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**5.01 ENVIRONMENTAL STATEMENT CHAPTER 10: CULTURAL
HERITAGE**

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10 CULTURAL HERITAGE

10.1 Introduction

- 10.1.1 This chapter presents the impact assessment and likely significant effects of the Proposed Development on Cultural Heritage.
- 10.1.2 The Environmental Impact Assessment (EIA) Scoping Report (**Appendix 1.1** and **Appendix 1.2** of this ES [TR020001/APP/5.05]) set out the proposed scope for the assessment of Cultural Heritage. In summary, the following have been assessed in this ES:
- a. Designated cultural heritage assets, including scheduled monuments, listed buildings, registered parks and gardens and conservation areas.
 - b. Non-designated cultural heritage assets including archaeological remains, historic buildings and the historic landscape.
- 10.1.3 This chapter aims to:
- a. Detail the requirements of principal legislation, policy and guidance relevant to this assessment.
 - b. Document how information relating to the existing and future environment has been collected through desk-based research, field survey and stakeholder consultation.
 - c. Describe the understanding of the existing and future baseline environment.
 - d. Describe the potential effects of the Proposed Development on cultural heritage assets and describe proportionate mitigation measures.
- 10.1.4 This chapter is supported by the following appendices [TR020001/APP/5.02]:
- a. **Appendix 10.1:** Cultural Heritage Desk-based Assessment (DBA).
 - b. **Appendix 10.2:** Cultural Heritage Gazetteer.
 - c. **Appendix 10.3:** Geophysical Survey Report (Ref. 10.1)
 - d. **Appendix 10.4:** Geophysical Survey Report (Ref. 10.2).
 - e. **Appendix 10.5:** Archaeological Trial Trench Evaluation Report (Ref. 10.3).
 - f. **Appendix 10.6:** Cultural Heritage Management Plan (CHMP).
 - g. **Appendix 10.7:** Archaeological Trial Trench Report (Ref. 10.4).
- 10.1.5 This chapter is also supported by **Figures 10.1** to **10.9** of this ES [TR020001/APP/5.03] and visual representations provided in **Appendix 14.7** of this ES [TR020001/APP/5.02].
- 10.1.6 The remainder of this chapter consists of:
- a. **Section 10.2** Legislation, policy and guidance relevant to the scope and methodology of the Cultural Heritage impact assessment;

- b. **Section 10.3** Scope of the assessment;
- c. **Section 10.4** Stakeholder engagement undertaken to inform the impact assessment;
- d. **Section 10.5** Methodology applied to the impact assessment;
- e. **Section 10.6** Assumptions and limitations at this stage of work;
- f. **Section 10.7** Baseline conditions;
- g. **Section 10.8** Embedded and good practice mitigation;
- h. **Section 0** Impact assessment;
- i. **Section 10.10** Additional mitigation;
- j. **Section 10.11** Residual effects;
- k. **Section 10.12** In-combination climate change;
- l. **Section 10.13** Monitoring; and
- m. **Section 10.14** Assessment summary.

10.2 Legislation, policy and guidance

10.2.1 This section identifies the key legislation, policy and guidance relevant to the scope and methodology for the Cultural Heritage assessment and which may influence the type of mitigation measures that could be incorporated into the Proposed Development during construction or operation.

10.2.2 **Table 10.1 to Table 10.4** provides a description of the relevant legislation, policy and guidance, and where each of these have been addressed in the ES.

Legislation

Table 10.1: Cultural Heritage legislation

Legislation	How and where addressed in ES
<p>The Ancient Monuments and Archaeological Areas Act 1979 (Ref. 10.5)</p> <p>Scheduled monuments are protected under the Ancient Monuments and Archaeological Areas Act 1979 (as amended) which imposes a requirement to obtain prior consent from the competent authority for any demolition, repair, and alteration works that might affect these nationally important assets.</p>	<p>There is one scheduled monument (Someries Castle NHLE 1008452) located within the 2km study area. This assessment includes a consideration of the impacts and effects of the Proposed Development on this asset, as reported in Section 10.9 of this chapter.</p>
<p>The Planning (Listed Buildings and Conservation Areas) Act 1990 (Ref. 10.6)</p> <p>The Planning (Listed Buildings and Conservation Areas) Act 1990 (as amended) is the principal statutory instrument which must be considered in the determination of any application affecting listed buildings and conservation areas.</p> <p>Under this legislation, local planning authorities and the Secretary of State are required to have special regard to the desirability of preserving a listed building, its setting, or any features of special architectural or historic interest that it possesses. It also places a duty on local planning authorities to publish proposals for their conservation areas and exercise their planning functions in a manner that gives regard to the desirability of preserving and enhancing the character or appearance of these areas.</p>	<p>The effects of the Proposed Development on conservation areas, listed buildings and their settings have been considered as part of the assessment and are reported in Section 10.9 of this chapter.</p>

Policy

Table 10.2: Cultural Heritage policy

Policy	How and where addressed in ES
<p>National Planning Policy Framework Section 16 (2021) (Ref. 10.7)</p> <p>The National Planning Policy Framework (NPPF) Section 16 acknowledges the importance of assessing the significance of heritage assets potentially harmed or lost through alteration or destruction or through development within their setting. It also sets out the considerations that local planning authorities should have when determining applications.</p>	<p>The requirements of the NPPF have been accounted for in this assessment, with particular regard given to establishing the significance of designated and non-designated assets and their settings. The significance of heritage assets and their settings is discussed in the Desk-based Assessment (DBA), Appendix 10.1 of this ES [TR020001/APP/5.02], and an assessment of the impact of the Proposed Development on the significance of heritage assets is discussed in Section 10.9 of this chapter.</p>
<p>National Policy Statement for National Networks – December 2014 (NPSNN) (Ref. 10.8)</p> <p>The NPSNN sets out the need for, and Government’s policies to deliver, development of nationally significant infrastructure projects on the national road and rail networks in England. It provides planning guidance for promoters of nationally significant infrastructure projects (NSIP) on the road and rail networks. The provisions of the NPSNN relevant to environmental assessment broadly mirror those as outlined in the ANPS.</p>	<p>There are no elements of the Proposed Development on the national road or rail network that would be classified as a NSIP in their own right. However, the NPSNN remains an important and relevant consideration, particularly as works are proposed on the Strategic Road Network (SRN) at Junction 10 of the M1 as part of the Proposed Development. The relevant policies of the NPSNN are consistent with the relevant policies of the ANPS and have not, therefore, been repeated here and accordingly the ANPS compliance table (Table 10.3) provides the necessary policy response.</p>
<p>Central Bedfordshire Local Plan 2015 – 2035 (Ref. 10.9)</p> <p>The <i>Central Bedfordshire Local Plan 2015 – 2035</i> was adopted on 21 July 2021. The policies of relevance to this chapter comprise Policy HE1 Archaeology and Scheduled Monuments, HE2 Historic Parks and Gardens and HE3 Built Heritage. The policies outline the requirement for development proposals to describe the significance of heritage assets including consideration of any contribution made by their setting and will assess the</p>	<p>The DBA, Appendix 10.1 of this ES [TR020001/APP/5.02], has assessed the significance of known and potential heritage assets, and a staged programme of investigation and protection of heritage assets are proposed in Section 10.10 of this chapter. The effects of the Proposed Development on heritage assets and their settings have been considered as part of the assessment and are reported in Section 10.9 of this chapter.</p>

Policy	How and where addressed in ES
<p>level of impact that the development proposals will have on those assets. The policies also outline the Council’s requirement for a programme of archaeological investigation where preservation in-situ cannot be achieved.</p>	
<p>Dacorum Core Strategy 2006 – 2031 (Ref. 10.10)</p> <p>Policy CS27 – Quality of the Historic Environment of the Core Strategy states, ‘All development will favour the conservation of heritage assets. The integrity, setting and distinctiveness of designated and undesignated heritage assets will be protected, conserved and if appropriate enhanced. Development will positively conserve and enhance the appearance and character of conservation areas. Negative features and problems identified in conservation area appraisals will be ameliorated or removed. Features of known or potential archaeological interest will be surveyed, recorded and wherever possible retained. Supplementary planning documents will provide further guidance.’</p>	<p>Appendix 10.7 of this ES [TR020001/APP/5.02] presents the results of a trial trench evaluation and the CHMP at Appendix 10.6 includes proposals for the preservation of heritage assets.</p>
<p>The North Hertfordshire District Council Local Plan 2011 – 2031 (Ref. 10.11)</p> <p>Policy HE4 states developers must submit an appropriate DBA and, where justified, an archaeological field evaluation. They must demonstrate how archaeological remains will be preserved if <i>in-situ</i> preservation of important archaeological remains is considered preferable. Where the loss of the whole or material part of important archaeological remains is justified, appropriate conditions are applied to ensure that the archaeological recording, reporting, publication and archiving of the results of such archaeological work is undertaken.</p>	<p>Appendix 10.1 of this ES [TR020001/APP/5.02], presents an appropriate DBA. Two phases of geophysical survey and two phases of archaeological trial trenching have been undertaken to further inform the archaeological potential of the Proposed Development Site, the results of which are summarised in Section 10.7 of this chapter.</p> <p>Mitigation proposals for the preservation of archaeological remains and preservation by record are set out in Section 10.10 of this chapter and in the CHMP which forms Appendix 10.6 of this ES [TR020001/APP/5.02].</p>

Policy	How and where addressed in ES
<p>Luton Borough Council Local Plan 2011 – 2031 (Ref. 10.12)</p> <p>The Luton Borough Council Local Plan 2011 – 2031 was adopted in 2017. Policy LLP30 states that development proposals must take account of the character, setting and local distinctiveness of affected heritage assets of particular importance within the borough including registered parks and gardens such as Luton Hoo. Proposals affecting designated and non-designated heritage assets are required to set out the significance of heritage assets, the impact of the proposed development on heritage assets and mitigation strategies, addressing the setting of the asset.</p>	<p>The DBA, Appendix 10.1 of this ES [TR020001/APP/5.02], has assessed the significance of known and potential heritage assets, and mitigation proposals for the preservation of archaeological remains and preservation by record are set out in Section 10.10 of this chapter. The effects of the Proposed Development on heritage assets and their settings have been considered as part of the assessment and are reported in Section 10.9 of this chapter.</p>

- 10.2.3 The Airports National Policy Statement (ANPS) (Ref. 10.13) does not have effect in relation to an application for development consent for an airport development not comprised of an application relating to the Heathrow Northwest Runway. Nevertheless, as set out within paragraph 1.41 of the ANPS, the Secretary of State considers that the contents of the ANPS will be both important and relevant considerations in the determination of such an application, particularly where it relates to London or the south east of England. In particular, the ANPS makes clear that, alongside the provision of a new Northwest Runway at Heathrow, the government supports other airports making best use of their existing runways as set out in Beyond the Horizon: Making best use of existing runways (Ref. 10.14), which is the specific policy context for this application.
- 10.2.4 In addition, whilst the ANPS does not have effect in relation to the Proposed Development, it sets out a number of principles for environmental impact assessment and compliance and these will be an important and relevant consideration in the determination of the application for development consent. A summary of the relevant provisions for the Cultural Heritage assessment and where these have been addressed in this ES is provided within **Table 10.3**.

Table 10.3: How relevant Cultural Heritage requirements of ANPS are addressed in the ES

ANPS Section	How and where addressed in ES
<p>Paragraphs 5.193 to 5.195 state: <i>“As part of the environmental statement, the applicant should provide a description of the significance of the heritage assets affected by the proposed development, and the contribution of their setting to that significance.</i></p> <p><i>The level of detail should be proportionate to the asset’s importance, and no more than is sufficient to understand the potential impact of the proposal on the significance of the asset. Consideration will also need to be given to the possible impacts, including cumulative, on the wider historic environment. At a minimum, the relevant Historic Environment Record should be consulted and the heritage assets assessed using appropriate expertise.</i></p> <p><i>Where a site on which development is proposed includes or has the potential to include heritage assets with archaeological interest, the applicant should include an appropriate desk-based assessment and, where necessary, a field evaluation. The applicant should ensure that the extent of the impact of the proposed development on the significance of any heritage asset affected can be adequately understood from the application and supporting documents.”</i></p>	<p>A description of the significance of heritage assets, and their setting, is set out in the DBA, Appendix 10.1 of this ES [TR020001/APP/5.02] and in Section 10.9 of this chapter.</p> <p>A list of data sources consulted to inform the cultural heritage baseline conditions is set out in Section 10.5 of this chapter.</p> <p>The methodology for assessing cumulative effects is presented in Section 10.5 of this chapter and the assessment results are discussed in Chapter 21 of this ES [TR020001/APP/5.01].</p> <p>The ES has been informed by the DBA and the field evaluation surveys, the results of which are presented in Appendix 10.3; 10.4; 10.5 and 10.7 of this ES [TR020001/APP/5.02]. Additional evaluation to be carried out as a requirement of the DCO is set out in the CHMP in Appendix 10.6 of this ES [TR020001/APP/5.02].</p> <p>The approach to the assessment of the likely significant effects is described in Section 10.9.</p>
<p>Paragraph 5.198 considers the minimisation of impacts on the historic environment of the Proposed Development.</p>	<p>Section 10.8 includes how the design of the Proposed Development has considered the historic environment and Section 10.10 suggests mitigation measures in order to minimise any significant adverse effects.</p>
<p>Paragraphs 5.209 to 5.212 are concerned with the recording of heritage features and paragraph 5.210 states: <i>“Where the loss of the whole or part of a heritage asset’s significance is justified, the</i></p>	<p>Recommendations to mitigate the loss of heritage significance (value) are set out in Section 10.10, and comprise a staged programme of archaeological investigation, and reporting.</p>

ANPS Section	How and where addressed in ES
<p><i>Secretary of State will require the applicant to record and advance understanding of the significance of the heritage asset before it is lost (wholly or in part)."</i></p>	

Guidance

Table 10.4: Cultural Heritage guidance

Guidance	How and where addressed in ES
<p>Planning Practice Guidance (PPG) 2021 (Ref. 10.15)</p> <p>The PPG for the Historic Environment adds further context to the NPPF by advising on the conservation and enhancement of the historic environment. It clarifies that the assessment of the nature, extent and importance of the significance of heritage assets (and the contribution of their setting) is integral to understanding the potential effects or harm caused by development proposals.</p>	<p>This guidance has been considered by undertaking the DBA, Appendix 10.1 of this ES [TR020001/APP/5.02], and site-based surveys, Appendix 10.3; 10.4; 10.5 and 10.7 of this ES [TR020001/APP/5.02], to establish the baseline cultural heritage conditions; applying best practice guidance to identify the potential loss or harm that could result from the Proposed Development (and the significance of any such effects) as set out in Section 10.9 of this ES; and identifying appropriate and proportionate mitigation measures as set out in Section 10.10 of this ES.</p>
<p>Aviation Noise Metric (Ref. 10.16) - Research on the Potential Noise Impacts on the Historic Environment by Proposals for Airport Expansion in England.</p> <p>The Airports National Policy Statement requires the assessment of the effects of noise change on heritage assets to be based on the guidance provided in the Aviation Noise Metric report.</p>	<p>The Aviation Noise Metric report, dated 2014, is complementary to the Historic England document The Setting of Heritage Assets (Ref. 10.17), which is Historic England’s guidance for assessing the effect of changes to the setting of heritage assets, including those arising from noise. Section 10.5 of this ES sets out a summary methodology for how this guidance has been used to inform the assessment of noise impacts on setting.</p>
<p>Historic England Good Practice Advice Notes: GPA2 Managing Significance in Decision-taking (2015) (Ref. 10.18); GPA3 The Setting of Heritage Assets (2019) (Ref. 10.19); and Advice Note 12 Statements of Heritage Significance (2019) (Ref. 10.20)</p> <p>The Advice Notes set out a process for understanding the significance of heritage assets likely to be affected by proposed</p>	<p>The assessment process for understanding setting and the contribution it makes to heritage significance has followed guidance set out in GPA2, GPA3 and Advice Note 12.</p> <p>The DBA in Appendix 10.1 of this ES [TR020001/APP/5.02] has assessed significance of known and potential heritage assets. The effects of the Proposed Development on the significance of heritage assets and their settings have been considered as part of the assessment</p>

Guidance	How and where addressed in ES
<p>development and the contribution that setting may make to that significance. The Advice Notes also set out a process for assessing the impact of development proposals upon the significance and setting of heritage assets.</p>	<p>and are reported in Section 10.9 of this chapter.</p>
<p>Chartered Institute for Archaeologists (CIfA) Standards and Guidance for Historic Environment Desk-based Assessments (2020) (Ref. 10.21)</p> <p>The CIfA Standards and Guidance for Historic Environment Desk-based Assessments provides good practice advice for the execution and reporting of desk-based assessment.</p>	<p>The DBA Appendix 10.1 of this ES [TR020001/APP/5.02] was undertaken in accordance with this guidance.</p>
<p>IEMA Principles of Cultural Heritage Impact Assessment in the UK (2021) (Ref. 10.22)</p> <p>The Institute of Environmental Management and Assessment (IEMA) Principles of Cultural Heritage Impact Assessment in the UK is a guide to good practice in cultural heritage impact assessment. The document provides guidance on understanding cultural heritage assets and evaluating the consequences of change.</p>	<p>The DBA Appendix 10.1 of this ES [TR020001/APP/5.02] has assessed the significance of known and potential heritage assets, and a staged programme of investigation and protection of heritage assets are proposed in Section 10.10 of this chapter. The effects of the Proposed Development on heritage assets and their settings have been considered as part of the assessment and are reported in Section 10.9 of this chapter.</p>

10.3 Scope of the assessment

10.3.1 This section describes the scope of the Cultural Heritage assessment, including how the assessment has responded to the Scoping Opinion. The temporal and spatial scope (refer to **Table 10.5**), the relevant receptors, and matters scoped in and out are identified. A description of engagement undertaken with relevant technical stakeholders to develop and agree this scope is provided in **Section 10.4**.

Scoping Opinion

10.3.2 The EIA Scoping Report set out the proposed scope and assessment methodologies to be employed in the EIA and is provided in **Appendices 1.1 and 1.2** of this ES [TR020001/APP/5.05].

10.3.3 In response to that Scoping Report, a Scoping Opinion was received from the Planning Inspectorate on 9 May 2019 and is provided in **Appendix 1.3** of this ES [TR020001/APP/5.05].

10.3.4 **Table 10.5** describes the main matters highlighted by the Planning Inspectorate in the Scoping Opinion and how these have been addressed in this ES. Responses to all comments received during scoping are presented in **Appendix 1.4** of this ES [TR020001/APP/5.02].

Table 10.5: Cultural Heritage Scoping Opinion comments

Scoping Opinion ID	Scoping Opinion comment	How this is addressed
4.14.2	Section 19.2 sets out policies of four local planning authorities; however, Section 19.3 only describes stakeholder engagement and consultation with two of those authorities to date. A statement should be provided on which authorities act as agents for others in the matters of archaeology and cultural heritage, if relevant, to provide context.	The Proposed Development site falls within or adjacent to four local authorities: Luton Borough Council (LBC); Central Bedfordshire Council (CBC); North Hertfordshire District Council (NHDC), Dacorum Borough Council (DBC) and Hertfordshire County Council (HCC). HCC acts on behalf of NHDC and DBC on matters related to archaeology. Consultation with the relevant officers of all host authorities (LBC, CBC and HCC, acting on behalf of NHDC and DBC) has now been undertaken as set out in Table 10.6 . In addition, consultation with Historic England (HE) has also been carried out.
4.14.3	The Inspectorate notes that the extended study area will be agreed in collaboration with the landscape architects to reflect the	The study area has been reviewed to reflect the semi-rural location of the Proposed Development site, the Highways Interventions that are located

Scoping Opinion ID	Scoping Opinion comment	How this is addressed
	<p>Zone of Theoretical Visibility (ZTV) developed for the LVIA. As the parameters of the proposed development are not yet confirmed, and no ZTV is yet prepared, the review of the study area should not discount the possibility that the study area may need to be wider than 5km to assess relevant effects to the settings of heritage assets, including designated and non-designated assets. The assessment should include consideration of the effects of overflying aircraft which may also lead to impacts on tranquillity. The Applicant should make effort to agree the study area and the heritage assets to be included in the assessment with relevant consultation bodies.</p>	<p>outside of the Main Application Site as well as the increase in noise levels during the operation of the Proposed Development. As a result, three study areas have been identified in the ES (refer to Spatial Scope in Section 10.3.5 of this chapter).</p> <p>Discussions with Historic England confirmed that a 5km study area was unnecessary, refer to Table 10.6 of this ES, and instead a 2km study area for designated heritage assets, including the 250m study area around highways interventions, would be used. It was agreed that the assessment would be complemented by a wider study area (beyond the 2km study area) which would be informed by the noise contour data, the ZTV and from the results of the walkover survey. The 1km study area for non-designated heritage assets has been agreed with CBC and HCC.</p>
4.14.4	<p>The Inspectorate notes that some on site archaeological evaluation has already commenced. Further evaluation may be required depending on the extent of works proposed in the application. The Inspectorate expects that the Applicant will make efforts to agree the extent of archaeological evaluations required with relevant consultation bodies, in order to establish baseline data and complete the assessment of likely significant effects.</p>	<p>Further consultation with the relevant stakeholders has been undertaken to agree the scope and nature of the additional evaluation that has been carried out to establish a robust baseline (see Table 10.6).</p>
4.14.5	<p>The Inspectorate expects that the ES will assess and identify any likely significant effects on the Someries Castle Scheduled Monument. The assessment should acknowledge changes in air quality and vibration which</p>	<p>A statement on the changes of air quality and noise and vibration to Someries Castle is included in Section 10.9 of this chapter. Viewpoints 23 to 25 in Appendix 14.7 of this ES [TR020001/APP/5.02] illustrate changes to the setting of Someries Castle.</p>

Scoping Opinion ID	Scoping Opinion comment	How this is addressed
	<p>may affect the fabric of the Scheduled Monument, where likely significant effects may occur.</p> <p>The Inspectorate also recommends that visual representations are provided to illustrate the impact on the setting of Someries Castle Scheduled Monument.</p>	
<p>4.14.6</p>	<p>The Inspectorate expects that the whole of Luton Hoo / Putteridge Bury Registered Parks and Gardens (RPGs) will be taken into account in the assessment. The Inspectorate recommends that visual representations are provided to illustrate the impact on the settings of Luton Hoo Mansion and RPG.</p>	<p>Luton Hoo and Putteridge Bury RPGs fall partly within the 2km study area however, they have been considered in their entirety in Section 10.9 of this ES. It is unlikely that Putteridge Bury RPG would experience significant effects as a result of the Proposed Development, however it has been included in this ES. Representative Viewpoints 17, 17A, and 19 of Appendix 14.7 of this ES [TR020001/APP/5.02] provide visual representations and illustrate the changes within the visual setting of Luton Hoo Mansion and RPG.</p>
<p>4.14.7</p>	<p>The proposed assessment methodology uses standardised EIA matrices. The Inspectorate considers that the analysis of setting and the impact upon it is a matter of qualitative and expert judgement which cannot be achieved solely by use of systematic matrices or scoring systems. The Inspectorate therefore recommends that, if used, these matrices should be seen primarily as material supporting a clearly expressed and non-technical narrative argument using professional judgement. The ES should use the concepts of benefit, harm and loss (as set out in the National Planning Policy Framework) to set out ‘what matters and why’ in</p>	<p>This ES chapter uses standard EIA matrices; these matrices are used in Section 10.9 of this ES to support a clearly expressed and non-technical narrative argument using professional judgement.</p> <p>The ES uses the concepts of benefit, harm and loss (as set out in the NPPF) to set out ‘what matters and why’ in terms of the heritage assets’ significance and setting, together with the effects of the Proposed Development upon them (refer to Section 10.9).</p>

Scoping Opinion ID	Scoping Opinion comment	How this is addressed
	terms of the heritage assets' significance and setting, together with the effects of the development upon them.	
4.14.8	The Inspectorate advises that the assessment of heritage asset settings should be cross-referenced with other relevant ES aspect assessments, including air quality, noise, lighting and landscape and visual effects.	The setting assessment has been informed by a number of other topic assessments including Chapter 7 Air Quality; Chapter 16 Noise and Vibration; Chapter 14 Landscape and Visual Impact Assessment of this ES [TR020001/APP/5.01] and Appendix 5.2 Light Obtrusion Assessment of this ES [TR020001/APP/5.02].
4.14.9	The ES should set out how the Cultural Heritage Management Plan (CHMP) will be secured through the DCO. The Inspectorate considers that the approach to mitigation section should emphasise the need to preserve heritage assets in-situ, where possible and appropriate. The Applicant should also make effort to agree mitigation approaches with all relevant consultation bodies and take account of potential impacts that may result to other aspects, such as biodiversity and landscape.	Mitigation proposals are set out in Section 10.10 of this ES. A CHMP, Appendix 10.6 of this ES [TR020001/APP/5.02], has been produced which sets out additional mitigation strategies for cultural heritage assets. The CHMP has been discussed with relevant consultation bodies and submitted with the application for development consent. The adoption and implementation of the CHMP will be a requirement of the DCO.
4.14.10	The ES should include figures which clearly depict the location of designated and non-designated heritage assets within the Zone of Influence (ZOI).	Figures 10.6 to 10.9 of this ES [TR020001/APP/5.03] show the location of designated and non-designated heritage assets within the ZOI.

Spatial scope

- 10.3.5 Different study areas, agreed with the relevant heritage stakeholders, have been used for the assessment of impact to cultural heritage assets. The variation in study areas is due, in part, to the different type of cultural heritage receptor and their sensitivity to change, and the nature of the predicted impact arising from the Proposed Development. The definition of study area boundaries has also considered the potential for heritage assets to be affected by noise and vibration, air quality, and visual impacts including impacts from construction and operational lighting and are informed by noise contour data

and the ZTV. The spatial scope of the assessment is illustrated in **Figures 10.1 to 10.9** of this ES [TR020001/APP/5.03].

Study area

Designated Heritage Assets

2km study area

- 10.3.6 A study area of 2km from the Main Application Site was used for data capture purposes. This initial study area was also adopted to establish a relevant historical and archaeological baseline and to identify designated heritage assets with the potential to be affected by the Proposed Development. Cultural heritage assets within the 2km study area are illustrated on **Figures 10.1 and 10.2** of this ES [TR020001/APP/5.03].
- 10.3.7 The 2km study area also includes the Off-site Car Parks and Off-site Planting areas. The 2km study area also includes Off-site Highways Interventions, where they fall within the study area. Off-site Highways interventions that are located beyond the 2km study area are subject to a separate study area (refer to **Paragraph 10.3.8**).

Wider study area (beyond the 2km study area)

- 10.3.8 The 2km study area has been used to capture the core baseline conditions for heritage assets. A wider study area, beyond the core 2km, has been informed by the ZTV and the noise change contours. This wider study area supplements the core 2km study area and has evolved and changed in line with the design parameters of the Proposed Development. The wider study area identifies heritage assets beyond the core 2km study area that may be impacted as a result of the physical presence of the Proposed Development and/ or by an increase in their existing noise environment that affects their appreciation and heritage significance. Cultural heritage assets within the wider study area are illustrated on **Figures 10.6 to 10.9** of this ES [TR020001/APP/5.03].
- 10.3.9 A baseline year of 2019 was selected for the noise assessment as this year represents the last year of normal activity at the airport pre-Covid-19 pandemic. The 2019 air noise baseline was defined through noise modelling using the Aviation Environmental Design Tool (AEDT) and 2019 aircraft movement data for the 92-day summer period (16 June to 15 September inclusive). A summary of the methodology for assessing changes in aviation noise levels is presented in **Section 10.5** of this chapter. The detailed methodology is defined in **Chapter 16 Noise and Vibration** of this ES [TR020001/APP/5.01] and details on noise data used for validation and the model validation method are provided in **Appendix 16.1** of this ES [TR020001/APP/5.02]. The wider study area supplements the core 2km study area; it is informed by the ZTV and noise change contours and has therefore evolved in line with the design parameters of the Proposed Development.
- 10.3.10 The ZTV has been generated using terrain data only and is therefore limited in mapping visibility as it does not take account of other landscape components which affect visibility such as buildings, woodland and hedgerows. Heritage

assets beyond the 2km study area that fell within the ZTV were visited to test the level of actual visibility with the Proposed Development Site. If visibility was precluded due to intervening settlement or vegetation, the asset was scoped out of assessment in the ES. The ZTV map should be read together with the viewpoint photographs and selective photomontages included in **Appendix 14.6** and **Appendix 14.7** of this ES [TR020001/APP/5.02].

250m study area

- 10.3.11 Where Off-site Highways Interventions are located beyond the 2km study area, a 250m study area has been applied to each. The 250m study area is considered appropriate as the interventions comprise localised junction improvement works only, such as signalisation or layout alterations. The works are located within urban settings and restricted to existing highways boundaries, as far as possible. Cultural heritage assets within the 250m study areas are illustrated on **Figures 10.1** and **10.2** of this ES [TR020001/APP/5.03].

Non-designated Heritage Assets

1km study area

- 10.3.12 The study area for the collation of information on non-designated cultural heritage assets was defined as 1km from the Main Application Site. This distance has been judged as appropriate to provide the context of, and potential for the survival of archaeological remains within the Proposed Development site, given its nature, size and location. Cultural heritage assets within the 1km study area are illustrated on **Figure 10.3** of this ES [TR020001/APP/5.03].
- 10.3.13 The Historic Landscape Characterisation Project for Hertfordshire as well as information provided by the HER officer for CBC has been used to characterise the baseline historic landscape of the Proposed Development site and a 1km study area and is illustrated in **Figure 10.5** of this ES [TR020001/APP/5.03].

Temporal Scope

- 10.3.14 The Proposed Development will be delivered incrementally during which construction and operation may take place simultaneously. For the purposes of assessment, three assessment phases are considered, Phase 1, Phase 2a and Phase 2b, as described in **Chapter 5** Approach to the Assessment of this ES [TR020001/APP/5.01].
- 10.3.15 The Proposed Development has the potential to affect heritage assets during each assessment phase, during which the airport will remain operational. As such, the Cultural Heritage assessment considers potential impacts to heritage assets that may arise during each assessment phase.

Receptors

- 10.3.16 The cultural heritage receptors that have been assessed comprise designated and non-designated archaeological remains, historic buildings and historic landscapes.

Matters scoped in

- 10.3.17 All cultural heritage matters, comprising archaeology, built heritage and historic landscape, have been scoped into this assessment.

Matters scoped out

- 10.3.18 There are no matters or heritage issues that would normally be considered in a full cultural heritage assessment scoped out of the cultural heritage assessment. Whether individual receptors or assets identified are considered further in the assessment is described in **Section 10.7**.

10.4 Stakeholder engagement and consultation

10.4.1 Engagement in relation to Cultural Heritage has been undertaken with a number of prescribed and non-prescribed stakeholders throughout the EIA process. The stakeholders consulted comprised:

- a. Central Bedfordshire Council Archaeology Officer, who is acting as archaeological advisor to Luton Borough Council;
- b. Central Bedfordshire Conservation Officer;
- c. Luton Borough Council Conservation Officer;
- d. Hertfordshire County Council Archaeology Officer; and
- e. Historic England.

10.4.2 The **Consultation Report** submitted with the application for development consent [TR020001/APP/6.01] and [TR020001/APP/6.02] contains a full account of the previous statutory consultation process and issues raised in feedback. Matters raised regarding the scope, method, or mitigation being considered as part of the Cultural Heritage assessment were then subject to further discussions directly with stakeholders during working group meetings. The main matters/themes raised during consultation and engagement considered relevant to the Cultural Heritage assessment were:

- a. the potential for direct impacts on buried heritage assets with archaeological interest and the need for the Applicant to carry out the additional trial trenching which will inform the likely impact arising from the Proposed Development; and
- b. changes to the settings of Someries Castle scheduled monument and Luton Hoo Grade II* RPG.

10.4.3 **Table 10.6** provides a summary of engagement relating to cultural heritage with relevant stakeholders, undertaken to inform the EIA to date, including the date and time of meetings and a summary of discussions to resolve matters raised.

Table 10.6: Stakeholder engagement relating to cultural heritage

Meeting name and date	Attendees (organisation)	Summary of discussion
An introductory stakeholder meeting for all the environmental disciplines was held on 26 February 2018 to brief consultees on the headline issues associated with the Proposed Development.	CBC archaeologist	This was attended by the CBC Archaeologist who agreed with the inclusive and proactive approach to the consultation process outlined at the meeting.
A teleconference was held on 27 February 2018 with the Historic England Inspector of Monuments	Historic England (HE) Inspector of Monuments	It was agreed that a technical meeting with the other key stakeholders would be desirable to achieve consensus. HE confirmed

Meeting name and date	Attendees (organisation)	Summary of discussion
<p>during which areas of responsibility and arrangements for the provision of advice to the Project design team were discussed.</p>		<p>that its interests extend to Grade I and II* listed buildings and Scheduled Monuments and Registered Park and Gardens only. Designated sites of lower status and undesignated heritage assets would be left to the relevant LPAs to advise on.</p>
<p>A meeting with the Historic England Inspector of Monuments and the CBC Archaeologist was held on 28 March 2018.</p>	<p>HE Inspector of Monuments CBC archaeologist</p>	<p>The aim of the meeting was to provide an overview of the Proposed Development and to discuss with the stakeholders the proposed methodology of the assessment and initial views on potential impacts of the Proposed Development on Cultural Heritage. The meeting also gave stakeholders the opportunity to provide some initial advice and identify any issues that need to be taken into consideration. The 2km study area was agreed as appropriate for assessing potential impacts to designated heritage assets. It was also agreed that rather than a 5km study area, a study area beyond 2km (the wider study area in this ES), informed by a ZTV and noise change contours, would be used to identify potential impacts arising from visual and noise intrusion.</p>
<p>A meeting with the CBC Archaeologists was held on 17 July 2018 to discuss the project and achieve consensus on the requirements for the evaluation of the land impacted by the Proposed Development within Bedfordshire</p>	<p>CBC archaeologists</p>	<p>It was agreed that the land immediately to the east of Wigmore Valley Park should be evaluated by archaeological trial trenching.</p>
<p>A meeting was held on 9 November 2018 with HCC Archaeologists to discuss the likely requirements for</p>	<p>HCC archaeologists</p>	<p>The technical requirements for the geophysical survey of this area were discussed and HCC provided further detailed guidance on the</p>

Meeting name and date	Attendees (organisation)	Summary of discussion
the evaluation of land impacted by the Proposed Development within Hertfordshire.		preferred specifications in an email [dated 12 November 2018].
A meeting was held on 8 July 2019. The Conservation officers from LBC and CBC were present as well as the CBC and HCC Archaeologists.	HCC Archaeologist CBC Archaeologist CBC Conservation Officer LBC Conservation Officer	Aim of the meeting was to inform the stakeholders of the progress of the heritage research and assessment. This provided an opportunity for the stakeholders to comment on the methodology and raise any specific concerns. The CBC Conservation Officer requested details of how the Air Quality and Noise assessments would address concerns about potential impacts on Someries Castle.
Pre-application advice letter from HE dated 23 April 2020.	HE Inspector of Monuments	HE responded to the baseline by letter to request that Luton Hoo RPG was assessed in its entirety and a holistic approach should be adopted for the assessment. HE also requested that the baseline reporting should include further description of the settings of Luton Hoo and Someries Castle.
Teleconference with CBC Archaeology Advisor on 5 November 2020 to advise of scheme re-start and discuss key changes and plans for field evaluation.	CBC Archaeologist	Scope of trial trenching was agreed including trenching to inform the ES.
Teleconference with HCC Archaeology Advisor on 12 November 2020 to advise of scheme re-start and discuss key changes and plans for field evaluation.	HCC Archaeologist	Scope of trial trench evaluation was assessed. HCC archaeologist proposed changes which were accepted and have been incorporated into a WSI for trial trench evaluation. HCC Archaeologist requested design drawings showing earthworks and areas of cut and fill.
Comments received from CBC Archaeology Advisor on 4 May 2021 on draft WSI for trial trenching.	CBC Archaeologist	WSI updated in line with comments from CBC Archaeology Advisor and resubmitted for agreement.

Meeting name and date	Attendees (organisation)	Summary of discussion
<p>Email from CBC Archaeology Advisor on 12 August 2021 confirming that the WSI for trial trenching had been agreed.</p>	<p>CBC Archaeologist</p>	<p>WSI scope and methodology agreed. Also agreed with CBC that, in order to futureproof the WSI, the appointed archaeological contractor would update the HER data as part of their method statement, which is written in response to the requirements of the WSI.</p>
<p>Email from HCC Archaeology Advisor on 1 July 2022 confirming that the WSI for trial trenching, rescheduled for 2022, had been agreed.</p>	<p>HCC Archaeologist</p>	<p>WSI scope and methodology for trial trenching that was to be undertaken to inform the ES was agreed.</p>
<p>Email from CBC Archaeology Advisor on 14 July 2022 confirming that the WSI for trial trenching, rescheduled for 2022, had been agreed.</p>	<p>CBC Archaeologist</p>	<p>WSI scope and methodology for trial trenching to be undertaken to inform the ES was agreed. In addition, the archaeological contractor’s method statement was received by the CBC Archaeologist on 19 July 2022 and was informed by an updated HER data search, as agreed previously with the CBC Archaeologist.</p>
<p>14 December 2021. A Teams meeting with officers from Historic England to discuss results of 2022 PEIR.</p>	<p>HE Inspector of Monuments, Inspector of Historic Buildings & Areas, and Senior Building Conservation Advisor</p>	<p>Scope of viewpoints and photomontages were reviewed and agreed to cover adequately the principal views required for the assessment. HE requested that photomontages used solid block colour.</p> <p>The PEIR assessed no significant effect to Someries Castle as a result of changes in air quality. HE requested that the cultural heritage chapter of the ES set out clearly which pollutants were tested for. It was agreed that establishing a direct link between pollutant levels and airport activity was problematic and monitoring of air quality levels would help provide more data for Someries Castle.</p>
<p>Response to 2022 Statutory Consultation dated 04 April</p>	<p>Historic England</p>	<p>Email correspondence between the Applicant and HE (18 – 28 July</p>

Meeting name and date	Attendees (organisation)	Summary of discussion
2022 recommended that images that relate specifically to heritage asset viewpoints and that demonstrate the specific impact upon settings are included with Chapter 10 of the ES. Also, that Viewpoints should be agreed with Historic England and the LPAs		2022) concluded that the viewpoints presented in the PEIR covered the highly graded assets that fell within HE's remit, and they were therefore content with the viewpoint location and no additional locations were required for the ES.
In email correspondence between the Applicant and HE (18 – 28 July 2022) HE suggested that two heritage assets, Grade II listed Vauxhall Motors building and Stopsley Common scheduled monument, may be impacted as a result of change within their setting.	HE Assistant Inspector of Historic Buildings & Areas	Grade II listed Vauxhall Motors building and Stopsley Common scheduled monument were assessed as part of the DBA (Section 5 of Appendix 10.1 of this ES [TR020001/APP/5.02]) and both assets were scoped out of the impact assessment as detailed in Section 5 and summarised in Section 6 of Appendix 10.1 of this ES [TR020001/APP/5.02].
18 August 2022 email from HCC Archaeology Officer.	HCC Archaeologist	Email confirmed that the trial trenches undertaken to inform the ES were signed-off and trenches could be backfilled.
22 August 2022 email from CBC Archaeology Officer	CBC Archaeologist	Email confirmed that the trial trenches undertaken to inform the ES were signed-off and trenches could be backfilled.
23 September 2022. Meeting with CBC Conservation Officer	CBC Conservation Officer	Meeting to discuss approach to assessment of impact on Someries Castle, scheduled monument. Conservation Officer is concerned that air quality data for Someries Castle is based on modelled data and not results of monitoring. The Conservation Officer suggested the proximity of the airport, and associated emissions, contributed to the deterioration of the brickwork and the model data should be substantiated by monitoring air quality during the airport's operational phase.

Meeting name and date	Attendees (organisation)	Summary of discussion
12 October 2022. Email correspondence with HE	HE Assistant Inspector of Historic Buildings & Areas	Request from Applicant to confirm whether we were obliged to use the guidance 'Aviation Noise Metric - Research on the Potential Noise Impacts on the Historic Environment by Proposals for Airport Expansion in England' in the ES. HE confirmed that it was not essential for the heritage impact assessment to use the guidance, but that the assessment should include and cross-reference noise data that has been used to inform the impact assessment.
24 November - 8 December 2022. Email correspondence with HCC Archaeology Officer	HCC Archaeologist	Email correspondence on draft CHMP resulting in revision to CHMP and confirmation from HCC Archaeologist (received 8 December 2022) that they are content with the CHMP.
14 December 2022 – 12 January 2023. Email correspondence with CBC Archaeology Officer	CBC Archaeologist	<p>Comments from CBC Archaeologist on the draft CHMP and final Trial Trench Report, Appendix 10.6 and Appendix 10.7 of the ES, respectively [TR020001/APP/5.02], requested that the mitigation proposals for the Late Iron Age/Roman buildings remains (HER 10808) are changed from preservation in situ to detailed excavation. The CBC Archaeologist stated that excavation was the preferred method due to the limited survival of the archaeological remains and the unlikelihood of them being preserved successfully during construction.</p> <p>The Applicant agreed to change the mitigation proposal and this is reflected in Section 10.9 of this ES and the CHMP Appendix 10.6 of this [TR020001/APP/5.02].</p>

10.5 Methodology

Overview

10.5.1 This section outlines the methodology employed for assessing the likely significant effects on Cultural Heritage from the construction and operation of the Proposed Development. This also includes the methodology for assessing potential impacts to heritage assets arising from sound, noise, vibration and changes in air quality.

Baseline methodology

10.5.2 This section presents the methodology for the baseline assessment including the data sources used in the compilation of the baseline assessment, and the criteria for determining the value of heritage assets.

10.5.3 The DBA, **Appendix 10.1** of this ES [TR020001/APP/5.02], has been undertaken in accordance with guidance and regulations published by ClfA, specifically the Standard and Guidance for Historic Environment Desk-Based Assessment and guidance published by Historic England (refer to **Table 10.4**).

Data sources

10.5.4 The baseline conditions for cultural heritage assets, as reported in **Appendix 10.1**, has been developed through consultation of the following sources:

- a. The results of a programme of archaeological fieldwork, the results of which are presented in **Appendix 10.3; 10.4; 10.5** and **10.7** of this ES [TR020001/APP/5.02].
- b. Central Bedfordshire and Luton HER [Data acquired 25 November 2020] for information relating to non-designated heritage assets and previous fieldwork events. Updated HER data was purchased in August 2022 in advance of trial trench evaluation, the results of which are presented in **Appendix 10.7** of this ES [TR020001/APP/5.02].
- c. Hertfordshire HER [Data acquired 18 December 2020] for information relating to non-designated heritage assets, historic landscape characterisation, and previous fieldwork events. Updated HER data was purchased in August 2022 in advance of trial trench evaluation, the results of which are presented in **Appendix 10.7** of this ES [TR020001/APP/5.02].
- d. National Heritage List for England (Ref. 10.23) for data relating to designated heritage assets.
- e. National Record of the Historic Environment held by Historic England.
- f. Bedfordshire and Luton Archives and Records Service for historical maps, photographs and local history.
- g. Hertfordshire Archives and Local Studies for historical maps, photographs and local history.
- h. Local Authority websites for information about conservation areas (Ref. 10.24 and Ref 10.25).

- i. National Library of Scotland for Historic Ordnance Survey mapping (Ref. 10.26).
- j. British Geological Survey, Geology of Britain Viewer (Ref. 10.27).
- k. Aerial photographs viewed online via the National Collection for Aerial Photographs (Ref. 10.28); Britain from Above (Ref. 10.29) and Historic England Aerial Photo Explorer (Ref. 30) websites.
- l. RAF Hendon archive for historic airfield maps.
- m. Defence of Britain Archive Database (Ref.31).
- n. Archaeology Data Service (Ref. 10.32) for information on previous cultural heritage assessments and fieldwork surveys.
- o. LiDAR data viewed online via The Environment Agency online database (Ref. 10.33).
- p. Natural England National Character Area profile: 110. Chilterns (Ref. 34).

10.5.5 The baseline has been informed by visits to the Proposed Development site and study area, during summer and winter months of 2018 and 2019 and the summer of 2022, as part of the baseline setting assessment.

Scoping heritage assets in or out of the impact assessment

10.5.6 The assessment of baseline, Section 5 of the DBA, **Appendix 10.1** of this ES, includes a description of heritage assets and a description of their heritage value, including the contribution that their setting makes to their value. The baseline assessment confirmed where impacts from the Proposed Development were likely and also unlikely to arise and, as a result, heritage assets unlikely to be affected were scoped out of the ES. The assessment for scoping out assets from the ES is detailed in Section 5 of the DBA, summarised in Section 6 of the DBA and also summarised in the gazetteer in **Appendix 10.2** of this ES [TR020001/APP/5.02]. A summary is also provided in **Section 10.7** of the ES.

Future baseline

10.5.7 The approach to defining future baseline is described in **Section 5.4** of **Chapter 5** Approach to the Assessment [TR020001/APP/5.01]. The future baseline considered for Cultural Heritage is described in **Section 10.7** of this chapter.

Construction and Operational impact assessment methodology

- 10.5.8 This section presents the methodology used for determining the magnitude of impact and significance of effect to heritage assets as a result of the construction and operation of the Proposed Development.
- 10.5.9 The principles of impact assessment methodology rest upon independently evaluating the value of the cultural heritage resource, and the magnitude of impact upon that value. By combining the value of the cultural heritage asset with the predicted magnitude of impact, the significance of the construction and operational effect can be determined. The effect can be beneficial or adverse.

Determining the value of heritage assets

- 10.5.10 The value of a heritage asset (its heritage significance) is guided by its designated status but is derived also from its heritage interest. Annex 2: Glossary of the NPPF defines value as “*the value of a heritage asset to this and future generations because of its heritage interest*”, which comprises archaeological, architectural, artistic and historic interest. The value of a heritage asset can therefore be defined by the sum and understanding of its heritage interest.
- 10.5.11 Each identified heritage asset can be assigned a value in accordance with the criteria set out in **Table 10.7**. Professional judgement and the results of consultation and engagement also contribute to the assessment of value, and regional variations, contribution to regional research agenda, and individual qualities of assets are taken into account where applicable.

Table 10.7: Criteria for determining the value of heritage assets

Value	Guidelines
High	Assets of international importance, such as World Heritage Sites, Grade I and II* listed buildings, Grade I and II* registered historic parks and gardens, Registered battlefields, Scheduled monuments, Non-designated archaeological assets of schedulable quality and importance.
Medium	Grade II listed buildings, Grade II listed registered historic parks and gardens, Conservation Areas, Locally listed buildings included within a Conservation Area, Non-designated heritage assets of a regional resource value.

Value	Guidelines
Low	Non-designated heritage assets of a local resource value as identified through consultation, Locally listed buildings.
Very Low	Non-designated heritage assets whose heritage values are compromised by poor preservation or damaged so that too little remains to justify inclusion into a higher grade.

Determining the magnitude of impact

- 10.5.12 The method for determining the magnitude of impact to heritage assets follows the same process for both construction and operational impacts and is set out in **Table 10.8**.
- 10.5.13 Impacts may arise during construction or operational activities and can be temporary or permanent. Permanent impacts could entail, for example, the removal of buried archaeological features; temporary impacts could entail, for example, construction activities within the setting of a heritage asset. The magnitude of impact arising from construction and operational activities takes into account mitigation measures which have been embedded within the Proposed Development as part of the design development process.

Table 10.8: Criteria for determining the magnitude of impact on heritage assets

Magnitude of impact	Description of impact
High	Change such that the significance of the asset is totally altered or destroyed. Comprehensive change to setting affecting significance, resulting in a serious loss in our ability to understand and appreciate the asset.
Medium	Change such that the significance of the asset is affected. Noticeably different change to setting affecting significance, resulting in erosion in our ability to understand and appreciate the asset.
Low	Change such that the significance of the asset is slightly affected. Slight change to setting affecting significance resulting in a change in our ability to understand and appreciate the asset.
Very Low	Barely perceptible changes to the asset that hardly affects significance. Minimal

Magnitude of impact	Description of impact
	change to the setting of an asset that have little effect on significance resulting in no real change in our ability to understand and appreciate the asset

- 10.5.14 An assessment to classify the effect, having taken into consideration any embedded mitigation, is determined using the matrix at **Table 10.9**.
- 10.5.15 The effect is determined by cross-referencing the value of the heritage asset with the magnitude of impact. Major and moderate effects are considered to be significant in accordance with standard EIA practice; minor and negligible effects are considered to be not significant. Where it is assessed that there would be no impact to a heritage asset, this is classified in the assessment as 'no effect'.

Table 10.9: Criteria for determining the significance of effect

Magnitude of impact	Value of heritage asset			
	High	Medium	Low	Very Low
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Minor
Low	Moderate	Minor	Minor	Negligible
Very Low	Minor	Minor	Negligible	Negligible

- 10.5.16 If appropriate, additional mitigation would be proposed where significant effects have been identified. An assessment of the significance of effect made prior to, and following, the implementation of additional mitigation, as set out in **Section 10.10**, allows the residual effect to be recorded. It is noted that mitigation does not automatically reduce an effect but may be used to offset or compensate for an adverse effect.

Assessing potential impacts arising from changes in air quality

- 10.5.17 The Air Quality impact assessment in **Chapter 7 Air Quality** of this ES **[TR020001/APP/5.01]** considers changes in pollutant or dust levels as a result of activities associated with the construction and operation of the Proposed Development. The assessment considers pollutant sources and emissions arising from construction activities such as demolition of existing structures; earthworks; construction of new structures and trackout; and construction traffic, equipment and plant. For operation, the assessed pollutant sources and emissions comprise aircraft main engines in the landing and take-off phase; aircraft auxiliary power units; ground power units, including the Fire Training Ground, landside road vehicles, and all background sources that are non-airport and major road related that are included in the National Atmospheric Emissions Inventory.

- 10.5.18 To inform the air quality assessment, monitoring was set up at locations where there were gaps in existing local authority monitoring around the airport, and at locations which were used to support model verification. An automatic monitoring station was installed to monitor nitric oxide (NO) and nitrogen dioxide (NO₂), collectively referred to as NO_x, fine particulate matter (PM₁₀, PM_{2.5}, PM₁), ozone (O₃), sulphur dioxide (SO₂), benzene, carbon monoxide (CO), black carbon, VOCs, naphthalene and toluene (refer to **Figure 7.2** of this ES [TR020001/APP/5.03]).
- 10.5.19 Pollutant levels have been predicted at a grid of receptors covering a 15km x 15km study area and the receptors included Someries Castle scheduled monument and Luton Hoo park and garden. A summary of the calculation of predicted emissions is included in the cultural heritage assessment for these assets; full details of the modelling methodology and calculation of emissions is presented in **Appendix 7.1** of this ES [TR020001/APP/5.02].

Assessing potential impacts arising from noise and vibration

- 10.5.20 The Noise and Vibration assessment in **Chapter 16** Noise and Vibration of this ES [TR020001/APP/5.01] assesses the likely significant effects on health and quality of life due to noise change. The assessment of impact arising from noise and vibration uses impacts on humans as a receptor, as human disturbance typically occurs at levels significantly below those required for building damage.
- 10.5.21 A number of locations have been considered in **Chapter 16** [TR020001/APP/5.01] for the assessment of ground noise and earthworks/ construction noise, including a receptor location at Someries Castle (shown on **Figure 16.4** of this ES [TR020001/APP/5.03]). Air noise assessment locations were also established to assess potential impacts arising from increases in air noise during operation, including locations at Someries Castle and Luton Hoo park, as shown in **Figures 10.6 to 10.8** of this ES [TR020001/APP/5.03].
- 10.5.22 The consideration of noise impacts on heritage assets, uses The Setting of Heritage Assets (Ref. 10.35) as its principal guidance. The assessment has been supplemented by guidance based on a report analysing the impact of aviation noise on the historic environment which was commissioned by English Heritage and published in 2014 (Ref. 10.36). This guidance methodology considers the asset's sensitivity to noise, informed by whether a specific soundscape formed an important part of their setting which contributed to its understanding, such as a specific noise that forms part of an asset's functional understanding or where the absence of sound is important for the asset's understanding.
- 10.5.23 The modelled noise contours are used to establish where there would be an increase in noise levels by comparison to the future baseline so that the magnitude of change to a heritage asset and the potential effect on its significance can be assessed.
- 10.5.24 Assessing whether noise from the Proposed Development interferes with the existing noise environment of heritage assets, i.e., the level of change from the future baseline, uses the following criteria which have been informed by the guidance methodology described above:

- a. An increase above 10dB with a minimum of 51dBL_{Aeq,16h} daytime, caused by increased aircraft noise is likely to dominate the existing noise environment and has the potential to represent a high magnitude of change.
- b. An increase between 1dB and 10dB may be intrusive and may interfere with the noise environment within the setting of heritage assets, which could represent a low to medium magnitude of change.
- c. Increases of less than or equal to 1dB with a minimum of 51dBL_{Aeq,16h} daytime, caused by new or altered aircraft noise is not likely to intrude upon the existing noise environment of heritage assets. Heritage assets that fall within this category are unlikely to experience notable change within their setting and have been scoped out of the impact assessment.

- 10.5.25 In addition to the assessment of the L_{Aeq,16h} noise metrics, context has been provided using the supplementary noise metric N65. As detailed in **Chapter 16 Noise and Vibration** of this ES [TR020001/APP/5.01], the N65 metrics are described in guidance from the Government and the CAA as supplementary metrics which can provide context and useful information but are not appropriate for identifying noise impacts or significant effects. These metrics are therefore referenced and described at appropriate points in the noise assessment to provide additional context to the potentially significant noise effects identified using the primary L_{Aeq} metric.
- 10.5.26 The noise assessment confirms there are no predicted noise increases above 10dB and all changes fall below 3dB. Heritage assets that fall within noise contour levels that predict a change of greater than 1dB above 51dBL_{Aeq,16h} have been screened into an assessment of impacts arising from changes to their setting, where their noise environment contributes to an understanding and appreciation of their heritage value.
- 10.5.27 The noise contours showing the location of heritage assets and the predicted level of noise change, are presented on **Figures 10.6 to 10.8** of this ES [TR020001/APP/5.03].
- 10.5.28 In defining the assessment criteria for vibration effects, **Chapter 16 Noise and Vibration** of this ES [TR020001/APP/5.01] makes reference to BS 5228-2:2009+A1:2014, which provides descriptions of the impact of vibration in terms of Peak Particle Velocity (PPV) on human receptors, as human disturbance typically occurs at levels significantly below those required for building damage.
- 10.5.29 Where a likely significant vibration effect relating to human disturbance has been identified, an assessment of significance in terms of building damage has been undertaken with reference to guidance in BS 7385-2. Criteria for assessing construction vibration are presented in **Chapter 16** of this ES [TR020001/APP/5.01] and is included in this chapter for ease of reference. The PPV values are defined as Lowest Observable Adverse Effect Level (LOAEL) and Significant Observed Adverse Effect Level (SOAEL) in DMRB, which is the methodology used in **Chapter 16** [TR020001/APP/5.01], with the Unacceptable Adverse Effect Level expressed as UAEL.

Table 10.10: Thresholds of potential effects of construction vibration on occupants of residential buildings

Time Period	Threshold Value Peak Particle Velocity (mm/s)		
	LOAEL	SOAEL	UAEL
All time periods	0.3	1.0	10.0
Description of effect (BS 5228-2)	Vibration might be just perceptible in residential environments.	It is likely that vibration of this level in residential environments will cause complaint but can be tolerated if prior warning and explanation has been given to residents.	Vibration is likely to be intolerable for any more than a very brief exposure to this level.

Assessing Cumulative effects

- 10.5.30 Cumulative effects have the potential to arise where the construction and/ or operation of two or more developments would result in effects to the same cultural heritage asset.
- 10.5.31 For a cumulative impact to arise as a result of direct, physical impacts during construction, another development would have to impact the same heritage asset as the Proposed Development. None of the other development assessed would result in physical impacts to buried heritage assets that could be impacted by the Proposed Development. Therefore, there are no potential cumulative effects to buried heritage assets.
- 10.5.32 Cumulative impacts arising from changes to the setting of a heritage asset can arise where built components of another development, when viewed alongside the above-ground components of the Proposed Development, contribute to a change in setting that could affect an asset’s heritage value. Cumulative impacts may also arise where there is potential for change to a heritage asset’s setting arising from an increase in noise levels. Other development that fall into these criteria have been included in the assessment of cumulative effects, the results of which are presented in **Chapter 21** of this ES [TR020001/APP/5.01].

10.6 Assumptions and limitations

- 10.6.1 This section provides a description of the assumptions and limitations to the Cultural Heritage assessment.
- 10.6.2 Heritage data has been obtained from third party sources and the assessment of effects is based on the accuracy of this information. Although data from HERs and the NHLE are generally reliable, on occasion asset data may be omitted, incorrectly named, have incorrect coordinate data, or be out of date.
- 10.6.3 The HER data was cross-checked against the NHLE data as listed building data was included in both sets of data. The HER data identified that Listed Building Consent had been granted in 2018 for the demolition of Winch Hill Farmhouse (NHLE 1307881) and a cross check of the North Hertfordshire Council planning portal confirmed that the building had been demolished in 2019 (planning reference: 18/03263/LBC). The former farmhouse is still recorded on the NHLE dataset but has been omitted from the baseline and figures that form part of this ES.
- 10.6.4 Walkover surveys to assess the setting of heritage assets were undertaken in the summer and winter months of 2018 and 2019 and the summer of 2022 to inform the DBA in **Appendix 10.1** of this ES [TR020001/APP/5.02].

Reasonable worst case

- 10.6.5 **Chapter 5** Approach to the Assessment of this ES [TR020001/APP/5.01] describes the general approach adopted to ensure that a reasonable worst case is assumed in this assessment including the use of parameters, accounting for uncertainty, and incorporating flexibility in design and demand forecasts.
- 10.6.6 Further relevant assumptions on worst case specific to this assessment include:
- a. The worst-case construction scenario for heritage assets considers the construction methodologies that would result in the greatest magnitude of permanent physical change or temporary change to an asset's setting. It assumes that construction activities would be continuous from the commencement of assessment Phase 1 to the completion of assessment Phase 2 and would be carried out concurrent with the operational activities of the airport. Different impacts could occur to heritage assets during all three assessment phases and, as such, each phase is assessed where applicable to the asset.
 - b. The worst-case scenario during operation of the Proposed Development is measured by the level of change to the setting of heritage assets. The greatest magnitude of permanent change to an asset's setting would occur at the peak of the airport's operation and is therefore defined as the operational airport in 2043 following completion of all development phases.

10.7 Baseline conditions

- 10.7.1 This section provides a summary description of the existing Cultural Heritage baseline. A detailed description of baseline conditions is set out in the DBA, **Appendix 10.1** of this ES [TR020001/APP/5.02], and a gazetteer of heritage assets is presented in **Appendix 10.2** of this ES [TR020001/APP/5.02]. **Figures 10.1 to 10.4** of this ES [TR020001/APP/5.03] show the location of heritage assets and previous archaeological investigations that have been considered in this assessment; **Figure 10.5** of this ES [TR020001/APP/5.03] shows the historic landscape character of the Proposed Development site and study area; **Figures 10.6 to 10.8** of this ES [TR020001/APP/5.03] show the changes in noise contours for each assessment phase, and **Figure 10.9** of this ES [TR020001/APP/5.03] shows designated heritage assets within the ZTV. Representative Viewpoints 23 to 25 (**Appendix 14.7** [TR020001/APP/5.02]) show views from Someries Castle scheduled monument, and Representative Viewpoints 17, 17A and 19 (**Appendix 14.7** [TR020001/APP/5.02]) show views from Luton Hoo RPG.
- 10.7.2 The baseline conditions for noise and vibration and for air quality are set out, respectively, in **Chapter 16** Noise and Vibration and **Chapter 7** Air Quality of this ES [TR020001/APP/5.01].

Existing conditions

Geology and Topography

- 10.7.3 The Proposed Development site is located to the south east of Luton, on a north - south aligned ridge at the north-eastern end of the Chiltern Hills. The topography of the Proposed Development site and study area is distinctly varied with Luton Airport Parkway Railway Station, located immediately to the west of the Main Application Site, being 113m above ordnance datum (AOD), the existing airport lying on a very flat and wide-open plateau at 157m AOD, and land to the east of the existing airport comprising a series of gently rolling dry valleys and ridgelines. There are various man-made topographical elements within and adjoining the Main Application Site, most notably a former landfill site which underlies the western part of Wigmore Valley Park and the long-stay car park to the east of the airport. There are also other areas of made ground, notably around the business park to the west and north west of the airport and at the ends of the runway.
- 10.7.4 The underlying geology across most of the Proposed Development site is recorded as undifferentiated Lewes Nodular Chalk Formation and Seaford Chalk Formation with bands of Holywell Nodular Chalk Formation, New Pit Chalk Formation and Chalk Rock Member running along the eastern and western extents of the Proposed Development site. Overlying these chalk formations are Clay-with-flints Formation deposits, superficial deposits formed from the dissolution of bedrock strata of the Chalk Group and Palaeogene Formations. This deposit is dominated by an orange/red-brown sandy clay with abundant nodules and rounded pebbles of flint with a variable thickness but can be up to 10m thick. Superficial Head deposits consisting of clay, silt, sand and

gravel are present in the dry valleys to the east of the Proposed Development site.

Archaeological investigations carried out for the Proposed Development

- 10.7.5 Summaries of all archaeological investigations, including those not associated with the Proposed Development, are presented in Section 4.3 of the DBA, **Appendix 10.1** of this ES [TR020001/APP/5.02] and illustrated on **Figure 10.4** of this ES [TR020001/APP/5.03]. Archaeological investigations carried out as part of this ES are summarised below and the fieldwork reports are submitted as appendices to this ES.
- 10.7.6 In 2018 and 2019, two phases of geophysical survey were undertaken for the Proposed Development on land to the east of the airport. The 2018 survey was undertaken by SUMO (**Appendix 10.3** of this ES [TR020001/APP/5.02],) on land within Bedfordshire which identified a small complex of ditches and pit-like anomalies that were interpreted as probably a component of a small Roman site and correlates with an enclosure recorded in the HER record (HER 10808). A possible pit alignment was also identified. The 2019 geophysical survey was undertaken by TigerGeo (**Appendix 10.4** of this ES [TR020001/APP/5.02],) on land within Hertfordshire which identified a small number of possible ditches across the surveyed area, but none forming groups or having diagnostic character.
- 10.7.7 In 2019, a trial trench evaluation was undertaken for the Proposed Development at land to the east of the airport (**Appendix 10.5** of this ES [TR020001/APP/5.02],). The scope of the trial trench evaluation was based on the results of the geophysical survey undertaken by SUMO in 2018 with trenches designed to target the possible Roman site and the possible pit alignment. The evaluation identified a single pit of Neolithic date and confirmed the presence of Late Iron Age / Early Roman activity in the form of a number of ditches which seemingly formed an enclosure encompassing the remains of a small building (correlating with HER 10808) and a series of rubbish pits.
- 10.7.8 A further phase of trial trench evaluation, agreed with the CBC and HCC Archaeologists, was carried out in 2022 to inform this ES. The evaluation identified sparse archaeological remains comprising two small ditches and a pit and the fieldwork report is presented in **Appendix 10.7** of this ES [TR020001/APP/5.02].
- 10.7.9 The results of the archaeological investigations carried out for the Proposed Development confirmed the presence of Iron Age and Roman archaeology within the Application Site, which suggests the Application Site and study area formed part of a relatively well-populated agrarian landscape during these periods. The presence of a Neolithic pit in the Application Site confirmed that the landscape was used during this period and may be indicative of temporary or seasonal activity.

Archaeological and historical background

- 10.7.10 The following presents a contextual summary of the archaeological and historic background of the Proposed Development Site and study area. Detailed information is provided in the cultural heritage DBA which forms **Appendix 10.1** of this ES [TR020001/APP/5.02].

Early Prehistoric (up to 4,000BC)

- 10.7.11 There is currently very little evidence for Palaeolithic or Mesolithic activity in the area. Settlement in Britain during the Palaeolithic was episodic and focused on caves and fissures often in more highland regions. The Mesolithic period in the archaeological record is characterised mainly from surface collections of flint scatters with a small number of excavated sites. There was no evidence of early prehistoric activity from any of the archaeological investigations carried out for the Proposed Development.

Later Prehistoric (up to 43AD)

- 10.7.12 Evidence for Neolithic activity in the area is relatively rare. There have been some important sites identified in the wider region, however extensive investigations at these sites provided little firm evidence for settlement activity. The Neolithic pit identified during trial trench evaluation contributes a small amount of evidence and knowledge to the understanding of this period but does not suggest a potential for extensive settlement-related activity to be present.
- 10.7.13 Early Bronze Age activity is dominated by field monuments and Late Bronze Age activity can be characterised broadly by the distribution of barrows along river valleys and monument complexes on the lower river terraces.
- 10.7.14 During the Late Bronze Age / Early Iron Age, land boundaries start to appear with three distinct types: dykes, ditched boundaries and post hole alignments. Settlement patterns in the Middle Iron Age still indicate a preference for higher ground, with occupation of the sides of river valleys, which is borne out by the results of the trial trench evaluation carried out for the Proposed Development (**Appendix 10.5** of this ES [TR020001/APP/5.02]) which identified a building and enclosure features associated with HER 10808 on the higher slopes above the dry valley.

Roman (43AD – 410)

- 10.7.15 Whilst there has been no Roman settlement identified within the historic core of Luton, a Roman settlement is known to have existed at Limbury, located approximately 4km north of the modern centre of Luton. Several settlement forms are identified in Bedfordshire and Hertfordshire including linear row settlements, nucleated farmsteads and substantial farms/ villa sites. Archaeological evaluation in Wigmore Valley Park identified several Roman occupation features including flint surfaces, pits, double ditches and Late Iron Age – Roman pottery sherds and Roman tile. The 2019 trial trench evaluation, carried out for the Proposed Development and presented in **Appendix 10.5** of this ES [TR020001/APP/5.02], identified further evidence of Late Iron Age/ Early Roman and Roman activity in the form of a number of ditches which

formed an enclosure encompassing the remains of a small building, enclosures and rubbish pits (HER 10808).

Early medieval (410 – 1066)

- 10.7.16 A settlement was established at Luton, approximately 1.5km north of the modern centre of Luton, by at least 475 AD, and settlement activity has been recorded in the vicinity of small Roman towns, such as at Kempton and Sandy, but there is no evidence for early medieval activity within the Application Site.

Medieval (1066 – 1540)

- 10.7.17 The Domesday Survey of 1086 reflects the changes in land ownership following the Norman Conquest of 1066. Bedfordshire is largely described as mainly nucleated with some dispersed settlement with agriculture dominating the local economy. Hertfordshire was among England's most densely wooded counties in the medieval period and its economy developed through trade rather than agriculture.
- 10.7.18 By the time of the 1086 Domesday survey, Luton (or *Loitone*) was a well-established settlement. By 1240, the town is recorded as Leueton and held an annual fair, with a second fair being granted in 1338 due to the growth of the town. Throughout the medieval period, Luton continued to be a quiet market town, with the principal activity being agriculture, as per the regional trend.
- 10.7.19 This period is characterised by much greater visibility and physical presence of archaeological sites, including churches, mottes, moats, monasteries and fishponds which emerged as developments within an existing landscape. This is evidenced in extant medieval buildings, including the fortified manor house of Someries Castle (NHLE 1008452), which dates to the late-15th century, and the Church of St. Mary in King's Walden, which has origins in this period. The presence of Someries Castle articulates the status of later medieval society in this part of England. It contributes to an understanding of how political power was organised and displayed, and represents an important aspect of social, political and economic history.

Post-medieval (1540 – 1900)

- 10.7.20 About half of Bedfordshire was still farmed under the open field system until the introduction of enclosures in the 18th and 19th centuries. The historic landscape character of the area still has pockets of piecemeal and irregular enclosure, but the majority of the current fields have derived from the amalgamation of smaller fields into larger parcels and the loss of historical boundaries.
- 10.7.21 Settlement during the post-medieval period would have been a mixture of dispersed and nucleated rural settlement and there are single farmsteads and 'end' place names which could be of medieval origin, but almost certainly originated in the post-medieval period, such as the hamlet of Wandon End and Lawrence End; Wandon End Farm (HER 15464), a post-medieval farmstead with a 16th century farmhouse (Grade II, NHLE 1102448), and range of barns, and Wandon End House (Grade II, NHLE 1307874) which dates to the early 18th century. Other houses and farmhouses in the study area which derive from

this period include the Old Homestead (Grade II*, NHLE 1176170) which dates to the early 17th century and is located in the village of Breachwood Green, and Wigmore Hall Farmhouse (Grade II, NHLE 1321368) which dates to the 19th century.

- 10.7.22 The parkland of Luton Hoo RPG (Grade II*, NHLE 1000578) was designed during this period. Luton Hoo takes its name from the Anglo Norse term "Hoo" which means "spur of the hill" and refers to the hill south of Luton and where much of Hyde Parish sits. The park was first enclosed in 1623 and enlarged and remodelled by Lancelot Brown in 1764-74. The principal building within the park is Luton Hoo house (Grade I, NHLE 1321301) which dates to the 19th century and is a focal point of the park. The dominant landscape feature within the park is the River Lea and its two associated lakes, created by Brown. Formal gardens were added to the southern front of the house in the early 20th century, bounded by garden houses and retaining walls (Grade I, NHLE 1158944) which were designed by Charles Mewes and laid out by William Romaine-Walker.

Modern (1900 – present)

- 10.7.23 Luton was a vital town during the Second World War (WWII) as Vauxhall Motors produced military equipment including vehicles such as tanks. As a result, Luton was heavily bombed and the town suffered extensive damage, with over 1,500 homes damaged or destroyed.
- 10.7.24 In 1938, the airport was opened and owned by the Borough of Luton. The Airport was also utilised during the war, being used by the Royal Air Force as a military training airfield. A fighter squadron were based there as well as a manufacturing site where military aircraft was designed and built. Heritage assets related to the defensive installations at the airport include an airfield battle headquarters (HER 17921) which is located largely underground, towards the northern extent of the Main Application Site boundary in Wigmore Park, a pillbox (HER 17922) which is now demolished, earthworks including gun emplacements (HER 12423) and the site of a prisoner of war camp (HER 17937), also demolished.
- 10.7.25 During a series of archaeological investigations at Luton Hoo in 2006, there was evidence identified throughout the estate for the use of Luton Hoo as a military centre during WWII. After the war, Luton and the surrounding area was developed, with a number of large residential estates being built. Many of the heritage assets from this period have been lost to later development with extant assets within the airport limited to Luton Airport Fire Station (HER 19823) which remains a functional part of the airport complex.

Historic Landscape

- 10.7.26 Much of the Proposed Development site which lies within the county of Bedfordshire and comprises largely 20th century and later development which includes the airport and ancillary structures, residential fringe areas of Luton Town and industrial buildings in the vicinity of Luton Parkway Station, principally those of Vauxhall Motors. These areas have changed significantly in the last 100 years and are not sensitive to change.

- 10.7.27 The designed landscape of Luton Hoo registered park and garden is located to the south-west of the Main Application Site and the landscape to the east of the park comprises pockets of 18th and 19th century plantation woodland and piecemeal enclosure, with a dominance of irregular enclosure and post-1950 boundary loss in the Application Site to the east of the airport. The 'Pre-18th century Irregular Enclosure' character area relates to the farm land associated with Winch Hill Farm, and the 'Post-1950 Boundary Loss' relates to the rest of the farm land to the east of Winch Hill Farm which has undergone late 20th century alterations and the loss of hedgerows, as can be seen on historic Ordnance Survey maps dated from 1888 to 1949 which show this land divided into smaller parcels.
- 10.7.28 The '18th – 20th century Woodland Plantation' character area relates to the small parcels of woodland to the north and south of Winch Hill Farm. These areas are not marked on historical Ordnance Survey maps of the 19th and 20th centuries and represent post-medieval plantation woodland. These areas have limited heritage value.
- 10.7.29 The majority of the current fields have derived from the amalgamation of smaller fields into larger parcels, resulting in the loss of historical boundaries. The fields articulate the current character of the landscape, rather than evoke the historical character of the area and are of limited heritage value and are not sensitive to change.
- 10.7.30 Small pockets of woodland characterised as 'Ancient Woodland' to the south-east and east of the airport relate to the remnants of Winch Hill Wood, which has been lost due to the creation and enclosure of agricultural land and by the development and expansion of the airport. At the time of Domesday, this area formed part of the largest woodland recorded in the county. During the 12th and 13th centuries, this area was an assart¹ landscape with irregular enclosures and isolated farms, hamlets and woodland remnants. The majority of woodland has been re-shaped or lost and the pockets of woodland that remain are indicative of the character of the former medieval landscape and provide a landscape context for the extant medieval features in the area, which includes Someries Castle.
- 10.7.31 Pockets of woodland to the east of Luton Hoo do not form part of the patchwork of remnant medieval landscape features, being planted during the post-medieval period, but do contribute to the setting of the designed landscape of Luton Hoo park. Specifically, George Wood, Hardingdell Woods, and Withstocks Wood to the east of the park help frame views from the house and from the eastern edge of the park land, therefore contributing to its appreciation.
- 10.7.32 The historic landscape features assessed as being sensitive to change comprise pockets of ancient woodland; the designed landscape of Luton Hoo park, and post-medieval woodland plantation of George Wood and Hardingdell Woods, Withstocks Wood.

¹ Arable land that was previously woodland which has been cut back to create fields.

Summary of heritage assets included or scoped out of the ES

- 10.7.33 Based on the evidence presented in the DBA, **Appendix 10.1** of this ES [TR020001/APP/5.02], and further informed by the ZTV and assessment of noise change contours, the following presents a summary of heritage assets that have been either been included in **Section 10.9** Impact Assessment or scoped out of further assessment.

Designated Heritage Assets

- 10.7.34 There are no designated heritage assets located within the Proposed Development site, and there are no World Heritage Sites or registered battlefields located within the study areas.

Scheduled monuments

- 10.7.35 Someries Castle (NHLE 1008452) is located approximately 250m south of the Main Application Site. The scheduled monument includes foundation and upstanding remains of the late medieval gatehouse and chapel which formed the west wing of the brick-built structure, plus the earthwork remains of a formal garden to the south west. The asset falls within the ZTV and also within the noise change contours that show a predicted level of change from the future baseline of greater than 1dB above 51dBL_{Aeq,16h}. There is also a potential for vibration impacts due to the asset's proximity to the Proposed Development. Someries Castle is therefore scoped in to the impact assessment in **Section 10.9**.
- 10.7.36 Six Hills Roman barrows (NHLE 1015579) is located approximately 9km east of the Main Application Site. The monument includes six Roman barrows known as 'The Six Hills' and the archaeologically sensitive area between them situated in an area of grassland formerly known as Sixpenny Common. The Proposed Development Site is not visible from the asset and therefore impacts from visual intrusion would not occur, however, the asset falls within the noise change contours that show a predicted level of change from the future baseline of greater than 1dB above 51dBL_{Aeq,16h}. Six Hills Roman barrows is therefore scoped in to the impact assessment in **Section 10.9**.
- 10.7.37 A further five scheduled monuments were included in the DBA, comprising:
- a. Whomerley Wood moated site (NHLE 1012052).
 - b. Earthworks in Boxwood (NHLE 1005241).
 - c. Barrow at Telegraph Hill (NHLE 1012449).
 - d. Neolithic enclosure known as Waulud's Bank (NHLE 1015558).
 - e. Strip Lynchets on Stopesley Common (NHLE 1425022).
- 10.7.38 The DBA confirmed that the Proposed Development Site did not contribute to the settings of the scheduled monuments. Views of the Proposed Development Site were not possible from any of the assets which meant that impacts would not arise as result of visual intrusion. The site visit to these assets to characterise and describe their setting confirmed that a particular noise environment was not an important component of the assets' settings, and

therefore impacts from aural intrusion that could affect their significance was unlikely. Whilst recognising that 'quietness' does not contribute to the assets' settings, the noise contour data produced for this ES confirmed that the assets would experience a noise change of less than or equal to 1dB above 51dBL_{Aeq,16h} from the future baseline, which was not likely to intrude upon their existing noise environment. As such, these assets are scoped out of the impact assessment in **Section 10.9** and are not assessed further in this ES chapter.

Registered parks and gardens

- 10.7.39 Grade II* Luton Hoo RPG (NHLE 1000578), and associated listed assets as detailed in the DBA, **Appendix 10.1** of this ES [TR020001/APP/5.02], is located approximately 200m south west of the Main Application Site. To comply with pre-application advice received by Historic England (**Table 10.6**), Luton Hoo and the heritage assets within the park are assessed collectively. Luton Hoo is a landscaped park that was first enclosed in 1623 and enlarged and remodelled by Lancelot Brown in 1764-74. Luton Hoo RPG, and the associated listed buildings within the park, which include Luton Hoo Conservation Area, fall within the ZTV which means that components of the Proposed Development may be visible from areas within the park, which may introduce change into its setting. The park also falls within the noise change contours that show a predicted level of change from the future baseline of greater than 1dB above 51dBL_{Aeq,16h}. The asset is therefore scoped in to the impact assessment in **Section 10.9**.
- 10.7.40 Grade II Putteridge Bury RPG (NHLE 1000917) and associated listed assets as detailed in the DBA, **Appendix 10.1** of this ES [TR020001/APP/5.02], is located 4km north east of the centre of Luton and approximately 2km north of the Main Application Site. The landscaped park was laid out c 1820, subsequently extended southwards to its present boundaries by 1884. The western edge of the park falls within the ZTV which means that components of the Proposed Development may be visible from areas within the park, which may introduce change into its setting. The park, which includes other listed buildings such as Putteridge Bury house, former stables, a walled garden; and Home Farm, also falls within the noise change contours that show a predicted level of change from the future baseline of greater than 1dB above 51dBL_{Aeq,16h} daytime. The asset is therefore scoped in to the impact assessment in **Section 10.9**.
- 10.7.41 The Grade I St Paul's Walden Bury (NHLE 1000150) is located approximately 4km to the east of the Main Application Site. The park comprises largely unaltered formal gardens and wooded pleasure grounds surrounding an early-18th century Grade II* listed country house, The Bury, with associated landscape parkland. The park falls outside of the ZTV and the Proposed Development Site does not contribute to an understanding or appreciation of its setting. Change arising from the presence of the Proposed Development would not change its setting and impacts to the asset's significance arising from visual intrusion are unlikely. However, the park falls within the noise change contours that show a predicted level of change from the future baseline of greater than 1dB above 51dBL_{Aeq,16h} daytime and is therefore scoped in to the impact assessment in **Section 10.9**.

- 10.7.42 The Grade II* listed The Improvement Garden (NHLE 1468798) is a sculpture garden opened in 1991 within Stockwood Park, which is a former country estate, now a public park, located approximately 1.5km south-west of Luton town centre. The northern edge of the park falls within the ZTV which means that components of the Proposed Development may be visible from areas within the park, which may introduce change into its setting. Also, the park falls within the noise change contours that show a predicted level of change from the future baseline of greater than 1dB above 51dBL_{Aeq,16h} and is therefore scoped in to the impact assessment in **Section 10.9**.
- 10.7.43 There are a further five RPGs located in the wider study area and included in the DBA. These comprise:
- a. the Grade II* Knebworth (NHLE 1000255) located approximately 8.5km east of the Main Application Site;
 - b. the Grade II* Temple Dinsley (NHLE 1000919) located approximately 4km east of the Main Application Site;
 - c. the Grade II Wardown Park (NHLE 1001445) located approximately 3km north west of the Main Application Site;
 - d. the Grade II Ayot House (NHLE 1000905) which is located approximately 6.7 km south east of the Main Application Site; and
 - e. the Grade II The Hoo, Kimpton (NHLE 1000912) which is located approximately 4.5km east of the Main Application Site.
- 10.7.44 The DBA confirmed that the Proposed Development Site did not contribute to the settings of the RPGs. Site visits carried out as part of the DBA confirmed that views of the Proposed Development were not possible from the assets and impacts to their significance arising from visual intrusion was therefore unlikely. The site visit to these assets also confirmed that a particular noise environment was not an important component of the assets' settings and impacts from aural intrusion that could affect their significance was unlikely. Whilst recognising that 'quietness' does not contribute to the assets' settings, the noise contour data produced for this ES confirmed that the assets would experience noise change levels of less than or equal to 1dB above 51dBL_{Aeq,16h} daytime, which was not likely to intrude upon their existing noise environment. As such, these assets are scoped out of the impact assessment in **Section 10.9** and are not assessed further in this ES chapter.

Conservation Areas

- 10.7.45 There are eight conservation areas discussed within the DBA. These comprise:
- a. High Town Road Conservation Area which is the core of Luton's earliest suburb.
 - b. Luton Town Centre Conservation Area encompasses the historic core of the town with most of the historic buildings dating to the 19th century. Residential, commercial and public buildings coexist, contributing to the vibrant character of the conservation area.

- c. Luton South Conservation Area which is located to the south of the centre of Luton town. The character of this conservation area is residential and includes a number of Victorian terraces along Stockwood Crescent and London Road as well as detached and semi-detached properties along West Hill Road. The conservation area encompasses Luton Hoo Memorial Park, to the south east.
- d. Plaiter's Lea Conservation Area on the northern fringes of Luton's commercial district.
- e. Luton Hoo (Hyde) Conservation Area which is located within the Luton Hoo RPG.
- f. Bendish Conservation Area which encompasses the historic core of the hamlet in the parish of St. Paul's Walden.
- g. Hitchin Conservation Area.
- h. Hitchin Hill Path Conservation Area.

10.7.46 High Town Road, Luton Town Centre, Luton South and Plaiter's Lea Conservation Areas are all located within Luton. Their settings and character are defined in part by their streetscape, and the built-up nature of their immediate environments preclude views of the Proposed Development Site, which does not contribute to their settings. As such, impacts to their significance arising from visual intrusion of the Proposed Development during construction and operation are unlikely, and these potential effects are not considered further in this chapter.

10.7.47 The conservation areas listed a to f above, all fall within the noise change contours that show a predicted level of change from the future baseline of greater than 1dB above 51dB_{L_{Aeq,16h}} daytime. As such, the conservation areas are scoped in to the impact assessment in **Section 10.9**. Potential impacts to Luton Hoo (Hyde) Conservation Area are assessed as part of Luton Hoo RPG.

10.7.48 Hitchin Conservation Area and Hitchin Hill Path Conservation Area are within the 250m study area for Off-site Highways Interventions, which are located beyond the 2km core study area. There are 124 listed buildings within these conservation areas which includes one Grade I listed building and six Grade II* listed buildings. The minor works associated with the Off-site Highways Interventions are likely to result in temporary, barely perceptible change to the settings of heritage assets within the 250m study area, and no change to the settings of heritage assets during operation. Furthermore, these conservation areas fall outside of the contours which represent noise level change and would not therefore experience material change to their existing noise environments. As such, these assets are scoped out of the impact assessment in **Section 10.9** of this chapter and are not assessed further.

Listed Buildings

10.7.49 There are 87 listed buildings that fall within the 2km study area, four of which are Grade I listed and one of which is Grade II* listed. The remaining 82 listed buildings are Grade II listed.

- 10.7.50 The four Grade I listed buildings are:
- a. the Church of St. Mary (NHLE 1102475) in Kings Walden to the north east of the Main Application Site;
 - b. the Parish Church of St. Mary (NHLE 1114615) in Luton Town to the west of the Main Application Site;
 - c. Luton Hoo house (NHLE 1321301) located south west of the Main Application Site; and
 - d. the garden houses and walls associated with Luton Hoo (NHLE 1158944) which are also located south west of the Main Application Site.
- 10.7.51 The setting of the Church of St. Mary (NHLE 1102475) in Kings Walden is rural and is defined by its location within Kings Walden Park, surrounded by agricultural land on all sides. The church is outside of the ZTV and therefore visual impacts arising from the physical presence of the Proposed Development would not arise. Furthermore, the church falls outside of the contours which represent noise change. As such, the asset would not experience material change to its existing noise environment and is therefore scoped out of the impact assessment in **Section 10.9** of this chapter and not assessed further.
- 10.7.52 The Parish Church of St. Mary (NHLE 1114615) is located in Luton Town. The church is set within a tree-lined green space, but its setting is dominated by multi-storey commercial and residential tower blocks. Views of the Proposed Development Site are not possible from within the grounds of the church and therefore impacts arising from the physical presence of the Proposed Development would not arise. The church falls within the noise change contours that show a predicted level of change from baseline of greater than 1dB above 51dBL_{Aeq,16h}. As such, the church is scoped in to the impact assessment in **Section 10.9**.
- 10.7.53 Luton Hoo house, garden houses and walls are scoped in to the impact assessment in **Section 10.9** of this ES and are considered as part of the holistic assessment of Luton Hoo RPG.
- 10.7.54 The Grade II* listed building comprises the Old Homestead (NHLE 1176170), located to the east of the Main Application Site in Breachwood Green village. The building, which is a residential property, falls within the ZTV and falls within the noise change contours that show a predicted level of change from the future baseline of greater than 1dB above 51dBL_{Aeq,16h}. As such, the building is scoped in to the impact assessment in **Section 10.9**.
- 10.7.55 Luton Hoo Stables is a Grade II* building that falls outside of the 2km study area (NHLE 1114713). To comply with the pre-application advice from Historic England (**Table 10.6**) which requested a holistic approach to the assessment of Luton Hoo RPG, i.e., to consider all assets in the assessment of the park, even if they fell outside of the study area, the stables are included as part of the assessment of Luton Hoo RPG.
- 10.7.56 The majority of the Grade II listed buildings within the 2km study area are located within existing settlement areas of Luton, Bendish and Breachwood Green, whilst others comprise discrete agricultural buildings, or small groups of

buildings such as farmhouses, stables and barns in rural settings. These assets, which are listed in **Appendix 10.2: Cultural Heritage Gazetteer [TR020001/APP/5.02]** were considered in the DBA as they fell within the ZTV which informed the extent of the wider study area. However, site visits confirmed that their immediate environments precluded views of the Proposed Development Site, principally due to intervening buildings or vegetation. In addition, the setting of buildings such as farmhouses and barns, is defined by the surrounding fields, which forms their functional setting. As such, it is assessed that impacts to the heritage significance of these assets arising from the physical presence of the Proposed Development would not arise and they are not assessed further in this chapter.

- 10.7.57 The DBA concluded that the following Grade II listed buildings may experience change as a result of the Proposed Development:
- a. Wigmore Hall Farmhouse (NHLE 1321368);
 - b. Wandon End Farmhouse (NHLE 1102448); and
 - c. Wandon End House (NHLE 1307874).
- 10.7.58 These assets are located to the east of the Main Application Site. They fall within the ZTV and site visits confirmed that views of the Proposed Development would be possible from the assets. Furthermore, their proximity to the Proposed Development may result in temporary impacts, arising from changes to their settings, during construction. These assets are therefore included in the impact assessment in **Section 10.9** of this ES.
- 10.7.59 In addition to the 87 listed buildings within the 2km study area, there are a further four Grade I and 22 Grade II* listed buildings within the wider study area. As described in **Section 10.3** of this ES, the wider study area supplements the core 2km study area; it is informed by the ZTV and noise change contours and has therefore evolved in line with the design parameters of the Proposed Development.
- 10.7.60 The majority of the buildings within the wider study area comprise churches, commercial and residential buildings located within existing areas of settlement in Preston, Hitchin and Stevenage to the north east of the airport. These assets, which are listed in **Appendix 10.2: Cultural Heritage Gazetteer of this ES [TR020001/APP/5.02]** were initially considered in the DBA as they fell within the ZTV which informed the extent of the wider study area. However, the site visits confirmed that the built-up nature of their immediate environments precluded views of the Proposed Development Site, which does not contribute to their settings and therefore impacts arising from the physical presence of the Proposed Development would not arise. Furthermore, these assets fall outside of the contours which represent noise change and would not therefore experience material change to their existing noise environment. These assets are scoped out of the impact assessment and not assessed further in this chapter.

Non-designated heritage assets

- 10.7.61 There are 131 records on the HER relating to sites of archaeological and historical activity. These records include the sites of heritage assets such as former buildings; historic landscape features such as former ridge and furrow, quarry pits and former woodland; and find spot evidence indicating the site of archaeological material which has since been removed. In addition to these records, a further 26 assets have been identified during the preparation of the DBA and a review of historical map evidence and LiDAR and largely comprise the sites of former woodland and pit-like features which may be indicative of quarrying. The DBA concluded that 25 records on the HER are located within the Order Limits and relate to the locations of former assets that no longer survive, such as the site of the Hospital of St. Mary Magdalene (HER 362) and historic landscape features such as the site of former quarry pits (HER 6733). HER 12422 is recorded on the HER as a potential archaeological feature; however, subsequent field evaluation confirmed that the asset was in fact a geological anomaly which has no heritage value. Assets HER 12423 and HER 12424, represent the locations of earthworks associated with former Second World War entrenchments. These assets were identified from aerial photographs but are located in areas currently occupied by hardstanding. Development is likely to have removed the earthworks in their entirety and subsurface remains are unlikely to be present.
- 10.7.62 The remaining assets that are recorded on the HER as surviving within the Proposed Development site comprise:
- a. HER 10808, the site of Iron Age and Roman settlement-related activity.
 - b. HER 7358, the site of a possible Roman building.
 - c. HER 17218/ 17219, which comprise cropmarks which may relate to late prehistoric or Roman activity.
- 10.7.63 All of these assets have the potential to be impacted by the construction of the Proposed Development and are therefore included in the impact assessment in **Section 10.9**.

Historic landscape

- 10.7.64 The Proposed Development would result in the loss of fields and hedgerow boundaries to the east of the airport which were created following the amalgamation of smaller fields following the Second World War; defined as 'post-1950 boundary loss' HLC areas on **Figure 10.5** of this ES **[TR020001/APP/5.03]**. In addition, fields characterised as 'irregular enclosure' would also be impacted as a result of the earthworks and the construction of Car Parks P10 and P11. These potential impacts are assessed further in **Section 10.9**.

Future baseline

- 10.7.65 The general approach to defining future baseline and the developments identified for consideration are described in **Section 5.4** of **Chapter 5** Approach to the Assessment of this ES **[TR020001/APP/5.01]**. In the absence of the

Proposed Development, there would be minor change to the baseline conditions of some cultural heritage assets.

- 10.7.66 Proposals to develop agricultural land at Land South and North West of Cockernhoe and East of Wigmore, would result in the loss of agricultural land to the west of Wandon End which contributes to the wider agricultural setting of the Grade II listed buildings of Wandon End Farmhouse (NHLE 1321368) and Wandon End House (NHLE 1307874).
- 10.7.67 For buried archaeological remains within the Application Site, the future baseline is expected to be the same as the present. Such remains are a static resource, which have reached equilibrium with their environment and do not change (e.g., decay or grow) unless their environment changes as a result of human or natural intervention. For the above ground heritage assets within the Application Site, there may be some decay over time in the absence of the Proposed Development as they near the natural end of their design lifespan.

10.8 Embedded and good practice mitigation measures

10.8.1 This section describes the embedded and good practice mitigation for Cultural Heritage that has been incorporated into the Proposed Development design or assumed to be in place before undertaking the assessment. A definition of these classifications of mitigation and how they are considered in the EIA is provided in **Chapter 5** Approach to the Assessment of this ES [TR020001/APP/5.01].

Embedded

- 10.8.2 The Proposed Development has evolved to take into consideration the heritage assets within the Order Limits and to minimise any impacts on the historic environment. A number of mitigation measures have been incorporated into the design of the Proposed Development. During the preparation of the design proposals, a number of different options were assessed. These included alternative locations of the proposed buildings, car parks and other hard standing areas as well as variations in height of the new buildings. Areas that have been subject to previous disturbance, such as the landfill site and previously landscaped areas within the existing airport have been identified. The Proposed Development will utilise this previously disturbed area for multi-storey, block, and surface parking car parking, offices and hotel facilities, expansion of Terminal 2, and for extensions to the existing airfield. Utilising previously disturbed areas avoids the risk of physically impacting buried archaeological remains.
- 10.8.3 The Proposed Development design seeks to enhance the historic landscape by including provision for the planting of hedgerows and hedgerow trees that are in-keeping with the historic landscape character of the area.

Good practice

- 10.8.4 The Code of Construction Practice (CoCP) (**Appendix 4.2** of this ES [TR020001/APP/5.02]) sets out measures to minimise impacts to heritage assets during construction activities including impacts arising from changes to the setting of heritage assets. These measures include minimising noise, dust and vibration during construction and the use of directional construction lighting that minimises light spill.
- 10.8.5 The CHMP (**Appendix 10.6** of this ES [TR020001/APP/5.02]) sets out how the historic environment will be protected during construction, in a consistent and integrated manner is presented at. The CHMP details the scope, guiding principles and methodology for the planning and implementation of archaeological mitigation that is required as a result of the construction of the Proposed Development and the measures within it will be secured through a requirement in the DCO.

10.9 Impact assessment

- 10.9.1 This section presents the results of the assessment of effects with the embedded and good practice mitigation measures, described in the previous section, in place.
- 10.9.2 The Cultural Heritage DBA, presented in **Appendix 10.1** of this ES [TR020001/APP/5.02], identifies the known designated and non-designated heritage assets located within the Proposed Development Site and study areas. Based on the evidence presented in the DBA, and further informed by the ZTV and assessment of noise change contours, a summary of heritage assets that have been either included in the Impact Assessment or scoped out of further assessment is presented in **Section 10.7** of this chapter.
- 10.9.3 Potential effects arising from the construction and operation of the Proposed Development are discussed in detail in this section and a summary of the assessment of effects is provided in **Table 10.12** in **Section 10.14**.
- 10.9.4 The heritage assets that are considered in the assessment of construction and/or operational impacts are listed in **Table 10.11**.

Table 10.11: Heritage assets considered in the impact assessment

Asset name	Construction Impacts	Operation Impacts
Somerles Castle, scheduled monument (NHLE 1008452).	Yes. Potential for vibration impacts	Yes. Potential for impact arising from visual/ aural intrusion
Six Hills Roman barrows, scheduled monument (NHLE 1015579).	No	Yes. Potential for impact arising from aural intrusion
Luton Hoo, Grade II* RPG (NHLE 1000578).	Yes. Potential for visual impacts and changes to setting	Yes. Potential for impact arising from visual/ aural intrusion
Putteridge Bury, Grade II RPG (NHLE 1000917).	No	Yes. Potential for impact arising from visual intrusion
St. Paul's Walden Bury, Grade I RPG (NHLE 1000150).	No	Yes. Potential for impact arising from aural intrusion
The Improvement Garden, Grade II* RPG (NHLE 1468798).	No	Yes. Potential for impact arising from visual/ aural intrusion
High Town Road Conservation Area.	No	Yes. Potential for impact arising from aural intrusion

Asset name	Construction Impacts	Operation Impacts
Luton Town Centre Conservation Area.	No	Yes. Potential for impact arising from aural intrusion
Luton South Conservation Area.	No	Yes. Potential for impact arising from aural intrusion
Plaiter's Lea Conservation Area	No	Yes. Potential for impact arising from aural intrusion
Bendish Conservation Area	No	Yes. Potential for impact arising from aural intrusion
Parish Church of St. Mary Grade I (NHLE 1114615)	No	Yes. Potential for impact arising from aural intrusion
Grade II* listed Old Homestead (NHLE 1176170)	Yes. Potential for visual impacts and changes to setting	Yes. Potential for impact arising from visual/ aural intrusion
Wigmore Hall Farmhouse Grade II (NHLE 1321368)	Yes. Potential for visual impacts and changes to setting	Yes. Potential for impact arising from visual/ aural intrusion
Wandon End Farmhouse Grade II (NHLE 1102448)	Yes. Potential for visual impacts and changes to setting	Yes. Potential for impact arising from visual/ aural intrusion
Wandon End House Grade II (NHLE 1307874)	Yes. Potential for visual impacts and changes to setting	Yes. Potential for impact arising from visual/ aural intrusion
HER 10808, the site of Iron Age and Roman settlement	Yes. Potential for permanent, physical impacts.	No
HER 7358, the site of a possible Roman building	Yes. Potential for permanent, physical impacts.	No
HER 17218/ 17219, LIA or Roman cropmarks	Yes. Potential for permanent, physical impacts.	No
HLC fields and hedgerow boundaries	Yes. Potential for permanent, physical impacts.	No

10.9.5 The assets and the predicted level of impact and effect are discussed below. The assessment phases are included only where there is potential for different impacts to occur within each assessment phase.

Construction Effects

Somerles Castle Scheduled Monument (NHLE 1008452)

Description of heritage value and setting

- 10.9.6 Somerles Castle is a scheduled monument of high value located approximately 250m south of the Main Application Site boundary. The asset represents the ruins of a 15th century magnate's residence and comprises buried and upstanding remains, including the gatehouse and chapel. The asset is of national importance as a survivor of a relatively rare building type and is one of the earliest examples of brick building in medieval England.
- 10.9.7 The castle derives its heritage value from its historic, architectural and archaeological interests. The presence of the castle articulates the status of late medieval society in this part of England and contributes to an understanding of how political power was organised and displayed. The setting of the castle is defined by the extent of its upstanding and buried remains. Historically, the castle would have had an aesthetic and functional relationship with the surrounding countryside, which would have been a predominantly assart landscape containing isolated farms and woodland remnants. The current landscape character is ostensibly post-medieval and modern, with planted woodland rather than assart, and large enclosed fields with fewer hedgerow boundaries. Although the landscape no longer contains components that are contemporary with the castle, and therefore does not contribute significantly to its heritage value, it provides a sympathetic and positive setting which does not detract from the ability to appreciate the asset.
- 10.9.8 The visual setting of the castle is not extensive, and long-range views across the surrounding countryside do not form part of its setting, due to its primary function as a residence rather than a defensive structure. Views are impeded to the west and south west by woodland planting and to the north by a farmhouse, and large agricultural buildings, the latter of which dominate the castle's immediate environs and detract from its setting. Views of the western extent of the airport, comprising the runway and access road, are visible from the western edge of the asset.
- 10.9.9 A specific noise environment and a sense of quietness is not required in order to understand or appreciate the asset. The noise environment experienced at the site of the asset is dominated by the sound of aircraft taking off and landing and while a sense of quietness is not an essential component of the setting of the asset, the existing soundscape dominates the experience of the castle and detracts from the appreciation of its setting.

Potential impacts to Somerles Castle during assessment Phase 1

- 10.9.10 As detailed in **Chapter 4** The Proposed Development of this ES [TR020001/APP/5.01], activities carried out during assessment Phase 1 assessment include earthworks to the east of the airport associated with landscaping and the construction of the aviation platform, changes to airfield layout and airside roads, enhancements to Terminal 1, amendments to existing car parks (Car Park P3, Car Park P4 and Car Park P5), and the creation of

surface level car parking (Car Park P6 and Car Park P7). The presence of construction traffic and tower cranes may result in temporary changes to the setting of the castle.

- 10.9.11 Due to intervening vegetation and buildings, ground level construction activities associated with the construction of new surface car parking, Car Park P6 and Car Park P7 located on the south side of Car Park P6, would not be visible from the asset, resulting in no change to the asset's setting and as such would have no impact on its value. In addition, amendments to existing car parks during assessment Phase 1 construction would result in no change to the heritage significance of the setting of the asset and no impact on the asset's heritage interests and value.
- 10.9.12 Tall construction plant, such as the use of tower cranes during the north and south extension of Terminal 1 may be visible above the rooflines of the existing airport buildings to the north of the castle, and their presence would introduce a new component into the visual setting of the castle. This would represent a minimal change in the asset's setting but would not affect its heritage interests and value. It is assessed that this would constitute a very low magnitude of impact and a temporary **minor adverse** effect, which is **not significant**.

Potential impacts to Someries Castle from construction noise during Assessment Phase 1

- 10.9.13 Due to the dynamic and transient nature of construction activities, the assessment of construction noise is based on typical construction works that will occur during each year of the construction phase, and predicted levels are therefore considered to represent a worst case scenario. The receptor locations at Someries Castle (GR1 and GR2) predict a reasonable worst case noise level of 52dB_{L_{Aeq,T}} which is below the construction noise LOAEL for human receptors and therefore assessed to be not significant in **Chapter 16** of this ES **[TR020001/APP/5.01]**.
- 10.9.14 The noise environment experienced at the castle is dominated by the sound of aircraft taking off and landing and its future baseline noise level from aircraft in assessment Phase 1 is predicted to be 60dB_{L_{Aeq,16h}}. The predicted worst case noise level from construction activities would represent a temporary change to the asset's noise environment which may be discernible. It is assessed that this would constitute a very low magnitude of impact and a temporary **minor adverse** effect, which is **not significant**.

Potential impacts to Someries Castle from construction vibration during assessment Phase 1

- 10.9.15 Construction vibration effects are detailed in **Chapter 16** of the ES **[TR020001/APP/5.01]**, and a summary methodology is provided in **Section 10.5** of this chapter. As summarised in **Section 10.5**, human disturbance typically occurs at levels significantly below those required for building damage and these PPV values are defined as LOAEL and SOAEL.
- 10.9.16 The assessment Phase 1 construction activities are located more than 1km from Someries Castle and ground vibration associated with plant movement

would not be perceptible. The only piling that may be required during assessment Phase 1 is for the new decked car park P9 which is approximately 1.5km north of the castle. Due to the distance from the asset, vibration arising from piling would not be perceptible at the castle. The PPV will therefore be below LOAEL and would result in no impact to the asset.

Potential impacts to Someries Castle during assessment Phase 2a

- 10.9.17 Assessment Phase 2a construction activities, including the construction of Terminal 2 and the extensions to the airfield, may result in temporary changes to the setting of the castle arising from the introduction of temporary construction machinery, construction traffic and plant into its setting.
- 10.9.18 Activities associated with the construction of Terminal 2 would be screened by intervening buildings and vegetation located to the north of the castle, resulting in no change to the asset's setting and as such would have no impact on its value.
- 10.9.19 Construction activities associated with the western airfield extension may be visible from the western edge of the asset. This ground level activity would represent a temporary change to the asset's visual setting but would not affect its value. It is assessed that this would constitute a very low magnitude of impact and a temporary **minor adverse** effect, which is **not significant**.
- 10.9.20 The construction of a surface movement radar (SMR) tower to the south east of the existing runway is also proposed during assessment Phase 2a. The SMR tower would comprise a steel lattice style structure, approximately 13m in height and would support a radar. The SMR tower would be surmounted by a red obstruction light and access from the existing airport perimeter road would be constructed for maintenance vehicles. The SMR tower would be located approximately 1.1km north east of Someries Castle and its construction would be screened by intervening vegetation and by a slight rise in topography between the tower and the asset. The SMR tower's construction traffic would use the existing perimeter road, located approximately 270m north of Someries Castle, which would introduce additional traffic into the visual setting of the asset. However, this would represent a minimal change that would not change the ability to understand the asset. This would constitute a very low impact, resulting in a temporary **minor adverse** effect, which is **not significant**.

Potential impacts to Someries Castle from construction noise during assessment Phase 2a

- 10.9.21 The receptor locations at Someries Castle (GR1 and GR2) predict a reasonable worst case noise level of 49dB_{L_{Aeq,T}} which is below the construction noise LOAEL for human receptors and therefore assessed to be not significant in **Chapter 16** of this ES [TR020001/APP/5.01].
- 10.9.22 The noise environment experienced at the castle is dominated by the sound of aircraft taking off and landing and its future baseline noise level for assessment Phase 2a is predicted to be 60dB_{L_{Aeq,16h}}. The predicted worst case noise level from construction activities would represent a discernible change to the asset's noise environment but would not change its setting, resulting in no impact.

Potential impacts to Someries Castle from construction vibration during assessment Phase 2a

- 10.9.23 The assessment Phase 2a assessment activities within 1km of Someries Castle comprise airfield works, including a new runway access, apron, taxiways and a surface movement radar tower just over 1km east of the castle, construction of Terminal 2 and its west pier, located just over 1km north-west of the castle, amendments to Car Park 3 to the north of the runway, and the construction of a MSCP (Car Park 1) and surface level car park (Car Park 2) to the west of the runway, just over 1km west of the castle. The distances of these activities would preclude the perception of vibration at Someries Castle resulting in no impact.
- 10.9.24 Piling will take place in assessment Phase 2a to support earthworks to the east of the airport, for the Luton DART extension and for Terminal 2 infrastructure; however, these activities are a minimum distance of 900 m from the asset and therefore piling induced vibration is unlikely to be perceptible, resulting in no impact.
- 10.9.25 The closest construction activity to Someries Castle comprises the provision of new airfield equipment and access track, approximately 280m north-west of the castle. Piling is not required for these constructions and the distance involved would preclude ground-borne vibration from construction traffic resulting in no impact.

Potential impacts to Someries Castle during assessment Phase 2b

- 10.9.26 The majority of assessment Phase 2b construction activities, including the construction of the new apron, stands and taxiway, the extension to the earthworks platform and car parking, would be located to the east and north east, between 1 and 1.5km from Someries Castle. Assessment Phase 2b construction activities are likely to be screened by intervening buildings and vegetation located to the north of the castle, resulting in no change to the asset's setting and no impact on its value.
- 10.9.27 The element of assessment Phase 2b construction that is nearest to Someries Castle comprises the fire training ground (FTG), located approximately 370m north east of the castle. The FTG would consist of several components, including storage units and welfare facilities with the tallest component comprising a 2-storey breathing apparatus chamber, which would be approximately 15m in height. Activities associated with the FTG construction are likely to be visible in views to the north east. These temporary works would represent minimal change to the asset's setting and would not affect the castle's heritage value. The magnitude of impact is assessed to be very low, resulting in a **minor adverse** effect, which is **not significant**.

Potential impacts to Someries Castle from construction noise during Assessment Phase 2b

- 10.9.28 The receptor locations at Someries Castle (GR1 and GR2) predict a reasonable worst case noise level during assessment Phase 2b construction of 61dB_{Aeq,T}

which is below the construction noise LOAEL for human receptors and therefore assessed to be not significant in **Chapter 16** of this ES [TR020001/APP/5.01].

- 10.9.29 The noise environment experienced at the castle is dominated by the sound of aircraft taking off and landing and its future baseline noise level for assessment Phase 2b is predicted to be 59dBL_{Aeq,16h}. Therefore, the predicted worst case noise level from construction activities would represent a discernible change to the asset's noise environment but would not change its setting, resulting in no impact.

Potential impacts to Someries Castle from construction vibration during assessment Phase 2b

- 10.9.30 Construction of the FTG would not result in significant levels of construction noise at Someries Castle. Piling will take place in assessment Phase 2b to support earthworks, New Century Park buildings and for Terminal 2 infrastructure. However, due to the distances involved, **Chapter 16** of this ES [TR020001/APP/5.01], concludes that piling-induced vibration would be imperceptible at Someries Castle, resulting in no impact to its fabric and no effect.

Luton Hoo Grade II* RPG (NHLE 1000578)

Description of heritage value and setting

- 10.9.31 Luton Hoo is a Grade II* listed landscaped park that was first enclosed in 1623 and enlarged and remodelled by Lancelot Brown in 1764-74.
- 10.9.32 Luton Hoo derives its value from its historic interest, and the architectural interest of its internal features, including Grade I listed Luton Hoo house (NHLE 1321301) and garden houses and retaining walls (NHLE 1158944); the Grade II* listed stables (NHLE 1114713); and the Grade II listed lodges (NHLE 1114715; NHLE 1114716), bridge (NHLE 1114717) and boathouse (NHLE 1159067) at the east entrance. Historic interest derives from the insight the park offers into the social and economic life of 18th and 19th century society, as well as the association with notable architects such as Robert Adam and Robert Smirke, and designers such as Lancelot Brown. Architectural and aesthetic interest derives from the appreciation of the design of the park, the careful location of its features, including the relationship between buildings, and planted trees and gardens. Architectural and aesthetic interest also derives from the careful positioning of the house on an elevated platform, with designed views to the east to look beyond the River Lea and towards the copses of George Wood and Hardingdell Wood.
- 10.9.33 Apart from the designed views to the east of the house, which enable long-range views beyond the River Lea and the fields and wooded copses beyond, the views within the park are designed to be inward looking, with internal views dominated and framed by banks of trees and planted boundaries restricting long-range views out of the park in most directions. The views out of and within the park provide a rural character to the asset's setting, despite the presence of Luton Town to the north. Luton Hoo house occupies a high point in the park and, from ground level, the roof tops of airport buildings can be seen breaking

the skyline and are more visible from the house's upper floors. The presence of these buildings in views from the park detract from the enjoyment of its rural aspect.

- 10.9.34 The experience of the park's noise environment changes as you move through the park. From the western edges of the park, road noise from the M1 is very noticeable and only reaches barely discernible levels at the golf course in the north of the park, approximately 1 km from the M1. Road noise from the A1081 forms part of the noise environment across the northern sections of the park, from the golf course and eastwards to the River Lea. The parkland to the east of Luton Hoo house can be experienced without noticeable intrusion from road noise but its noise environment is punctuated by the sound of passing trains on the Midland Main Line to the east. The dominant feature of the park's noise environment is the aviation noise from planes landing and taking off from the airport. The aviation noise is not constant, but it's a prominent component of the experience of the park. The park's existing noise environment does not impact its historic or architectural interests, but it does detract from an appreciation of the park's aesthetic interest and the enjoyment of designed views.
- 10.9.35 The park provides the aesthetic and functional setting for the listed buildings contained within, and the historical context and group value of these assets contributes to the heritage value of the park, which is assessed as high.

Assessment Phase 1

- 10.9.36 Assessment Phase 1 construction activities, include changes to airfield layout and airside roads, amendments to existing car parking (Car Park P3, Car Park P4 and Car Park P5), the creation of temporary surface car parking (Car Park P6 and Car Park P7) and enhancements to Terminal 1.
- 10.9.37 Due to intervening vegetation and buildings, ground level construction activities associated with the construction of new surface car parking, Car Park P6 and Car Park P7, located on the south side of Car Park P6, would not be visible from the asset, resulting in no change to the asset's setting and no impact on its value.
- 10.9.38 Furthermore, enhancements to Terminal 1 and amendments to existing car parks during assessment Phase 1 construction would not be visible from the park and would not change its setting, resulting in no impact to the value of the asset.

Assessment Phase 2a

- 10.9.39 The Off-site Car Parks P1 and P2 to the south west of the Main Application Site, constructed during assessment Phase 2a, are located on the northern edge of Luton Hoo Grade II* RPG.
- 10.9.40 Car Park P1 would comprise a multi-storey building with a height of approximately 20.35m. Car Park P2, would comprise surface level parking.
- 10.9.41 Construction of Car Park P1 may be visible from elevated areas within the park, particularly if emerging from the woodland to the north of the house and following the internal road to the park's north access. It may also be visible from

the first and second floor rooms of Luton Hoo house. The introduction of construction equipment into views from within the park would introduce additional modern structures that are incongruous with the parks predominantly rural setting. This is assessed to represent a barely perceptible change to the appreciation of the park's aesthetic interest, but it would not affect the appreciation of the internal designed views or the parks historic or architectural interests. The impact to the park's aesthetic interest, which would be temporary, would constitute a very low magnitude of impact, resulting in a temporary **minor adverse** effect, which is **not significant**.

Assessment Phase 2b

- 10.9.42 Works associated with the construction of Hangar A and B may be visible above the horizon in views from the parkland west of the River Lea towards the Proposed Development site. Construction equipment would be viewed alongside buildings which are already visible in views from the park. These additional construction structures would further detract from the ability to appreciate the parks rural setting, which contribute to its aesthetic interest. However, view of temporary construction equipment would not affect the appreciation of the internal designed views or the parks historic or architectural interests. The impact to the park's aesthetic interest, which would be temporary, would constitute a very low magnitude of impact, resulting in a temporary **minor adverse** effect, which is **not significant**.

Old Homestead, Grade II* (NHLE 1176170)

Description of heritage value and setting

- 10.9.43 The Old Homestead is an early-17th century, open-hall house, of timber-framed construction located in the village of Breachwood Green, approximately 1.5km east of the Main Application Site. The heritage significance of the house, which is high, derives from its architectural interest as a building that demonstrates the local vernacular style, and historic and archaeological interest relating to its method of construction and later phases of development and modification. Historic interest is also derived from a very rare 17th century wall painting of a floral design (dated 1600-1625) on the northern wall of the house.
- 10.9.44 The principal house faces east onto a mature garden, bounded by hedgerows and hedgerow trees which forms a green buffer between the house and Chapel Road. The house's location within Breachwood Green village contributes to its setting but its position, set back from the road and from neighbouring houses, with a mature garden occupying the intervening space, results in an almost secluded setting and prevents the house being viewed and appreciated as part of the wider streetscape of the village. The house is located within the ZTV and the site visit confirmed that components of the Proposed Development may be visible in views to the west, from the rear of the property.

Assessment Phase 1

- 10.9.45 Assessment Phase 1 activities associated with amendments to existing car parks and the creation of surface level car parking to the north of the airport are unlikely to result in visual intrusion within the setting of the house. Activities

comprising the movement of construction plant associated with landscaping and the construction of the aviation platform to the east of the airport may be visible in views from the rear of the property. The temporary introduction of construction plant and equipment into a previously rural space would represent a noticeable change in views from the house but would not affect the ability to appreciate the house within its immediate setting or impact its heritage significance. The impact would be very low, resulting in a temporary **minor adverse** effect which is **not significant**.

Assessment Phase 2a and 2b

- 10.9.46 Assessment Phase 2a and Phase 2b activities are unlikely to be noticeable from the house, resulting in no change to the heritage significance of the asset's setting and no change to its value.

Wigmore Hall Farmhouse Grade II listed building (NHLE 1321368)

Description of heritage value and setting

- 10.9.47 Wigmore Hall Farmhouse is located just beyond the northern edge of the Main Application Site, on the south side of Eaton Green Road. The building is a 19th century former farmhouse which is used currently as Wigmore Hall Conference Centre. The heritage value of the former farmhouse, which is medium, lies in its historic interest as an early 19th century farmhouse and its association with the agricultural heritage of the area. Its architectural interest derives from the appreciation of its symmetrical façade and Georgian appearance. The setting of the former farmhouse has been eroded by housing development to the north and hardstanding car parking and development to the west and south. The agricultural farmland, which would have provided the functional setting to the farmhouse, has been lost, and although Wigmore Park to the south of the house does provide a semi-rural context, but it does not make a significant contribution to the asset's heritage value.
- 10.9.48 Construction activities during all three construction phases would not change the setting of the asset and would have no impact on its value.

Wandon End House (NHLE 1307874) and Wandon End Farmhouse (NHLE 1102448) Grade II listed buildings

Description of heritage value and setting

- 10.9.49 Wandon End House and Wandon End Farmhouse are located just beyond the north-east Order Limits of the Main Application Site on the north side of Darley Road. The buildings are both Grade II listed and are therefore of medium value. The buildings derive their value, which is medium, from their architectural interest, as examples of late medieval and post-medieval construction and design, and historic interest as they are indicative of the agricultural heritage of the area. The buildings derive some of their value from their agricultural surroundings, which provide the functional setting for both. However, modern suburban development to the east of the buildings has eroded that setting to some extent.

- 10.9.50 Construction activities associated with earthworks and remediation during all three construction phases would represent noticeable change to the predominantly rural setting of both buildings. This would constitute a medium magnitude of impact to the heritage significance of their setting which would result in a temporary **moderate** adverse effect, which is **significant**.

Iron Age and Roman Settlement

- 10.9.51 The site of Iron Age and Roman settlement-related activity (HER 10808) is located within the Main Application Site to the east of Wigmore Park. The area was evaluated in 2019 and was characterised as the remains of Iron Age/ Early Roman to Roman settlement and enclosure, which included several pits and a Roman building. The building remains had been truncated by previous ploughing, but the retrieval of painted wall plaster, box flue and roof tile suggest the building may have been of some status.
- 10.9.52 Trial trench evaluation undertaken to inform the ES, the results of which are presented in **Appendix 10.7** of this ES [TR020001/APP/5.02] confirmed there were no additional archaeological remains associated with the Roman building within the evaluated area. The lack of associative contexts combined with the low levels of preservation diminishes the archaeological interest of the remains and lessens their relevance and value to regional research agenda.
- 10.9.53 The asset, which is assessed to be of low value, is located within the area designed for landscape mitigation, comprising meadow grassland and scrub, which will be planted during assessment Phase 1 construction. The planting activities and the movement of construction plant above the archaeological remains may result in permanent impacts as a result of the physical removal or compaction of archaeological material. This would constitute a high magnitude of impact, resulting in a **moderate adverse** effect, which is **significant**.

Site of possible Roman building

- 10.9.54 The site of a possible Roman building (HER 7358) is located to the east of Winch Hill. An archaeological watching brief associated with the installation of a fuel pipeline identified significant quantities of Roman pottery and building material which suggested the presence of a building in the vicinity. If present, the asset has the potential to be of medium heritage value due to the archaeological interest of the buried remains, and the contribution they could make to regional research.
- 10.9.55 The additional archaeological trial trench evaluation, the results of which are presented in **Appendix 10.7** of this ES [TR020001/APP/5.02] found no evidence of activity relating to the site of the possible Roman building (HER 7358), the record of which is located approximately 125m north-east of the proposed fuel connection pipeline and access road. The trial trench results therefore confirm that the design of the connection pipeline and access road avoids areas of significant archaeological remains. It is assessed that the construction of the Proposed Development will have no impact on this heritage asset and **no effect**.

Cropmarks of possible late prehistoric and Roman activity

- 10.9.56 Cropmarks which may relate to late prehistoric or Roman activity (HER 17218 and HER 17219) are located east of the Main Application Site, on either side of the lane that leads to Winch Hill. Both assets relate to cropmark evidence identified from aerial photographs, comprising linear and curvilinear features that may relate to late prehistoric or Roman activity, due to their proximity to known and potential remains. If the features are archaeological, they are likely to relate to enclosure or trackway features. Features of this type would have archaeological interest for contributing to the understanding of how people moved through and managed the landscape but would have little evidential value. The assets' heritage value is therefore assessed to be low.
- 10.9.57 The construction of earthworks associated with the infiltration basin and the construction of the fuel farm facility during assessment Phase 2a could remove any archaeological remains present, resulting in a total loss of their heritage value. The magnitude of impact would be high, resulting in a **moderate adverse** effect, which is **significant**.

HLC features; fields and hedgerow boundaries

- 10.9.58 Assessment Phase 1 earthworks and the construction of Car Parks P10 and P11 would result in the partial loss of fields and enclosures that are characterised as 'post-1950 boundary loss' and 'irregular enclosure'. This type of enclosure is the prevailing landscape character in this part of the study area and the fields represent changes to the landscape arising from the amalgamation of smaller fields into larger following the Second World War; and they have minimal sensitivity to change and are of very low value. The loss of these elements of the historic landscape will have low impact on how the wider historic landscape is understood or appreciated and would represent a **negligible** effect which is **not significant**.

Potential archaeological features identified in the DBA

- 10.9.59 Potential archaeological assets identified from a review of aerial imagery, including LiDAR, have been identified in the fields to the east of the Main Application Site. These are described in the DBA in **Appendix 10.1** of this ES and listed in the gazetteer in **Appendix 10.2** of this ES [TR020001/APP/5.02]. The features resemble a series of small depressions and may represent former quarrying, which would be of very low archaeological interest and heritage value. Assessment Phase 1 earthworks activities to the east of the airport associated with landscaping and the construction of the aviation platform could result in the removal of these features. This would constitute a high magnitude of impact but, due to the very low value of the features, would result in a **minor adverse** effect, which is **not significant**.

Potential archaeological features that may be identified from additional trial trenching

- 10.9.60 Additional trial trenching, to be undertaken as a requirement in the DCO and set out in the CHMP presented in **Appendix 10.6** of this ES [TR020001/APP/5.02],

will be carried out in fields to the east of the airport. Based on the results of geophysical surveys carried out for the Proposed Development, which are presented as **Appendix 10.3** and **Appendix 10.4** of this ES [TR020001/APP/5.02], and the presence of the site of Iron Age and Roman settlement-related activity (HER 10808) in the field to the south, there may be potential for field boundaries associated with subsistence-level farming or trackways to be present, associated with the Iron Age and Roman site. Features of this type would have archaeological interest for contributing to the understanding Iron Age and Roman farming and land management but would have little evidential value. The assets' heritage value is therefore assessed to be low.

- 10.9.61 The construction of earthworks associated with the infiltration basin and the construction of the fuel farm facility during assessment Phase 2a could remove any archaeological remains present, resulting in a total loss of their heritage value. The magnitude of impact would be high, resulting in a **moderate adverse** effect, which is **significant**.

Operational effects

- 10.9.62 This assessment considers the Proposed Development once operational and all effects are considered to be permanent. These include impacts on heritage assets due to changes in their setting arising from the presence of the Proposed Development. Those changes may arise from ground, airborne and surface access noise associated with the operational development (refer to **Chapter 16** of this ES [TR020001/APP/5.01]).
- 10.9.63 The potential for the greatest magnitude of impact to the assets discussed below occurs upon completion of assessment Phase 2b, the operational airport following completion of all development phases. Completion of this phase represents the greatest amount of change arising from the presence of new structures within the asset's setting and peak operational activities.

Somerles Castle Scheduled Monument (NHLE 1008452)

- 10.9.64 Somerles Castle is located approximately 250m south of the airport. Operational activities from the existing airport form part of its current setting, with views of the western edge of the runway visible from the western edge of the asset. Representative Viewpoints 23 to 25 in **Appendix 14.7** of this ES [TR020001/APP/5.02] show the Proposed Development from Somerles Castle.
- 10.9.65 Views from the castle to the north and north-east (refer to Representative Viewpoint 24 in **Appendix 14.7** of this ES [TR020001/APP/5.02]) towards the airport are restricted by intervening buildings and planting. Due to the existing screening, the introduction of new built form is unlikely to be visible from the asset, and would not change the asset's visual setting. Views of the operational airport to the west would continue, with a perceptible increase in the use of the runway. This would not be incongruous with the asset's current experience, and current visual setting, and would not affect the asset's architectural, archaeological or historic interest. The magnitude of impact is assessed to be very low, resulting in a **minor adverse** effect, which is **not significant**.

- 10.9.66 Components of the Development would be visible in views towards Someries Castle which may influence how the asset is appreciated. The visualisations in **Appendix 14.7** of this ES [TR020001/APP/5.02] of this ES, demonstrate that the FTG would be partially visible in the middle-distance. This would be viewed alongside existing modern structures, including farm buildings and an earthen bund and would further emphasise the proximity of the airport. The presence of the FTG in the view would not affect the castle's heritage value, and would represent minimal change to the asset's setting. The magnitude of impact is assessed to be very low, resulting in a **minor adverse** effect, which is **not significant**.
- 10.9.67 The increase in aircraft movements has the potential to affect air pollution levels, resulting in damage to the historic fabric of the castle. The Air Quality impact assessment in **Chapter 7 Air Quality** of this ES [TR020001/APP/5.01] has predicted there would be negligible change in pollutant concentrations at 476 out of 477 receptors, with a slight adverse effect at one receptor. The air quality model predicts a negligible change in the concentrations of NO₂ and particulate matter (PM₁₀ and PM_{2.5}) at the site of Someries Castle. As such, it is assessed there would be no impact to the fabric of the castle as a result of the operational Development, resulting in no effect.
- 10.9.68 The data relating to the frequency of flights is used as contextual data in the noise assessment and correlates with any predicted increase in noise levels. Quietness does not form an important component of the setting of Someries Castle. The existing noise environment at the castle is dominated by aviation noise and while this does not contribute to its understanding or appreciation, it does detract from the overall experience of the asset.
- 10.9.69 The noise change contours for assessment Phase 1 operation (**Figure 10.6** of this ES [TR020001/APP/5.03]) show an increase from baseline of less or equal to 1dB above 51dB_{L_{Aeq,16h}} but below 63dB_{L_{Aeq,16h}}, and the noise change contours for assessment Phase 2a and assessment Phase 2b operation (**Figure 10.7** and **Figure 10.8** of this ES [TR020001/APP/5.03]) show an increase from the future baseline of between 1dB and 1.99dB above 51dB_{L_{Aeq,16h}} but below 63dB_{L_{Aeq,16h}}. These predicted noise levels for all operational assessment phases would represent a negligible to minor change from the future baseline. This would represent minimal change to the asset's setting and would therefore constitute a very low magnitude of impact, resulting in a **minor adverse** effect, which is **not significant**.

Six Hills Roman barrows Scheduled Monument (NHLE 1015579)

- 10.9.70 Six Hills comprises the site of six Roman barrows in Stevenage, over 10km north east of the Main Application Site. The heritage value of the barrows, which is high, derives from their archaeological and historical interest and the potential for archaeological evidence to contribute to knowledge relating to Roman burial tradition, construction methods and religious beliefs.
- 10.9.71 The setting of the barrows is not extensive and is defined by the extent of their buried and above ground remains. They are bordered on all sides by large-scale buildings which preclude views to contemporary landscapes or features in

the wider area and are located adjacent to a road which dominates their noise environment. Quietness is not a component of the assets' setting and does not contribute to their value.

- 10.9.72 The barrows are scoped into the ES as they are located on the edge of the illustrated noise contour data as shown on **Figures 10.6 to 10.8** of this ES **[TR020001/APP/5.03]**. The noise change contours for assessment Phase 1 operation (**Figure 10.6** of this ES **[TR020001/APP/5.03]**) show an increase from the future baseline of less or equal to 1dB above 51dBL_{Aeq,16h} daytime but below 63dBL_{Aeq,16h}, which would be a negligible change to the noise environment and would not introduce change into the assets' setting or impact their heritage value.
- 10.9.73 The noise change contours for assessment Phase 2a operation (**Figure 10.7** of this ES **[TR020001/APP/5.03]**) shows an increase from the future baseline of between 1dB and 1.99dB above 51dBL_{Aeq,16h} but below 63dBL_{Aeq,16h} daytime. This change in noise level would have a negligible to minor effect on the assets' noise environment and would not change the assets' setting or impact their heritage value.
- 10.9.74 The noise change contours for assessment Phase 2b operation (**Figure 10.8** of this ES **[TR020001/APP/5.03]**) shows the assets on the edge of the 51dBL_{Aeq,16h} daytime contours which show an increase from the future baseline of between 2dB and 2.99dB. This change would be a minor change to the assets' noise environment; it would not change the assets' setting or impact their heritage value.
- 10.9.75 It is assessed there would be no impact to Six Hills Roman barrows during the operational phases of the Proposed Development and therefore no effect for all operational phases.

Luton Hoo Grade II* RPG (NHLE 1000578)

- 10.9.76 The setting of Luton Hoo RPG is predominantly rural and characterised by its designed landscape, with views generally framed and formed by the park's internal features. The operational airport would introduce new built form into views from within the RPG, including views of Car Park P1 and Hangar A and B as shown on Representative Viewpoints 17, 17A and 19 in **Appendix 14.7** of this ES **[TR020001/APP/5.02]**. The presence of these structures would introduce new components into the visual setting of the RPG. The new components are not prominent features in views from the RPG but would further detract from its parkland character. This is assessed to represent a low magnitude of impact, resulting in a **moderate adverse** effect, which is **significant**.
- 10.9.77 As detailed in the construction impacts, the noise environment of the park changes at different points within it, and invasive noise from the M1, the A1081, the Midland Main Line and the airport and aviation noise all form part of the park's noise environment in different sections of the park. The aviation noise is not a constant feature, but it is a prominent component of the experience of the park. The park's existing noise environment does not affect the ability to appreciate its historic or architectural interests, but it does detract from an

appreciation of the park's general aesthetic, which is classed as both architectural and artistic interest, and the enjoyment of its designed views.

- 10.9.78 Four noise receptor locations were marked across Luton Hoo RPG; in the north, south, east and western edges of the park to ensure the entirety of the park was included in the assessment. The resulting noise change contours for assessment Phase 1 operation (**Figure 10.6** of this ES [TR020001/APP/5.03]) predict an increase from the future baseline of less or equal to 1dB, above 51dBL_{Aeq,16h} and below 63dBL_{Aeq,16h} for the majority of the park, which would be a negligible to minor change of the park's noise environment. Assessment Phase 1 operational noise would not introduce change into the assets' setting or further impact its heritage interests or value, resulting in no impact and no effect.
- 10.9.79 The noise change contours for assessment Phase 2a operation (**Figure 10.7** of this ES [TR020001/APP/5.03]) show a predicted increase from the future baseline of between 1dB and 1.9dB above 51dBL_{Aeq,16h} and below 63dBL_{Aeq,16h} for the majority of the park. A factor in the change in noise level would be the increase in flight numbers. The noise increase arising from the increased frequency of flights would represent a negligible to minor change to the assets' noise environment. This would not affect the park's historic or architectural interests but would have a perceptible impact on the aesthetic appreciation of the park and the ability to appreciate its rural setting and designed views. This would represent a very low magnitude of change, resulting in a **minor adverse** effect, which is **not significant**.
- 10.9.80 The noise change contours for assessment Phase 2b operation (**Figure 10.8** of this ES [TR020001/APP/5.03]) show a predicted increase from the future baseline of between 2dB to 2.9dB. Whilst the eastern and southern edges of the park are below 51dBL_{Aeq,16h} and the middle portion of the park is between 51dBL_{Aeq,16h} and 63dBL_{Aeq,16h}, the very northern end of the park is above 63dBL_{Aeq,16h}. The predicted increase of 2 to 2.9dB for the northern end of the park above 63dBL_{Aeq,16h} therefore leads to an adverse likely significant effect in noise terms.
- 10.9.81 The noise increase during assessment Phase 2b arises from the increased frequency of flights. The noise environment within the park is not a quiet experience and does not rely solely on quietness for an appreciation of its heritage interests. However, the increased frequency of aviation noise would slightly affect the ability to appreciate the aesthetic appreciation of the park and the ability to appreciate its rural setting and designed views. This would represent a low magnitude of change, resulting in a **moderate adverse** effect which is **significant**. However, it is important to note that this effect would predominantly be experienced at the very northern end of the park, and the remaining majority of the park would experience lesser effects.
- 10.9.82 ***Putteridge Bury Grade II RPG (NHLE 1000917)***
- 10.9.83 Putteridge Bury RPG is a Grade II listed park of medium value located approximately 2km to the north of the Main Application Site. The park is located partially inside of the 2km study area, but the larger proportion is located in the

wider study area. The park was created in the 18th and 19th centuries and surrounds Putteridge Bury (Grade II, NHLE 1347083), a former country house. The park has historic interest as an 18th and 19th century park that was laid out to surround a county house. Additional historic interest derives from the association of the park to the renowned architect Edwin Lutyens and Gertrude Jekyll, a noted Victorian gardener. The setting of the park is largely rural; mid to late-20th century development on the outskirts of Luton, to the south-west, is visible from the western half of the park, and mature woodland and a belt of trees provide screening to the park from most sides.

- 10.9.84 The asset was scoped into the impact assessment as it fell partially within the ZTV. The site walkover assessed the potential for changes to the park's setting as a result of visual intrusion during the operational phases of the Proposed Development. The site visit confirmed there would be no visibility with the Proposed Development site from within the park due to screening from intervening settlement and its tree-lined boundaries. As such, it is assessed that there would be no change to the park's setting and no impact to its heritage interests as a result of the Proposed Development and no effect.

St. Paul's Walden Bury, Grade I RPG (NHLE 1000150)

- 10.9.85 St. Paul's Walden Bury, a heritage asset of high value, is located approximately 5km to the east of the Main Application Site and comprises largely unaltered formal gardens and wooded pleasure grounds surrounding an early 18th century country house, with associated landscape park. Restoration of the gardens and pleasure grounds in the mid-20th century included works by Sir Geoffrey Jellicoe from the 1930s to the 1990s which contributes to its historic interest. The setting of the park is rural and it is bounded largely by agricultural land and woodland. Designed views extending from the park contribute to the park's setting, including views extending south from the house across the valley and the distant countryside, and long views to the east and north along tree-lined avenues, which draw the eye to follies and statues. The noise environment is different in different parts of the park. The majority of the park, and particularly those areas occupied by woodland, are relatively quiet with very little noise intrusion from activities external to the park. The noise environment changes in the southern part of the park where the farm buildings are part of a working farm. Aviation noise from overhead aircraft approaching the airport is part of the asset's noise environment but the noise does not intrude to such an extent as to detract from the asset's rural character.
- 10.9.86 The park falls outside of the ZTV and therefore would not be affected by the physical presence of the Proposed Development but is included in the impact assessment as it falls within the noise contour data (**Figures 10.6 to 10.8** of this ES [TR020001/APP/5.03]).
- 10.9.87 The noise change contours during assessment Phase 1 operation (**Figure 10.6** of this ES [TR020001/APP/5.03]) show a noise increase from the future baseline of less or equal to 1dB above 51dBL_{Aeq,16h} but below 63dBL_{Aeq,16h}, which would be a negligible change to the park's noise environment and would not affect the park's setting or impact its heritage value. This is therefore assessed as no impact and no effect.

- 10.9.88 The noise change contours for assessment Phase 2a and assessment Phase 2b operation (**Figure 10.7** and **Figure 10.8** of this ES [TR020001/APP/5.03]) show an increase from the future baseline of between 1dB and 1.9dB above 51dBL_{Aeq,16h} but below 63dBL_{Aeq,16h}. This would be a negligible change to the park's noise environment and would not affect its setting or impact its heritage value. This is therefore assessed as no impact and no effect.

The Improvement Garden, Grade II* RPG (NHLE 1468798)

- 10.9.89 The Improvement Garden is a Grade II* listed park of high value located approximately 2.5km south east of the Main Application Site. The park falls partially within the ZTV (**Figure 10.9** of this ES [TR020001/APP/5.03]) and also within the noise contour data (**Figures 10.6 to 10.8** of this ES [TR020001/APP/5.03]). The park comprises a 20th century sculpture garden located entirely within the estate of Stockwood Park. The park is located on the edge of Luton and bordered to the west by the M1. Trees and tall hedgerows around the southern and western perimeter of the park preclude long-range views in these directions, but road noise from the M1 and the A1081 to the south do form part of the experience of the park.
- 10.9.90 The site visit confirmed that the areas of the park that fall within the ZTV would have no visibility with the Proposed Development site due to screening from the tree-bordered, open spaces that characterise Stockwood Park, therefore there would be no impact arising from the physical presence of the Proposed Development and the effect would be neutral.
- 10.9.91 The noise change contours for assessment Phase 1 operation (**Figure 10.6** of this ES [TR020001/APP/5.03]) shows an increase from the future baseline of less or equal to 1dB above 51dBL_{Aeq,16h} but below 63dBL_{Aeq,16h}, which would be a negligible change to the assets' noise environment and would not introduce change into the assets' setting or impact its heritage value.
- 10.9.92 The noise change contours for assessment Phase 2a operation (**Figure 10.7** of this ES [TR020001/APP/5.03]) and for assessment Phase 2b operation (**Figure 10.8** of this ES [TR020001/APP/5.03]) show an increase from baseline of between 1dB and 1.9dB above 51dBL_{Aeq,16h} but below 63dBL_{Aeq,16h}. This would be a negligible change in the assets' noise environment and would not change the assets' setting or impact its heritage value.
- 10.9.93 There would be no impact and no effect for all operational phases of the Proposed Development.

Conservation Areas

- 10.9.94 High Town Road Conservation Area; Luton Town Centre Conservation Area; Luton South Conservation Area and Plaiter's Lea Conservation Area, are all located within Luton Town. Impacts arising from the physical presence of the Proposed Development have been scoped out as there are no views of the Proposed Development Site from within the areas. The heritage value of the conservation areas derives from their architectural and historic interests, recognising that some parts of these areas represent the historic core of Luton and articulate its historical development.

- 10.9.95 All of the conservation areas are residential and/ or commercial in character and have a relatively noisy sound environment indicative of a busy residential centre, alongside intermittent aviation noise. High Town Road Conservation Area is located on the edge of the modelled noise contours with the remaining conservation areas located only partially within the noise contours. All have been included in the impact assessment for completeness.
- 10.9.96 The noise change contours during assessment Phase 1 operation (**Figure 10.6** of this ES [TR020001/APP/5.03]) show a noise increase from the future baseline of less or equal to 1dB, above 51dBL_{Aeq,16h} but below 63dBL_{Aeq,16h}, which would be a negligible change from within the conservation areas and in the context of their noise environment. Assessment Phase 1 operations would therefore result in no change to the conservation areas' characters and would not impact their heritage value. There would be no impact and no effect arising from assessment Phase 1 operation of the Proposed Development.
- 10.9.97 The noise change contours during assessment Phase 2a operation (**Figure 10.7** of this ES [TR020001/APP/5.03]) show an increase from the future baseline of between 1dB and 1.9dB above 51dBL_{Aeq,16h} but below 63dBL_{Aeq,16h}. This change in noise level would be negligible within the context of the conservation areas' noise environment and would not affect the appreciation of their heritage interests or value. There would be no impact and no effect arising from assessment Phase 2a operation of the Proposed Development.
- 10.9.98 The noise change contours for assessment Phase 2b operation (**Figure 10.8** of this ES [TR020001/APP/5.03]) show a predicted increase from baseline of between 2dB to 2.9dB above 51dBL_{Aeq,16h} but below 63dBL_{Aeq,16h}. This would affect the southern part of the Town Centre Conservation Area, the southern edge of Plaiters Lea Conservation Area, and the northern edge of New Town Conservation Area. This change in noise level would be minor within the context of the conservation areas' existing noise environment and would not affect the appreciation of their heritage interests or value. The effect from assessment Phase 2b is assessed to be low, resulting in a **minor adverse** effect, which is **not significant**.

Parish Church of St. Mary Grade I (NHLE 1114615)

- 10.9.99 The Parish Church of St. Mary (NHLE 1114615) is located in Luton Town. The church is set within a tree-lined green space, but its setting is dominated by multi-storey commercial and residential tower blocks and its noise environment is dominated by road traffic and intermittent aviation noise. Impacts arising from the physical presence of the Proposed Development have been scoped out as views of the Proposed Development Site are not possible from within the grounds of the church. The heritage value of the church derives from its archaeological, architectural and historic interests.
- 10.9.100 The church falls within the noise change contours which show a predicted level of change from the future baseline of greater than 1dB above 51dBL_{Aeq,16h} but below 63dBL_{Aeq,16h}, which would be a negligible change in the context of the church's noise environment (**Figure 10.6** of this ES [TR020001/APP/5.03]). Assessment Phase 1 operations would therefore result in no change to the

setting of the church and no impact to its heritage value. Therefore, it is assessed there would be no effect arising from assessment Phase 1 operation of the Proposed Development.

- 10.9.101 The noise change contours during assessment Phase 2a operation (**Figure 10.7** of this ES [TR020001/APP/5.03]) show an increase from baseline of between 1dB and 1.99dB above 51dBL_{Aeq,16h} but below 63dBL_{Aeq,16h}. This change in noise level would be negligible in the context of the church's existing noise environment, resulting in no change to the setting of the church and no impact to its heritage value. Therefore, it is assessed there would be no effect arising from assessment Phase 2a operation of the Proposed Development.
- 10.9.102 The noise change contours for assessment Phase 2b operation (**Figure 10.8** of this ES [TR020001/APP/5.03]) show a predicted increase from the future baseline of between 2dB to 2.9dB above 51dBL_{Aeq,16h} but below 63dBL_{Aeq,16h}. This change in noise level would derive from the increased frequency of flights which, whilst representing a minor change to the church's existing noise environment, would not affect its heritage interests or value. The effect from assessment Phase 2b is assessed to be very low, resulting in a **minor adverse** effect, which is **not significant**.

Grade II* listed Old Homestead (NHLE 1176170)

- 10.9.103 The Old Homestead is an open-hall house that dates to the early 17th century and is located in the village of Breachwood Green. Its value derives from its architectural interest as an open-hall style house; its historic interest as one of the oldest properties in the village, and its artistic interest due to a rare 17th century painting which decorates one of its internal walls. The house's position in the village is set back from the road and from neighbouring houses, resulting in an almost secluded character. The house faces east onto a mature garden, bounded by hedgerows and hedgerow trees which forms a green buffer between the house and road beyond and contributes to its semi-rural setting. The asset's noise environment is relatively quiet, with very little invasive noise from the surrounding properties or from the road in front of the house. The noise environment is punctuated intermittently by the sound of aircraft landing at the airport and this intrusion into the asset's setting does detract from the ability to appreciate its semi-rural setting.
- 10.9.104 The noise change contours for assessment Phase 1 operation (**Figure 10.6** of this ES [TR020001/APP/5.03]) show an increase from the future baseline of less or equal to 1dB, above 51dBL_{Aeq,16h} but below 63dBL_{Aeq,16h}, which would be negligible within the assets' noise environment and would not introduce perceptible change into the asset's setting or impact its heritage values.
- 10.9.105 The noise change contours for both assessment Phase 2a operation (**Figure 10.7** of this ES [TR020001/APP/5.03]) and for assessment Phase 2b operation (**Figure 10.8** of this ES [TR020001/APP/5.03]) show an increase from the future baseline of between 1dB and 1.9dB above 51dBL_{Aeq,16h} but below 63dBL_{Aeq,16h}. This change in noise level would be negligible within the assets' noise environment and would not change the asset's setting or impact its heritage values.

10.9.106 Therefore, it is assessed there would be no effects as a result of all operational phases of the Proposed Development.

Wigmore Hall Farmhouse Grade II (NHLE 1321368)

10.9.107 Wigmore Hall Farmhouse is located just outside of the Main Application Site boundary, to the north-east, and dates to the 19th century. It is a former farmhouse, now used as a conference centre. The heritage significance of the former farmhouse, which is medium, lies in its historic interest as an early 19th century farmhouse which articulates the area's agricultural history, and the architectural interest of its symmetrical façade and Georgian appearance.

10.9.108 The setting of the former farmhouse has significantly eroded, following the demolition of its associated farm buildings and the construction of the 20th century housing development to its north. The farmland, which would have provided the functional setting to the farmhouse, is no longer present but some of the asset's rural context is retained by Wigmore Park. The park is not contemporary with the asset and is not an important component of its setting, but it does provide a visual aspect that is sympathetic to the asset's history and it forms a buffer between the asset and the airport.

10.9.109 Buildings associated with the airport are currently visible from the rear of the asset and the operational phases of the Proposed Development would introduce new structures into this view, particularly Car Park P9 and Car Park P12. The presence of these structures in views would not impact the asset's historic or architectural interests but would further erode its setting. This would constitute a low magnitude of impact, resulting in a **minor adverse effect**, which is **not significant**.

Sensitivity analysis

10.9.110 None of the scenarios or risks considered for sensitivity analysis, as described in **Chapter 5** Approach to the Assessment of this ES [TR020001/APP/5.01], would influence the conclusions of the impact assessment reported in this section. This is because the footprint of the Proposed Development would remain the same and therefore the identified impacts to buried heritage assets would still arise ultimately, regardless of which phase of development they occurred within.

10.10 Additional mitigation

10.10.1 This section describes the mitigation measures identified as a result of the assessment process, that are proposed in addition to those already considered to be in place as described in **Section 10.8** Embedded and good practice mitigation measures. These are proposed to reduce or mitigate the effects on Cultural Heritage as a result of the construction and operation of the Proposed Development.

Design

10.10.2 The site of a possible Roman building, asset HER 7358, is located in proximity to the proposed fuel connection pipeline and associated access road. A programme of additional archaeological evaluation has been completed in 2022 and the results, which are presented in **Appendix 10.7** of this ES **[TR020001/APP/5.02]**, confirm there are no significant archaeological remains in this location and therefore no potential impact to asset HER 7358. As such, additional mitigation by design measures are not required.

Construction

10.10.3 The requirement for additional trial trench evaluation and mitigation measures during construction are set out in the CHMP. The evaluation and mitigation measures comprise:

- a. Additional trial trench evaluation.
- b. Detailed archaeological excavation.
- c. Targeted archaeological monitoring during construction and operation.
- d. Protocols to be adopted for dealing with unexpected archaeological discoveries.

10.10.4 Additional trial trenching would be undertaken for parts of the Proposed Development that could not be investigated for the ES. The scope of the additional trial trenching has been agreed with the archaeologist for HCC and will be undertaken in accordance with the CHMP, **Appendix 10.6** of this ES **[TR020001/APP/5.02]**.

10.10.5 The results of the trial trench may result in the requirement for an archaeological mitigation response, which may comprise the preservation of archaeological remains and/ or detailed archaeological excavation and recording. The completion of a successful programme of archaeological mitigation would compensate for impacts arising from the Proposed Development, including impacts to potentially late prehistoric or Roman cropmarks (HER 17218 and HER 17219), and would result in effects that were **not significant**.

10.10.6 It has been agreed with the Central Bedfordshire Council Archaeologist, who is acting as archaeological advisor to Luton Borough Council, that potential impacts to the site of Iron Age and Roman settlement-related activity (HER 10808) will be mitigated by a programme of detailed archaeological excavation.

- 10.10.7 The requirement for site-specific Written Schemes of Investigation to achieve the mitigation measures is set out in the CHMP which is presented in **Appendix 10.6** of this ES [TR020001/APP/5.02].
- 10.10.8 Mitigation measures for Wandon End House and Wandon End Farmhouse, which would experience a moderate adverse effect during construction arising from a change in their rural setting, are not proposed due to the temporary nature of the impact.

Operation

- 10.10.9 It is assessed that Luton Hoo RPG would experience a moderate adverse effect as a result of the operation of the Proposed Development, arising from an increase in noise levels within the park. There is no appropriate response that would mitigate increased noise levels within a parkland setting, therefore no additional mitigation is proposed for the operational phase of the Proposed Development.

10.11 Residual effects

Construction effects

- 10.11.1 Potential direct impacts on buried archaeological remains would be managed by a programme of archaeological investigation and recording.
- 10.11.2 Impacts to the site of Iron Age and Roman settlement-related activity (HER 10808) and other potential late prehistoric and Roman remains, including asset (HER 17218) and asset (HER 17219) will be mitigated by a programme of archaeological investigation and recording. This has been agreed with the Central Bedfordshire Council Archaeologist, who is acting as archaeological advisor to Luton Borough Council, and is as set out in the CHMP, **Appendix 10.6** of this ES [TR020001/APP/5.02].
- 10.11.3 The agreed mitigation would not minimise the physical impact to the assets, as the archaeological evidence would still be removed, but would compensate for their loss by preserving them by record. The residual effect following the successful completion of the archaeological mitigation would be **minor adverse** and **not significant**.
- 10.11.4 The residual effects to Wandon End House and Wandon End Farmhouse, both Grade II listed buildings, would remain as **moderate adverse** and temporary.

Operational effects

- 10.11.5 No mitigation has been proposed or is practicable with respect to operational effects. As such the effects would be as reported in **Section 10.9**.

10.12 In-combination climate change effects

- 10.12.1 The construction and operation of the Proposed Development would not result in effects to cultural heritage assets that would worsen as a result of climate change. As such, there would be no in-combination climate change effects to the cultural heritage resource.

10.13 Monitoring

Construction monitoring

- 10.13.1 It is anticipated that the majority of archaeological mitigation works, as specified in this ES, would be carried out in advance of construction activities and in accordance with the CHMP, **Appendix 10.6** of this ES [TR020001/APP/5.02], that has been agreed with the local authority archaeology officers and Historic England.
- 10.13.2 The CHMP includes an archaeological mitigation measure which comprises a watching brief during the construction of the proposed fuel pipeline.

Operational monitoring

- 10.13.3 Monitoring of cultural heritage assets is not required during the operation of the Proposed Development.

10.14 Impact assessment summary

- 10.14.1 **Table 10.12** provides a summary of the identified impacts, mitigation and likely effects of the Proposed Development on Cultural Heritage.

Table 10.12: Cultural Heritage impact assessment summary

Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Sensitivity	Description of effect and significance	Additional Mitigation	Residual Effect
Construction						
<i>Somerles Castle Scheduled Monument</i>						
Assessment Phase 1: Minimal change to the asset's setting during expansion of Terminal 1	None proposed	Very low	High	Temporary minor adverse	None proposed	Minor adverse (not significant)
Assessment Phase 2a: Minimal change to asset's setting during construction of western airfield extension; construction of Terminal 2 and SMR	None proposed	Very low	High	Temporary minor adverse	None proposed	Minor adverse (not significant)
Assessment Phase 2b: Minimal change to the asset's setting during construction of FTG	None proposed	Very low	High	Temporary minor adverse	None proposed	Minor adverse (not significant)
<i>Luton Hoo Grade II* RPG</i>						
Assessment Phase 2a: Barely perceptible change to setting of park during construction of Car Park P1 and slight temporary impact to aesthetic interest	None proposed	Very low	High	Temporary minor adverse	None proposed	Minor adverse (not significant)
Assessment Phase 2b: Barely perceptible change to setting of park during	None proposed	Very low	High	Temporary minor adverse	None proposed	Minor adverse (not significant)

Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Sensitivity	Description of effect and significance	Additional Mitigation	Residual Effect
construction of Hangar A and B and slight temporary impact to aesthetic interest						
<i>Old Homestead Grade II* Listed Building</i>						
Assessment Phases 1: Construction activities associated with earthworks and construction of the aviation platform would introduce change into the building's setting	None proposed	Very Low	High	Temporary minor adverse	None proposed	Minor adverse (not significant)
<i>Wandon End House and Wandon End Farmhouse Grade II Listed Buildings</i>						
Assessment Phases 1, 2a and 2b: Construction activities associated with earthworks and remediation during all three construction phases would represent noticeable change into the predominantly rural setting of both buildings	None proposed	Medium	Medium	Temporary moderate adverse	None proposed as effect is temporary	Moderate adverse (significant)
<i>Asset HER 10808 (the site of Iron Age and Roman settlement-related activity)</i>						
Assessment Phase 1: Physical impacts as a result of landscaping.	Proposed Development has avoided impacting the asset by incorporating	High	Low	Permanent moderate adverse	Detailed archaeological excavation in advance of construction and in	Minor adverse (not significant)

Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Sensitivity	Description of effect and significance	Additional Mitigation	Residual Effect
	the archaeological remains into embedded landscape design, thereby preserving in situ in an area designated for meadow grassland and scrub.				accordance with the CHMP.	
Asset HER 7358 (the site of a possible Roman building)						
Assessment Phase 2a: Physical impacts as a result of the installation of the fuel connection pipeline	None proposed.	No impact	Medium	No effect	No mitigation required	No effect
Assets HER 17218 and HER 17219 (cropmarks which may relate to late prehistoric or Roman activity)						
Assessment Phase 2a: Physical impacts as a result of the construction of earthworks and fuel farm facility	None proposed	High	Low	Permanent moderate adverse	Archaeological evaluation and investigation in advance of construction and in accordance with a methodology set out in the CHMP.	Minor adverse (not significant)
Potential archaeological assets identified from baseline assessment						

Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Sensitivity	Description of effect and significance	Additional Mitigation	Residual Effect
Assessment Phase 1 earthworks activities to the east of the airport associated with landscaping and the construction of the aviation platform could result in the removal of these features	None proposed	High	Very Low	Minor adverse	None proposed	Minor adverse (not significant)
<i>Potential archaeological features that may be identified from additional trial trenching</i>						
Assessment Phase 1 earthworks activities to the east of the airport associated with landscaping and the construction of the aviation platform could result in the removal of features of medium value	None proposed	High	Medium	Moderate adverse	Archaeological evaluation and investigation in advance of construction and in accordance with a methodology set out in the CHMP.	Minor adverse (not significant)
<i>HLC features; fields and hedgerow boundaries</i>						
Assessment Phase 1 earthworks and the construction of Car Parks P10 and P11 resulting in partial loss of features of very low value	None proposed	Low	Very low	Negligible	None proposed	Negligible
Operation						
<i>Somerles Castle Scheduled Monument</i> The increase in aircraft movements and views of	None proposed	Very Low	High	Minor adverse	None proposed	Minor adverse (not significant)

Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Sensitivity	Description of effect and significance	Additional Mitigation	Residual Effect
FTG as a result of the operational Development would represent a minimal change in views from and towards the castle. This would emphasise the proximity of the airport but would not affect any of the heritage interests that contribute to its value						
<p>Luton Hoo Grade II* RPG Operational Development would introduce new built components into the visual setting of the RPG. The new components are not prominent features in views from the RPG but would further detract from its parkland character. The increase in noise levels would detract further from the park's rural character and would represent a slight change to the setting of the park.</p>	None proposed	Low	High	Moderate adverse	None proposed	Moderate adverse (significant)
<p>Parish Church of St. Mary Grade I (NHLE 1114615) Increase in aviation noise during assessment Phase 2b</p>	None proposed	Very Low	High	Minor adverse	None proposed	Minor adverse (not significant)

Impact	Embedded/ Good Practice Mitigation	Magnitude	Receptor Sensitivity	Description of effect and significance	Additional Mitigation	Residual Effect
Wigmore Hall Farmhouse Grade II (NHLE 1321368)	None proposed	Low	Medium	Minor adverse	None proposed	Minor adverse (not significant)

COMPETENT EXPERTS

Topic	Role	Company	Qualifications/competencies/experience of author
Cultural Heritage	Author	AECOM	BA Archaeology. Five years professional experience as an archaeologist with three years as a Heritage Consultant/specialist in cultural heritage baseline assessment, impact assessment, fieldwork design and fieldwork management.
Cultural Heritage	Checker	AECOM	Diploma HE in Archaeology. 25 years in the heritage sector, 15 of those in consultancy. Lead author for EIA and DCO schemes including HS2 Phase 2b, Net Zero Carbon Capture and renewable energies.
Cultural Heritage	Approver	AECOM	MA Archaeology of Buildings. Member of the Chartered Institute for Archaeologists. 20 years' experience in the heritage sector.

GLOSSARY AND ABBREVIATIONS

Term	Definition
ANPS	Airports National Policy Statement
CBC	Central Bedfordshire Council
CHMP	Cultural Heritage Management Plan
CIfA	Chartered Institute for Archaeologists
CoCP	Code of Construction Practice
DBA	Desk-based Assessment
DCO	Development Consent Order
EIA	Environmental Impact Assessment
ES	Environmental Statement
FTG	Fire Training Ground
HCC	Hertfordshire County Council
HE	Historic England
HER	Historic Environment Record
LOAEL	Lowest Observable Adverse Effect Level
MPPA	Million passengers per annum
NHLE	National Heritage List for England
NPPF	National Planning Policy Framework
RPG	Registered Park and Garden
SMR	Surface Movement Radar
WSI	Written Scheme of Investigation
ZOI	Zone of Influence
ZTV	Zone of Theoretical Visibility

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