Appendix A

TOPIC BASED SCHEMES ASSESSMENT: AoS FOR AIRPORTS NPS

A-12 LANDSCAPE

June 2018

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12 LANDSCAPE

12.1 INTRODUCTION

12.1.1 This topic based assessment considers each of the three airport expansion schemes shortlisted by the Airports Commission's (AC), namely London Heathrow Extended Northern Runway (LHR-ENR), London Heathrow Northwest Runway (LHR-NWR) and London Gatwick Second Runway (LGW-2R) (together, the shortlisted schemes) under the Landscape topic.

12.1.2 By law, before designating an Airports National Policy Statement (NPS) an Appraisal of Sustainability (AoS) must be carried out. This AoS is a strategic level assessment. It is based on the contents of the Airports NPS. The AoS considers alternatives to the Government's preferred scheme as set out in the Airports NPS, including the outline masterplans supplied to the Airports Commission for the three shortlisted schemes. This AoS considers the impacts of expansion without the benefits of the mitigation package put forward by scheme promoters, unless stated otherwise. The Government has outlined that it expects a significant mitigation package to be put in place by the promoter of its preferred scheme to ensure that wherever possible significant effects are avoided, reduced or offset.

12.1.3 Further project-level design will be required which will inform an environmental impact assessment carried out by the promoter. This would include an assessment, which is likely to include effects identified in the AoS as well as more detailed mitigation developed as detailed design progresses. This will also be developed through consultation with both affected communities and other stakeholders.

12.1.4 This assessment is based partly upon the previous assessment undertaken as part of AC's Sustainability Appraisal, but also responds to the AoS Appraisal Framework. The Framework addresses Landscape issues, which have been identified through a review of plans, policies and programmes, and also the landscape baseline.

12.1.5 Each shortlisted scheme is considered against the AoS Appraisal Framework Objectives, and Questions. The Objective and Questions, which are addressed within this assessment are as follows:

→ **AoS Objective 18:** To promote the protection and improvement of landscapes, townscapes, waterscapes and the visual resource including areas of tranquillity and dark skies.

- **AoS Question 35:** Will it protect and enhance nationally and locally designated landscape, townscape and waterscape?
- **AoS Question 36:** Will it lead to impact on sensitive views?
- **AoS Question 37:** Will it lead to a loss of tranquillity and increase in light pollution?

12.2 POLICY AND LEGISLATION

12.2.1 The following policy and legislation relevant to the Landscape Assessment is summarised below and their context and applicability is explained as appropriate in the relevant sections of the assessment. Other topic specific policy and legislation has been covered within specific topic sections.

International Union for Conservation of Nature (IUCN)

12.2.2 Areas of Outstanding Natural Beauty (AONBs) are part of a global family of protected areas recognised and classified by the IUCN. AONBs, National Parks and Heritage Coasts in England and Wales fall into Category V – Protected Landscapes. The IUCN definition of Protected Areas Category V is, "*A protected area where the interaction of people and nature over time has produced an area of distinct character with significant ecological, biological, cultural and scenic value; and where safeguarding the integrity of this interaction is vital to protecting and sustaining the area and its associated nature conservation and other values*."

12.2.3 The IUCN definition of Protected Landscape aims to maintain the harmonious balance between people, landscapes and nature for now and for future generations.[1]

The European Landscape Convention (ELC)

12.2.4 The ELC (Florence: Council of Europe, 2000, ETS 1X6) defines 'Landscape' as "…*an area, as perceived by people, whose character is the result of the action and interaction of natural and / or human factors." It is the first international convention to focus specifically on landscape. It is dedicated to the protection, management and planning of all landscapes in Europe and recognises that all landscapes are potentially important, irrespective of location or condition. It states, "that the landscape is an important part of the quality of life for people everywhere: in urban areas and in the countryside, in degraded areas as well as areas of high quality, in areas recognised as being of outstanding beauty as well as every day areas." It requires "Landscape to be integrated into regional and town planning policies and in cultural, environmental, agricultural, social and economic policies, as well as any other policies with possible direct or indirect impacts on landscape*".[2]

12.2.5 The ELC influences planning policy in the UK. Under the Natural Environment and Rural Communities (NERC) Act 2006, Natural England's general purpose is "*to ensure that the natural environment is conserved, enhanced and managed for the benefit of present and future generations, thereby contributing to sustainable development*".[3] Within England, Natural England, an executive non-departmental public body, is the government's advisor for the natural environment responsible for protecting, conserving and enhancing the landscape.

National Planning Policy Framework 2012 (NPPF)

12.2.6 Although the NPPF[4] does not contain specific policies for nationally significant infrastructure projects, it does provide guidance on the conservation and enhancement of the natural environment within the planning system. It states, "*The planning system should contribute to and enhance the natural environment by:*

Protecting and enhancing valued landscapes, geological conservation interests and soils;

Recognising the wider benefits of ecosystem services;

Minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including establishing coherent ecological networks that are more resilient to current and future pressures;

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[1] Brown, J., Mitchell, N. and Beresford. M., 2005. *The protected landscape approach*. [online] Accessed 09/01/2017.
[2] Natural England, 2009. *Integrating the European Landscape Convention.* [online]. Accessed 09/01/2017.
[3] Section 2(1) of the NERC Act 2006.
[4] Communities and Local Government, 2012. *National Planning Policy Framework*. p. 1, paragraph 3, pp. 25-26 [online]. Accessed 09/01/2017.

Preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability; and

Remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate."

12.2.7 The NPPF refers to valued landscapes and in particular those protected by designations such as National Parks and AONBs, although it is less specific on areas outside these designations. It states, "*Great weight should be given to conserving landscape and scenic beauty in National Parks, the Broads and AONB, which have the highest status of protection in relation to landscape and scenic beauty*." With respect to sustainable development the NPPF states, "*Pursuing sustainable development involves seeking positive improvements in the quality of the built, natural and historic environment, as well as people's quality of life*".[5]

12.2.8 Within the over-arching role that the planning system will play, a set of 12 'core planning principles' have been developed to underpin place-shaping and decision making. The key relevant principles are (paragraph 17):

- → Always seek to secure high quality design and a good standard of amenity for all existing and future occupants of land and buildings;
- → Take account of the different roles and character of the different areas, promoting the vitality of our main urban areas, protecting the Green Belts around them, recognising the intrinsic character and beauty of the countryside and supporting thriving communities within it.

12.2.9 Planning policies and decisions should aim to ensure that developments[6]:

- → Respond to local character and history, and reflect the identity of local surroundings and materials, while not preventing or discouraging appropriate innovation;
- → Are visually attractive because of good architecture and appropriate landscaping.

12.2.10 The NPPF notes the importance of tranquillity and requires that planning policies and decisions aim to "*identify and protect areas of tranquillity, which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reaso*n"[7].

12.2.11 The NPPF advises on the importance of controlling light pollution, "*By encouraging good design, planning policies and decisions should limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation*." [8]

Planning Practice Guidance (PPG)

12.2.12 PPG for Natural Environment[9] states, "*Green Infrastructure is important to the delivery of high quality sustainable development, alongside other forms of infrastructure such as transport, energy, waste and water. Green Infrastructure provides multiple benefits, notably ecosystem*

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[5] Communities and Local Government, 2012. *National Planning Policy Framework*. p. 26, paragraph 115; p. 3 paragraph 9. [online] Accessed 09/01/2017.
[6] Communities and Local Government, 2012. *National Planning Policy Framework*. p. 15, paragraph 58. [online] Accessed 09/01/2017.
[7] Communities and Local Government, 2012. *National Planning Policy Framework.* p. 29, paragraph 123. [online] Accessed 09/01/2017.
[8] Communities and Local Government, 2012. *National Planning Policy Framework*. p. 30, paragraph 125. [online] Accessed 09/01/2017.
[9] Department for Communities and Local Government, 2016. *Planning Practice Guidance Natural Environment*, p. 28; p.109 Paragraph 28. [online] Accessed 09/01/2017.

services, at a range of scales, derived from natural systems, for the individual, for society, the economy and the environment. To ensure that these benefits are delivered, green infrastructure must be well planned, designed and maintained. Green infrastructure should, therefore, be a key consideration in both local plans and planning decisions where relevant."

12.2.13 With regard to the importance of conserving and enhancing the natural environment it states, "*The components of green infrastructure exist within the wider landscape context and should enhance local landscape character and contribute to place-making. High quality networks of multifunctional green infrastructure provide a range of ecosystem services and can make a significant contribution to halting the decline in biodiversity*."

The Countryside and Rights of Way Act 2000 (CRoW)

12.2.14 Section 85 of the CRoW sets out the general duties of public bodies etc, "*In exercising or performing any functions in relation to, or so as to affect, land in an area of outstanding natural beauty, a relevant authority shall have regard to the purpose of conserving and enhancing the natural beauty of the area of outstanding natural beauty*." If undertaking works in relation to, or so as to affect land in a National park or AONB, it would need to comply with the respective duties in Section 11A of the National Parks and Access to Countryside Act 1949 and Section 85 of the CRoW.

12.2.15 The CRoW requires relevant local authorities to work together to prepare AONB Management Plans, in recognition of the national and international importance of AONB landscapes. The purpose of the plan is to formulate policies for the management of the AONB in order to conserve and enhance natural beauty and retain local distinctive local landscape character. A key function of the AONB Management Plan is to inform development plan policy with respect to the purposes of AONB designation.

12.3 BACKGROUND TO THE ASSESSMENT

12.3.1 The assessment is based on the following reports:

- Airports Commission, 2015. *Final Report*[10];
- Jacobs, 2014. *10. Place: Baseline*[11];
- Jacobs, 2014. *10. Place Assessment*[12]; and
- Airports Commission, 2014. *Appraisal Framework*[13].

12.3.2 This assessment is based on the assessments contained within the AC's reports which are considered to be up to date in respect of the baseline landscape and visual studies and design information. Additional work has been undertaken in respect of relevant landscape planning policy, landscape designations and recommendations for landscape and visual impact assessment at the Environmental Impact Assessment (EIA) stage.

12.3.3 The study area for the assessment is an area offset 5km from the boundary of each shortlisted scheme, where the proposed development may influence the landscape in a significant manner. It is acknowledged however that visual effects have the potential to extend beyond this boundary. Visual effects will arise in areas where the built development is potentially visible and where there are changes in the existing skyline due to different flight paths and patterns. At this stage the extent of theoretical visibility cannot be modelled accurately because the dimensions

[10] Airports Commission, 2015. *Final Report*. [online]. Accessed 09/01/2017.
[11] Jacobs, 2014. 10. *Place: Baseline*. [online]. Accessed 09/01/2017.
[12] Jacobs, 2014. 10. *Place Assessment.* [online]. Accessed 09/01/2017.
[13] Airports Commission, 2014. *Appraisal Framework*. [online]. Accessed 09/01/2017.

of existing buildings that would limit visibility near both airports are unavailable. For the purpose of this assessment the study area for landscape and visual effects is the same. The assessment considers potential impacts on the following within the 5km study area:

- National Character Areas;
- County Character Areas;
- District Character Areas;
- Visual Receptors; and
- Public Rights of Way (PRoW).

12.3.4 Impacts on AONB and Areas of Great Landscape Value (AGLV) (or locally designated landscapes) were assessed within a 15km study area. National and local landscape designation is one of a number of criteria that are considered in identifying the relative value and the sensitivity of a landscape to the proposed development. AONBs are nationally valued landscapes recognised by designation, which has a formal statutory basis intended to protect their special characteristics and qualities. Locally valued landscapes recognised through local designations (such as AGLV) may be protected by local planning policy.

12.3.5 Tranquillity has been assessed using the Campaign for the Protection of Rural England (CPRE) Tranquillity Mapping[14], overlain by noise contours to illustrate where low-flying aircraft affects landscapes and sites of tranquillity. Light pollution impacts have been assessed using the CPRE Dark Skies information[15].

12.3.6 A high level desk based assessment has been undertaken in line with Guidelines for Landscape and Visual Impact Assessment (GLVIA) Third Edition[16] and the AC Appraisal Framework (Chapter 10)[17].

12.3.7 The assessment is entirely based on desk study and, in this context there are limits on what may be concluded prior to a full assessment of landscape and visual impacts.

12.4 INTERACTION WITH OTHER TOPICS

12.4.1 The assessment of the landscape topic is closely related to other topic-based assessments in the AoS. In particular, the following interactions are noted with Table 12.1.

Table 12.1: Interaction of the Landscape Topic with Other Topics

TOPIC	INTERACTION
Community	Changes to landscape can have an indirect effect on areas that are culturally valued or recreational open space used by communities.
Quality of Life	Changes to landscape and visual intrusion can have an adverse effect on quality of life.
Noise	Landscapes and their tranquillity can be affected by noise, in this context this is generated by construction, surface transport and aviation noise.
Biodiversity	Loss of landscape features also affects biodiversity. Landscape mitigation can

[14] Campaign to Protect Rural England, 2007. *Developing an Intrusion Map of England.* [online]. Accessed 09/01/2017.
[15] Jacobs, 2014. 10. *Place: Baseline,* pp. 69-70. [online]. Accessed 09/01/2017.
[16] Landscape Institute and Institute of Environmental Management and Assessment, 2013. *Guidelines for Landscape and Visual Impact Assessment* (Third Edition). Routledge: Oxon.
[17] Airports Commission, 2014. *Appraisal Framework,* Chapter 10. [online]. Accessed 09/01/2017.

TOPIC	INTERACTION
	affect biodiversity depending on design and species used. Use of green infrastructure can benefit both landscape and biodiversity.
Soil	Soil structure and nutrients determine the ecosystems that they can support (and landscape features).
Water	Water bodies are an integral part of the landscape and changes to the visibility of a water body or its orientation will have an impact on the waterscape.
Carbon	Soils and vegetation absorb and store carbon. Loss of land and vegetation will reduce the capacity of the landscape to absorb carbon emissions, and may result in the release of stored carbon into the atmosphere.
Historic Environment	Heritage assets form an integral part of many landscapes. Landscape features form part of historic landscapes. Loss of heritage features can change landscapes. Similarly changes to the landscape can affect the setting of heritage assets.

12.5 ASSESSMENT CRITERIA

12.5.1 The general criteria used for assessing the significance of effects within the AoS are set out in the methodology in Section 3 of the AoS to which this appendix is attached.

12.5.2 Additional assessment criteria specific to this topic have also been applied to the assessment and these are set out below (Tables 12.2, 12.3 and 12.4). The criteria are derived from GLVIA[18] and the Interim Advice Note 135/10 Landscape and Visual Effects Assessment[19].

12.5.3 Identification of significance is set out in Table 12.5.

Table 12.2: Landscape and Visual Receptor Sensitivity

SENSITIVITY	DESCRIPTION
High	A landscape of particularly distinctive character and scenic quality; Nationally and regionally designated landscape for its scenic quality and character; Viewers with a proprietary interest, specific interest in the view and prolonged viewing opportunities. Examples include occupiers of residential properties, people using recreational facilities such as National Trails and public rights of way, or viewpoints in nationally or locally designated landscapes.
Medium	A landscape of distinctive character and scenic quality; Locally designated landscape for its scenic quality and character; Viewers with a moderate interest in their surroundings. Examples include people using recreational facilities where landscape appreciation is unlikely to be a primary motive, local viewpoints, and people using public rights of way.
Low	A landscape of no distinctive character and scenic quality; A landscape not subject to any form of landscape designation; Viewers with a passing interest in their surroundings such as people using roads and other transport users.
Very low	A landscape that is damaged, neglected or poor character and lacking scenic

[18] Landscape Institute and Institute of Environmental Management and Assessment, 2013. *Guidelines for Landscape and Visual Impact Assessment* (Third Edition). Routledge: Oxon.
[19] Department for Transport, 2010. *Interim Advice Note 135/10 Landscape and Visual Effects Assessment*. [online]. Accessed 09/01/2017.

SENSITIVITY	DESCRIPTION
	quality; A landscape not subject to any form of landscape designation; Viewers with no interest in their surroundings such as people at their place of work.

Table 12.3: Magnitude of Landscape and Visual Impacts

MAGNITUDE	DESCRIPTION
High	Total or widespread loss or major alteration to key landscape elements / characteristics; Complete change or widespread alteration to the existing view.
Medium	Partial loss or alteration to one or more key landscape elements / characteristics; Noticeable but localised alteration to the existing view.
Low	Limited loss or alteration to one or more key landscape elements / characteristics; Partial and much localised alteration to the existing view.
Very low	Extremely limited loss or alteration to one or more key landscape elements / characteristics; Barely perceptible change to the existing view. It may be difficult to differentiate the proposed development from its surroundings.

Table 12.4: Significance of Landscape and Visual Effects

SIGNIFICANCE	TYPICAL DESCRIPTORS OF LANDSCAPE EFFECT
Significant positive effect	→ The project would: ▪ Enhance the character (including quality and value) of the landscape; ▪ Create an iconic high quality feature and/or series of elements; ▪ Enable a sense of place to be created or greatly enhanced; ▪ Lead to a major improvement in a view from a highly sensitive receptor.
Positive effect	→ The project would: ▪ Complement or improve the character (including quality and value) of the landscape; ▪ Maintain or enhance characteristic features and elements; ▪ Enable a sense of place to be restored; ▪ Cause limited improvement to a view from a receptor of medium sensitivity, or cause greater improvement to a view from a receptor of low sensitivity.
Negative effect	→ The project would: ▪ Not quite fit the character (including quality and value) of the landscape; ▪ Be at variance with characteristic features and elements; ▪ Detract from a sense of place; ▪ Cause limited deterioration to a view from a receptor of medium sensitivity, or cause greater deterioration to a view from a receptor of low sensitivity.

SIGNIFICANCE	TYPICAL DESCRIPTORS OF LANDSCAPE EFFECT
Significant negative effect	→ The project would: ▪ Conflict with the character (including quality and value) of the landscape; ▪ Have an adverse impact on characteristic features and elements; ▪ Diminish a sense of place; ▪ Cause a noticeable deterioration to a view from a highly sensitive receptor, or cause a noticeable deterioration in the existing view over a moderate area.
Mixed positive and negative effect	→ The project would lead to an improvement and deterioration in: ▪ The character (including quality and value) of the landscape; ▪ Characteristic features and elements; ▪ A sense of place; ▪ Cause major deterioration to a view from a highly sensitive receptor and would constitute a major discordant element in the view.

12.5.4 The AoS schemes were appraised against the AoS Objectives and Questions, using the notation set out in the table below. It should be noted that the schemes are assessed individually against the requirements of the Strategic Environmental Assessment (SEA) Regulations and presented together for comparison. This means that although the nature of effects can vary between schemes, the significance may be the same.

Table 12.5: Identification of Significant Effects in the AoS

++	*Significant positive effect*
+	*positive effect*
-	*negative effect*
--	*Significant negative effect*
+/-, ++/--	*Mixed positive and negative effect*
?	*Uncertain effect*
0	*No relationship / neutral effect*

12.6 SUMMARY OF BASELINE AND ISSUES

NATIONAL BASELINE

12.6.1 England is divided into 159 National Character Areas[20]. Data is presented for each area and is limited at a national level. However, previous analysis for the period 1999-2003[21] showed that:

→ Existing landscape character is being maintained in 51% of England's landscapes;

→ A further 10% of existing character is being enhanced;

[20] Natural England, 2015. *National Character Area profiles.* [online]. Accessed 09/01/2017.
[21] Natural England, 2006. Lan*dscape: England's landscapes: Landscape character: Countryside quality counts.* [online]. Accessed 09/01/2017.

→ 20% of England's landscapes are showing signs of neglect, with past loss of character not being reversed; and

→ 19% of new landscape characteristics are emerging.

12.6.2 The above indicators suggest that the character of English landscape is being sustained, as they present an improvement on the 1990-1998 baselines. This stated that 36 per cent of England's character areas were stable and 64% were showing signs of neglect.

12.6.3 There are a number of national level designations in England including National Park, AONB and Heritage Coast. Local designations include AGLV.

12.6.4 Landscape and townscape character is also assessed at local level and additional character assessments exist within other administrative boundaries, for example local authorities or settlements. This includes assessment of the historic interest landscape[22] and townscapes[23].

12.6.5 Heritage assets within 2km of each scheme are described in AoS Appendix 11 Historic Environment. Although some assets including registered parks and gardens and conservation areas are described below, it is not a comprehensive description of the significant heritage assets and their settings that contribute to the views and historic characteristics of the wider landscape / townscape. Detailed studies based on guidance provided in '*The Setting of Heritage Assets*'[24] and '*Seeing History in the View*' [25] are necessary at the EIA stage to understand the wider historic landscape characteristics and visual significance.

12.6.6 Skyglow from urban areas is the greatest source of light pollution with satellite measurements of artificial light at night showing all the main urban areas of Greater London, Birmingham, Merseyside and Tyneside saturating the night sky with artificial lighting. Devon and Cornwall are the only areas in England showing very low light pollution[26].

LOCAL BASELINE

GATWICK AIRPORT

12.6.7 Gatwick Airport is sited on a flat plain in rural landscape between the urban areas of Horley to the north and Crawley to the south. Much of the wider rural area nearby is protected by national landscape designations including the Surrey Hills AONB, High Weald AONB, and the Kent Downs AONB; a locally designated AGLV, and Metropolitan Green Belt. The study area includes several areas of Open Access land, Registered Parks and Gardens and the North Downs Way National Trail. Other recreational features include Country Parks, Tandridge Border Path and Sussex Border Path recreational routes, public footpaths and golf courses.

12.6.8 Gatwick Airport lies in National Character Area NCA 121: Low Weald[27] and the remainder of the study area is in NCA 122: High Weald[28]. The airport and surrounding study area lies within a flat to gently undulating landscape, which rises towards the Surrey Hills AONB in the north and the High Weald AONB in the south. Much of the study area is in mixed agricultural use comprising a small to irregular size field pattern enclosed by hedgerows with hedgerow trees. Woodlands, including many areas of Ancient Woodland within the AONBs, are abundant and provide a sense of enclosure.

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[22] Historic England, 2015. *Historic Landscape Characterisation.* [online]. Accessed 09/01/2017.
[23] Historic England, 2015. *Historic Townscape Characterisation.* [online]. Accessed 09/01/2017.
[24] Historic England, 2015. *The Setting of Heritage Assets* [online]. Accessed 09/01/2017.
[25] Historic England, 2011. *Seeing History in the View* [online] Accessed 09/01/2017.
[26] Campaign to Protect Rural England, 2003. *Night Blight in England and UK*. [online]. Accessed 09/01/2017.
[27] Natural England, 2015. *National Character Area profile*. [online]. Accessed 09/01/2017.
[28] Natural England, 2015. *National Character Area profile*. [online]. Accessed 09/01/2017.

12.6.9 Crawley was designated a New Town in 1947. Its character is largely defined by mid to late twentieth century garden suburb type development, predominantly low-rise. Few older buildings exist with the exception of St Margaret's Church at Ifield, which is a local landmark building. Industrial development, offices and hotels providing accommodation for airport users are concentrated in the Manor Royal area of the borough, which is characterised by mainly low-rise buildings in different styles. Horley has a more varied character comprising a Victorian – Edwardian core with some pre-Victorian development surrounded by 1930s to 1950s suburban housing. Major transport routes include the M23, A22, A24, A264 and mainline railway. Crawley and Horley townscape character is of ordinary quality and character with some locally unique buildings. These townscapes are reasonably tolerant of change.

12.6.10 The most significant hydrological feature within the study area is the River Mole, which flows within the site towards the River Thames in the north. There are several smaller streams within and in close proximity to the airport boundary, many of which are demarcated by narrow bands of vegetation.

12.6.11 The least tranquil areas[29] are around Gatwick Airport, Horley, Crawley and the M23, with tranquillity increasing to the east and west of the airport. CPRE Dark Skies mapping show the highest levels of light in the least tranquil areas[30].

12.6.12 Views towards Gatwick Airport are relatively limited by the built up areas of Horley in the north and Crawley in the south and by rising ground and woodland cover within the Surrey Hills AONB and High Weald AONB. There are long distance views from high ground within both AONBs towards Gatwick Airport.

12.6.13 Views north towards Gatwick Airport from Crawley are filtered or screened by intervening topography and woodland. Although the airport is not directly visible from urban fringes at Ifield, Langley Green and Lowfield Heath, aircraft are clearly visible on the skyline when they take–off and come in to land. The rolling landform combined with the extensive pattern of trees, woods and forests, creates a relatively enclosed landscape with few vantage points for panoramic views across the landscape or town.

12.6.14 Valued views and vistas are available from the surrounding Country Parks and AONBs due to the higher elevation. Within the Surrey Hills AONB there are far reaching expansive views from scarp viewpoints including Box Hill. Open views from AONBs, outdoor recreation areas and footpaths and residential properties have the highest sensitivity to changes that could harm the character of the view in a way that cannot be mitigated.

HEATHROW AIRPORT

12.6.15 Heathrow sits within a largely man-made landscape of a predominantly urban / industrial nature.

12.6.16 No nationally designated landscapes lie within 15km of Heathrow Airport; the Chilterns AONB lies over 15km to the north west of the proposed Heathrow schemes. A locally designated, locally valued Area of Landscape Importance is located on the south west edge of the 5km study area. Four Registered Parks and Gardens lie within the 5km study area. Areas of Open Access Land lie close to the Thames Path National Trail in the southern part of the study area. Areas of statutory Green Belt, which act as a constraint to further development, lie close to Heathrow Airport.

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[29] Campaign to Protect Rural England Tranquillity Mapping presented in Jacobs, 2014. *10. Place: Baseline*. [online] Accessed 09/01/2017.

[30] Campaign to Protect Rural England, 2003. *Light Pollution Map: East of England.* [online] Accessed 09/01/2017.

12.6.17 The nearby River Thames corridor to the south and the Colne Valley Regional Park to the west are a focus for recreational space and tranquillity, with historic parkland at Windsor, Richmond and Hampton Court; ancient woodland at Burnham Beeches; many former mineral workings restored as lakes; and the South West London Waterbodies Special Protection Area (SPA) and Ramsar site. Recreational routes include the Colne Valley Way and London Loop, as well as circular footpaths round Queen Mother Reservoir and the Wraysbury Reservoir Complex. Several Country Parks lie within the 5km study area.

12.6.18 Heathrow Airport lies within national character area NCA 115: Thames Valley[31] and within 1km of NCA 111: North Thames Basin[32]. The study area is relatively flat and low-lying and varies between 20-30m Above Ordnance Datum with a gentle slope southwards to the River Thames. Slough is located on higher ground to the North West, and Windsor and Runnymede to the southwest. The topography of the landscape has been altered substantially by road and rail embankments, sand and gravel workings and reservoirs. The open character of the landscape is accentuated by the flat topography. Vegetation cover is relatively sparse and often concentrated around roads, rivers, lakes and reservoirs.

12.6.19 The waterscape of the study area comprises the River Colne and River Crane, which drain into the River Thames, all of which are significant watercourses. Two artificial waterways, the Longford River and Duke of Northumberland's River run along the western and southern boundaries of the airport. Several flooded sand and gravel pits, particularly along the Colne Valley in the regional park, and the large Wraysbury and Staines reservoirs are dominant features in the landscape.

12.6.20 Settlements close to the north and east of the airport are the small villages of Longford, Harmondsworth, Sipson and Harlington. The majority of the buildings were constructed in the mid-twentieth century and include a mix of styles including two-storey detached houses and townhouses, blocks of flats and bungalows. Further north, east and south of the airport built development comprises low-rise suburban housing and local centres, modern airport-related development and major roads. Townscape character is predominantly of ordinary quality and character, and is reasonably tolerant of change. The Hillingdon Historic Core and Harmondsworth Historic Core are valued for their association with a church, green or common and have considerable time depth dating back to medieval times. These areas have high sensitivity and are susceptible to relatively small changes from the proposed development.

12.6.21 Tranquillity mapping[33] around Heathrow Airport is dominated by areas of low tranquillity, which include the airport, urban areas inside the M25, the M25 itself and Slough. The most tranquil area is to the south west of the airport. CPRE Dark Skies mapping show the highest levels of light in the least tranquil areas including the M25 eastwards, Slough and the M4.

12.6.22 Views towards Heathrow Airport from the north, east and south are restricted by built development and raised reservoir embankments. Vegetation along the M25 and M4 and waterways including the River Colne constrain views of the airport. Views are available from the outer edge of settlements nearest to the airport at Harmondsworth, Sipson, Harlington and Longford. Urban development, transport infrastructure and Heathrow Airport are dominant features in the landscape and influence most views. Views from outdoor recreation areas and footpaths, and residential properties have the highest sensitivity to changes that could harm the character of the view in a way that cannot be mitigated.

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[31] Natural England, 2015. *National Character Area profile*. [online] Accessed 09/01/2017.
[32] Natural England, 2015. *National Character Area profile*. [online] Accessed 09/01/2017.
[33] CPRE Tranquillity Mapping presented in Jacobs, 2014. 10. *Place: Baseline*. [online] Accessed 09/01/2017.

FUTURE BASELINE AND ISSUES

12.6.23 Landscape and townscape character will be subject to pressure from urban development. This will be both direct (physical impact and impact on visual setting) and indirect (eg effects of increased traffic or noise).

12.6.24 Recent changes and trends affecting the rural landscape around Gatwick Airport are because of changes to native woodland due to pest and diseases affecting trees, loss and decline of hedgerows and hedgerow trees, and changes in agriculture. Demand for new building land and development pressure on areas within commuting distance of London and new roads and road improvement schemes affect the landscape. There is a recognised need to maintain Gatwick Airport's importance as an international airport[34].

12.6.25 In the vicinity of Heathrow Airport the natural character of the area has been overtaken by urban influences: a dense network of roads including the M25 corridor, the airport, railway lines, golf courses, pylon lines, reservoirs and extensive mineral workings. Development pressures include major roads, lighting and signage, expansion of urban areas and airport development, much unrelated to the surrounding area and contributing to the overall fragmentation of the landscape. Pressure for development remains high due to the proximity of London, major transport links and the airport. Development may provide opportunities for co-ordinated provision of quality green infrastructure[35].

12.6.26 Development, which is likely to take place in areas around Gatwick and Heathrow regardless of the runway expansion proposals, will have direct and indirect effects on the character of the surrounding landscape and visual amenity.

12.6.27 There are a number of impacts of climate change on landscape character. These include direct impacts such as flooding events, longer growing seasons or low river flows. Although climate change impacts, such as increased summer temperatures, may not influence landscape character directly; there could be indirect effects on landscape components such as agricultural land use, changes in recreation and tourism[36].

12.6.28 Gatwick Airport sits within a largely rural landscape with two proximal urban areas: Horley to the north; and Crawley to the south. Much of the surrounding rural area is protected by national or local landscape designations, although there is development pressure associated with the airport, the proximity to London, and the main north-south road/rail corridor. It is expected that future development will be focussed on the existing urban centres to avoid impacting on the dispersed settlement nature of the rural and woodland areas. Climate change is leading to changes in crops and woodland species mix.[37]

12.6.29 Heathrow sits within a largely man-made landscape of a predominantly urban / industrial nature. The landscape around Heathrow is mixed with developed urban areas existing alongside areas of high sensitivity, such as the Colne Valley Regional Park, that are of high value to the local community. Pressure for future development remains high due to the proximity of London, major transport links and the airport.[38]

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[34] Natural England, 2015. *National Character Area profile 121: Low Weald,* p. 29. [online] Accessed 09/01/2017.
[35] Natural England, 2015. *National Character Area profile 115: Thames Valley*, p. 33. [online] Accessed 09/01/2017.
[36] Natural England, 2002. *Landscape Character Assessment topic papers.* [online] Accessed 09/01/2017.
[37] Jacobs, 2014. 10. *Place: Baseline*, Chapter 3. [online] Accessed 09/01/2017.
[38] Jacobs, 2014. 10. *Place: Baseline*, Chapter 3. [online] Accessed 09/01/2017.

12.7 MITIGATION INCLUDED IN ASSESSMENT

12.7.1 This assessment has taken into account the following landscape mitigation proposed by each promoter.

LGW-2R

12.7.2 Mitigation Strategies for Gatwick[39] describe how the design of the project has proactively avoided and minimised adverse effects on archaeology, heritage, landscape and townscape, whilst minimising waste, and appropriate mitigation has been factored into the design of the second runway.

12.7.3 Landscape impacts would be reduced through both onsite mitigation and offsite enhancement measures, including the development of a linear park and habitat management. A Landscape Strategy would be developed to take into account the existing landscape and townscape resource based on consultation with local communities and stakeholders.

12.7.4 Specific measures include screening vegetation on the southern boundary of the site to help integrate the scheme into the surrounding area and screen views. Screening vegetation has also been proposed in the southwestern part of the site to screen residential properties in Ifieldwood.

LHR-ENR

12.7.5 Mitigation for LHR-ENR is proposed to minimise impacts on existing landscape character and heritage assets.[40] Higher quality more accessible open space will be provided, which could be of greater benefit in terms of landscape character, recreation and amenity, and will include ecological compensation habitat areas and river flood alleviation mitigation proposals. To mitigate for any impacts on the Colne Valley Regional Park there is potential to accommodate an extension to the park within the green belt to the east of the M25 and south of the M4.

12.7.6 Measures would include enhancement of meadow areas, a diversion of the Colne Brook and access and green link improvements within Colne Valley Regional Park. Mitigation works are also proposed within Harmondsworth Moor Park, which would improve the quality of views within the park and screen views towards the new runway.

LHR-NWR

12.7.7 Landscape mitigation measures proposed for LHR–NWR[41] are intended to mitigate effects on landscape character resulting from a third runway. The Illustrative Masterplan combines proposals to mitigate the effects of the proposed development on all water, biodiversity, landscape and recreational features, and the proposals to redevelop the Colne Valley Regional Park. Mitigation is proposed within and around the Colne Valley Regional Park to offset adverse effects from construction of the new runway. The proposals have been designed to provide new green spaces within an expanded park by utilising the diverted water course and

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[39] Gatwick Airport London, unknown date. *A Second Runway for Gatwick, Updated Scheme Design Submission - SD4 Mitigation Strategies,* pp. 39-40, [online] Accessed 09/01/2017.

[40] Runway Innovations Ltd, 2014. H*eathrow Expansion Updated Scheme Design – Executive summary of submission to the AC by Runway innovations Ltd and Heathrow Hub Ltd,* pp. 14-15. [online]. Accessed 09/01/2017.

[41] Amec, 2014. Heathr*ow Airport Limited Heathrow's North-West Runway - Landscape and Visual Impact Assessment.* pp. 11-13. [online]. Accessed 09/01/2017.

new flood storage proposals. They include habitat creation areas, a diversion of the Colne Valley Way and improvements to recreational areas. Mitigation works are also proposed within Harmondsworth Moor Park, which would improve the quality of views within the park and screen views towards the new runway. Mitigation measures within farmland to the south of the M4 around the remaining villages have also been proposed to improve habitats and green linkages.

12.8 APPROACH TO ASSESSMENT OF LANDSCAPE

12.8.1 A high level assessment entirely based on desk study has been undertaken. In this context there are limits on what may be concluded prior to a full assessment of landscape and visual impacts.

12.8.2 Impacts at the strategic level have been assessed for both construction and operational phases. For instance, during construction, effects covered under landscape arise from earthworks, lighting and construction activities. During operation, effects would include presence of new infrastructure, buildings and effects from flight paths. This is addressed through the consideration of the duration of the impact (short medium and long term) within the assessment.

12.8.3 Potential impacts on landscape, views and tranquillity cannot be assessed with accuracy in relation to any of the schemes until further information is available for the proposed direction, height and number of flights. Tranquillity levels in the vicinity of the affected areas could be reduced by aircraft noise, aircraft movement - particularly during take-off and landing, additional static lighting at the airport and lighting from airborne aircraft. Detailed assessment of potential daytime and night time effects should be undertaken at the EIA stage when this information is available.

12.8.4 The methodology for the high level, desk based assessment is based on guidance set out in GLVIA and the AC: Appraisal Framework (Chapter 10, Place)[42] for landscape, townscape and waterscape.[43]

12.8.5 Detailed assessment of the proposed schemes on the significance of heritage assets should be undertaken at the EIA stage following guidance set out in '*The Setting of Heritage Assets*'[44] and '*Aviation Noise Metric*'[45.] During EIA, site specific surveys can be undertaken and more detailed information regarding design will be available for assessment.

12.9 ASSESSMENT OF SHORTLISTED SCHEMES

AoS Objective 18: To promote the protection and improvement of landscapes, townscapes, waterscapes and the visual resource including areas of tranquillity and dark skies.

12.9.1 The receptors that would likely be subject to 'significant' landscape, townscape, waterscape and visual effects, i.e. effects of a moderate or greater level, are those with the highest sensitivity as described in Table 12.2. They include nationally designated landscapes and those with particularly distinctive character and scenic quality; viewpoints and vistas in landscapes of this quality and value; occupiers of residential properties; and people using recreational facilities such as National Trails and public rights of way.

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[42] Airports Commission, 2014. *Appraisal Framework*. pp. 88-93. [online] Accessed 09/01/2017.
[43] Jacobs, 2014. 10. *Place Assessment,* p.69, Appendix B Landscape Methodology. [online] Accessed 09/01/2017.
[44] Historic England, 2015. *The Setting of Heritage Assets.* [online] Accessed 09/01/2017.
[45] Historic England, 2014. *Aviation Noise Metric – Research on the Potential Noise Impacts on the Historic Environment by Proposals for Airport Expansion in England, Project No. 6865*. [online] Accessed 09/01/2017.

LGW-2R

NATIONAL LANDSCAPE DESIGNATIONS

12.9.2 The Surrey Hills AONB, High Weald AONB, Kent Downs AONB are situated within 15km of Gatwick Airport. There would be no direct effects on the distinctive landscape character of the AONBs due to the intervening distance. Due to the elevated nature of these landscapes relative to the airport, there is the potential for views from the AONBs towards construction activities and/or operational airport to be affected. The AONBs are located at such a distance that the construction works, and operational buildings and infrastructure would be viewed in the context of the existing airport in a wide panorama.

12.9.3 Whilst this conclusion is based on the limited information available regarding indicative flight paths within the study area, the potential distant impacts on the South Downs National Park would need to be assessed in the project level landscape and visual impact assessment.

12.9.4 Overall, it is considered unlikely that there would be a significant effect on the scenic quality neither of the AONBs, nor on their landscape character, or on their visual amenity. The effects on the AONBs during both construction and operation were therefore considered to be a negative effect.

LOCAL LANDSCAPE DESIGNATIONS

12.9.5 Designated by Surrey County Council and of regional importance is the Surrey Hills AGLV, which is contiguous with and covers a wider area than the Surrey Hills AONB. The AGLV is more varied in character than the AONB and comprises part of the dip slope of the North Downs and parts of the Low Weald to the south of the Downs. The AGLV is important in protecting the integrity of the Surrey Hills AONB, particularly views to and from the AONB. Natural England are currently processing a Modification Order to include part(s) of the AGLV in the AONB. Under this process, if it is established that any part(s) of the AGLV meets the statutory criteria of an AONB, it could be given AONB status. Meanwhile the part(s) of the AGLV under consideration retain the highest level of policy protection through being depicted on Policies Maps of Local Plans.

12.9.6 The West Sussex landscape character area (LCA) LW8 Northern Vales[46] would experience the greatest impact, as the majority of construction works would take place at this location. There would be a permanent loss of landscape features, which would continue into the operation of the airport.

12.9.7 The other West Sussex LCAs outside the Surrey Hills AONB and AGLV (LW4 Low Weald Hills, HW1 High Weald and HW2 High Weald Forests) and the Surrey LCAs[47] Low Weald Open Weald and Wooded Weald county character areas) are unlikely to experience an impact due to their distance from LGW-2R.

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[46] West Sussex County Council, 2005. *Landscape Character Assessment of West Sussex.* [online] Accessed 09/01/2017.

[47] Surrey County Council, 1997. *The Future of Surrey's Landscape and Woodlands*. Quentin Press Limited: Brighton.

LOCAL TOWNSCAPE DESIGNATIONS

12.9.8 There are three local townscape character areas (TCA) within the study area (Ifield and Langley Green, Manor Royal and Horley).

12.9.9 It is considered unlikely that the Ifield and Langley Green TCA would be physically affected by the scheme. The construction works would be noticeable within this TCA because it would be physically closer, and there would be a reduction in tranquillity in some residential areas.

12.9.10 The Manor Royal Industrial Estate is a predominately commercial and industrial area and is considered an ordinary quality landscape of low value. Several buildings to the north of the site will need to be removed to accommodate the runway and diversion of the A23. Visual impacts from the LGW-2R scheme on the Horley TCA are assessed to be barely perceptible.

OTHER AREAS WITH LANDSCAPE CHARACTER VALUE

12.9.11 Buchan and Tilgate Country Parks are situated within the study area to the south of Crawley, however they are screened by the existing built up area, and therefore would not be subject to significant effects.

12.9.12 It is likely that an area of Ancient Woodland on Bonnetts Lane to the southwest of the proposed scheme would need to be removed and could not be replaced. The loss of this small highly valued landscape feature would be permanent.

VISUAL EFFECTS

12.9.13 Potential impacts on views and valued vistas and viewpoints are likely to arise in areas of the Surrey Hills AONB, High Weald AONB, Kent Downs AONB and the locally designated landscape (AGLV) with inter-visibility of the scheme. Potential indirect impacts of new lighting and the direction / height / number of flights over the AONBs during operation cannot be assessed with accuracy until further information is available. Whilst it is considered likely that these factors could cause some deterioration in valued views and vistas from the AONBs, there would be only a much localised alteration due to the intervening distance.

12.9.14 Views of new lighting and aircraft during take-off and landing will be available from residential and recreational receptors to the immediate south, west and east.

12.9.15 Adverse effects are anticipated on views from Ifieldwood, B2036 and Radford Road properties, Crawley public rights of way and the Tandridge Border Path during construction. This is due to the proximity of these receptors to the works and the current open views experienced from these locations. Views from Ifieldwood and the Tandridge Border Path will be adversely impacted during operation, due to the loss and effect upon the current open view from these locations.

12.9.16 Other areas within the study area, which will be impacted during construction, include the northern edge of Crawley (Langley Green and Ifield and The Royal Manor Industrial State) and Russ Hill. These impacts will remain through to operation for Russ hill, but will likely be reduced at the northern edge of Crawley.

12.9.17 Changes to existing views from Charlwood, Norwood Hill from the proposed built development would be barely discernible.

AREAS OF TRANQUILLITY AND DARK SKIES

12.9.18 Although the Surrey Hills AONB, High Weald AONB and Kent Downs AONB lie within 15km from Gatwick Airport, the magnitude of impact on views during construction and operation is considered likely to be low. Potential indirect impacts of new lighting and the direction / height / number of flights over the AONBs cannot be assessed with accuracy until further information is available. It is considered likely that these factors could cause deterioration in tranquillity levels and some valued views and vistas from the AONBs.

12.9.19 The least tranquil areas (shown on CPRE mapping for Tranquillity) are around Gatwick Airport, Horley, Crawley and the M23, with tranquillity increasing to the east and west of the airport.

12.9.20 Compared to the baseline situation, it is considered likely that there will be increased numbers of aircraft overflying areas of higher tranquillity. It is possible that the corridors of overflight may be reduced in number and extent, which will potentially reduce noise and visual disturbance over the AONBs.

12.9.21 The N70 contours show only minor differences between the contours in 2030 and 2050. In this respect, this assessment has used the same methodology for defining the study area for tranquillity as the AC's assessment.[48] The N70 contour is the area with aircraft at 7,000ft or below. Whilst the N70 contour does not provide a definitive area where aircraft are below 7,000ft above mean sea level (AMSL), the largest aircraft at 70dB Lmax identified within the NATS London Airspace Consultation Standard Noise Tables appendix (Airbus 380), is at 7,000ft with this noise level. It is therefore considered a valid proxy for the 7,000ft contour pending the airspace change programme that would be available from detailed design activity. In some areas currently showing moderate tranquillity, the anticipated increase in over-flight will reduce tranquillity levels in the future.

12.9.22 CPRE Dark Skies mapping show the areas with the highest levels of light coincide with the least tranquil areas.

12.9.23 There is the potential for increased light levels. During construction this would be required to facilitate any night time construction works and in the winter evenings. During operation, the new airport infrastructure will also require lighting in addition to any lights from aircraft whilst on the ground and in flight. It is noted that any increased lighting would be within the context of existing high levels of light, generated by the airport and surrounding development. The effects would be most significant on those receptors with open views to the west around Ifieldwood. For receptors further away, light pollution from the scheme would not be distinguishable from the lighting at the adjacent Gatwick airport and urban edge of Crawley.

12.9.24 Gatwick Airport lies within an area identified within the CPRE 'Dark Skies' mapping, as having the highest relative level of night time lighting when viewed from above. It is unlikely that the scheme will alter the results of the CPRE Dark Skies mapping given the existing conditions in the vicinity of the airport, the urban area of Crawley and part of the M23.

12.9.25 Potential impacts on nationally designated landscapes including High Weald AONB, Surrey Hills AONB and the adjoining AGLV from the LGW-2R scheme, cannot be assessed with accuracy until further information is available regarding the location of new lighting and the direction / height / number of flights over the AONBs. It is considered likely that this will cause some deterioration in valued views and vistas from the AONBs, which have the highest sensitivity to change.

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[48] Jacobs, 2014. 10. *Place Baseline,* p. 70, Appendix B, Landscape, Townscape and Waterscape Methodology [online]. Accessed 09/01/2017.

CUMULATIVE EFFECTS

12.9.26 Cumulative effects on landscape/townscape designations, assets, and sensitive views, areas of tranquillity and dark skies may arise from airport expansion in combination with other major infrastructure development. Nearby major infrastructure schemes include improvements to the M23 motorway and the A27 in West Sussex. In particular there are likely to be direct and indirect cumulative effects on the tranquillity of sensitive landscape designations including the South Downs National Park and High Weald AONB and Surrey Hills AONB due to noise. In addition to major infrastructure schemes the nearby local authorities also have plans for growth set out in their local development plans, this growth will result in direct and indirect landscape and visual effects on areas of landscape sensitivity including increased noise, light pollution and decreasing tranquillity, and also lead to an increase in demand for recreational use of these areas.

LHR-ENR

NATIONAL LANDSCAPE DESIGNATIONS

12.9.27 The Chilterns AONB lies over 15km from the scheme. Whilst it is likely that there would be much localised changes to some distant views during construction and operation, the magnitude of impact would be low from this distance. Potential indirect impacts of new lighting and the direction / height / number of flights over the AONB cannot be assessed with accuracy until further information is available. It is considered likely that these factors could cause deterioration in some valued views and vistas from the AONB.

LOCAL LANDSCAPE DESIGNATIONS

12.9.28 LHR-ENR is likely to be visible from the nearby Area of Landscape Importance, particularly from areas of higher ground close to the war memorial at Cooper's Hill. However, views from here are over long distances and are already affected by the existing Airport. The effects on these views are considered to be negligible, for both construction and operation.

12.9.29 There is the potential for the scheme to impact upon the district and county level LCAs within the Study Area.

12.9.30 The Hillingdon Lower Colne Floodplain character area would experience the greatest impact in terms of landscape character as the majority of land take and construction works would take place here. There would also be an impact upon Hillingdon Open Gravel Terrace character area, Slough Road Infrastructure character area and the Hillingdon Historic Core character area, due to physical changes for airport infrastructure and a reduction in visual amenity.

12.9.31 The loss of landscape features would be permanent for the Hillingdon Lower Colne Floodplain, Hillingdon Historic Core, the loss of Longford village and part of Harmondsworth.

LOCAL TOWNSCAPE DESIGNATIONS

12.9.32 The loss of landscape features would be permanent within the Hillingdon Historic Core.

OTHER AREAS WITH LANDSCAPE CHARACTER VALUE

12.9.33 The Colne Valley Regional Park is within and immediately to the west of the site boundary. Some of the park would be lost to accommodate the new runway. In addition, views from the park at Colnbrook and Poyle would be impacted by the construction works.

VISUAL EFFECTS

12.9.34 Views from properties in Stanwell, Stanwell Moor, Harmondsworth and Sipson would be impacted during construction due to the proximity of works and the open nature of views. The adverse effects would continue into the operation of the airport for properties in Harmondsworth and Sipson. This is because the operational airport would be in very close proximity and although partially screened by proposed bunding, the bunding itself would have a visual impact.

12.9.35 Views from the Public Rights of Way south of the M4, including the Colne Valley Way and Harmondsworth Moor would be impacted by the construction works. These areas would have close range views towards construction works. This impact would continue into the operational phase.

TRANQUILLITY AND DARK SKIES

12.9.36 The Chilterns AONB lies over 15km from the scheme. It is considered likely that the magnitude of impact of additional lighting on night time views during construction and operation would be low from this distance. Potential indirect impacts of new lighting and the direction / height / number of flights over the AONB cannot be assessed with accuracy until further information is available. It is considered likely that these factors could cause deterioration in some valued views and vistas from the AONB.

12.9.37 CPRE tranquillity mapping illustrates low tranquillity in areas around Heathrow Airport which include the airport, urban areas inside the M25, the M25 itself and Slough. The most tranquil area is to the southwest of the airport.

12.9.38 Compared to the baseline situation, it can be observed that there is expected to be increased numbers of aircraft overflying the Chilterns AONB, which may reduce tranquillity levels in the future.

12.9.39 The corridors of over-flight may be increased in number and extent, which has the potential to increase noise and visual disturbance over the areas of the Chilterns AONB. The areas shown to be effected are currently considered to be in the least tranquil category, with some areas to the west considered of moderate tranquillity.

12.9.40 CPRE Dark Skies mapping show the areas with the highest levels of light coincide with the least tranquil areas including the M25 eastwards, Slough and the M4. The airport lies within an area identified within the CPRE ‘Dark Skies’ mapping as having the highest relative level of night time lighting when viewed from above. There is potential that the proposed flight paths may extend into areas of lower levels of night time lighting to the west of the airport, which is unlikely to alter the results of the CPRE ‘Dark Skies’ mapping.

12.9.41 It is likely that the airport would require lighting in winter evenings during construction and occasionally overnight. During operation, the new airport infrastructure will also require lighting in addition to any lights from aircraft whilst on the ground and in flight. The proposed additional lighting will take place within the context of lighting at the existing airport, lighting from nearby urban areas and the M25. Impacts would be the greatest for those receptors to the west around Colnbrook and to the north around Harmondsworth and Sipson. Receptors further away would not easily be able to distinguish the additional lighting from that currently being emitted.

CUMULATIVE EFFECTS

12.9.42 Cumulative effects on landscape/townscape designations, assets, and sensitive views, areas of tranquillity and dark skies may arise from airport expansion in combination with other major infrastructure development. Nearby major infrastructure schemes include improvements to the M25, Crossrail, and HS2. In particular there are likely to be direct and indirect cumulative effects on the tranquillity of sensitive landscape designations include the Chilterns AONB due to noise. In addition to major infrastructure schemes the nearby local authorities also have plans for growth set out in their local development plans, this growth will result in direct and indirect landscape and visual effects on areas of landscape sensitivity from increased noise, light pollution and decreasing tranquillity, and will also lead to an increase in demand for recreational use of these areas.

LHR-NWR

NATIONAL LANDSCAPE DESIGNATIONS

12.9.43 The Chilterns AONB lies over 15km from the scheme. Whilst it is likely that there would be very localised changes to some views during construction and operation, the magnitude of impact would be low from this distance. Potential indirect impacts of new lighting and the direction / height / number of flights over the AONB cannot be assessed with accuracy until further information is available. It is considered likely that these factors could cause deterioration in some valued views and vistas from the AONB.

LOCAL LANDSCAPE DESIGNATIONS

12.9.44 LHR-NWR is likely to be visible from the nearby Area of Landscape Importance particularly from areas of higher ground close to the war memorial at Cooper's Hill. However, views from here are over long distances and are already affected by the existing Airport. The effects on these views are considered to be negligible, for both construction and operation.

12.9.45 The study area contains a number of landscape and townscape character areas at district and county levels. The Hillingdon Lower Colne Floodplain character area would experience the greatest impact due to the land take and construction works here. The Windsor and Maidenhead Settled Developed Floodplain character area and the Hillingdon Historic Core character area will also experience impacts as a result of the construction of airport infrastructure and a reduction in visual amenity.

12.9.46 For Hillingdon Lower Colne Floodplain the loss of landscape features would be permanent and would therefore continue into the operation of the airport.

OTHER AREAS WITH LANDSCAPE CHARACTER VALUE

12.9.47 The Colne Valley Regional Park is within and immediately to the west of the site boundary. Part of the park would be lost to accommodate the new runway. There would be significant negative impacts on views from the park at Colnbrook and Poyle during the construction works.

VISUAL EFFECTS

12.9.48 Potential visibility of the LHR-NWR scheme would be constrained by existing built form to the north, east and south, and by vegetation and reservoir embankments to the west.

12.9.49 Significant negative visual effects would be experienced by occupiers of residential properties at Harmondsworth and Sipson villages, Harmondsworth Moor, Stanwell and Stanwell Moor, as well as users of public rights of way including the Colne Valley Way to the south of the M4 during construction. Effects on residents at Harmondsworth and Sipson villages would remain

significant during operation. With mitigation, effects at other settlements and on public rights of way south of the M4 would reduce with time.

TRANQUILLITY AND DARK SKIES

12.9.50 CPRE tranquillity mapping illustrates low tranquillity in areas around Heathrow Airport, which include the airport, urban areas inside the M25, the M25 itself and Slough and increasing in nearby areas within the Chilterns AONB. The most tranquil areas are to the south west of the airport and North West in the Chilterns AONB.

12.9.51 The corridors of over-flight may be increased in number and extent, which has the potential to increase noise and visual disturbance over the Chilterns AONB. The areas shown to be effected are currently considered to be in the least tranquil category, with some areas to the west considered of moderate tranquillity.

12.9.52 CPRE Dark Skies mapping show the areas with the highest levels of light coincide with the least tranquil areas including the M25 eastwards, Slough and the M4. The airport lies within an area identified within the CPRE 'Dark Skies' mapping as having the highest relative level of night time lighting when viewed from above. There is potential that the proposed flight paths may extend into areas of lower levels of night time lighting to the west of the airport, however it is unlikely to alter the results of the CPRE 'Dark Skies' mapping.

12.9.53 LHR-NWR would require lighting in winter evenings during construction and occasionally overnight. During operation, the new airport infrastructure will also require lighting in addition to any lights from aircraft whilst on the ground and in flight. The proposed additional lighting will be within the context of the lighting at the existing airport and the lighting also in nearby urban areas and the M25. The effects would be most significant for those receptors to the west around Colnbrook and Horton and to the north at Longford. Landscape, townscape and visual receptors further away from the scheme would find it difficult to distinguish the new lighting from the existing lighting at the airport and along the urban edges of London, Staines and Slough.

CUMULATIVE EFFECTS

12.9.54 Cumulative effects on landscape and townscape designations, visual amenity, tranquillity and dark skies may arise from airport expansion in combination with other major infrastructure development. Nearby, proposed major infrastructure schemes include improvements to the M25, Crossrail, and HS2, which in combination with the scheme could have direct and indirect cumulative effects on tranquillity in the Chilterns AONB due to increased noise. In addition to major infrastructure schemes, nearby local authorities have plans for growth which are set out in their local development plans. This planned growth will result in direct and indirect landscape and visual effects on landscapes with high sensitivity due to increased noise, light pollution and reduced tranquillity. It is anticipated there will also be an increase in demand for the recreational use of the Chilterns AONB

Table 12.6: Summary of Significant Landscape and Townscape Effects LGW-2R[49]

RECEPTOR	CONSTRUCTION PHASE	OPERATIONAL PHASE
Designation area effects		
High Weald AONB, Surrey Hills AONB and Kent Downs AONB	To be assessed when flight path information is available	To be assessed when flight path information is available
Landscape Effects		

[49] Jacobs, 2014. *10. Place: Assessment*, p. 44, Table 3.1. [online]. Accessed 26/01/2017.

RECEPTOR	CONSTRUCTION PHASE	OPERATIONAL PHASE
West Sussex: LW8 Northern Vales character area	Moderate Adverse effect	Moderate Adverse effect
Visual Effects		
Crawley public rights of way	Moderate Adverse effect	Minor Adverse effect
Ifield	Moderate Adverse effect	Moderate Adverse effect
B2036 and Radford Road Properties	Moderate Adverse effect	Negligible effect
Tandridge Border Path	Major Adverse effect	Moderate Adverse effect
High Weald AONB	Moderate Adverse effect	Moderate Adverse effect
Surrey Hills AONB	Moderate Adverse effect	Moderate Adverse effect
Kent Downs AONB	Moderate Adverse effect	Moderate Adverse effect

Table 12.7: Summary of Significant Landscape and Townscape Effects LHR-ENR[50]

RECEPTOR	CONSTRUCTION PHASE	OPERATIONAL PHASE
Designation area effects		
Chilterns AONB	To be assessed when flight path information is available	To be assessed when flight path information is available
Colne Valley Regional Park	Moderate Adverse effect	Minor adverse effect
Landscape Effects		
Hillingdon Lower Colne Floodplain character area	Major Adverse effect	Major Adverse effect
Windsor and Maidenhead Settled Developed Floodplain character area	Moderate Adverse effect	Minor Adverse effect
Townscape Effects		
Hillingdon Historic Core	Moderate Adverse effect	Minor Adverse effect
Visual Effects		
Stanwell and Stanwell Moor properties	Moderate Adverse effect	Minor Adverse effect
Wraysbury Reservoir	Moderate Adverse effect	Minor Adverse effect
Poyle Industrial Estate	Moderate Adverse effect	Minor Adverse effect
Colnbrook (southern edge)	Major Adverse effect	Moderate Adverse effect
Horton	Major Adverse effect	Moderate Adverse effect
Colne Valley Way	Major Adverse effect	Moderate Adverse effect
Longford	Major Adverse effect	Moderate Adverse effect

[50] Jacobs, 2014. 10. Place: Assessment, p. 69, Table 3.3. [online]. Accessed 09/01/2017.

Table 12.8: Summary of Significant Landscape and Townscape Effects LHR-NWR[51]

RECEPTOR	CONSTRUCTION PHASE	OPERATIONAL PHASE
Designation area effects		
Chilterns AONB	To be assessed when flight path information is available	To be assessed when flight path information is available
Colne Valley Regional Park	Moderate Adverse effect	Minor adverse effect
Landscape Effects		
Hillingdon Lower Colne Floodplain character area	Major Adverse effect	Major Adverse effect
Hillingdon Open Gravel Terrace character area	Moderate Adverse effect	Minor Adverse effect
Slough Road Infrastructure character area	Moderate Adverse effect	Minor Adverse effect
Townscape Effects		
Hillingdon Historic Core	Major Adverse effect	Moderate Adverse effect
Visual Effects		
Stanwell and Stanwell Moor properties	Moderate Adverse effect	Minor Adverse effect
Public rights of way south of M4	Moderate Adverse effect	Minor Beneficial effect
Harmondsworth and Sipson villages	Major Adverse effect	Moderate Adverse effect
Harmondsworth Moor	Major Adverse effect	Moderate Adverse effect
Colne Valley Regional Park	Moderate Adverse effect	Minor Adverse effect

[51] Jacobs, 2014. 10. Place: Assessment, p. 69, Table 3.3. [online]. Accessed 09/01/2017.

AoS Objective 18: To promote the protection and Improvement of Landscapes, Townscapes Waterscapes and the Visual Resource, Including Areas of Tranquillity and Dark Skies.

Appraisal Question 35: Will It Protect and Enhance Nationally and Locally Designated Landscape, Townscape and Waterscape?

SEA Topic	LGW-2R	LHR-ENR	LHR-NWR
Description of Impact (including receptor)	**National Landscape Designations:** Potential indirect impacts from new lighting and the direction / height / number of flights: Surrey Hills AONB, High Weald AONB, and Kent Downs AONB. **Local Landscape Designations:** Long distance views from the Surrey AGLV which adjoins the Surrey Hills AONB. Potential indirect impacts from new lighting and the direction / height / number of flights**.** **Local Townscape Designations:** Effects on tranquillity of Ifield and Langley TCAs. **Other areas with landscape character value:** Loss of Ancient Woodland on Bonnetts Lane. The LW8 Northern Vales character area would experience the greatest impact.	**National Landscape Designations:** Potential indirect impacts of new lighting and the direction / height / number of flights over the Chilterns AONB. **Local Landscape Designations:** Long distance views from Area of Landscape Importance; impacts upon the Hillingdon Lower Colne Floodplain, Hillingdon Open Gravel Terrace, Slough Road Infrastructure and Hillingdon Historic Core character areas. **Local Townscape Designations:** There would be an irreversible loss of valued landscape features from within the Hillingdon Historic Core. **Other areas with landscape character value:** Loss of the Colne Valley Regional Park and views from the park at Colnbrook and Poyle would be impacted by the construction works.	**Nationally landscape Designation:** Potential indirect impacts of new lighting and the direction / height / number of flights over the Chilterns AONB. **Local Landscape Designations:** Long distance views from Area of Landscape Importance; impacts upon the Hillingdon Lower Colne Floodplain and the Maidenhead Settled Developed Floodplain. **Local Townscape Designations**: There would be an irreversible loss of valued landscape features from within the Hillingdon Historic Core. **Other areas with landscape character value:** Loss of the Colne Valley Regional Park and views from the park at Colnbrook and Poyle, would be impacted by the construction works.
Direct/ Indirect/ Cumulative	**Direct, indirect and Cumulative** Effects on the value of landscape assets would be direct (construction and operation of new infrastructure) and indirect (lighting, overhead flights). Cumulative effects on landscape assets may arise from airport expansion in combination with other major infrastructure development.	**Direct, Indirect and Cumulative** Effects on the value of landscape assets would be direct (construction and operation of new infrastructure) and indirect (lighting, overhead flights). Cumulative effects on landscape assets may arise from airport expansion in combination with other major infrastructure development.	**Direct, Indirect and Cumulative** Effects on the value of landscape assets would be direct (construction and operation of new infrastructure) and indirect (lighting, overhead flights). Cumulative effects on landscape assets may arise from airport expansion in combination with other major infrastructure development.
Probability (High, Medium, Low, Very Low)	**High** There is a High probability that negative effects will occur in relation to these receptors. The significance of these effects will depend on the extent and effectiveness of mitigation.	**High** There is a High probability that negative effects will occur in relation to these receptors. The significance of these effects will depend on whether it will be possible to provide effective mitigation.	**High** There is a High probability that negative effects will occur in relation to these receptors. The significance of these effects will depend on whether it will be possible to provide effective mitigation.

SEA Topic	LGW-2R	LHR-ENR	LHR-NWR
Phase, Duration (Long-term, Medium-term, Short-term), Frequency	**Construction and Operation, Long-term, Continuous** Direct effects on landscape assets will occur both during construction and operation. The effects will be on-going throughout the operational life of the airport.	**Construction and Operation, Long-term, Continuous** Direct effects on landscape assets will occur both during construction and operation. The effects will be on-going throughout the operational life of the airport.	**Construction and Operation, Long-term, Continuous** Direct effects on landscape assets will occur both during construction and operation. The effects will be on-going throughout the operational life of the airport.
Permanent/ Temporary **Irreversible/ Reversible**	**Permanent and Irreversible** Some of the direct effects on landscape are permanent and irreversible. However, it may be possible to reduce the significance of these effects through landscape mitigation and enhancement measures.	**Permanent and Irreversible** Some of the direct effects on landscape are permanent and irreversible. However, it may be possible to reduce the significance of these effects through landscape mitigation and enhancement measures.	**Permanent and Irreversible** Some of the direct effects on landscape are permanent and irreversible. However, it may be possible to reduce the significance of these effects through landscape mitigation and enhancement measures.
Magnitude and Spatial Extent, incl. Transboundary	**Low, Regional** Gatwick is located in a flat to gently undulating rural landscape, and the effects on the landscape and valued views and vistas extend across various areas of sensitive landscape, which are identified.	**Low , Regional** Negative effects on one nationally designated landscape are unlikely due to the intervening distance. Negative effects on locally designated landscapes are identified.	**Low, Regional** Negative effects on one nationally designated landscape are unlikely due to the intervening distance. Negative effects on locally designated landscapes are identified.
Assumptions and Limitation	A desk based assessment only has been undertaken at this stage. An assumption on the screening provided by vegetation based on desk based information was made. Potential indirect impacts of new lighting and the direction / height / number of flights over the AONBs cannot be assessed with accuracy until further information is available but are considered likely to have a negative effect.	A desk based assessment only has been undertaken at this stage. An assumption on the screening provided by vegetation based on desk based information was made. Potential indirect impacts of new lighting and the direction / height / number of flights over the AONB cannot be assessed with accuracy until further information is available but are considered likely to have a negative effect.	A desk based assessment only has been undertaken at this stage. An assumption on the screening provided by vegetation based on desk based information was made. Potential indirect impacts of new lighting and the direction / height / number of flights over the AONB cannot be assessed with accuracy until further information is available but are considered likely to have a negative effect.
Significance	**Negative effect (-)**	**Negative effect (-)**	**Negative effect (-)**
	Indirect and cumulative effects on three AONBs and one AGLV, townscapes, direct and cumulative effects on areas of landscape character value. High probability of long-term effects occurring during construction and operation which are permanent and irreversible. Low magnitude and potential regional extent.	Indirect and cumulative effects on an AONB, Area Landscape Importance; direct, indirect and cumulative effects on local landscapes and landscape character. High probability of long-term effects occurring during construction and operation which are permanent and irreversible. Low magnitude and potential regional extent.	Indirect and cumulative effects on an AONB, Area Landscape Importance; direct, indirect and cumulative effects on local landscapes and landscape character. High probability of long-term effects occurring during construction and operation which are permanent and irreversible. Low magnitude and potential regional extent.

Appraisal Question 36: Will it lead to Impact on Sensitive Views?

SEA Topic	LGW-2R	LHR-ENR	LHR-NWR
Description of Impact (including receptor)	Potential for deterioration in valued views and vistas from Surrey Hills AONB, Kent Downs AONB and High Weald AONB due to new lighting and the direction / height / number of flights over the AONBs. The most significant views towards the proposed scheme would be from B2036 and Radford Road properties, Crawley, public rights of way and the Tandridge Border Path during construction; and would continue into operation for Ifieldwood and the Tandridge Border Path.	Potential for deterioration in valued views and vistas on the Chilterns AONB from the direction / height / number of flights overhead. Views from properties in Stanwell, Stanwell Moor, Harmondsworth and Sipson would be impacted during construction and operation. Views from the Public Rights of Way south of the M4 during construction and operation.	Potential for deterioration through increased visual disturbance in areas of the Chilterns AONB, from increased number of flights overhead. Views from properties in Stanwell, Stanwell Moor, Harmondsworth and Sipson would be impacted during construction and operation. Views from the Public Rights of Way south of the M4 during construction and operation.
Direct/ Indirect/ Cumulative	**Direct, indirect and Cumulative** The works will result in a direct effect on the views from the receptors, which have been identified. Cumulative effects on sensitive views may arise with other major infrastructure.	**Direct, indirect and Cumulative** The works will result in a direct effect on the views from the receptors, which have been identified. Cumulative effects on sensitive views may arise with other major infrastructure.	**Direct, indirect and Cumulative** The works will result in a direct effect on the views from the receptors, which have been identified. Cumulative effects on sensitive views may arise with other major infrastructure.
Probability (High, Medium, Low, Very Low)	**High** There is a High probability that negative effects will occur in relation to these receptors. However, the significance of these effects will depend on whether it will be possible to provide effective mitigation.	**High** There is a High probability that negative effects will occur in relation to these receptors. However, the significance of these effects will depend on whether it will be possible to provide effective mitigation.	**High** There is a High probability that negative effects will occur in relation to these receptors. However, the significance of these effects will depend on whether it will be possible to provide effective mitigation.
Phase, Duration (Long-term, Medium-term, Short-term), Frequency	**Construction and Operation, Long-term, Continuous** Direct effects on views and visual amenity from high sensitivity receptors will occur both during construction and operation.	**Construction and Operation, Long-term, Continuous** Direct effects on views and visual amenity from high sensitivity receptors will occur both during construction and operation.	**Construction and Operation, Long-term, Continuous** Direct effects on views and visual amenity from high sensitivity receptors will occur both during construction and operation.
Permanent/ Temporary **Irreversible/**	**Permanent and Irreversible** Some of the direct effects on views and visual amenity are permanent and irreversible. However, it	**Permanent and Irreversible** Some of the direct effects on l views and visual amenity are permanent and irreversible.	**Permanent and Irreversible** Some of the direct effects on views and visual amenity are permanent and irreversible.

SEA Topic	LGW-2R	LHR-ENR	LHR-NWR
Reversible	may be possible to reduce the significance of these effects through landscape mitigation and enhancement.	However, it may be possible to reduce the significance of these effects through landscape mitigation and enhancement.	However, it may be possible to reduce the significance of these effects through landscape mitigation and enhancement.
Magnitude and Spatial Extent, incl. Transboundary	**Low, Regional** Gatwick is located in a flat to undulating landscape and the effects on views will be experienced both locally, and extend to areas of high ground located to the north and to the south.	**High, Local** The negative effects on views will be experienced locally.	**High, Local** Same as LHR ENR.
Assumptions and Limitation	A desk-based assessment only has been undertaken at this stage. An assumption on the screening provided by vegetation based on desk-based information was made. Potential indirect impacts of new lighting and the direction / height / number of flights cannot be assessed with accuracy until further information is available but are considered likely to have a negative effect on some sensitive views.	A desk-based assessment only has been undertaken at this stage. An assumption on the screening provided by vegetation based on desk-based information was made. Potential indirect impacts of new lighting and the direction / height / number of flights cannot be assessed with accuracy until further information is available but are considered likely to have a negative effect on some sensitive views.	A desk-based assessment only has been undertaken at this stage. An assumption on the screening provided by vegetation based on desk-based information was made. Potential indirect impacts of new lighting and the direction / height / number of flights cannot be assessed with accuracy until further information is available but are considered likely to have a negative effect on some sensitive views.
Significance	**Significant negative effect (--)**	**Significant negative effect (--)**	**Significant negative effect (--)**
	Indirect effects on three AONBs; direct and cumulative effects on views from residential and recreational receptors; high probability of effects; occurs during construction and operation; effects are long-term, permanent and irreversible; effects are low magnitude but potentially regional in extent.	Indirect effects on one AONB; direct and cumulative effects on views from residential and recreational receptors; high probability of effects; occurs during construction and operation; effects are long-term, permanent and irreversible; effects are high magnitude but local in extent.	Indirect effects on one AONB; direct and cumulative effects on views from residential and recreational receptors; high probability of effects; occurs during construction and operation; effects are long-term, permanent and irreversible; effects are high magnitude but local in extent.

Appraisal Question 37: Will it lead to a Loss of Tranquillity and Increase in Light Pollution?

SEA Topic	LGW-2R	LHR-ENR	LHR-NWR
Description of Impact (including receptor)	Potential for increased numbers of aircraft over-flying areas of higher tranquillity, including AONBs and to the east and west of the airport. Potential for increased aircraft noise and views of aircraft in flight. There is likely to be increased light levels from construction and operational lighting, in addition to any lights from aircraft whilst on the ground and in flight. Lighting from the airport will particularly affect open views to the west around Ifieldwood.	Potential for increased numbers of aircraft over-flying the Chilterns AONB, which may reduce tranquillity levels. Potential for increased aircraft noise and views of aircraft in flight. There is likely to be increased light levels from construction and operational lighting, in addition to any lights from aircraft whilst on the ground and in flight. Impacts would be the greatest for those receptors to the west around Colnbrook, and to the north around Harmondsworth and Sipson.	Potential for increased numbers of aircraft overflying the Chilterns AONB, which may reduce tranquillity levels. Potential for increased aircraft noise and views of aircraft in flight. There is likely to be increased light levels from construction and operational lighting, in addition to any lights from aircraft whilst on the ground and in flight. The effects would be most significant for those receptors to the west around Colnbrook and Horton and to the north at Longford.
Direct/ Indirect/ Cumulative	**Direct, Indirect and Cumulative** The works will affect the identified receptors. Cumulative effects on tranquillity and dark skies may arise with other major infrastructure development.	**Direct, Indirect and Cumulative** The works will affect the identified receptors. Cumulative effects on tranquillity and dark skies may arise with other major infrastructure development.	**Direct, Indirect and Cumulative** The works will affect the identified receptors. Cumulative effects on tranquillity and dark skies may arise with other major infrastructure development.
Probability (High, Medium, Low, Very Low)	**Medium** It is likely that there will be increased lighting however this will be influenced by the construction programme and detailed lighting design. There is uncertainty regarding the details of flight routes and therefore the areas, which may be affected.	**Medium** It is likely that there will be increased lighting however this will be influenced by the construction programme and detailed lighting design. There is uncertainty regarding the details of flight routes and therefore the areas, which may be affected.	**Medium** It is likely that there will be increased lighting however this will be influenced by the construction programme and detailed lighting design. There is uncertainty regarding the details of flight routes and therefore the areas, which may be affected.
Phase, Duration (Long-term, Medium-term, Short-term), Frequency	**Construction and Operation, Long-term, Continuous** The Direct effects on landscape assets will occur both during construction and operation.	**Construction and Operation, Long-term, Continuous** The Direct effects on landscape assets will occur both during construction and operation.	**Construction and Operation, Long-term, Continuous** The Direct effects on landscape assets will occur both during construction and operation.
Permanent/ Temporary	**Temporary and Reversible** The effects are reversible as lighting can be removed	**Temporary and Reversible** The effects are reversible as lighting can be	**Temporary and Reversible** The effects are reversible as lighting can be

SEA Topic	LGW-2R	LHR-ENR	LHR-NWR
Irreversible/ Reversible	or reduced and impacts on tranquillity are dependent on the routes and frequency of the over flight.	removed or reduced and impacts on tranquillity are dependent on the routes and frequency of the over flight.	removed or reduced and impacts on tranquillity are dependent on the routes and frequency of the over flight.
Magnitude and Spatial Extent, incl. Transboundary	**Low, Regional** The effects on light pollution will be experienced outside the immediate locality of the airport.	**Low, Regional** The effects on light pollution will be experienced outside the immediate locality of the airport.	**Low, Regional** The effects on light pollution will be experienced outside the immediate locality of the airport.
Assumptions and Limitation	There remains significant uncertainty regarding the details of routes due to both the detailed design issues associated with the scheme development and application of the UK Future Airspace Strategy. Potential indirect impacts of new lighting and the direction / height / number of flights cannot be assessed with accuracy until further information is available but it is considered likely that these factors would have a negative effect on tranquillity and an increase in light pollution.	There remains significant uncertainty regarding the details of routes due to both the detailed design issues associated with the scheme development and application of the UK Future Airspace Strategy. Potential indirect impacts of new lighting and the direction / height / number of flights cannot be assessed with accuracy until further information is available but it is considered likely that these factors would have a negative effect on tranquillity and an increase in light pollution.	There remains significant uncertainty regarding the details of routes due to both the detailed design issues associated with the scheme development and application of the UK Future Airspace Strategy. Potential indirect impacts of new lighting and the direction / height / number of flights cannot be assessed with accuracy until further information is available but it is considered likely that these factors would have a negative effect on tranquillity and an increase in light pollution.
Significance	**Negative effect (-)**	**Negative effect (-)**	**Negative effect (-)**
	Direct, indirect and cumulative effects on loss of tranquillity and increased light pollution on up to three AONBs, and undesignated areas and local communities; medium probability due to uncertainty on flight paths and lighting design; long term effects during construction and operation; temporary and reversible due to nature of lighting; low magnitude but potential for regional extent.	Direct, indirect and cumulative effects on loss of tranquillity and increased light pollution on one AONB, and undesignated areas and local communities; medium probability due to uncertainty on flight paths and lighting design; long term effects during construction and operation; temporary and reversible due to nature of lighting; low magnitude but potential for regional extent.	Direct, indirect and cumulative effects on loss of tranquillity and increased light pollution on one AONB, and undesignated areas and local communities; medium probability due to uncertainty on flight paths and lighting design; long term effects during construction and operation; temporary and reversible due to nature of lighting; low magnitude but potential for regional extent.

12.10 MITIGATION

12.10.1 This assessment has taken account of the proposed mitigation measures described in Section 12.7 above.

12.10.2 Construction of each shortlisted scheme is likely to have long-term negative effects on landscape throughout all phases of development, principally associated with the location and scale of the sites. Given the scale of the likely development, fully effective mitigation of local level landscape and visual impacts during the construction and operational phases is unlikely. Furthermore, the location of mitigation planting within the airport and controlled airspace would be required to comply fully with all relevant Civil Aviation Authority (CAA) regulations.

12.10.3 Although mitigation strategies for LGW-2R would limit land-take requirements whilst inherently avoiding and minimising impacts to existing landscape character and heritage assets, the impacts of the scheme would be consistently negative. Whilst the proposed mitigation will help to limit landscape and visual impacts, it is unlikely to reduce impacts on tranquillity. It is considered likely that some areas of high tranquillity may be impacted by new flight paths associated with the scheme and could not be mitigated.

12.10.4 Extensive landscape mitigation measures proposed for LHR-NWR would reduce the effects of the proposals on water, biodiversity, landscape and recreational features and would redevelop part of the Colne Valley Regional Park. Whilst the overall impact would remain negative, the proposed mitigation would reduce the significance of effect.

12.10.5 Mitigation proposed for LHR-ENR would provide higher quality, more accessible open space than exists at present, which could be of benefit in terms of landscape character, recreation and amenity. It will include ecological compensation habitat areas and river flood alleviation mitigation proposals. Impacts on landscape character would be relatively contained, given the limited land take and present levels of low tranquillity. Overall, the impact of the scheme on existing landscape character would be negative.

12.10.6 Other measures, which could be considered for each of the shortlisted schemes, are options for respite from flight paths over designated landscapes, similar to those currently undertaken for built up areas. Such measures should be considered but not impose limitations on the operators.

12.10.7 During project/application level design, further consideration should be given to landscape mitigation based on the findings of detailed visual and landscape impact assessment, linkages to ecosystem services assessment and ecological surveys and the protection of heritage assets and their setting.

12.10.8 As part of design, a comprehensive landscape strategy would ensure the proposals would reinforce and enhance landscape character whilst enhancing a sense of place. The strategy should ensure the proposals would achieve multiple environmental mitigation objectives and contribute positively to the wider green infrastructure. In this respect mitigation could include both onsite and offsite planting within green infrastructure frameworks for several administrative boundaries thereby necessitating close collaboration with all relevant stakeholders.

12.10.9 It is recommended that a landscape strategy is developed in conjunction with the strategy of mitigation for the historic environment to protect heritage assets and their setting as well as valued views. Specific measures for both Heathrow schemes could include landscape measures to minimise impacts on the Harmondsworth Conservation Area and its listed buildings and Hillingdon Historic Core. Mitigation measures that should be considered include those that address heritage at risk (including those that become at risk as a result of the preferred option), enhancement to conservation areas, improving the setting of assets, mitigation of noise impacts, together with opportunities for community engagement, which could

include improved access to and/interpretation, understanding and appreciation of heritage assets. Adopting the use of green space in areas of high or known archaeological potential will also contribute to enhancement.

12.10.10 This topic based assessment identifies the need for more detailed landscape and visual impact assessment at the project level EIA stage as part of the iterative process to inform the development of the detailed design. At this stage site specific surveys can be undertaken based on more detailed information such as proposed building heights. It is recommended it includes assessment of valued views and vistas within the protected landscapes and the setting of heritage assets towards the proposed scheme. The assessment should include site appraisal from publicly accessible viewpoint locations.

12.10.11 The detailed assessment should take account of information on flight paths, which have not been assessed at this stage because this detail is not available, but may have associated landscape, visual and tranquillity impacts.

12.11 ASSUMPTIONS AND LIMITATIONS

12.11.1 Potential impacts of new lighting and the direction / height / number of flights cannot be assessed with accuracy until further information is available. It is considered likely that these factors would have a widespread negative effect on landscape character, views and visual amenity, tranquillity and would increase light pollution.

12.11.2 A desk based assessment has been undertaken and there have been no site visits. A Zone of Theoretical Visibility (ZTV) map has not been produced for any of the proposed schemes because insufficient height data is available to model accurately nearby existing buildings and structures, which could screen views of the proposals. It is recommended that ZTV mapping is undertaken at the more detailed EIA stage to inform the extent of the study area for the assessment of landscape and visual effects.

12.11.3 An assumption on the screening provided by vegetation is based on desk based information including aerial photography, Ordnance Survey mapping and Google Street View. It is assumed that the existing vegetation identified as providing screening will still exist during the construction and operation phases of the scheme (unless clearly lost as a result of the proposed scheme).

12.11.4 No scheme-specific landscape and visual impact assessments or site survey has been undertaken to inform this strategic level assessment. It is acknowledged that effects may extend beyond the study area, particularly indirect effects generated by surface or aviation traffic. Therefore, a precautionary principle has been applied to this assessment.

12.11.5 Published landscape character assessment at regional and local level, and AONB Management Plans would inform the application level assessment.

12.11.6 All flight routes shown in the Landscape Figures are to be considered as indicative only. They were produced as a result of a workshop between AC, CAA, NATS and the scheme promoters for noise modelling purposes. They should not be considered definitive route indications.

12.12 CONCLUSIONS

AoS Objective 18: To promote the protection and improvement of landscapes, townscapes, waterscapes and the visual resource including areas of tranquillity and dark skies

12.12.1 As with any major infrastructure project, effects on landscape character and visual amenity will arise during construction and operation. The significance of the effects will depend on the scale and nature of the impacts associated with each scheme in relation to the sensitivity of the receiving landscape and visual receptor and their proximity to the scheme. Not all impacts can be effectively mitigated due to the scale and nature of the proposed development.

12.12.2 On all sites, the proposed airport expansion would be seen in the context of existing airport facilities. Development, which is likely to take place in areas around Gatwick and Heathrow regardless of the runway expansion proposals, will have direct and indirect effects on the character of the surrounding landscape and visual amenity.

12.12.3 Land take for each scheme will be large and will inevitably have a negative impact on the character of the landscape surrounding each site, and on landscape resources. Although already influenced by the existing facilities, the landscape around Heathrow Airport and Gatwick Airport is mixed, comprising areas of urban development and rural landscape as well as areas of high sensitivity.

EFFECTS ON DESIGNATIONS AND CHARACTER

12.12.4 Gatwick Airport is sited on a flat to gently undulating rural landscape between the urban areas of Horley to the north and Crawley to the south. Most of the surrounding rural area is protected by national landscape designations including the Surrey Hills AONB, High Weald AONB, and Kent Downs AONB; the locally designated Surrey AGLV, and Metropolitan Green Belt. Several areas of Open Access land, Registered Parks and Gardens, the North Downs Way National Trail, the Tandridge Border Path and Sussex Border Path recreational routes lie within 15km of the proposed scheme. All of these designated landscapes have high sensitivity.

12.12.5 It is assumed from the information available that there would be no direct effects on any nationally or locally designated landscapes from the LGW-2R scheme. No designated landscapes lie within 2km of the site, with the exception of two areas of CRoW (Open Space), one of which adjoins the southwestern edge of the site boundary. This scheme will involve the loss of ancient woodland, which could not be mitigated due to the time it would take for replacement planting to reach maturity.

12.12.6 Although there would be no direct landscape effects on the AONBs or AGLV, indirect effects could arise in areas with intervisibility of the scheme, from new flight patterns over the designated landscapes. Effects on views would be most prominent in the High Weald AONB, which lies due south of the scheme and less than 5km at its nearest point to the site boundary. Potential effects cannot be assessed with accuracy until further information is available regarding the direction / height / number of flights over the AONBs.

12.12.7 The LGW-2R scheme lies mainly within the West Sussex LW8 Northern Vales LCA, which is heavily influenced by Gatwick Airport and Crawley. It has moderate sensitivity and is reasonably tolerant of change of the nature proposed during construction and operation. Despite the proposed mitigation, there would be negative effects on landscape character due to the loss of landscape features.

12.12.8 Heathrow Airport lies within a largely man-made landscape comprising urban and industrial development interspersed with several reservoirs and large water areas resulting from sand and gravel workings. The Chilterns AONB, the nearest nationally designated landscape, lies over 15km to the north west of the proposed Heathrow expansion schemes. A locally

designated Area of Landscape Importance, four Registered Parks and Gardens, Areas of Open Access land, areas of statutory Green Belt, and the Thames Path National Trail and other recreational trails lie within 5km of Heathrow Airport.

12.12.9 Although these designated landscapes have high sensitivity, they either lie at a greater distance or extend over a much smaller area than the designated landscapes surrounding Gatwick Airport. From the information available it is assumed that there would be no direct effects on the Chilterns AONB from the LHR-ENR scheme. Distant indirect effects in areas of the AONB with intervisibility of the scheme cannot be assessed until further information is available regarding the direction / height / number of flights.

12.12.10 Although the LHR-ENR scheme would involve partial loss of the Colne Valley Regional Park, the proposed mitigation would provide higher quality, more accessible open space.

12.12.11 At operation this scheme would have negative effects on a discrete part of the Hillingdon Historic Core TCA. Significant residual negative effects are predicted to arise within the Hillingdon Lower Colne Floodplain LCA.

12.12.12 From the information available it is assumed that there would be no direct effects on the Chilterns AONB from the LHR-NWR scheme. Although this scheme would be slightly nearer to the AONB, distant indirect effects in areas with intervisibility of this scheme would be broadly similar to those that would arise from the LHR-ENR scheme.

12.12.13 At operation the spatial extent of effects on the Hillingdon Historic Core, Harmondsworth and Sipson villages, and Harmondsworth Moor landscape and townscape character areas would be greater from LHR-NWR than from the LHR-ENR scheme. Significant negative effects are predicted to arise.

12.12.14 The LHR-NWR scheme would involve partial loss of the Colne Valley Regional Park, which with mitigation, would provide higher quality, more accessible open space.

12.12.15 It is concluded that indirect negative effects on nationally and locally designated landscapes (three AONBs and an AGLV) are most likely to arise from the LGW-2R scheme due to the extent of the protected areas and their close proximity to this scheme. However, there would be no direct effects on these areas.

EFFECTS ON SENSITIVE VIEWS

12.12.16 For LGW-2R, the most significant views towards the scheme would be from residential and recreational receptors to the immediate south, west and east. Views from properties at Ifieldwood, Crawley, public rights of way, and the Tandridge Border Path would be altered. All receptors have high sensitivity. Significant negative visual impacts would arise at all of these locations during construction. The effects would continue during operation in relation to receptors with the highest sensitivity, notably the Surrey Hills AONB, High Weald AONB, Kent Downs AONB and Tandridge Border Path recreational trail.

12.12.17 LHR-ENR would have a negative effect on views from properties in Stanwell, Stanwell Moor, Harmondsworth, Sipson and long distance views from a local Area of Landscape Importance. Significant Negative effects on views are likely to arise at properties on the edge of settlements at Colnbrook, Horton and Longford, as well as the Colne Valley Way recreational route.

12.12.18 LHR-NWR would have a Significant Negative effect on views from Harmondsworth and Sipson villages and Harmondsworth Moor.

12.12.19 It is concluded that Significant Negative visual effects would arise from all three schemes. It is likely the LGW-2R scheme would have more widespread effects on views, which would include

areas within nationally designated landscapes, than either the LHR-ENR or LHR-NWR schemes.

EFFECTS FROM LIGHT AND LOSS OF TRANQUILLITY

12.12.20 For all three schemes there is the potential for some areas to experience a reduction in tranquillity due to the increased area of flight paths associated with the new runway. In the absence of proposed definitive flight routes, potential impacts on tranquillity due to increased noise levels and views of increased aircraft activity associated with LGW-2R cannot be assessed with accuracy in relation to the Surrey Hills AONB, High Weald AONB or Kent Downs AONB. Similarly, potential effects on the Chilterns AONB from LHR-ENR and LHR-NWR cannot be assessed at this stage. It is considered likely that negative effects from increased over-flying would be greater from LGW-2R due to the extent and closer proximity of the surrounding AONBs compared to the impact of the LHR-ENR and LHR-NWR schemes on the Chilterns AONB.

12.12.21 Whilst there is the potential for increased light levels it is unlikely to alter the results of the CPRE Dark Skies mapping given the existing conditions. In this respect potential effects have been assessed as Negative for all three shortlisted schemes. Landscape mitigation and enhancement measures proposed for each scheme would reduce potential landscape and visual impacts. However, further mitigation measures and conclusions about the most appropriate design for each site should be developed following detailed landscape and visual impact assessment and consideration of linkages to ecosystem services assessment and ecological surveys.

PROJECT LEVEL LANDSCAPE AND VISUAL IMPACT ASSESSMENT

12.12.22 This high level, entirely desk based study has identified limits on what may be concluded until a full landscape and visual impact assessment is undertaken when detailed design information is available.

12.12.23 It will be important to undertake a full landscape and visual impact assessment at the project level including site-based assessments of views from publicly accessible viewpoints from designated landscapes towards the development site. This would enable the need for screening or other mitigation to be assessed and subsequently designed.

12.12.24 The assessment should be undertaken following guidance and the methodology provided in the GLVIA[52]. The use of Landscape Character Assessment is recommended in order to provide a sound basis for guiding, informing and understanding the ability of any location to accommodate change and to make positive proposals for conserving, enhancing or regenerating character, as detailed proposals are developed.

12.12.25 One of the key impacts on protected landscapes will be those arising from changes to flight paths and the potential effects on tranquillity. It will also be important to consider cumulative noise impacts in these areas and to look at the potential for mitigation such as respite for designated landscapes. This will depend on detailed airspace design. Reducing or avoiding flight paths below 7,000ft over protected landscapes would be in line with Civil Aviation Authority guidance which recommends that, “where practicable, and without a significant detrimental impact on efficient aircraft operations or noise impact on populated areas, airspace routes below 7,000ft (amsl) should, where possible, be avoided over AONB and National Parks”.

[52] Landscape Institute and Institute of Environmental Management and Assessment, 2013. *Guidelines for Landscape and Visual Impact Assessment* (Third Edition). Routledge: Oxon.

12.12.26 Detailed studies based on guidance provided in 'The Setting of Heritage Assets' and 'Seeing History in the View' are necessary at the EIA stage to understand historic landscape character. Detailed assessment of the proposed schemes on heritage assets, for instance registered parks and gardens and conservation areas, that contribute to the views and historic characteristics of the wider landscape/townscape should be undertaken at the EIA stage following guidance set out in 'The Setting of Heritage Assets' and 'Aviation Noise Metric'. During EIA, site specific surveys can be undertaken when more detailed design information will be available for assessment. Mitigation measures that should be considered include those that address heritage at risk (including those that become at risk as a result of the preferred option), enhancement to conservation areas, improving the setting of assets, mitigation of noise impacts, together with opportunities for community engagement, which could include improved access to and/interpretation, understanding and appreciation of heritage assets. Adopting the use of green space in areas of high or known archaeological potential will also contribute to enhancement.

12.12.27 From the high-level assessment undertaken it can be concluded that the most significant effects will be on undesignated local landscapes due to their close proximity to the proposed development. In this context consultation will be required with the local planning authorities and other stakeholders to determine the full scope of the landscape and visual impact assessment to be undertaken.