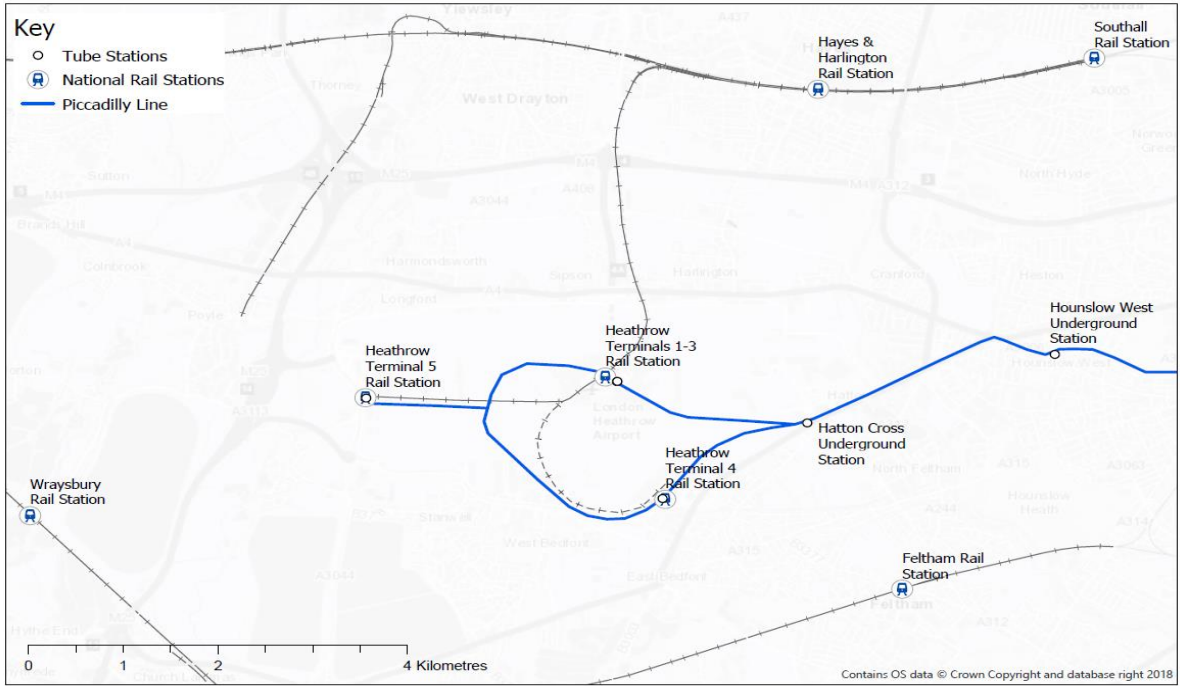


Figure 15 Finalised Rail Network Around the HWH Site

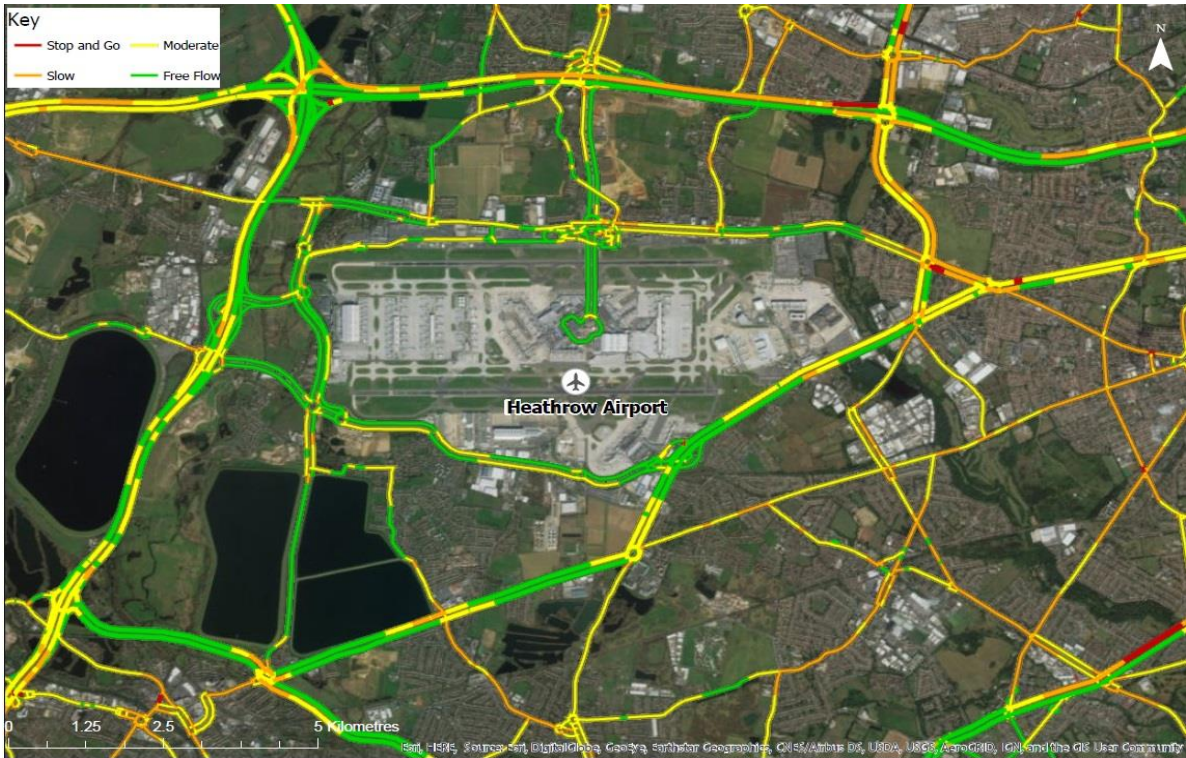


Figure 16 Level of Service VIC for the AM Peak Hour (0800 to 0900hrs)

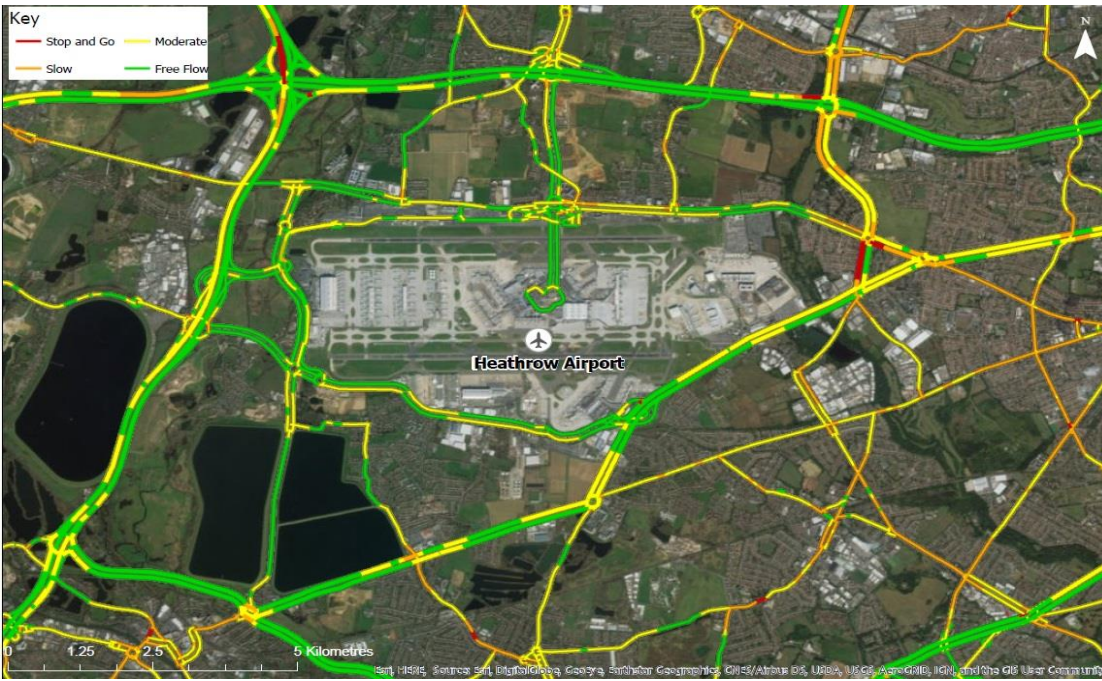


Figure 17 Level of Service VIC for the Lunch Time Peak Hour (1200 to 1300hrs)

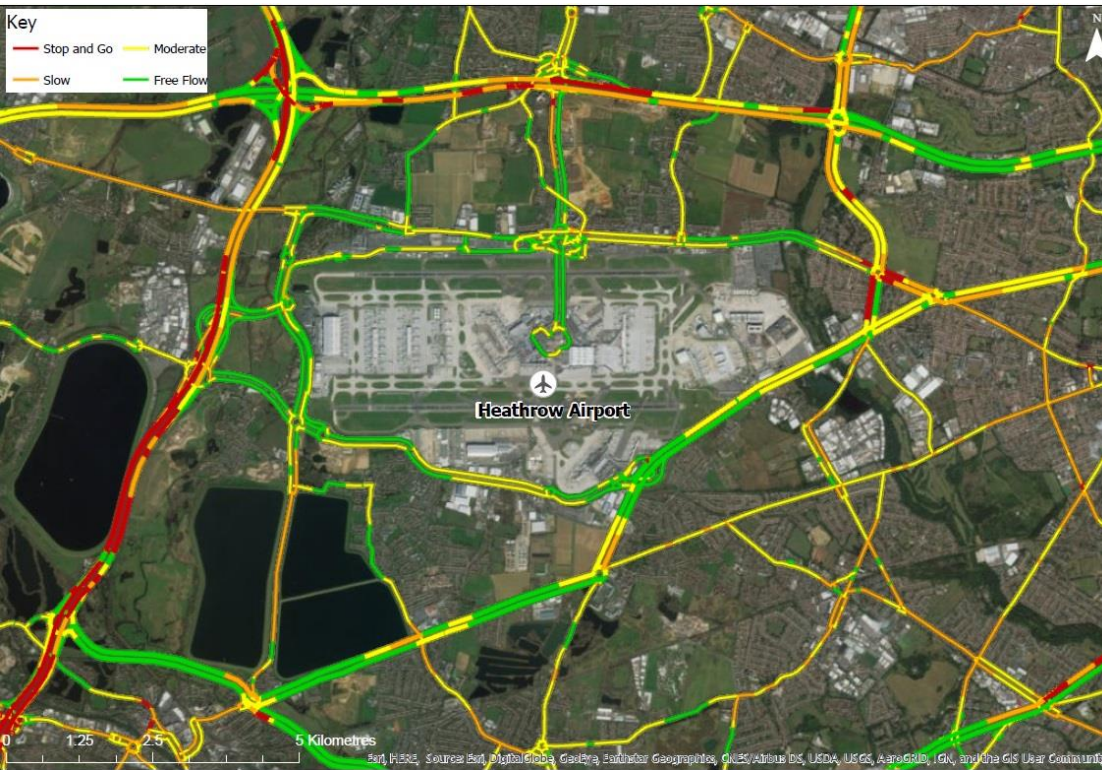


Figure 18 Level of Service VIC for the PM Peak Hour (1700 to 1800hrs)

Transport Modelling Suite

- I.16.38 The analysis would require a mixture of strategic transport modelling, with local modelling used to test the detailed traffic engineering and road operations to identify design and capacity issues, as well as test future improvement options.
- I.16.39 It is therefore proposed to use the TfL suite of modelling tools to achieve the necessary study aims. Hence, the approach uses the TfL strategic Cube Model with information and recent travel data collected from the Transport Baseline. This is in line with modelling best practice.
- I.16.40 Given the nature of this study it is recommended the use of both strategic and also a local level modelling applications. This allows for the use of three-levels of modelling for satisfying the various requirements of the other different project teams, namely:
- **Strategic Model** – this would be the Strategic Modelling (Macro Level) from an update of the existing TfL Cube Model, enhanced within the study area with our new Transport Baseline (Stage 1a output) for better assignment results in the study area;
 - **Microscopic Model** – this would be a new VISSIM or DyaSim Microscopic Model (Local Level) to examine the local travel movements at an operational level. This new model would be based on a cordoned-out network and matrices from the Strategic Model; and
 - **Junction Models** – these would be the various Junction Models (Detailed Level) to examine the capacity, levels-of-service (LOS), queues and delays arising from the detailed traffic movements provided by the models. These models would allow for a detailed examination of geometric layout improvements to test/confirm geometric designs. The programs used would include:
 - *HCS or similar – Freeway Capacity and LOS, weaving, ramps;*
 - *Linsig or similar – traffic control signals evaluation and design;*
 - *Picady – priority/give-way junctions evaluation and design; and*
 - *Arcady – roundabout evaluation and design.*
- I.16.41 The outlined modelling approach has been applied successfully to many other studies both Internationally and throughout the UK.
- I.16.42 In addition to being an internationally-based modelling strategy, the approach also features analysis techniques from the Design Manual for Roads and Bridges (DMRB).
- I.16.43 The Strategic Model would be an incremental demand model and assignment model. This model would use a matrix estimation model which would allow update origin-destination (OD) trips in the model area based on the Transport Baseline observations.
- I.16.44 The Strategic Model would include analysis of the main modes of transport (cars, taxi/MaaS, bus, rail, underground, Goods Vehicles).
- I.16.45 The Microsimulation Model would take its OD demand and OD routes from the Strategic Model. The simulation model would focus on the main highways in the area and its junctions.
- I.16.46 Trip matrix estimation would be necessary as the base trip matrices would be calibrated to observed traffic count information from our surveys. The assignment model would be calibrated to the same set of traffic counts, and an appropriate model application would be set up to allow for efficient model runs and maintain consistent levels of analysis. The study area

zone system (TAZ) is likely to require revision as part of this process.

I.16.47 The network would be based on the strategic network and information for junctions and their control. Network coding can also be assisted by observations in virtual earth maps provided by Google or Bing Maps and any CAD data that exist. Network coverage for the links and junctions as shown in the **Figure 19**.



Figure 19 Proposed Model Area

I.16.48 OD trip and route data for the microsimulation model would be exported from the Strategic Model. As with the Strategic Regional Model, the microsimulation model would also be calibrated against traffic observations of flows as well as data on route times, queues and delays at main junctions if this data exists.

Develop Future Years Forecast Models

I.16.49 Various future analysis years would be tested:

- Base Year (existing conditions); and
- Future Years.

I.16.50 In developing the future year forecasts we would liaise with TfL for their Reference Cases for future years. This is the normal process and allows Government acceptance of the model outputs.

I.16.51 In particular, use of the totals from the OD matrices to determine the future year total travel demands and apply them to the Base Year (existing conditions) matrices from the enhanced model. This technique has the advantage of taking into account the planned and committed Future Years development trips already included in the TfL Reference Case as well as the Transport Master Plan, thereby aligning the study emerging results with the wider policy and

transport initiatives programme being pursued by the relevant planning and transport authorities. Future Year analysis would be restricted to the horizon years.

I.16.52 The network and zonal data would be based on the existing TfL Reference Case for future year network scenarios. Again, this has the advantage of maintaining consistency with the wider transport strategy for the region.

Assess Transport Network Performances

I.16.53 This task would assess the existing and future operational performances of the highway and PT networks. It would be necessary to establish and assess peak hour transport operational conditions and resultant level of service (LOS) on key strategic transport links and sections.

I.16.54 Outputs from the Strategic Model would be produced to provide the network-wide trip assignments. These would be fed into the local level models to provide analysis of movements and flows within the primary study area.

I.16.55 This would highlight the Levels of Service (LOS) and capacity analysis output results would be presented in tabular form for ease of presentation, and also the model graphics from the powerful software suite.

I.16.56 The analysis focuses on peak hours, when the network is busiest. This would save time and reduce expenses. For each of the Base Year and forecast Future Years, time periods should be run for the various models:

- Weekday AM Peak Hour (morning);
- Weekday Inter-Peak; and
- Weekday PM Peak Hour (evening).

I.16.57 These are the typical time periods for such studies, and hence exceptional periods are excluded from the analysis.

I.17 Environmental Modelling Tests

ES Scoping Model Needs

I.17.1 This section of the sets out the proposed strategic modelling to feed into the Environmental Statement (ES) scoping exercise currently underway. Following discussion with the Environmental Impact Assessment (EIA) team, the submission requirements are:

- A Preliminary Environmental Report Chapter;
- An ES Traffic Chapter; and
- A Construction Logistics Plan (CLP) which sets out the strategies and standards for the management of materials and personnel required of the appointed contractor to ensure that traffic impacts remain within the bounds of the ES chapter assessment.

Model Time Periods

I.17.2 The model time periods are based on the TfL Strategic Model. This would cover the AM peak hour, Inter-Peak (IP) hour and PM peak hour. Estimates from these three time periods would be assigned from the strategic model for the test years.

I.17.3 The GEART Rule 1 and Rule 2 EIA screening tests, and the air quality odour and noise and

vibration calculations would require either 24 or 18 hour flows, which would be estimated using expansion factors calculated from observed traffic counts sourced from nearby traffic census counts or from the TfL modelling unit. Information on air quality and odour is presented in **Chapter 1 'Air Quality and Odour'** and information on noise and vibration is presented in **Chapter 16 'Noise and Vibration'** of the EIA Scoping Report.

Highway Network Delay

I.17.4 For all assessment years, estimates to determine an evaluation of 'Driver Delay' would be produced using the strategic model. This would be based on model calculations of the flow-to-capacity analysis of key identified links.

Pedestrian and Cyclist Amenity

I.17.5 The ES scoping proposes to undertake a qualitative analysis based on DMRB (Volume 11, Section 3, Part 8; Pedestrians, Cyclists, Equestrians and Community Effects) guidance.

I.17.6 The ES scoping requests some modelling work to apply the GEART criteria to test the impacts of amenity and fear and intimidation. As such, estimates for each model assessment year would be produced of the following:

- 18hr Traffic flows;
- 18hr HGV flows; and
- 18hr average speeds.

Severance

I.17.7 The ES scoping proposes to apply the GEART criteria for estimating the impacts of severance. The ES scoping requests some modelling work to establish the impact magnitude. This would require the following modelling tests for each of model assessment years:

- 24hr traffic flows; and
- Two additional sensitive hours traffic flow to assess peak construction traffic.