Park Plaza West EIA Scoping Report

Formal request for a Scoping Opinion from Broxbourne Borough Council

Sunset London Studios Propco Ltd

NOVEMBER 2021

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1. Introduction

1.1. Overview

1.1.1. Sunset London Studios Propco Ltd, as the Applicant, is intending to seek full planning permission from Broxbourne Borough Council for the development of a 'best in class' film studio located on Park Plaza West.

1.1.2. The Park Plaza West development ('the proposed development') is a multi-production studio facility which has been designed to draw globally recognised film and media brands to Broxbourne. This will deliver local economic and employment opportunities and provide a new identity for the borough. The proposed development includes state of the art sound stages with accompanying support and office facilities, and associated community and green spaces. Further details of the proposed development can be found in Chapter 2: *Site description & development proposals.*

1.1.3. This Environmental Impact Assessment (EIA) Scoping Report has been prepared to provide Broxbourne Borough Council with sufficient information to adopt a Scoping Opinion.

1.2. Environmental Impact Assessment

Purpose of the Environmental Impact Assessment

1.2.1. EIA is a process for ensuring that the likely significant effects of a new development on its surrounding environment are fully understood and considered before that development is allowed to proceed. The Ministry of Housing, Communities & Local Government's (now the Department for Levelling Up, Housing and Communities) Planning Practice Guidance states that the purpose of EIA is:

> *"to protect the environment by ensuring that a local planning authority when deciding whether to grant planning permission for a project, which is likely to have significant effects on the environment, does so in the full knowledge of the likely significant effects, and takes this into account in the decision making process"*

The Development in the Context of the EIA Regulations 2017

1.2.2. The procedures for carrying out EIA for a proposed development within the terrestrial environment are set out within the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended in 2018 (1) and 2020 (2)) - herein the 'EIA Regulations 2017'.

1.2.3. The EIA process is divided into three main competent stages (prior to decision making); Screening, Scoping, and Assessment. These stages are discussed in the context of the proposed development in the following sections.

Screening

1.2.4. EIA Screening is a procedure used to determine whether a development is classified as an 'EIA development'. The EIA Regulations 2017 identifies two different categories of developments which require an EIA:

- Schedule 1 developments; and
- Schedule 2 developments likely to have significant effects on the environment.

1.2.5. The proposed development is not a Schedule 1 development, for which EIA would be mandatory. It is however of a development type listed within Schedule 2 of the EIA Regulations, falling under category 10(b) urban development projects (including the construction of shopping centres and car parks, sports stadiums, leisure centres and multiplex cinemas).

1.2.6. A development is considered to be a Schedule 2 development if any part of it lies within a 'sensitive area' or if it meets or exceeds the relevant thresholds and criteria for that category of development, as detailed in the EIA Regulations 2017. For category 10(b) projects, these are as follows:

i. The development includes more than 1 hectare of urban development which is not dwelling-house development; or
ii. The development includes more than 150 dwellings; or
iii. The overall area of the development exceeds 5 hectares.

1.2.7. The proposed development does not lie within a sensitive area, as defined in the EIA Regulations; however, on the basis that it exceeds criterion i and iii, the proposed development is considered to be Schedule 2 development and would therefore fall within the scope of the regulations. Schedule 2 developments are considered to be 'EIA development' if they are likely to result in significant effects on the environment by virtue of factors such as their nature, size, and location.

1.2.8. Assessment work completed to date indicates that the proposed development is likely to result in significant environmental effects. Therefore, in line with the requirements of the EIA Regulations 2017 and in the interest of undertaking a robust and transparent assessment of the proposed development's likely significant environmental effects, the applicant intends to voluntarily enter into the EIA process and will submit an Environmental Statement (ES) in due course, in conjunction with the planning application.

Scoping

1.2.9. Scoping is an important, though optional, exercise undertaken during the early stages of the EIA process. Its purpose is to focus the EIA and resultant ES on key issues and to avoid the unnecessarily complicated examination of minor issues.

1.2.10. This report is a formal request for a Scoping Opinion submitted under Regulation 15(1) of the EIA Regulations 2017.

1.2.11. In accordance with Regulation 15(2), this request is accompanied by:

i. A plan sufficient to identify the land;
ii. A brief description of the nature and purpose of the development, including its location and technical capacity;
iii. An explanation of the likely significant effects of the development on the environment; and
iv. Such other information or representations as the person making the request may wish to provide or make.

1.2.12. Under the allowance to provide 'such other information or representations as the person making the request may wish to provide or make', the Applicant has taken the opportunity to provide the local planning authority, statutory consultees and other stakeholders with a better understanding of the proposed approach to the EIA process, the various technical assessments being undertaken and the intended structure of the ES, through the information provided in this report.

Assessment

1.2.13. The purpose of the ES is to provide the information reasonably required to reach a conclusion on the significant effects of the development on the environment, taking into account current knowledge and methods of assessment.

1.2.14. Under regulation 2(1) of the EIA Regulations 2017, an ES 'has the meaning given by Regulation 18'. Regulation 18(3), defines an ES as a statement which includes 'at least':

a) a description of the proposed development comprising information on the site, design, size and other relevant features of the development;
b) a description of the likely significant effects of the proposed development on the environment;
c) a description of any features of the proposed development, or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;
d) a description of the reasonable alternatives studied by the developer, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment;
e) a non-technical summary of the information referred to in sub-paragraphs (a) to (d); and
f) any additional information specified in Schedule 4 relevant to the specific characteristics of the particular development or type of development and to the environmental features likely to be significantly affected.

1.2.15. These criteria appear in full within Schedule 4 of the EIA Regulations 2017. The ES will reiterate these criteria and signpost to where each criterion has been met within the document.

1.2.16. The assessments reported within the ES will be based on the Scoping Opinion issued in response to this report.

1.3. Competent experts

1.3.1. In accordance with Regulation 18(5) of the EIA Regulation 2017, the EIA process (including this Scoping Report and the forthcoming ES) will be undertaken by 'competent experts' who have appropriate credentials, experience and expertise within their field.

1.3.2. The EIA is being led by CBRE's qualified team of environmental consultants who are experienced in the coordination and successful delivery of statutory EIAs. Additionally, CBRE are registered with the IEMA EIA Quality Mark scheme, and are committed to delivering accurate, robust, and proportionate assessments.

2. Site description & development proposals

2.1. Site context

Location of the site

2.1.1. The proposed development is located in the Borough of Broxbourne, Hertfordshire on an area of land known as Park Plaza West (National Grid Reference (NGR) TL 34940 00596).

2.1.2. Park Plaza refers to an area of land located within the southern part of the Borough. It is situated either side of the Great Cambridge Road (A10), the Winston Churchill Way (A121) and the Lieutenant Ellis Way (B198). These major roads dissect the Park Plaza area into discrete parcels; including the Park Plaza West parcel – the location of the proposed development – which is the area of agricultural land located to the west of the A10, as shown in Figure 2.1.

2.1.3. The site boundary as shown on Figure 2.1 is indicative and will be confirmed in the ES. The blue hatch shown on Figure 2.1 is undevelopable land which falls within the Applicants ownership, this land has been used as highways easement for the A10. There is the possibility that the site boundary could be extended to include associated development as discussed in paragraphs 2.2.17 to 2.2.21, this will be confirmed within the ES.

Description of the site and its sensitivities

2.1.4. The Park Plaza West site, herein referred to as the 'application site', is a 35.8 hectare (ha) site which is predominantly comprised of arable, greenfield land. Within the application site, small areas of woodland/scrub, ponds, short sections of poor hedgerow and limited patches of ruderal vegetation are present. The application site is level to very gently sloping, at an average elevation of approximately 27 m AOD. The application site is also open, with the exception of agricultural buildings associated with Theobolds Park Farm and a temporary construction compound currently in use on the southern area of the site associated with works to Junction 25 of the M25.

2.1.5. Theobolds Park Farm is not currently an operational farming enterprise, following the purchase of the site by the Applicant with a view to seeking development. A soils and agricultural quality survey undertaken to support the Agricultural Land Classification Report (3), determined the land within the application site to be of Grade 2, Grades 3b and 3a[1] and 'other' representing the farm buildings, areas of scrub and the compound currently located within the application site. The proposed development will result in the loss of approximately 33.6 ha of agricultural soils and land. Of this, approximately 15.5 ha would be classified as Best and Most Versatile (BMV) land. The principle of redeveloping this land has been established within the approved development plan, specifically through the allocation of the land for commercial development in the Broxbourne Local Plan (4) (Policy PP1: Park Plaza West). The quantum of BMV land lost as a result of the proposed development would be less than 20 ha, and therefore considered to be a 'smaller loss' that would not require consideration by Natural England as a statutory consultee (5).

[1] Best and Most Versatile (BMV) agricultural land is classified as land in Agricultural Land Classification (ALC) Grades 1, 2 and 3a.

2.1.6. The agricultural buildings are located centrally on the eastern boundary of the application site and include three Grade II Listed farm buildings: Theobalds Park Farmhouse; Large Barn at Theobalds Park Farm 10 metres west-south-west of House; and Cob Outbuilding Approximately 25 metres south-south-west of Theobolds Park Farm. Associated with these Listed Buildings is a locally designated 'area of archaeological interest'.

2.1.7. Another 'area of archaeological interest' is located within the application site, further south of the agricultural buildings, associated with the remains of a 16th Century medieval homestead moat connected with the manor of Cullings.

2.1.8. The application site is currently served by two footpaths. Public Right of Way (PRoW) Cheshunt 014 crosses the southern part of the application site. This PRoW is currently overgrown in places and appears infrequently used. PRoW Cheshunt 013 runs along the western boundary of the application site adjacent to the New River. This footpath connects the area to the north of the application site over the M25 beyond the Hertfordshire boundary.

2.1.9. Near to the route of footpath Cheshunt 014, within the south west of the application site, is the former location of Cecil's pond. The feature is now fragmented and does not currently exist as a traditional 'pond'. The former pond is believed to be a large, rectangular water feature connected with the former 16th century water gardens of Theobalds Palace.

2.1.10. The application site also falls within a Mineral Safeguarding Area (MSA) for Sand and Gravel. MSAs identify areas where particular care is needed to prevent the unnecessary sterilisation and loss of resources and where development would only be supported where it can be justified.

Surrounding environment

2.1.11. Roads are adjacent to the boundaries of the application site to the north (B198), east (A10) and south (M25), whilst the New River – an artificial waterbody – borders the western boundary.

2.1.12. The New River is raised on a low embankment and surrounded by woodland to the west, the southern area of which is protected by a group Tree Preservation Order (TPO). This woodland provides screening to the Theobalds Estate and the Birch hotel (which includes two Listed Buildings), located further west of the application site. This area to the west of the application site is also identified as Green Belt land.

2.1.13. North of Lieutenant Ellis Way (B198) lies agricultural land, a collection of trees identified to have TPOs and the settlements of Bury Green and Churchgate. Churchgate is designated as a Conservation Area within which there is a collection of buildings listed for architectural and historical value.

2.1.14. To the north east of the application site is the A10 and A121 roundabout and Cedars Park, a public park located on a historic palace estate. Centred around Sir William Cecil's 16th century house, which was used by King James I as a hunting lodge, the park also overlaps with two designations: Theobalds Palace Scheduled Monument and an area of archaeological interest.

2.1.15. East of Great Cambridge Road (A10) is the car dealership 'Big Motoring world, Enfield', News International printworks and the Travelodge hotel. The Lea Valley railway line and the town of Waltham Cross lie further east of these receptors.

2.1.16. To the south of the application site, past the M25, is Capel Manor and gardens, the continued route of the New River and office spaces.

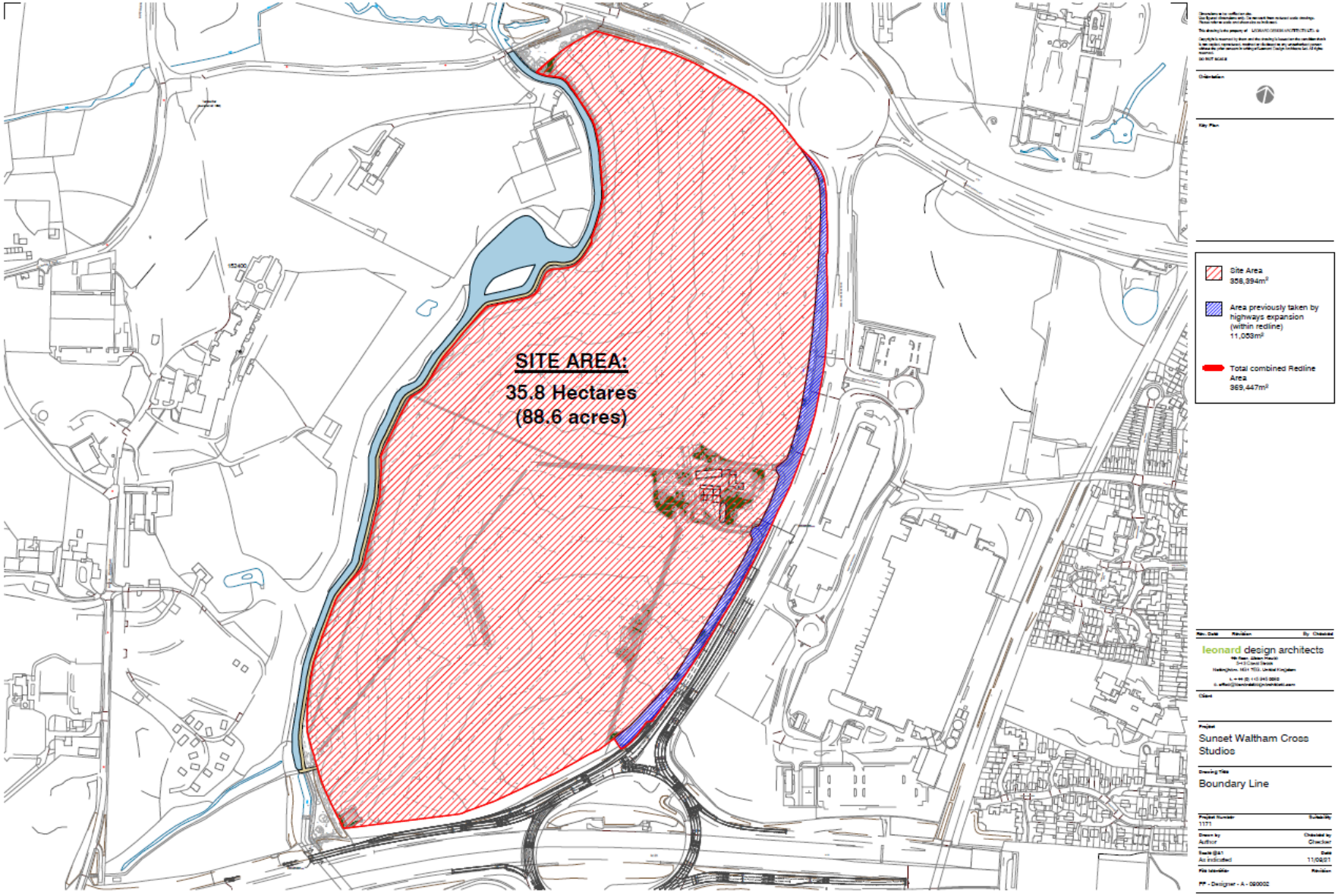

Figure 2.1 Location Plan

Planning history

2.1.18. No historic planning applications have been identified within the application site.

2.1.19. The Broxbourne Local Plan (4) identifies developments within Park Plaza area as key to enable the Council to meet its desired employment growth. Policy PP1 of the Local Plan allocates the Park Plaza West site as a potential new business campus, including a requirement for up to 100,000 m^2 of gross business floorspace and a well landscaped open space in the southern area of the allocation.

2.1.20. The proposed development will exceed the overall floorspace set out in Policy PP1 due to the built form requirements of delivering a best-in-class film studio with large scale stage space and supporting production offices, and workshops. These buildings require significant floorspace to deliver an efficient world class studio complex capable of attracting global brands for television and features.

The proposed development will be a significant employment hub – offering a variety of opportunities which will diversify the type of employment and skills base available within the Borough.

2.2. The proposed development

The need for the development

2.2.1. The Park Plaza area is an accessible location which forms a key gateway into Broxbourne and Hertfordshire. Broxbourne Borough Council has identified the area as a strategic employment location within its Local Plan and has sought to develop the area in a way which promotes employment and the local economy.

2.2.2. The Employment Land Study (6) (2016) indicates that Park Plaza West is the most suitable location in the Borough for a large-scale unique inward investment as the application site is considered to have the greatest potential to capture higher-value enterprises and jobs in Broxbourne. This is due to its scale and location close to the M25.

2.2.3. The proposed development would provide the desired economic and employment growth alongside a new identity for the Borough and the facility will draw globally recognised film and media brands to Broxbourne.

Description of the development

2.2.4. The proposed development consists of the following:

- Up to 130,000 m^2 of film studio floorspace and associated production space (Gross Internal Area (GIA)), including the following potential arrangement:
  - Head house;
  - 21 new purpose built sound stages;
  - Seven production offices;
  - Nine workshops; and
  - Amenity and support spaces.
- Outdoor production area 'backlot' circa 30,000 m^2;
- Two mobility hubs (including vehicle and cycle parking), a waste hub/recycling centre, and associated facilities;
- Approximately 9.5 ha of soft landscaped space across the site that is publicly accessible and additional landscaping within the secure site boundary;

- Restoration of three grade II listed buildings;
- Rerouting of the public right of which crosses the site; and
- Provision of a pond in the landscaped area which has taken inspiration from Cecil's pond.

2.2.5. An illustration of the proposed development is shown in Figure 2.2 to provide some context. Although the design of the proposed development is not yet final, including building size and specific uses, the level of detail currently available is sufficient to enable an initial assessment of the proposed development to identify any potential environmental effects.

2.2.6. The environmental assessments that will be undertaken to identify the likely effects of the proposed development will continue to feed into the evolving design to seek to avoid or design out environmental effects wherever possible. However, the main elements of the proposed development are considered to be sufficiently fixed to ensure that the proposed development considered within this report (and the subsequent Scoping Opinion) will be materially the same as the proposed development which will be assessed in the ES.

Scale of the proposed development

2.2.7. The proposed building density patterns across the application site vary. The density is likely to be highest in the northern part of the application site where the main film studio stages and workshops are likely to be built. The southern area of the application site is proposed to be retained as the 'southern meadow', an area of landscaping. In the west of the application site, adjacent to the New River is currently proposed to be the backlot. A backlot is an exterior production area used to film outdoor scenes, the proposed development's backlot will be designed to accommodate structures / buildings of a temporary nature.

2.2.8. The scale of the temporary and permanent buildings will be confirmed and assessed within the ES. It is anticipated that the permanent building massing in terms of height will be up to 22 m with limited instances of broadcasting equipment e.g. satellite dishes extending beyond this by up to 1 m.

Access points

2.2.9. There will be two new points of vehicular access to the proposed development, these will also cater for walking and cycling. Other walking and cycling accesses are being considered but have not yet been determined.

2.2.10. One new access point will be from the existing signalised junction on the A10 Great Cambridge Road. Works will be required to modify this junction to provide both access and egress to the application site. A second new access point will be constructed from the B198 Lieutenant Ellis Way to the north of the application site. Further detail on these works is provided in the following associated development section.

Landscaping

2.2.11. A landscape design for the proposed development is currently being developed which seeks to provide landscaping throughout the application site on both secure and publicly accessible land.

2.2.12. Planting will be incorporated between buildings to form a tree lined avenue which runs north – south through the built area of the site. It will also create buffers along the route of the New River and along the A10. The southern meadow will provide landscaped space which is open to the general public. Alongside landscaping, this area will incorporate a pond which is inspired by Cecil's pond, surface water attenuation ponds, and footpaths across the site including the re-routed PRoW Cheshunt 014.

Figure 2.2 Indicative Use Requirements of the Site

Form of application

2.2.13. Full planning permission is being sought by the applicant for the proposed development.

2.2.14. Consideration is being given to the submission of a separate application for the enabling works required to support the proposed development. In which event, two planning applications would be submitted in parallel; one application would consist of enabling works including vegetation clearance and earthworks, and the other application would cover the enabling works, construction and operation of the proposed development.

2.2.15. In light of this, the environmental assessments will consider enabling as a separate phase of works (see Section 3.4 *Temporal scope of assessment*).

2.2.16. However, currently the preferred choice would be to submit one application which covers all aspects of the proposed development; enabling works, the construction and operation of the proposed development.

Associated development

2.2.17. Associated development is that which does not form part of a planning application, but which is required in order for a development to progress.

2.2.18. The proposed development requires the modification of the signalised junction at A10/Great Cambridge Road to incorporate a fourth (western) arm that provides an access and egress to the site. This will accommodate left and right turns in/out of the application site.

2.2.19. Additionally, a new, four-arm signalised junction on B198 Lieutenant Ellis Way, is proposed west of A10/Winston Churchill Way roundabout providing a second access / egress point from the application site. These works would likely be completed as Section 278 works.

2.2.20. Associated development is also likely to include new connections to local utility networks. The exact location and nature of the diversions and connections required to allow the proposed development to operate, is still being ascertained. Section 6.3 Utilities provides further detail on these.

2.2.21. Additionally, Broxbourne Borough Council may require improved pedestrian and cycling connections from the site to encourage walking and cycling within the area.

3. EIA methodology

3.1. Focus of EIA

3.1.1. EIA is a process that should be focused on the likely significant environmental effects of a proposed development. It is not intended to be a process to address all of the possible environmental effects.

3.1.2. One of the main criticisms of current EIA practice is that the scope is often drawn too widely, which results in environmental statements which are unnecessarily long and are less useful for their intended purpose, i.e., to act as a decision-making tool.

> *"At its best, EIA helps to shape the design and siting of development such that social value to communities and broader economic value to investors can both be met, without eroding natural capital and pushing the boundaries of environmental limits – a tool that can truly support moves towards sustainability. However, the many competing demands can often serve to stifle the process, resulting in reams of information that mask the key environmental issues that need to be considered." (IEMA, 2011)*

3.1.3. In light of this, this Scoping Report has sought to clearly identify the impacts which could result in significant environmental effects and, therefore, the aspects on which the ES should focus. To ensure a proportionate assessment, impacts not considered likely to result in significant environmental effects will not be included within the ES.

3.2. Relevant planning policy and guidance

3.2.1. The following national and local planning policy and guidance is relevant to the proposed development:

- National Planning Policy Framework (NPPF, 2021) (7);
- National Planning Practice Guidance (NPPG, 2014 as amended) (8);
- Borough of Broxbourne Local Plan 2018-2033 (4); and
- Institute of Environmental Management and Assessment (IEMA) Guidelines for environmental impact assessment.

3.2.2. In addition, consideration will also be given to relevant Supplementary Planning Documents (SPDS) and Supplementary Planning Guidance (SPGs).

3.3. Receptors

3.3.1. The following key receptors have been identified within the vicinity of the application site. It is proposed that the assessments will focus on identifying the effects of the proposed development at/on these receptors within the relevant chapters of the main volume of the ES and the supporting technical reports provided within the ES appendices:

- Pedestrians, cyclists and users of public rights of way;
- Residential properties and those who inhabit them;
- Users of commercial properties;
- Users of nearby community facilities;

- Landscape character;
- Lee Valley Ramsar and Special Protection Area;
- Epping Forest Special Area of Conservation;
- Wormley-Hoddesdonpark Woods Special Area of Conservation;
- Temple Bar Meadow Local Wildlife Site;
- Broom Hills Local Wildlife Site;
- On-site habitats;
- Protected species, particularly bats, badgers and birds;
- Grade II*Listed Buildings: Theobalds Park House and Capel Manor.
- Grade II Listed Buildings: Classroom Block immediately south-west of Theobalds Park College; Bullscross Farmhouse; Bulls Cross Farm Barns on north side of farmyard; The Cedars Park garden walling on west side; The Cedars Park Grotto at south end of central part of park; The Cedars Park fragment of Theobalds Palace 80 metres north west of the Cedars Lodge; The Cedar Park outbuildings south-east of the Cedars Lodge; The Cedars Park wall and fragment of Theobalds Palace north of the Cedars Lodge; North Wall to The Cedars Park; Garden Walling on east side of the Cedars Park; Stables and former coach house range at Capel Manor; Garden Walls to east of Capel House; and Bulls Cross Lodge;
- Theobalds Palace, Waltham Cross Scheduled Monument;
- Forty Hall (Enfield Council) Conservation Area;
- The New River;
- Non-designated archaeological assets;
- Theobalds Brook;
- On-site ditches;
- Public transport users;
- Vehicle drivers;
- Existing local and future employees;
- Existing local population; and
- The atmosphere.

3.4. Approach to environmental assessment

Geographical scope of assessment

3.4.1. The draft site boundary for the application site is shown in Figure 2.1.

3.4.2. The relevant geographical scope of assessment, also known as a study area, for each topic is stated within the technical sections contained in Section 5 and 6 of this report. These study areas have been determined using best practice and professional judgement to ensure that any receptors with the potential to experience potential significant effects will be identified.

Temporal scope of assessment

3.4.3. It is currently envisaged that the proposed development will be delivered in three main phases – enabling works, construction phase and the operational phase. The enabling works, the first phase, is programmed over a 36-week period (July 2022 – March 2023). The main construction phase works are anticipated to commence in March 2023 and last for 111 weeks and the proposed development is expected to be operational from July 2025.

3.4.4. If the enabling works are completed under a separate application, there is a potential, although unlikely risk that the enabling works could be approved and completed without gaining approval of the proposed development. As a result, three assessment scenarios will be assessed in the ES which require consideration at the enabling, construction and operational stages, these are also shown in Figure 3.1:

- **Assessment scenario 1**: The future baseline of the application site, meaning the likely evolution of the existing baseline without the implementation of the proposed development (either enabling works or subsequent studio development). The future baseline assumes that the application site is maintained and managed in accordance with typical farming practices that have been carried out to date at the site;
- **Assessment scenario 2**: Enabling works consisting of a major cut and fill exercise, with an accompanying remediation scheme back to greenfield conditions in the event that the proposed development does not gain approval; and
- **Assessment scenario 3**: Construction of the proposed development, following the completion of earthworks in Assessment Scenario 1 and its subsequent operation.

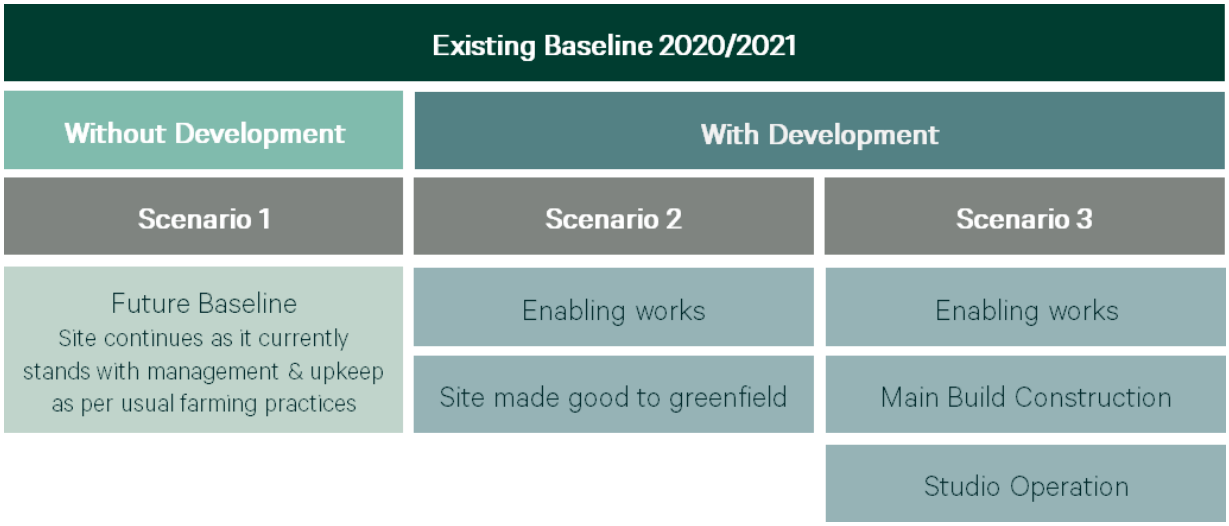

Figure 3.1: Assessment scenarios to be considered in the ES

3.4.5. Following submission of this EIA Scoping Report, should the decision be made to include the enabling works as part of the main application, assessment scenario 2 would not require assessment. Additionally, the enabling works and main build construction would be considered together under a 'construction phase' scenario (unless appropriate to separate).

3.4.6. In accordance with best practice guidance, the landscape and visual assessment (Volume III) will also assess the impacts of the development 15 years after operation, after which time it is considered that the vegetation would be fully established and provide the maximum screening.

3.4.7. The transport chapter of the ES and the assessment contained within the separate Transport Assessment will also consider a future 'review' scenario in accordance with guidance (9). This is currently expected to be 10 years after opening.

3.4.8. Given the nature of the development and its likely continuous operation, decommissioning is not appropriate and will not be assessed.

Cumulative effects

3.4.9. The EIA Regulations 2017 require the consideration of cumulative effects. Cumulative effects can be either:

- The combined or 'inter-development' cumulative effect of the proposed development together with other developments that are consented but not yet completed (taking into consideration effects during both the construction and operational phases); and
- The combined, synergistic or 'intra-development' cumulative effects caused by the combination of a number of effects of the proposed development on a particular receptor (taking into consideration effects during both the construction and operational phases), which may collectively cause a more significant effect than individually.

3.4.10. Inter-development cumulative effects will be described within each technical chapter in the ES, while intra-development cumulative effects will be considered within a separate, stand-alone ES chapter in the main volume of the ES.

Inter-Development Cumulative Effects

3.4.11. Good practice guidelines recommend that an EIA should assess the cumulative effects of a development with other developments only where there are likely to be significant effects.

3.4.12. Under the EIA Regulations 2017, the requirement for considering cumulative schemes within the inter-development cumulative assessment is restricted to 'cumulation with other existing development and/or approved development'. This omits the previous requirement to assess schemes that are 'reasonably foreseeable' (e.g., were allocated for future development) under the Town and Country Planning (Environmental Impact Assessment) Regulations 2011.

3.4.13. In their response to the technical consultation on EIA thresholds in 2015, the Ministry of Housing, Communities & Local Government's (now the Department for Levelling Up, Housing and Communities) stated that urban development projects below the revised EIA screening thresholds *"will not be likely to have significant effects either alone or in combination with other projects because of their nature, location or impact*". On this basis, the consideration of cumulative effects should be limited to those projects where:

- the development includes more than 1 hectare (site area) of urban development which is not dwellinghouse development; or
- the development includes more than 150 dwellings; or
- the overall area of the development exceeds 5 hectares.

3.4.14. Existing developments form part of the baseline and will therefore be considered in the ES in this way. Table 3.1 provides details of the developments considered to be reasonably foreseeable within 2 km of the application site. These developments are those which meet the aforementioned criteria and/or provide over 10,000 m^2 of non-residential floorspace and have yet to be completed.

Table 3.1
Reasonably Foreseeable Development for the Inter-Development Cumulative Assessment

Reasonably Foreseeable Development	Description
Name: Cheshunt Lakeside **Reference:** 07/18/0461/O (approved 02.08.2019) **Location:** - Land at Delamare Road Cheshunt Hertfordshire En8 Associated applications: 07/20/1186/RM and 07/19/0996/RM	Outline application with all matters reserved other than access for the demolition of existing buildings and structures and the redevelopment of the site for a residential-led mixed use development including basement parking and servicing comprising up to 1,725 apartments (Use Class C3 (including elderly accommodation) up to 19,051 sq.m (GIA) of commercial and non-commercial floorspace including business (Use Class B1), retail (Use Classes A1, A2, A3 and A4) and community and leisure uses (Use Classes D1 and D2), a two form entry primary school, the creation of a new local centre plaza and link access from Windmill lane, plus associated works for landscaping, flood attenuation, works to existing waterways, parking areas, pedestrian, cycle and vehicular routes.
Name: Land at Maxwells Farm **Reference:** 07/18/1181/O (approved 23.06.2020) **Location:** Land at Maxwells Farm west Great Cambridge Road, Cheshunt, Hertfordshire Associated applications: 07/20/0907/RM and 07/21/0486/RM	Outline application for construction of a high-tech employment development in a parkland setting together with associated infrastructure comprising: 1) a data centre facility (up to 65,000 sqm) and associated ancillary plant storage and office space 2) Business space (up to 36,400sqm) reserved for B1/B2/B8 Use 3) open space, landscaping and flood mitigation 4) associated vehicular access from the A10 (Great Cambridge Road) and Lieutenant Ellis Way 5) Electricity Sub Station.
Name: Rosedale Park **Reference:** 07/17/0352/O (approved 30.06.2020) **Location:** Land north and south of Andrew's lane and South of Peakes way Cheshunt Hertfordshire EN7 Associated applications: 07/21/0596/RM	Demolition of existing buildings at Garryross farm and Development of a mixed-use scheme to include a new linear park and comprising up to 380 dwellings, 64 bed care home, local centre comprising up to 380 dwellings, 64 bed care home, local centre comprising up to 604sqm (GIA) of A1, A2, A3, A4, A5 and D1/ D uses and associated ancillary facilities, a primary school, improved recreational leisure and sporting facilities and associated open space, landscaping and car parking
Name: Cheshunt Football Club **Reference:** 07/18/0514/F (approved at appeal 16.09.2021) **Location:** Cheshunt Football Club, Theobalds Lane, Cheshunt, Herts, EN8 9LY Associated applications: N/A	Area 1 - New stadium with capacity for up to 2000 spectators. 53 no. 1 bedroom apartments, 62 no. 2 bedroom apartments, 26 no. 3 bedroom houses and 22 no. 4 bedroom houses, (163 Residential Dwellings) highway access works, internal roads and supporting infrastructure Area 2 - Northern block - New facilities for Cheshunt Football Club in use classes D1, D2 and sui generis - matters relating to internal layout and appearance reserved. Area 3 - Western block - New sports, community, leisure and commercial uses in use classes A1, A3, A4, A5, B1, D1 and D2 - matters relating to internal layout reserved. (Resubmission of 07/16/1369/F)

3.4.15. Broxbourne Borough Council are invited to comment on the reasonably foreseeable developments identified in Table 3.1 and, identify other developments they consider relevant to the cumulative assessment within their Scoping Opinion.

Mitigation

3.4.16. EIA is an iterative process, which helps to shape the design to prevent adverse environmental effects whilst maximising potential beneficial environmental benefits. The process follows the principles of the mitigation hierarchy which sets out the order in which mitigation actions have been considered, from most desirable to least desirable, as shown in Figure 3.2.

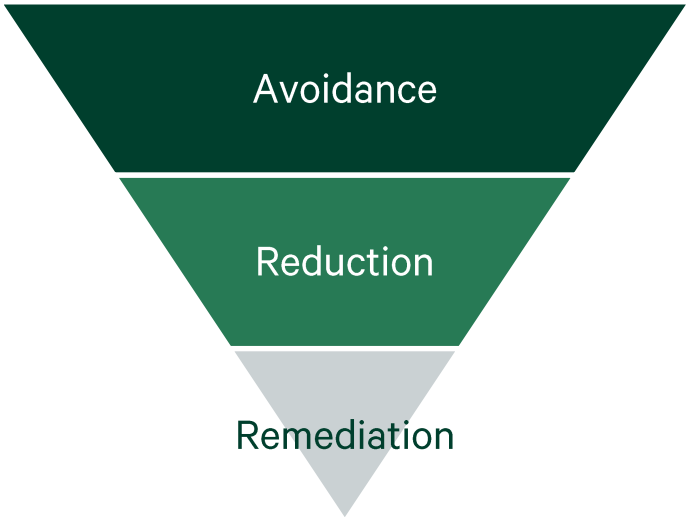

Figure 3.2 Mitigation hierarchy

3.4.17. Within the process, an initial impact assessment of the proposed development is undertaken, on the basis of which recommendations will be made regarding how the proposals could be altered to avoid adverse effects and improve beneficial effects. Where avoidance is not possible, then the focus will be to lessen the magnitude of effect. Where these measures are incorporated into the design of the proposed development and, as such, will be shown on the application plans, they are termed 'design interventions'.

3.4.18. Where the design interventions (also sometimes known as primary or embedded mitigation) do not fully avoid impacts on the environment additional mitigation and enhancement measures will be identified where required. The ES will include an assessment of residual effects, which are those likely to arise after any additional proposed mitigation and enhancement has been applied.

3.4.19. This iterative approach to the EIA process is shown in Figure 3.3.

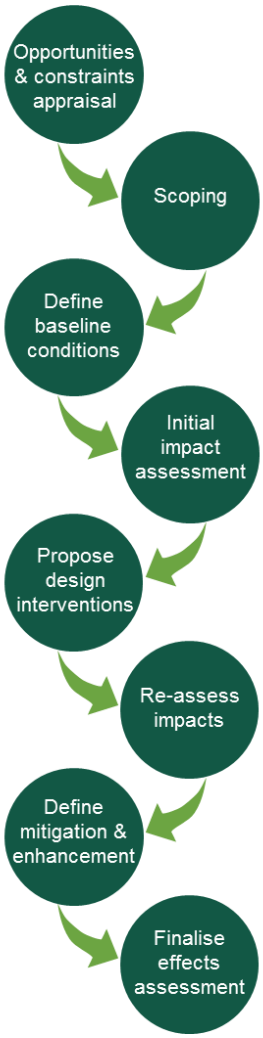

Figure 3.3 Iterative EIA approach

3.4.20. The ES will clearly state appropriate management and monitoring activities that will be undertaken to both mitigate any potential adverse significant effects and to review the efficacy of any recommended enhancement measures, where relevant. These will also be reviewed at the reserved matters stage to ensure that they remain effective and appropriate, with the potential for revision if required.

Consideration of alternatives

3.4.21. Part 5, Environmental Statements, Regulation 18, of the EIA Regulations 2017 requires the ES to contain:

> *"(3)(d) a description of the reasonable alternatives studied by the developer, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment;".*

3.4.22. Government Planning Practice Guidance on Environmental Impact Assessment states at paragraph 035 that:

> *"Where alternative approaches to development have been considered, the Environmental Statement should include a description of the reasonable alternatives studied which are relevant to the proposed development and its specific characteristics and provide an indication of the main reasons for the choice made, including a comparison of the environmental effects"*

3.4.23. Potential alternatives can be broadly grouped into the following categories:

- Alternative sites;
- Alternative land uses;
- Alternative processes; and
- Alternative development layouts.

3.4.24. The Applicant has purchased the application site with the clear intent of the future development of a film studio and therefore, alternative locations and land uses will not be considered. Additionally, alternative processes, which are typically more relevant for industrial uses, will not be considered.

3.4.25. As such, the ES chapter (Chapter 4: Alternatives and Design Evolution) will therefore focus on alternative development layouts and the design evolution of the proposed development.

Assessment of significance

Receptor sensitivity

3.4.26. Receptors are defined as the physical resources or user groups that are subject to impacts. They will be identified through a combination of desk-top studies and site visits undertaken by the various members of the EIA team.

3.4.27. Within each environmental topic chapter of the ES, receptors/resources will be identified, and their sensitivity determined. Sensitivity may depend on factors such as: rarity; quality; importance in an international, national, regional or local context and/or replaceability etc. This is generally categorised as being 'very high', 'high', 'medium', 'low' or 'negligible' as illustrated in Table 3.2.

Table 3.2
Description of receptor sensitivity

Sensitivity (value)	Typical description
Very high	Very high importance and rarity, international scale and very limited potential for substitution.
High	High importance and rarity, national scale, and limited potential for substitution.
Medium	Medium or high importance and rarity, regional scale, limited potential for substitution.
Low	Low or medium importance and rarity, local scale.
Negligible	Very low importance and rarity, local scale.

3.4.28. A table will be included within the methodology section of each chapter setting out the sensitivity criteria used in the assessment and the rationale for each of these criteria. A summary will then be provided at the end of the baseline conditions section to draw conclusions relating to the perceived sensitivity of identified receptors.

Magnitude of impact

3.4.29. Impacts are generally understood to be the changes resulting from an action.

3.4.30. The magnitude of an impact is generally considered to be 'large', 'medium', 'small' or 'negligible'. As with sensitivity, a table will be included in each technical chapter of the ES alongside an explanation of the rationale for each of these criteria. Where it is possible to do so, criteria will be based on recognised standards and guidelines. Where this is not possible, the criteria will be based on expertise and professional experience. A typical description of impact magnitude that may be applied by a technical discipline is included in Table 3.3.

Table 3.3
Description of Impact magnitude

Magnitude of impact		Typical description
Large	Adverse	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements.
	Beneficial	Large scale or major improvement of resource quality; extensive restoration; major improvement of attribute quality.
Medium	Adverse	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements.
	Beneficial	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality.
Small	Adverse	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.
	Beneficial	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring.
Negligible	Adverse	Very minor loss or detrimental alteration to one or more characteristics, features or elements.
	Beneficial	Very minor benefit to or positive addition of one or more characteristics, features or elements.

Significance of effect

3.4.31. Effects are generally understood to be the consequences of impacts on sensitive receptors. The significance of the effect is informed by the magnitude of the impact and the sensitivity of the receptor.

3.4.32. The assessment of significance within the ES also considered using a common scale, with effects described as being 'major', 'moderate', 'minor' or 'negligible' (which also includes 'neutral' or 'no impact' assessments). The method for ascribing significance is left to the judgement of each technical consultant, so that it reflects best practice within their specialist area. However, a generic significance matrix and broad definitions for each of these descriptors are provided Table 3.4 and Table 3.5. The specific criteria to be used to determine significance will be outlined in each of the relevant technical topics.

Table 3.4
Significance matrix

		Sensitivity (value)				
		Very high	High	Medium	Low	Negligible
Impact magnitude	Large	Major	Major or Moderate	Major or Moderate	Moderate or Minor	Minor
	Medium	Major or Moderate	Major or Moderate	Moderate	Moderate or Minor	Minor or Neutral
	Small	Major or Moderate	Moderate or Minor	Moderate or Minor	Minor	Minor or Neutral
	Negligible	Minor	Minor or Neutral	Minor or Neutral	Neutral	Neutral
	No change	Neutral	Neutral	Neutral	Neutral	Neutral

3.4.33. Effects are generally considered to be 'Significant' where they are of 'Moderate' or 'Major' significance (either adverse or beneficial). However, the approach may differ between assessments, where this is the case, this will also be outlined within the relevant ES technical chapter.

Table 3.5
Significance of effect

Significance of effect	Typical description
Major	These effects may represent key factors in the decision-making process. Potentially associated with sites and features of national importance or likely to be important considerations at a regional or district scale. Major effects may relate to resources or features that are unique and which, if lost, cannot be replaced or relocated.
Moderate	These effects, if adverse, are likely to be important at a local scale and on their own could have a material influence on decision-making; and
Minor	These effects may be raised as local issues and may be of relevance in the detailed design of the scheme but are unlikely to be critical in the decision-making process;
Negligible	These effects are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error, these effects are unlikely to influence decision making, irrespective of other effects.

3.4.34. In addition to the significance of the effect, statements are also made as to whether effects are adverse or beneficial, direct or indirect, temporary or permanent, reversible or irreversible, short-, medium- or long-term and/or cumulative. Definitions and examples for each are provided below:

- **Adverse** – a harmful or unfavourable effect (e.g., the loss of trees to allow the construction of new buildings);
- **Beneficial** – a favourable or advantageous effect (e.g., the creation of jobs as a result of proposed construction works);
- **Direct** – an effect without intervening factors (e.g., the removal of trees to allow for the construction of new buildings);
- **Indirect** – an effect not directly caused by the development (e.g., changes to the pattern of traffic movements across the road network as a result of a new road being constructed);

- **Temporary** – an effect lasting only for a limited period of time (e.g., piling during construction);
- **Permanent** – an effect lasting or intended to last or remain unchanged indefinitely (e.g., land reclamation from the sea);
- **Reversible** – an effect that is capable of being reversed so that the previous state is restored (e.g., the removal of solar panels to revert to grazing pasture);
- **Irreversible** – an effect that is not capable of being undone or altered (e.g., gravel extraction);
- **Short term** – an effect lasting between 0 and 5 years;
- **Medium term** – an effect lasting between 5 and 10 years;
- **Long term** – an effect lasting more than 10 years; and
- **Cumulative** – increasing by one addition after another (e.g., traffic generated by different developments occurring in close proximity to one another).

4. Proposed scope of the Environmental Statement

4.1. ES scope and requirements

4.1.1. This section considers the likely environmental effects of the proposed development and therefore the technical topics proposed for inclusion within the ES. Regulation 4(2) states that:

> *"the EIA must identify, describe and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of the proposed development on the following factors—*
>
> *(a) population and human health;*
>
> *(b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC(a) and Directive 2009/147/EC(b);*
>
> *(c) land, soil, water, air and climate;*
>
> *(d) material assets, cultural heritage and the landscape;*
>
> *(e) the interaction between the factors referred to in sub-paragraphs (a) to (d)."*

4.1.2. A list of technical topics was initially evaluated based on the potential for each to exhibit significant environmental effects as a result of the proposed development. This evaluation process included provisional assessments for each topic to understand the existing baseline conditions.

4.1.3. Based on the initial evaluation process, Table 4.1 summarises:

- The topics that are considered to have the potential for likely significant environmental effects; and
- The topics where the potential for likely significant environmental effects is not anticipated.

Table 4.1
Significance of effect

Topics with potential for likely significant environmental effects	Topics where potential for likely significant effects are *not* anticipated
Air Quality	Daylight, Sunlight and Overshadowing
Archaeology	Ground Conditions
Biodiversity	Wind
Built Heritage	Waste and Materials
Climate Vulnerability	Utilities
Effects on Climate: Greenhouse Gas Emissions	
Human Health	

Topics with potential for likely significant environmental effects	Topics where potential for likely significant effects are *not* anticipated
Landscape and Visual	
Lighting	
Major Accidents and Disasters	
Noise and Vibration	
Socioeconomics	
Water Resources	
Transport	

4.1.4. For those topics that are considered to have the potential for likely significant environmental effects, a detailed assessment will be provided within a technical chapter in the main volume of the ES (ES Volume II), or in the case of Landscape & Visual in a separate ES Volume (ES Volume III).

4.1.5. The exceptions to this are human health, risks of major accidents and disasters, and climate change. Stand-alone technical chapters are not proposed for these topic areas. Instead, where the risks of major accidents and/or disasters or effects of the development in relation to human health or climate change are relevant to a specific technical assessment, this will be stated and assessed within the respective ES chapter.

4.1.6. For those topics where potential likely significant environmental effects are not anticipated, topic specific technical chapters will not be provided within the main volume of the ES. However, where planning requirements stipulate that technical reports for these topics are required to support the planning applications, these reports will be submitted alongside the planning application.

4.1.7. The reasons for the judgements made regarding the potential for likely environmental effects and the means by which the scoped in topics will be addressed in the ES, are provided in the sections that follow.

4.1.8. Scoping is not limited to the submission of a request for a Scoping Opinion and is an ongoing process. If, as a consequence of further assessment being carried out by the technical consultants, it becomes clear that one or more of the topics where the potential for likely significant environmental effects is not anticipated are in fact likely to result in significant effects then the matter will be reported through the preparation of a full ES chapter.

4.2. Structure of the Environmental Statement

4.2.1. An ES must meet the requirements set out in Regulation 2(1) of the EIA Regulations 2017; however, these requirements do not include a specific structure that an ES should accord with. This section sets out CBRE's proposed structure for the ES.

4.2.2. The ES will be presented in four separate volumes as shown in Figure 4.1.

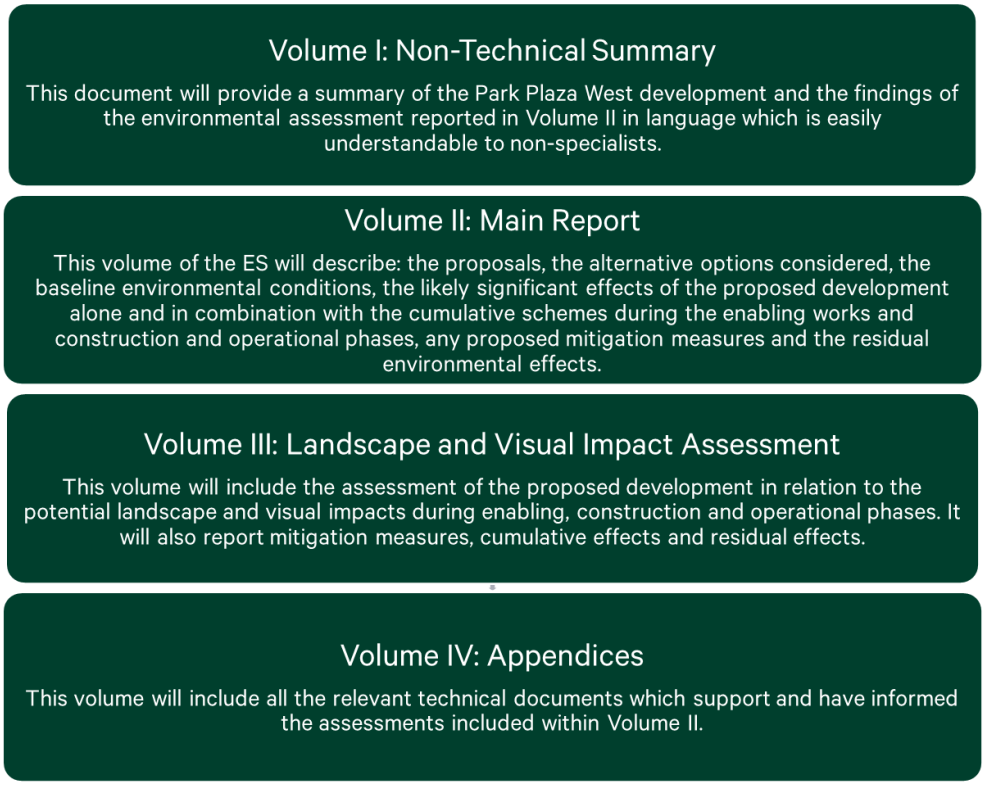

Figure 4.1 Volumes of the ES summary

4.2.3. The proposed structure of Volume II of the ES is shown in Table 4.2. To enable the reader to easily switch between the Main Report in Volume II and the associated technical documents in Volume IV, the numbering of the appendices will remain consistent with the chapter number in Volume II.

Table 4.2
Proposed structure of Volume II of the ES

Chapter	Content
1. Introduction	Development background and context; explanation of EIA and the EIA Regulations; the structure of the ES; information on the project team and chapter authors; where to view the ES; how to comment etc.
2. Site and surrounding area	Description of application site and the wider study area.
3. Proposed Development & Construction Strategy	Description of the elements of the development relevant to the assessment of the possible effects on the environment, including phasing, associated development etc. Describes the construction strategy, including indicative phasing of the works.
4. Alternatives & Design Evolution	Outline of the alternatives considered by the Applicant, including alternative layouts etc.
5. EIA Methodology	Approach to EIA process, including: consultation, responses received and how/where issues have been addressed within the ES, discussion of issues scoped out of the EIA, structure of technical chapters, and assessment of residual impact significance.
6.- 15. Technical topics	Detailed assessment of each environmental topic area (air quality, archaeology, biodiversity, built heritage, effects on climate, lighting, noise and vibration, socioeconomics, water resources and transport), including consideration of direct,

Chapter		Content
		indirect, primary, secondary, short, medium and long-term and inter-development cumulative effects. Please note that the assessment for technical topic Townscape and Visual will be provided within Volume III of the ES.
16.	Intra-development cumulative effects	Assessment of intra-development cumulative effects from the proposed development on key receptors.
17.	Summary of Mitigation & Residual Effects	Full list of the residual effects of the proposed development, the mitigation measures proposed and how these are to be secured.
18.	Glossary & Abbreviations	List of abbreviations and glossary of terms.

4.2.4. It is proposed that the technical chapters (Chapters 6-15) will be structured as follows:

- Introduction;
- Methodology;
- Baseline conditions;
- Potential significant impacts;
- Design interventions;
- Assessment pre-mitigation;
- Mitigation & enhancement measures;
- Assessment post-mitigation; and
- Inter-development cumulative effects.

4.2.5. The structure of the technical chapters – particularly the use of tables – has been devised by CBRE to make the technical assessments better focussed and more accessible to readers, and to reduce the length of the main volume of the ES. Where information has been summarised in the tables, references are provided as to where further information is provided in the technical appendices.

4.2.6. CBRE's technical chapter structure was reviewed by an ES assessor from the Institute of Environmental Management & Assessment (IEMA) in September 2017 and the approach was commended.

5. Topics with potential for likely significant environmental effects

5.1. Landscape and Visual

Context

5.1.1. It is considered that there is the potential for likely significant effects relating to landscape and visual impact and so this topic shall be 'scoped into' the EIA.

5.1.2. The landscape and visual analysis are informing and testing the evolving proposed development. The Landscape and Visual Impact Assessment (LVIA) will record how the proposed development has developed in response to the landscape and visual issues, including alternative design options that have been explored. The LVIA will cross reference the heritage chapter of the ES, where appropriate.

Baseline conditions

Study area

5.1.3. The extent of the overall study area for the LVIA is informed by the Zone of Theoretical Visibility (ZTV). This is a computer-generated analysis map (Figure 5.1) which has been produced to illustrate the theoretical visibility of the proposed development.

5.1.4. The ZTV illustrates the extent to which the development as a whole (modelled at up to 22 m ridge height) is potentially visible from the surrounding area viewed from a height of 1.6 m above ground to be roughly representative of the average human eye hight. The plan has been prepared using GIS computer software (MapInfo) and Environment Agency LiDAR Digital Surface Model (DSM) data, and as such takes into account built form.

5.1.5. The DSM data provided by EA has undergone heavy filtering and while some vegetation is accounted for, it does not fully represent the potential screening observed in the field. Field verification is required to refine the accuracy of the ZTV.

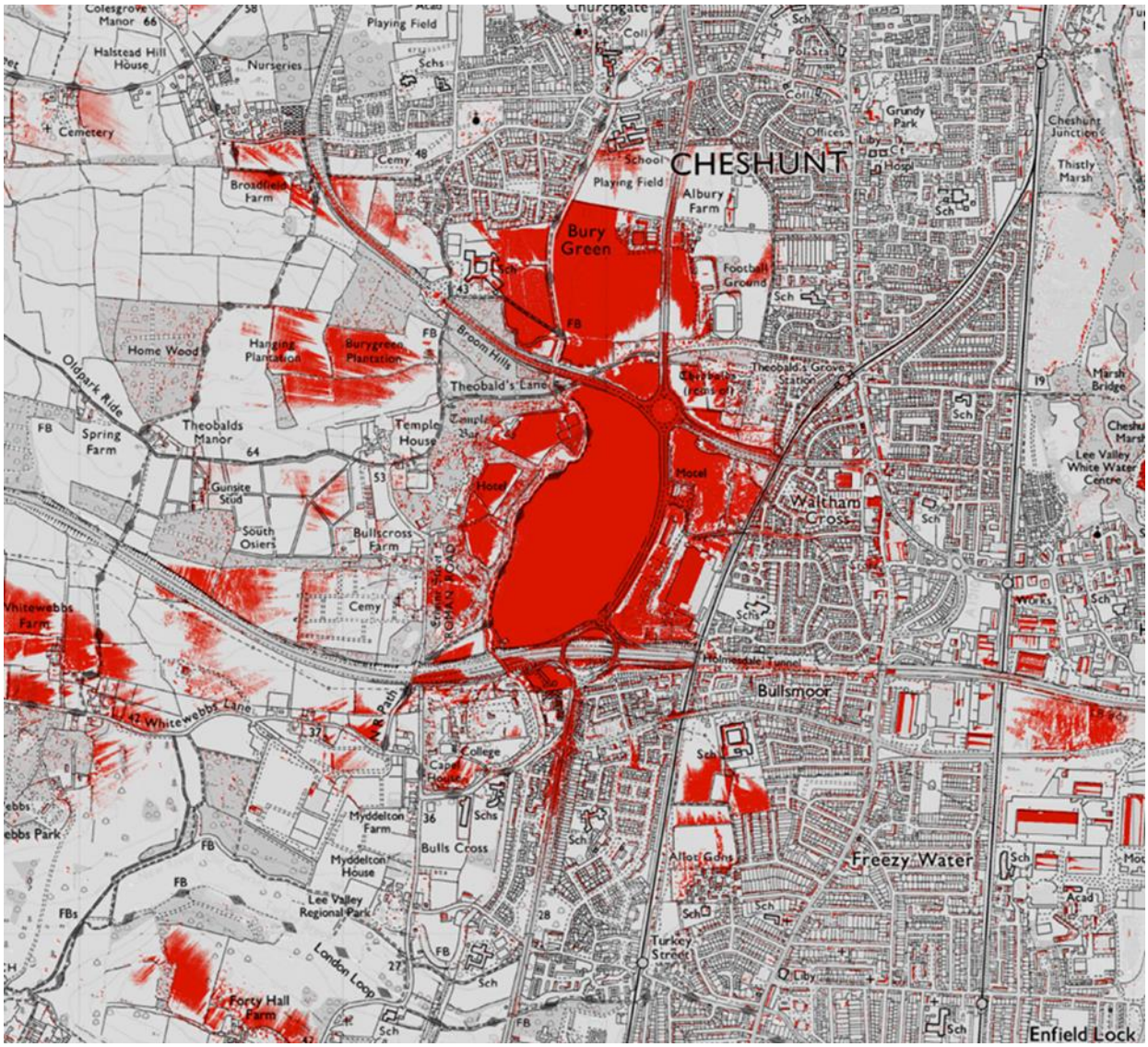

Figure 5.1 Zone of Theoretical Visibility

Receptors

5.1.6. The following sources of information have been used to establish the possible receptors within the study area:

- Google maps (10);
- Multi-Agency Geographic Information for the Countryside (MAGIC) Map (11);
- Natural England Character Area Profiles (12); and
- Broxbourne Landscape Character Assessment (13).

LANDSCAPE CHARACTER

5.1.7. The application site has been the subject of extensive landscape and visual studies to inform the Green Belt release and site allocation, Policy PP1: Park Plaza West under The Broxbourne Local Plan (4) (June 2020).

5.1.8. At a district level, the landscape character assessment classifies the Borough into distinctive Landscape Types and their component Landscape Character Sub-Area. The site is in the landscape classified as Landscape Type E: River Valley Floodplain – Farmland. This is a relatively small area considered to be of moderate to poor landscape condition, of a moderate visual sensitivity and overall low landscape character sensitivity with some capacity to change. Upgrades to the road network have resulted in an erosion of rural character and tranquillity through increased noise. Predominantly flat, it is noted that the overall sense of tranquillity is disturbed by proximity to the A10 corridor, which is a source of noise and visual intrusion.

5.1.9. Within the published material the character of the local landscape in which the site lies are sub-divided into the following three distinct components:

- Wooded Farmland;
- Farmland; and
- Urban.

5.1.10. The wooded farmland is located to the west, beyond New River and the urban area is located to the east, beyond the A10. The site lies within a central band of 'farmland'. This area of farmland is described within the published documentation as an urban fringe landscape with an assortment of pasture fields, mature hedgerows, small pockets of woodland, and groups of active and derelict glasshouses. The local road network is acknowledged as introducing a source of noise and movement.

5.1.11. The character areas and features local to the site are illustrated on Figure 5.2.

Undeveloped landscape

5.1.12. Farmland is predominantly arable, fragmented by transport and urban development.

5.1.13. Recreational areas include formal and informal spaces within the urban fringe and are often linked by footpaths (i.e., Cedars Park to the north-east).

5.1.14. Unmanaged land is located to the east of the A10 and to the rear of the Travelodge which is earmarked for future business use development.

5.1.15. Historic parkland is a dominant feature in the landscape, retaining significant woodland resource.

Developed landscape

5.1.16. Commercial/Industrial built form flanks the A10 transport corridor to the east which introduces a large scale and mass of development close to the site.

5.1.17. Residential and smaller-scale development defines the remainder of the urban context, although this is screened and separated from the site by dense woodland tree belts/copses and the intervening commercial/industrial use close to the road network.

5.1.18. The tower associated with Theobalds Estate to the west of the site (converted into a hotel) is visible filtered through and above the woodland vegetation, which adds an element of history to the site's surroundings.

5.1.19. The landscape receptors are likely to include the:

- New River and its corridor; and
- The Farmland of the application site.

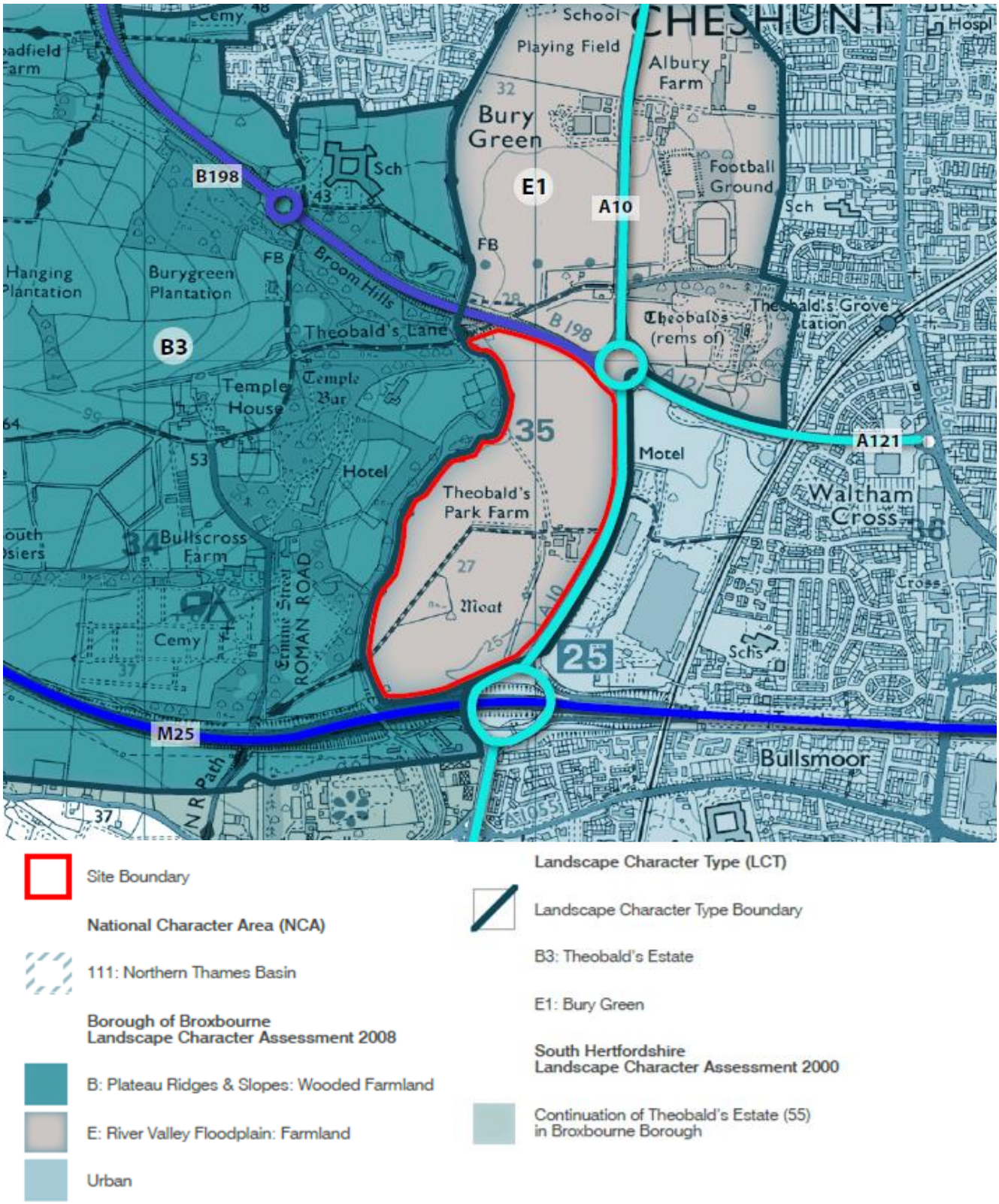

Figure 5.2 Landscape Character Areas

VIEWS AND VISIBILITY

5.1.20. The application site is well contained by the wooded parkland to the west, woodland belts to the north and the presence of dense woodland which flanks the M25. Intermittent enclosure is afforded by the commercial/ industrial development off the A10.

5.1.21. The flat topography, enclosing woodland elements and adjacent built form limit the majority of views to those from within the local area in close proximity to the site. However, there are longer distance views of the site from high ground to the east, where the Travelodge and Printworks buildings form distinct elements in the view, partly screening the site.

5.1.22. As the land to the east of the application site is developed in the future (in line with local policy aspirations) the additional built form may further screen these views whilst at the same time providing an urban context.

5.1.23. The visual receptors (people) of highest sensitivity within the ZTV will be:

- People walking along and enjoying recreational activities within the New River corridor; and
- Those using the public footpath network which crosses or connects with the site (including the New River and Waterside Green Chain HD19 recreational route).

5.1.24. It is worthy of note that there is a general lack of residential properties in the area, and subsequently few of these highly sensitive visual receptors who may have the potential to be affected by the development of the application site.

5.1.25. The lower sensitivity receptor group of road users (but likely to be frequent viewers) will be focussed on the road ahead and are likely to be travelling at speed so will experience fleeting views, however their proximity to the site indicates they are relevant visual receptors.

5.1.26. The visual assessment is proposed to be focused on the following seven receptors:

- **Viewpoint 1:** Taken from the eastern site boundary, off the A10.Travelodge Cheshunt (hotel);
- **Viewpoint 2:** Taken from the southern site boundary, at the access to the public footpath on site and the New River recreational route;
- **Viewpoint 3:** Taken from the western site boundary, along the New River and Waterside Green Chain HD19 recreational route;
- **Viewpoint 4:** Taken from the northern site boundary, along the New River and Waterside Green Chain HD19 recreational route;
- **Viewpoint 5:** Taken from the overhead motorway footbridge along the New River;
- **Viewpoint 6:** Long distance view taken from a hill above Monkhams Hall, Holyfield; and
- **Viewpoint 7:** Long distance view taken from an area of high ground to the east.

5.1.27. These are shown visually in Figure 5.3 with representative baseline photography provided in Appendix A.

Figure 5.3 Viewpoints which will form the basis of the assessment of visual effects

Key issues and requirement for assessment

Enabling works and construction

5.1.28. During the enabling and construction phases, a number of changes to the landscape character and visual amenity would arise as a result of:

- Site clearance (including vegetation removal);
- Site preparation including earthworks;
- Haulage operations and temporary parking;
- Operation and movement of plant;
- Temporary lighting;
- Site compound; and
- Partially built structures.

5.1.29. The LVIA will consider the effects of all of the above, alongside the programme and phasing of the works.

Operation

5.1.30. For the purposes of the assessment, the operational phase will consider both opening year (Year 1) and 15 years after operation (Year 15). Year 1 will assess the worst-case scenario where vegetation is not fully matured, and Year 15 will assess the effects after a time which the proposed planting will be fully matured. The principal aspects considered likely to result in significant effects during the operational stage and therefore those which will be included in the assessment are:

- The location and height parameters of the buildings (including consideration of the potential for structures on the backlot);
- The operational landscape - the final levels and features in the areas without built-form, e.g., landform, structure planting, signage;
- Details of serving arrangements;
- New lighting strategy; and
- Landscape planting and management.

Assessment methodology

Baseline conditions

5.1.31. The sources identified in paragraph 5.1.6, will be used to establish baseline conditions in the ES.

Assessment scenarios

5.1.32. The assessment will consider all assessment scenarios outlined within paragraph 3.4.4.

Assessment approach

5.1.33. The methodology employed in the preparation of the LVIA will take account of the following published guidance:

- Guidelines for Landscape and Visual Impact Assessment, LI and IEMA, 2013. Third Edition (14);
- Landscape Institute Technical Information Note: Townscape Character Assessment, 05/2017, Revised April 2018 (15);
- Visual Representation of Development Proposals, Technical Guidance Note 06/19, Landscape Institute, September 2019 (16);
- European Landscape Convention, Council of Europe, October 2000;
- An Approach to Landscape Character Assessment, Natural England 2014 (17); and
- Assessing landscape value outside national designations, LI, February 2021, Technical Guidance Note 02/21 (18).

5.1.34. The assessment will be undertaken by a Fellow of the Landscape Institute and will be included within Volume III of the ES. Photography and visualisations will be a component of the assessment and will accord with the Landscape Institute Technical Guidance Note 06/19: Visual Representation of Development Proposals. The visual effects assessment will consider daytime and night-time issues.

5.1.35. The approach to the assessment of landscape and visual effects will include:

- Description of the extant baseline situation in respect of the relevant landscape and townscape, this will include reference to consented, but yet to be constructed projects. Historic features and landscapes will be referenced where they influence the character and visual context, although the assessment of effects on heritage assets will be considered in the Built Heritage ES Chapter;
- Definition of thresholds and terminology used in the assessment;
- Classification of the resources in respect of their intrinsic sensitivity, arising from the value of the resource/receptor and susceptibility to the change proposed;
- A systematic process for the identification and description of the likely changes (impacts) to the landscape and visual context. This will include a description of the phases of the proposed development and the components which give rise to landscape and visual impacts. Classification of the magnitude of the likely change relating to the scale, geographic extent and duration/reversibility of impacts;
- Description of the mitigation measures, adopted in the design approach, to prevent, reduce or compensate for adverse impacts and any future measures required to address residual effects. The LVIA will also consider climate change; and
- Assessment of effects and their significance (the function of the sensitivity of the resource and the magnitude of the change for each receptor). Visual effects will be assessed for summer and winter views and daytime and night-time conditions.

5.1.36. Where potential cumulative effects are identified, regarding consented schemes confirmed by the LPA, an assessment of cumulative landscape and visual effects will be completed.

Assessment criteria

RECEPTOR SENSITIVITY

Landscape

5.1.37. The value and susceptibility ascribed to landscape assets contributes to an understanding and consideration of the potential sensitivity of an area as outlined in this section.

5.1.38. Landscape Value is rated, for the purposes of this assessment on the following scale:

- **National/International** – Designated landscapes which are nationally or internationally designated for their landscape value – including National Parks, Areas of Outstanding Natural Beauty, World Heritage sites; Heritage Coast and National Scenic Areas.
- **Borough** – Locally or regionally designated landscapes (e.g., Area of High Landscape Value, Regional Scenic Areas); also, areas which local evidence (such as tourism guides, landscape character assessments or other documentary information) indicates as being more valued than the surrounding area.
- **Local** – 'everyday' landscape which is appreciated by the local community but has little or no wider recognition of its value.

Landscape Susceptibility

5.1.39. Landscape Susceptibility indicates the ability of a defined landscape or visual receptor to accommodate a proposed development "without undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies." (GLVIA 3, paragraph 5.40).

5.1.40. At the highest end of the 'susceptibility spectrum' is a landscape wherein changes as a result of a development would be entirely at odds with the character of the local area, related to matters including pattern, grain, use, scale, and mass. The development would require extensive change to the topography, vegetative cover or form of buildings. Mid-way on the spectrum is a landscape wherein a development has a degree of consistency with the existing scale, pattern, grain, land use of the prevailing character, although mitigation may be appropriate to enhance assimilation.

5.1.41. At the lower end of the spectrum a development would be entirely consistent with the character of the local area, related to matters including pattern, grain, use, scale, and mass.

Landscape Sensitivity

5.1.42. At the lower end of the spectrum (low sensitivity) resources may be; low valued/undesignated landscapes, with no distinctive or sensitive features, with the potential to accommodate appropriately design development, and where adverse effects can be mitigated for. At the higher end of the range are; those highly valued/designated landscapes recognised in policy, may contain landscape features that cannot accommodate development of the type proposed, and where mitigation measures are unable to avoid, compensate or offset the undue consequences which would arise.

Visual

5.1.43. The value of views should take account of:

- Recognition of value attached to a particular view, possibly associated to a heritage asset or planning designation; and/or
- Indicators of the value through guidebooks, tourist maps, or historic references.

5.1.44. For the purposes of the visual assessment, the susceptibility of people to changes in their views and visual experience is a function of the occupation of the people, the extent to which their attention or interest is focused on the views and the visual amenity they experience at a particular location.

5.1.45. Visual sensitivity - At the lower end of spectrum may be those people engaged in an activity which is not focussed on the landscape or context of the person/people, where the views are infrequent, the representative or specific viewpoints are not associated with a valued landscape or asset. At the higher end of the spectrum people are engaged in an activity whereby the focus of the visual experience is directly linked to the landscape context, the views are associated with a valued landscape or important assets/landmarks, and the number or people and frequency of the visual experience is high.

MAGNITUDE OF IMPACT

Landscape

5.1.46. At the lower end of the spectrum, the degree of landscape change (magnitude) may be small, and the loss/addition of landscape features affecting only a limited proportion of the total extent which the resource contributes to the character. The changes are entirely consistent with the context, and the geographic extent over which the effects occur may be localised.

5.1.47. At the higher end of the spectrum the change may be over an extensive area with a high proportion of landscape elements which contribute to the character of the area being lost or altered. The change may be at odds and incongruent with the context within which it occurs.

Visual

5.1.48. At the lower end of the spectrum, the visual change (magnitude) may be small scale with no notable loss or addition to the view, the change is consistent with the baseline context and will not give rise a contrast in elements, form, colour and line, whilst the views are likely to be fleeting, glimpsed, or viewed infrequently.

5.1.49. At the higher end of the spectrum the changes will be large scale, with losses of key elements in the view and/or additional features which may be incongruent in the composition. There is likely to be contrast in scale, form, line and colour and the changes will affect a large proportion of the view and be fully visible. The duration of the view is likely to be prolonged and frequent.

SIGNIFICANCE OF EFFECT

Significance of Landscape Effects

5.1.50. At the lower end of the spectrum the resource affected may be of limited value and sensitivity, the degree of change may be small and the loss of landscape features may be only a limited proportion of the total extent that the landscape/asset represents and contributes to the character; the changes are entirely consistent with the baseline situation, the geographic extent over which the effects occur is possibly localised.

5.1.51. At the higher end of the spectrum the change may affect the landscape resources of the highest level of value and sensitivity and be experienced over an extensive area with a high proportion of landscape elements which contribute the character of the area lost/altered, the change maybe at odds and incongruent within the context in which it occurs.

Significance of Visual effects

5.1.52. At the lower end of the spectrum the visual change may affect the lower order of visually sensitive receptors, the changes experienced would be small scale with no notable loss of addition to the view, the change would be consistent with the baseline and would not give rise to contrast in elements, form, colour and line, views are likely to be fleeting, glimpsed, or viewed infrequently.

5.1.53. At the higher end of the spectrum the changes would affect the higher order of visual receptors and the change would be large scale, with losses of key elements in the view and/or additional features which may be incongruent in the composition. There is likely to be contrast in scale, form, line and colour and the changes will be distinctive and prominent.

Threshold of Significance

5.1.54. It is important to acknowledge that GLVIA (paragraph 3.33) recognises that it is not essential to establish a series of thresholds of different levels of significance. The simple point is to make clear judgements as to whether the effects are significant or not significant. Notably the word ‘harm’ is not contained in the GLVIA, any judgements on ‘harm’ are planning judgements and would be addressed in the appropriate forum.

5.2. Biodiversity

Context

5.2.1. It is considered that there is the potential for likely significant effects relating to biodiversity and so this topic shall be 'scoped into' the EIA. Although the site is of relatively low ecological value due to arable farming practices, there are some features of ecological value on site, and potential exists for legally protected species to be present.

Baseline conditions

Study area

5.2.2. The field survey area has included the application site itself and the adjacent New River corridor. This is considered appropriate as the application site is tightly bounded by the New River and major roads, including the M25, therefore no reason was identified for field surveys to be undertaken beyond these clear boundaries.

5.2.3. The study areas of relevance to the desk study were variable. A 2 km radius around the central point of grid reference TL349006 was used for the local records centre data search, while internationally designated sites were identified up to 10 km distance from the site. These distances are considered to be sufficient to the site and proposed development, based upon published guidance from the Chartered Institute of Ecology and Environmental Management (e.g., CIEEM 2017. Guidelines for Preliminary Ecological Appraisal, 2nd edition. Chartered Institute of Ecology and Environmental Management, Winchester) and professional judgement.

Receptors

5.2.4. The following sources have been used to establish the possible receptors within the study area:

- Desk studies in 2011 and 2019;
- A suite of field surveys undertaken in 2011, 2016, 2019 and 2021 including;
  - Extended Phase 1 habitat survey;
  - Bat roost inspection (building and trees);
  - Tree climbing survey;
  - Bat activity survey;
  - Bat emergence surveys;
  - Badger survey;
  - Habitat Suitability Index survey;
  - eDNA (environmental DNA) survey; and
  - Breeding bird surveys.
- Open source data from MAGIC, Natural England and the Joint Nature Conservation Committee.

DESIGNATED SITES

5.2.5. The desk study identified a number of national and local designated nature conservation sites in the study area (<2 km), these are listed in Table 5.1, which also includes the four internationally designed sites located within the 10 km study area. These are shown on Figure 5.4.

Table 5.1
Designated sites within the study areas

Name	Status	Location	Interest
International			
Lee Valley	Special Protection Area	TQ351888 1.4 km NE of site boundary	Non-breeding Gadwall, Shoveler and Bittern bird species.
Lee Valley	Ramsar	TQ351888 1.4 km NE of site boundary	Nationally scarce plants, and rare/vulnerable invertebrates, internationally important populations of overwintering Gadwall and Shoveler birds.
Epping Forest	Special Area of Conservation	TQ41889774 6 km SE of the site boundary	Atlantic acidophilous beech forests.
Wormley-Hoddesdonpark Woods	Special Area of Conservation	TL31940586 6 km NW of the site boundary	Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli.
National			
Turnford & Cheshunt Pits	Site Special of Scientific Interest	TL370027 1.4 km NE of site boundary	Gravel pits with areas of marsh, grassland, ruderal herbs, scrub and woodland, part of the Small River Lee and a further water body Hall Marsh Scrape. The pits are of national importance for wintering gadwall and shoveler.
Local			
Broom Hills (80/072)	Local Wildlife Site (LWS)	TL 345 011 0.2 km NW of site boundary	Old semi-natural woodland bisected by a road. Pedunculate Oak (Quercus robur) is dominant in the northern compartment while the southern area is predominantly Sycamore (Acer pseudoplatanus) with some Ash (Fraxinus excelsior) and scattered conifers. A small stream in the south supports some interesting wet clay areas with plants such as Pendulous Sedge (Carex pendula), Wood Sedge (Carex sylvatica) and Wood Anemone (Anemone nemorosa). Other species of interest include Broad Buckler-fern (Dryopteris dilatata), Giant Fescue (Festuca gigantea), Wood Meadow-grass (Poa nemoralis), Yellow Archangel (Lamiastrum galeobdolon), Hairy-brome (Bromopsis ramosa) and Common Dog-violet (Viola riviniana). A remnant old Hornbeam (Carpinus betulus) hedge is present along the northern edge of the wood. Wildlife Site criteria: Old secondary woodland with a predominantly semi-natural canopy and varied structure; >2 ha; woodland indicators.
Temple Bar Meadow (80/012)	LWS	TL 344 011 0.3 km NW of site boundary	Rough, damp old grassland with a reasonably species-rich sward supporting plants such as Red Fescue (Festuca rubra), Field Wood-rush (Luzula campestris), Meadow Buttercup (Ranunculus acris), Sweet Vernal-grass (Anthoxanthum odoratum), Meadow Vetchling (Lathyrus pratensis), Bird's-foot Trefoil (Lotus corniculatus), Common Sorrel (Rumex acetosa), Marsh Bedstraw (Galium palustre) and Lady's Smock (Cardamine pratensis). Scrub is dominant around the edges of the site and is invading the grassland. A ditch is present to the

Name	Status	Location	Interest
			south and south-east edges. Wildlife Sites criteria: Grassland indicators.
Burygreen Plantation (80/073)	LWS	TL 341 014 0.5 km NW of site boundary	Old plantation on ancient woodland site comprising mainly Pedunculate Oak (Quercus robur) with younger Sycamore (Acer pseudoplatanus) plus other species such as Common Lime (Tilia x europaea), Sweet Chestnut (Castanea sativa), Ash (Fraxinus excelsior) and Horse-chestnut (Aesculus hippocastanum). Hornbeam (Carpinus betulus) coppice is also present, mainly alongside a small stream that meanders through the wood. The ground flora includes several woodland indicators and is of most interest close to the stream. Species recorded include Wood Meadow-grass (Poa nemoralis), Wood Anemone (Anemone nemorosa), Yellow Archangel (Lamiastrum galeobdolon), Giant Fescue (Festuca gigantea), Remote Sedge (Carex remota), Pendulous Sedge (Carex pendula) and Dog's Mercury (Mercurialis perennis). Wildlife Site criteria: Old woodland with a semi-natural canopy and varied structure; >2 ha; woodland indicators.
Bonney Grove Wood (80/058)	LWS	TL 340 023 1.3 km NW of site boundary	Old semi-natural broadleaved woodland with a canopy of Hornbeam (Carpinus betulus) and Ash (Fraxinus excelsior) with Pedunculate Oak (Quercus robur) more frequent in the south. There is some Hornbeam coppice and Wych Elm (Ulmus glabra) is also common. The shrub layer is predominantly of Hawthorn (Crataegus monogyna) and Elder (Sambucus nigra). Species recorded in the ground flora includes Cow Parsley (Anthriscus sylvestris), Dog's Mercury (Mercurialis perennis), Hairy-brome (Bromopsis ramosa), Broad Buckler-fern (Dryopteris dilatata), Wood Sedge (Carex sylvatica), Giant Fescue (Festuca gigantea), Three-nerved Sandwort (Moehringia trinervia) and Wood Meadow-grass (Poa nemoralis). A small braided stream crosses the site and a remnant boundary bank and hedge, including Hornbeam, is present. Wildlife Site criteria: Old secondary woodland with a semi-natural canopy and varied structure; >2 ha; shown on 1st Edition 6 to 1 mile O.S.; woodland indicators.
Old Rush Field (80/003)	LWS	TL 333 017 1.4 km NW of site boundary	Species-rich old neutral grassland with damp/wet hollows. Species recorded include Common Sorrel (Rumex acetosa), Common Knapweed (Centaurea nigra), Meadow Buttercup (Ranunculus acris) and Meadow Vetchling (Lathyrus pratensis) with Ragged Robin (Lychnis flos-cuculi), Marsh Marigold (Caltha palustris), Brooklime (Veronica beccabunga), Water Mint (Mentha aquatica) and several rushes (Juncus spp.) and sedges (Carex spp.) in the wetter sward. The field is surrounded by mixed species hedgerows. Wildlife Site criteria: Grassland indicators.
Meadow N of Barrow Lane (80/018)	LWS	TL 338 022 1.4 km NW of site boundary	An area of unimproved neutral, partly wet, grassland divided in the north-east by a scrub-lined small ditch. The sward supports a good diversity of grasses and herbs and is wettest within the triangle of land in the north-east corner and along a strip running from the south-west to the north-east corners of

Name	Status	Location	Interest
			the main field. Species recorded include Yorkshire Fog (Holcus lanatus), Sweet Vernal-grass (Anthoxanthum odoratum), Crested Dog's-tail (Cynosurus cristatus), Bird's-foot Trefoil (Lotus corniculatus), Common Sorrel (Rumex acetosa), Common Knapweed (Centaurea nigra), Meadow Buttercup (Ranunculus acris), Oxeye Daisy (Leucanthemum vulgare) and Common Fleabane (Pulicaria dysenterica) along with Glaucous Sedge (Carex flacca) and a number of rushes (Juncus spp.). Mixed-species hedgerows of shrubs and trees border the south, west and north sides. Wildlife Site criteria: Grassland indicators.
Thistly Marsh (81/001/03)	LWS	TL 367 020 1.6 km east of site boundary	This site has been left as a result of removing SSSIs from Wildlife Sites. It will be reviewed once survey data and a site assessment have been carried out. Wildlife Site criteria: Buffers an SSSI.

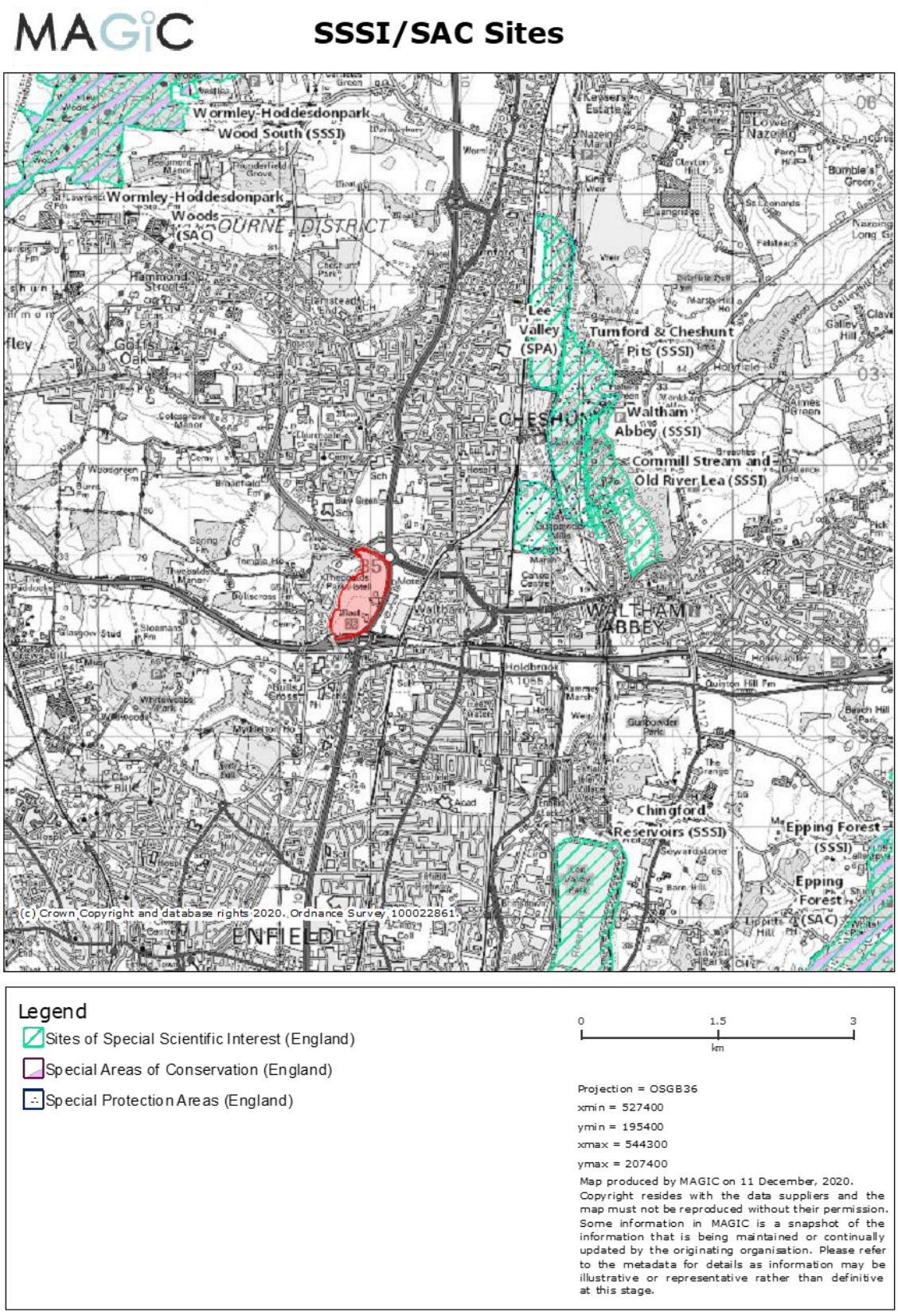

Figure 5.4 Designated Sites. Map shows Sites of Special Scientific Interest (SSSIs), Special Protection Areas (SPA) and Special Areas of Conservation (SAC)

HABITATS

5.2.6. The habitats on the application site are, in general, of low conservation interest. The vast majority of the site is made up of arable fields, with some small areas of woodland/scrub, ponds, short sections of poor hedgerow and limited patches of ruderal vegetation (see Figure 5.5).

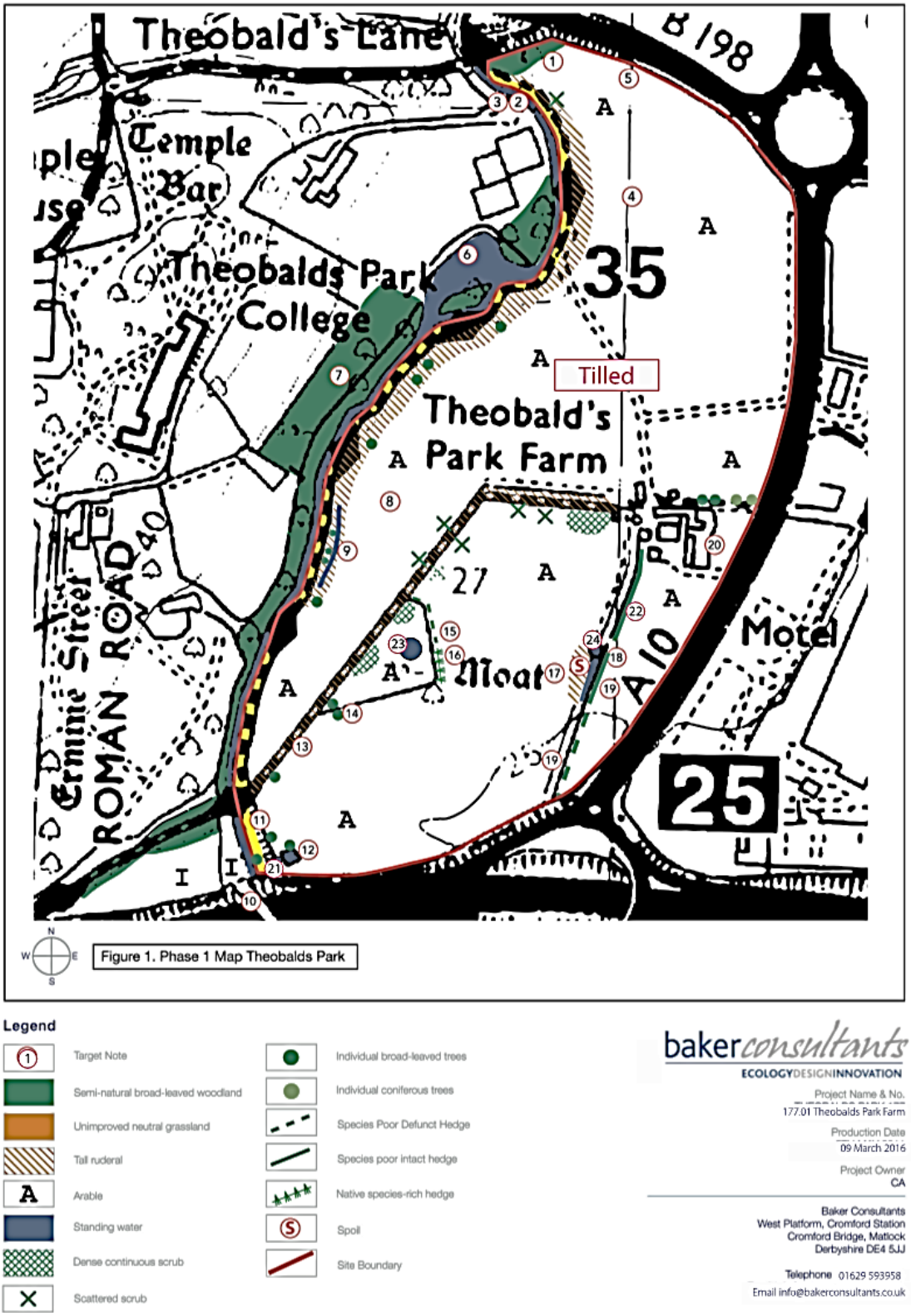

Figure 5.5 Phase 1 Habitat Map

5.2.7. There are no running water habitats within the site, however the New River watercourse marks the western boundary of the site.

5.2.8. Five waterbodies were recorded within the site in 2016:

- At the southern extremity of the site is a fenced compound with a square settling pond (Target Note (TN) 12);
- A smaller waterbody (TN21) formed next to this larger pond between 2011 and 2016;
- Two other ponds are located to the south of the farm buildings, close to the southeast corner of the site (TN18 and TN24); and
- A temporary waterbody towards the south-western section of the site (TN23).

5.2.9. A ditch located approximately half-way along the riverbank, at the base of the slope (TN9), identified in the 2011 survey, held no water in 2019 and 2021.

5.2.10. At the northern end of the site is a small area of woodland (TN1). This has a number of ivy-clad sycamore and young wych elm with six mature oak trees. The ground flora includes creeping buttercup, lesser celandine, cow parsley, cleavers, common nettle, broadleaved dock, dog's mercury, ground ivy and bramble.

5.2.11. The northern part of the site lacks field boundaries, but there are two hedges in the southern half. Running south from the farm buildings is a dense hedge (TN19) with wych elm, blackthorn, hawthorn, ivy, field maple and holly. This has a parallel dry ditch in its northern and southern sections and a narrow grassy border with red dead-nettle, Yorkshire fog, cleavers and common nettle.

5.2.12. Towards the centre of the site (TN15) there is a relict hedge-line, consisting of hawthorn, elder and ivy, with two mature oak trees, each with a diameter of c.1.3 m.

5.2.13. Further details on the baseline conditions of the application site are included in the Baker Consultants Park Plaza West Ecological Appraisal, June 2021 (ref: 177.06_rep_CA). This report is provided in Appendix B.

5.2.14. A summary of the findings in relation to protected species is provided within the following sections.

PROTECTED SPECIES

Bats

5.2.15. The habitats within the site were assessed for their potential to support roosting bats. Surveys have determined that there is one tree with moderate bat roost potential located within the site, and a number of farm buildings, some of which have high bat roost potential. However, further bat emergence surveys have not indicated the presence of any roosting bats within the application site.

5.2.16. The New River, adjacent to the western site boundary, offers some of the best foraging and commuting habitat for bats within the wider survey area.

Badgers

5.2.17. Badgers were identified as also present within the site during surveys undertaken in 2016 and 2019. However, further checks for badger activity in June 2021 found no confirmed use of the known setts, and no new activity elsewhere.

Amphibians and reptiles (herpetofauna)

5.2.18. Five ponds located within the application site were subject to eDNA surveys in 2016, all of which returned a negative result. In 2021, two ponds on the application site held water and were tested for eDNA. Both tests again returned negative results, confirming that great crested newts are not present within the application site.

Birds

5.2.19. Breeding bird surveys have been undertaken in 2016, 2019 and 2021 (further details of which can be found in Baker Consultants Park Plaza West Ecological Appraisal). These recorded:

- A total of 50 bird species during the 2016 breeding bird surveys, including 17 notable species;
- A total of 32 bird species during the 2019 breeding bird surveys, including seven notable species; and
- A total of 28 bird species during the 2021 breeding bird surveys, including five notable species.

5.2.20. The bird assemblage is considered to be of local value, and the New River has had a breeding pair of garganey (a rare species of duck) recorded on it.

Invertebrates

5.2.21. Due to the limited availability of dead wood and wooded habitats recorded on the site, it is not likely that significant stag beetle habitat exists.

5.2.22. The close proximity of the New River is expected to provide suitable habitat for dragonflies and damselflies associated with the marginal and aquatic vegetation to the west of the site, and potentially the ruderal areas along the western site boundary, by association.

Plants

5.2.23. Japanese knotweed has been recorded outside the northern boundary of the proposed development, close to the New River, at Grid Reference TL 3481 0107.

Key issues and requirement for assessment

5.2.24. The identified receptors that are proposed to be assessed within the ES are listed within this section. These have been identified through desk studies and a range of field surveys at the site, undertaken between 2011 and 2021.

5.2.25. The main impacts considered likely to result in significant environmental effects, and that will therefore be assessed are:

- The loss of habitats within the site during enabling and construction works;
- Potential indirect impacts, such as air pollution or increased public access, on nearby designated sites; and
- Disturbance impacts on notable species, from issues such as noise and lighting.

5.2.26. The main receptors that will be considered are:

DESIGNATED SITES:

1. Lee Valley Ramsar and SPA (including Turnford and Cheshunt Pits SSSI)
2. Epping Forest SAC
3. Wormley-Hoddesdonpark Woods SAC
4. Temple Bar Meadow LWS
5. Broom Hills LWS

HABITATS:

6. Running water
7. Open water
8. Woodland and scrub
9. Hedgerows

SPECIES:

10. Bats
11. Badger
12. Birds

Assessment methodology

Baseline conditions

5.2.27. The sources identified in paragraph 5.2.4, will be used to establish baseline conditions in the ES. Information obtained from statutory consultees and any other open source data including MAGIC, Natural England and Joint Nature Conservation Committee (JNCC) will also be updated, reviewed and used to inform baseline conditions, where relevant.

Assessment scenarios

5.2.28. Three assessment scenarios will be assessed within the biodiversity chapter of the ES. These are:

- **Assessment scenario 1:** The future baseline of the site in the event that the proposed development is not brought forward (either enabling works or subsequent studio development). The future baseline assumes that the application site is maintained and managed in accordance with typical farming practices;
- **Assessment scenario 2:** Enabling works consisting of major cut and fill exercise, with an accompanying remediation scheme back to greenfield conditions in the event that the proposed development does not gain approval; and
- **Assessment scenario 3:** Construction of the proposed development, following the completion of earthworks in assessment scenario 1 and its subsequent operation.

Assessment approach

ECOLOGICAL IMPACT ASSESSMENT

5.2.29. The Biodiversity Chapter of the ES will be guided by best practice guidance for ecological impact assessment (EcIA) as set out by the Chartered Institute of Ecology and Ecological Management (Guidelines for Ecological Impact Assessment. Version 1.1 Updated September 2019).

5.2.30. The Ecology Chapter will assess the enabling works, construction and operation phases of the proposed development, confirming receptors, assessing impacts, and setting out mitigation and monitoring recommendations. It will define residual impacts and assess cumulative impacts with other relevant schemes.

Sensitivity

5.2.31. Establishing a comprehensive ecological baseline, and application of the EcIA guidelines, will allow a value to be attributed to each ecological receptor in accordance with CIEEM's geographic framework which, for the proposed development, will be: local, district, county, regional, national and international. These will be used to determine the sensitivity of receptors.

Magnitude

5.2.32. The predicted ecological impacts from the proposed development, will be characterised as set out in CIEEEM guidance, taking into account:

- **Direction:**
  - Positive - a change that improves the quality of the environment; and
  - Negative - a change which reduces the quality of the environment.
- **Extent**: the spatial or geographical area over which the impact may occur under a suitably representative range of conditions;
- **Magnitude**: the size, amount, intensity and volume of impact (assessed in a quantitative way where possible);
- **Duration**: the time over which the impact is expected to last (considering both the timeframe in relation to ecological characteristics and human timeframes);
- **Frequency:** the number of times an activity occurs will influence the resulting effect;
- **Timing**: the timing of an activity or change may result in an impact if it coincides with critical life stages or seasons; and
- **Reversibility:** whether the impact is temporary or permanent.

Significance

5.2.33. The significance of impacts will be assessed on the same geographic scale as sensitivity, considering effects on the integrity of designated sites, and the favourable conservation status of habitats and species.

5.2.34. Reference will be made to the technical assessments within supporting reports that will be appended to the ES.

BIODIVERSITY NET GAIN

5.2.35. Biodiversity net gain requires developers to ensure habitats for wildlife are enhanced and left in a measurably better state than they were pre-development.

5.2.36. An assessment will be undertaken of the types of habitat present and their condition before development, and then improvements to the area and/or quality of these habitats post-development will be demonstrated. A Biodiversity Net Gain calculation will be produced for the application site using the Defra Biodiversity Metric. This will be integrated within the biodiversity chapter of the ES, and will provide a quantitative measure of the habitat losses and gains at the site predicted to arise from the proposed development.

HABITAT REGULATIONS ASSESSMENT

5.2.37. A 'shadow' Habitat Regulations Assessment (HRA) will be prepared for submission to the Local Planning Authority, to assess potential impacts on the European designated sites nearby: Lee Valley Ramsar and SPA, Epping Forest SAC and Wormley-Hoddesdonpark Woods SAC.

5.2.38. The shadow HRA will be prepared and appended to the ES.

5.3. Built Heritage

Context

5.3.1. It is considered that there is the potential for likely significant effects relating to built cultural heritage, including direct and indirect impacts on listed buildings and their settings.

5.3.2. The built heritage assessment will assess the likely effect of the proposed development on 'built' or 'above ground' heritage receptors. It will also consider the setting impacts on archaeological assets with an above ground presence. The assessment of likely effects on archaeology or 'below ground' heritage receptors will be presented in a separate chapter of the ES.

5.3.3. Built heritage receptors include Listed Buildings, Scheduled Ancient Monuments (with upstanding remains), Conservation Areas, Registered Parks and Gardens and non-designated heritage receptors such as locally listed buildings.

Baseline conditions

Study area

5.3.4. A study area comprising the application site and a radius of 500 m from the outer boundary of the site is proposed, and all designated and non-designated assets with the study area are proposed to be ‘scoped-in’. Where assets share a common setting, and the impacts are likely to relate only to changes to their setting, they may be grouped.

5.3.5. In addition, professional judgement will be used during the assessment to determine if assets outside the 500 m study area also need to be ‘scoped-in’. These are likely to include assets where the Zone of Theoretical Visual Influence (ZTV) study (Figure 5.1) suggests that there will be significant intervisibility with the application site which might affect the setting of these assets. We note that the preliminary ZTV suggests that all potentially affected heritage assets are within the scoped-in area within 500 m of the red line.

Receptors

5.3.6. The following sources have been used to establish the possible receptors within the study area:

- National Heritage List for England; and
- Hertfordshire Historic Environment Record.

5.3.7. The study area, alongside the relevant heritage assets are shown on the map at Figure 5.6.

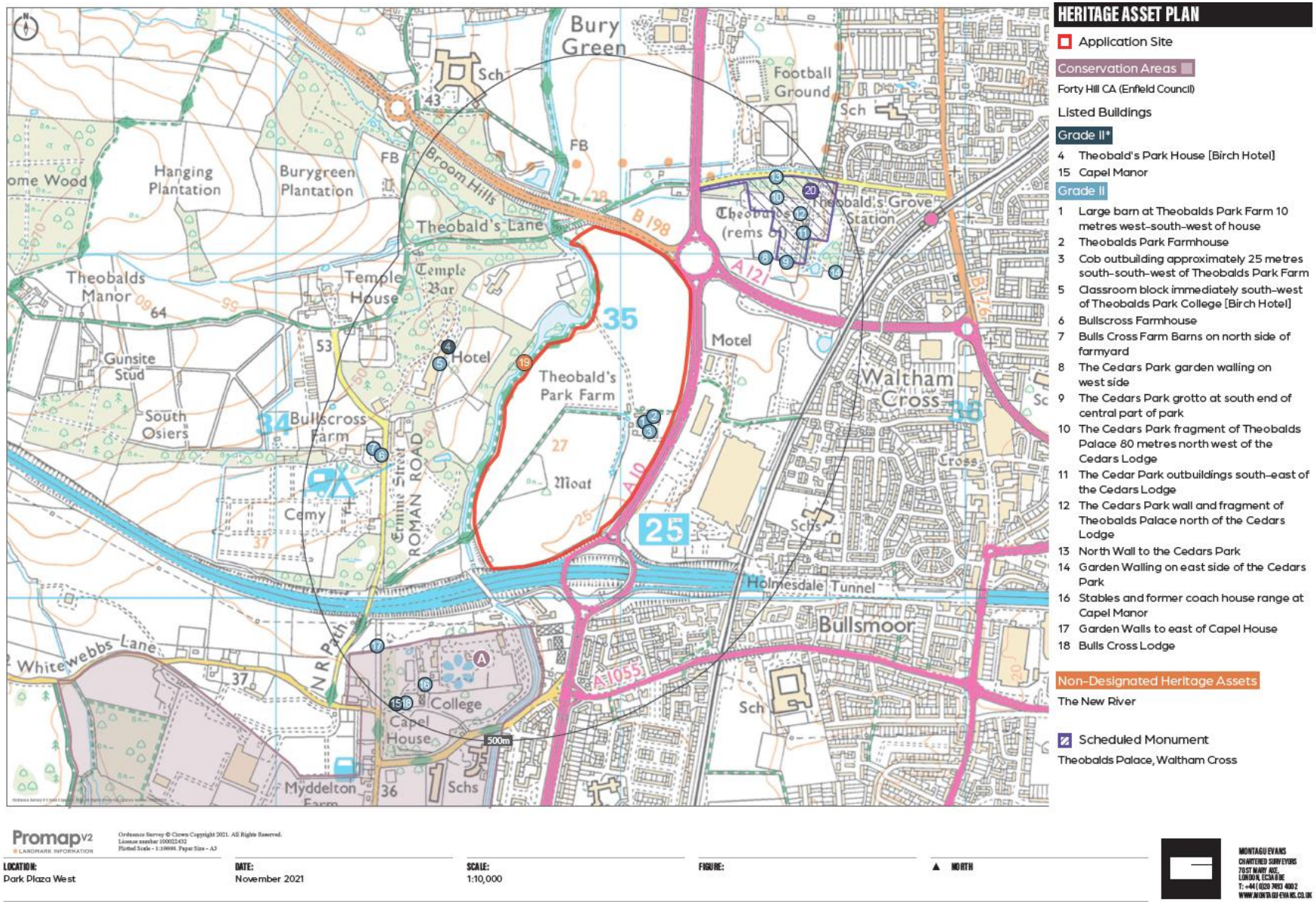

Figure 5.6 Heritage assets

THE APPLICATION SITE HISTORICAL CONTEXT

5.3.8. Within the application site are three Grade II listed buildings and a number of other unlisted buildings around a farm yard. Below ground features are discussed in the Archaeology section.

5.3.9. Cullings moat, located to the south of Theobalds Park Farm, may have been the site of a medieval manor house known as Cullings but no built remains of it survive. In the C16, the land was associated with the royal palace at Theobalds, located outside the application site, to the north east in what is now Cedars Park.

5.3.10. The application site was part of the outer gardens or inner parkland, and Cecil's Pond, which survives in fragmentary form, appears to have been a water feature associated with the gardens. The modern Lieutenant Ellis Way (B198) largely follows a historic lane that defined the northern edge of the park.

5.3.11. The New River along the western boundary of the application site was built around 1609-13 to carry water from Hertfordshire to central London. It is slightly raised above the application site, and has a long distance footpath known as the New River Path running alongside it.

5.3.12. After the park was disparked in the mid C17, the application site became farmland, and Theobalds Park Farm was built. The earliest of the farm buildings surviving within the application site, the Cob Barn (Grade II), dates to the late C17 and was probably part of the original farm complex. The large barn dates to the C18 and the farmhouse was rebuilt in the early C19.

5.3.13. Birch, formerly Theobalds Park House (listed Grade II*), was built in the 1760s to the west of the New River and became a hotel in the 1930s.The application site was part of the C18 park associated with Theobalds Park House, and a ditch running south from the farm complex may have been the boundary of this park. The footpath through the application site may also date to this period and probably provided access to the farm complex through the parkland. The park was made smaller in the late C19, and the land that currently comprises the application site was returned to agricultural use.

5.3.14. The A10 (Great Cambridge Road) was built in the 1930s and forms the eastern boundary of the application site. The land to the east of the A10 was used as farmland and nurseries throughout the C20. The section of the M25 (London Orbital Motorway) to the south of the application site was built in the early 1980s, and the sliproad from the M25 to the A10 was also built at that date.

KEY RECEPTORS

5.3.15. Built heritage receptors located within the application site include the three Grade II listed buildings associated with Theobalds Park Farm:

- Theobalds Park Farmhouse;
- Large barn at Theobalds Park Farm 10 m west-south-west of house; and
- Cob outbuilding approximately 25 m south-south-west of Theobalds Park Farm.

5.3.16. Built Heritage Receptors outside the application site but within the study area include:

- Listed Buildings Grade II*:
  - Theobalds Park House; and
  - Capel Manor.
- Listed Buildings Grade II:
  - Classroom Block immediately south-west of Theobalds Park College;
  - Bullscross Farmhouse;
  - Bulls Cross Farm Barns on north side of farmyard;

    - The Cedars Park garden walling on west side;
    - The Cedars Park Grotto at south end of central part of park;
    - The Cedars Park fragment of Theobalds Palace 80 metres north west of the Cedars Lodge;
    - The Cedar Park outbuildings south-east of the Cedars Lodge;
    - The Cedars Park wall and fragment of Theobalds Palace north of the Cedars Lodge;
    - North Wall to The Cedars Park;
    - Garden Walling on east side of the Cedars Park;
    - Stables and former coach house range at Capel Manor;
    - Garden Walls to east of Capel House; and
    - Bulls Cross Lodge.
- Scheduled Monuments:
    - Theobalds Palace, Waltham Cross.
- Conservation Areas (CA):
    - Forty Hall CA (Enfield Council).
- Non-Designated Heritage Assets:
    - The New River.

5.3.17. Other historic landscape features within the application site, notably Cecil's Pond, "Cullings Moat" and the ditch (a possible C18 former park pale) will be assessed within the Archaeology chapter of the ES and are therefore entirely scoped out of this Built Heritage chapter.

Key issues and requirement for assessment

5.3.18. The assessment will consider the effects of the proposed development upon the heritage value of the 'scoped-in' receptors from the build of the proposed development (both enabling and construction) and from the completed development itself. Cumulative effects, if any, will also be considered.

Enabling and Construction phases

5.3.19. Works of restoration and adaptation are proposed for the listed buildings within the application site. These works will have direct impacts on these assets, and will be direct, permanent, long term and irreversible.

5.3.20. Demolition and construction activities may also cause indirect effects on (built) heritage receptors both within and near the application site as a result of a change to the receptor's setting. These effects may include the visibility of equipment associated with construction (cranes, hoarding, etc.), noise, dust, traffic movements and vibration.

Operational phase

5.3.21. The three Grade II listed buildings within the application site would be restored and brought into beneficial use as part of the completed development. New buildings will be built in the setting of the restored listed buildings on the application site.

5.3.22. The completion of new development on the application site would also lead to indirect impacts on the setting of heritage assets nearby. These effects would be mainly visual through the introduction of modern development into what is currently an agricultural landscape. There may also be setting impacts from noise, light, vehicle movements and loss of tranquilness associated with the use of the application site as film studios.

Cumulative Effects

5.3.23. The likely cumulative effect of the proposed development on (built) heritage receptors will also be considered in the context of the cumulative schemes.

Assessment methodology

Baseline conditions

5.3.24. The sources identified in paragraph 5.3.6, alongside the following, will be used to establish baseline conditions in the ES:

- Site surveys including those undertaken by Latham Architects;
- Site visits to individual heritage assets;
- Zone of Visual Influence study undertaken by Leyton Place Landscape; and
- Verified visualisations undertaken by Leyton Place Landscape.

Assessment scenarios

5.3.25. Assessment scenario 1, the scenario in which no development is brought forward, is scoped out of this assessment as it represents maintenance of the existing baseline and therefore no change to the condition or setting of any built cultural heritage assets.

5.3.26. Assessment scenario 2 (enabling works) and scenario 3 (full development) will be assessed in the ES as these have the potential to result in effects on built cultural heritage assets and their settings.

Assessment approach

5.3.27. The assessment will consider the effects of the proposed development upon the heritage value of the Scoped-In receptors from construction of the development and from the completed development itself. Cumulative effects, if any, will also be considered.

Assessment criteria

5.3.28. The criteria used to assess the sensitivity (value) of heritage receptors and the potential effects on them are set out below. Great weight and importance has been given to all designated heritage assets.

RECEPTOR VALUE

5.3.29. The (built) heritage assessment will identify the significance of each heritage receptor which, to avoid confusion with the term ‘significant’ as used for EIA, will be referred to as the heritage receptor’s ‘heritage value’. The assessment of heritage value will include a description of the setting of a heritage receptor, and the contribution that setting makes to its heritage value in line with best practice.

5.3.30. The sensitivity (value) of heritage receptors is assessed based on the categories in Table 5.2. Where a receptor falls between two categories, professional judgement is used to determine the appropriate sensitivity (value).

Table 5.2
Description of receptor value

Receptor value	Criteria	Examples
Very high	Building / site / area of international heritage value	– World Heritage Sites; – Grade I statutory listed buildings; – Some Scheduled Monuments with upstanding remains; and – Grade I Registered Park and Garden.
High	Building / site / area of national heritage value	– Grade II* statutory listed buildings; – Some Scheduled Monuments with upstanding remains; and – Grade II* Registered Parks and Gardens.
Medium	Building / site / area of national heritage value	– Grade II statutory listed buildings; – Conservation Areas; – Scheduled Monuments without upstanding remains; and – Grade II Registered Parks and Gardens.
Low	Building / site / area of particular local heritage value	– Locally listed buildings (or equivalent non-designated heritage assets).
Negligible	Building / site / area of local heritage value	– Receptors not formally identified, but which may have a degree of value meriting consideration in planning decisions.

MAGNITUDE OF IMPACT

5.3.31. The second part of the assessment stage is to identify the magnitude of impact arising from the proposed development on the heritage, townscape, or visual receptor.

5.3.32. The magnitude of impact is a qualitative judgement that considers the size or scale, geographical extent or duration and reversibility of the impact, susceptibility of the receptor to change, and whether the proposed development:

– Conforms with the pattern, scale, mass, grain, and historic features of the receptor;
– Creates a loss or restoration of key features of the receptor;
– Contributes to the identified receptor character; and
– Accords with national, regional, and local planning policy and guidelines.

5.3.33. Potential magnitudes of impact are set out using the criteria at Table 5.3.

Table 5.3
Magnitude of impact

Magnitude	Criteria
Large	– Considerable change to the value of the receptor; – The proposals are a new component, ranging from a notable change in receptor characteristics over an extensive area to intensive change over a more limited area; – The proposals would be very noticeable; and / or – Loss of or major alteration to key elements / features / characteristics of the baseline. The duration of this impact may be permanent and non-reversible.

Magnitude	Criteria
Medium	– A clearly discernible change to the value of the receptor; – The proposals are dissimilar to a main component of the receptor but similar to other components; – The proposals would be readily noticeable; and / or – Partial loss of or alteration to one or more key elements / features / characteristics of the baseline. The duration of this impact may be semi-permanent and partially reversible.
Small	– Slight change to the value of the receptor; – The proposals are similar to a main component of the receptor but similar to other components; – The proposals would not be readily noticeable; and / or – Minor loss of or alteration to one or more key elements/features/characteristics of the baseline. The duration of this impact may be temporary and reversible.
Negligible	– Barely discernible change to the value of the receptor; and / or – Very minor loss of or alteration to one or more key elements / features / characteristics of the baseline.
No change	– No change to the value of the receptor.

SIGNIFICANCE OF EFFECT

5.3.34. Professional judgement is required to determine the nature of the likely effects by combining the magnitude of the effect with the sensitivity (value) of the receptor. Criteria defining the nature of effect is provided at Table 5.4 and Table 5.5.

Table 5.4
Significance matrix

		Receptor value				
		Very high	High	Medium	Low	Negligible
Impact magnitude	Large	Major	Major or Moderate	Major or Moderate	Moderate or Minor	Minor
	Medium	Major or Moderate	Major or Moderate	Moderate	Moderate or Minor	Minor or Neutral
	Small	Major or Moderate	Moderate or Minor	Moderate or Minor	Minor	Minor or Neutral
	Negligible	Minor	Minor or Neutral	Minor or Neutral	Neutral	Neutral
	No change	Neutral	Neutral	Neutral	Neutral	Neutral

Table 5.5
Significance of an effect

Significance of effect	Description
Major	The proposed development would give rise to a very significant effect on the receptor. Major effects may relate to resources or features that are unique and which, if lost, cannot be replaced, or relocated.
Moderate	The proposed development would give rise to a significant effect on the receptor. These effects could have a material influence on decision-making.
Minor	The proposed development would give rise to an effect on the receptor, but this would not be significant. These effects are unlikely to be critical in the decision-making process
Negligible	The proposed development would give rise to a barely discernible effect on the receptor. This would not be significant and are unlikely to influence the decision-making process.
Neutral	The proposed development would have no effect on the receptor. These effects are unlikely to influence decision making, irrespective of other effects

5.3.35. The description of the effect will also consider the nature of the effect, alongside whether the effect is:

- Direct or indirect;
- Permanent or temporary;
- Short, medium, or long term; and
- Reversible or irreversible.

5.3.36. Professional judgement is required to determine the nature of effect with the criteria defining the nature of the impact provided at Table 5.6.

Table 5.6
Nature of an effect

Nature of an effect	Criteria
Beneficial	– An advantageous effect to a receptor.
Neutral	– An effect that on balance, is neither beneficial nor adverse to a receptor.
Adverse	– A detrimental effect to a receptor.

5.4. Archaeology

Context

5.4.1. The application site has been the subject of an archaeological desk-based assessment which concluded that, based on the available evidence, the site has a moderate potential to contain finds and features from the prehistoric periods and a known potential to contain medieval and post medieval features relating to Theobalds Park and agricultural practices. Therefore, it is considered that there is the potential for likely significant effects relating to archaeology and so this topic shall be 'scoped into' the EIA.

5.4.2. Government policy in relation to archaeology is outlined in Section 16 of the National Planning Policy Framework (NPPF), entitled 'Conserving and Enhancing the Historic Environment'. This provides guidance for planning authorities, property owners, developers and others on the conservation and investigation of heritage assets.

5.4.3. Paragraph 194 states that planning decisions should be based on the significance of the heritage assets potentially affected, and that the level of detail supplied by an applicant should be proportionate to the importance of the asset and should be no more than sufficient to understand the potential impact of the proposal upon the significance of that asset. The paragraph also outlines that where a site includes, or has the potential to include, heritage assets with archaeological interest, local planning authorities should require developers to submit an appropriate desk-based assessment and, where necessary, a field evaluation.

5.4.4. Paragraph 203 requires the decision-maker to take into account the effect on the significance of non-designated heritage assets and to take a balanced judgement having regard to the scale of harm or loss and the significance of the asset(s) potentially affected.

Baseline conditions

Study area

5.4.5. A study area of 1 km radius from the site boundary has been used in the desk-based assessment. This is a standard study area for an archaeological desk-based assessment and conforms with the Chartered Institute of Archaeologists (CIfA) Standards and Guidance of Historic Environment Desk Based Assessments (2017).

Receptors

5.4.6. The following sources have been used to establish the possible receptors within the study area:

- Hertfordshire Historic Environment Record (HER) Data;
- The National Heritage List for England (NHLE) held by Historic England;
- Historic England Archive;
- Pastscape;
- Environment Agency Lidar Data;
- Online Aerial Imagery;
- Local studies and record office research;
- Review of historic mapping; and
- Evaluation trenching implemented in accordance with a Written Scheme of Investigation (WSI) submitted to and approved by Hertfordshire County Council (provided in Appendix C with consultation provided in Appendix D).

5.4.7. There are no scheduled monuments within the application site (i.e., the area within the redline boundary).

5.4.8. The 1 km study area includes the scheduled monument Theobalds Palace (NHLE 1005250) which is located c. 270 m to the north east of the site and Eleanors Cross is located c. 970 m to the east (NHLE 1017471). The setting of these assets has been considered in the archaeological desk-based assessment and are not considered sensitive to change from a below ground heritage perspective.

5.4.9. A review of the available evidence has confirmed that the site has a moderate potential to contain finds and features from the Prehistoric periods and a known potential to contain medieval and post medieval features relating to Theobalds Park and agricultural practices. The potential for finds and features from all other periods is considered low.

5.4.10. Sensitive receptors within the study area are considered to be non-designated archaeological assets of local to regional significance (subject to the results of the evaluation trenching). The archaeological interest of the study area can be secured by a programme of archaeological investigation; the scope of this and the method for Broxbourne Borough Council to secure the requirement for this shall be discussed and agreed with Broxbourne Borough Council's archaeological advisor as part of the pre application consultation.

Key issues and requirement for assessment

5.4.11. In terms of the effects on archaeology, the likely significant effects of the development are direct, such as the loss or damage to a heritage feature, and indirect, including the effect on the setting of Scheduled Monuments.

Assessment methodology

Baseline conditions

5.4.12. The sources identified in paragraph 5.4.6 will be used to establish baseline conditions in the ES. An archaeological desk-based assessment which accords with the CIfA Standards & Guidance for Historic Environment Desk Based Assessments 2017 has been produced. An archaeological evaluation of the application site will be undertaken the WSI for which has been agreed with Hertfordshire County Council.

Assessment scenarios

5.4.13. The results of the desk-based assessment and evaluation trenching will be used to assess the effects of the enabling and construction phases of the proposed development on archaeological features against clearly defined criteria.

5.4.14. At this stage it is anticipated that there will be no operational effects relating to archaeology, therefore, assessment of operational effects relating to archaeology can be scoped out of the EIA.

Assessment approach

5.4.15. The ES shall:

- Define archaeology baseline conditions;
- Identify relevant archaeology receptors;
- Assess the potential for archaeology impacts throughout the demolition and construction works and resultant archaeology effects;
- Assess the likely significant archaeology effects;
- Assess any required mitigation or monitoring to address any likely significant adverse archaeology effects; and
- Assess the potential for cumulative archaeology effects.

RECEPTOR IMPORTANCE / VALUE

5.4.16. The significance of a heritage asset is defined in the NPPF as "The value of a heritage asset to this and future generations because of its heritage interest. That interest may be archaeological, architectural, artistic, or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting." In the case of many heritage assets their importance has already been established through the designation (i.e., scheduling, listing and register) processes applied by Historic England.

5.4.17. The significance (or importance) of a heritage asset is assessed in terms of national, regional, or local statutory or non-statutory protection and grading of the asset. For non-designated archaeological assets determination of significance will use the Secretary of State's non-statutory criteria and professional judgement. Using this approach, the criteria for establishing the importance of a heritage asset is described in Table 5.7.

Table 5.7
Determining the Importance of a Heritage Asset

Importance / Value	Typical description
Very high	Archaeological sites or monuments of international importance, including World Heritage Sites. Structures and buildings inscribed as of universal importance as World Heritage Sites.
High	Ancient monuments scheduled under the Ancient Monuments and Archaeological Areas Act 1979, or archaeological sites and remains of comparable quality, assessed with reference to the Secretary of State's non-statutory criteria
Medium	Archaeological sites and remains which, while not of national importance, score well against most of the Secretary of State's criteria
Low	Archaeological sites that score less well against the Secretary of State's criteria.
Negligible	Areas in which investigative techniques have produced negligible or only minimal evidence for archaeological remains, or where previous large-scale disturbance or removal of deposits can be demonstrated.

5.4.18. It is widely recognised that the heritage significance of an asset is not the same as its sensitivity to changes to its setting. Thus, in determining effects upon the setting of assets by a development, both importance and sensitivity to changes to setting need to be considered. Factors considered when assessing sensitivity to change include, but are not limited to, heritage significance, condition, type and period of asset, and landscape positioning.

MAGNITUDE OF IMPACT

5.4.19. Determining the magnitude of impact is based on an understanding of how, and to what extent, the proposed development would impact heritage assets.

5.4.20. The magnitude of the impact is a product of the extent of development impact on an asset. Impacts are rated as Large, Medium, Low and Negligible/Neutral and can be direct or indirect. The criteria for assessing the magnitude and nature of impact are set out in Table 5.8.

Table 5.8
Evaluation of the Scale and Significance of Effect

Magnitude and Nature	Direct impacts	Indirect impacts
Large	Complete removal of an archaeological site.	Radical transformation of the setting of an archaeological monument.
Medium	Removal of a major part of an archaeological site and loss of research potential.	Partial transformation of the setting of an archaeological site e.g., the introduction of significant noise or vibration levels to an archaeological monument leading to changes to amenity use, accessibility, or appreciation of an archaeological site.
Low	Removal of an archaeological site where a minor part of its total area is removed but the site retains a significant future research potential.	Minor harm to the setting of an archaeological monument.
Negligible	Negligible impact from changes in use, amenity, or access.	Negligible perceptible change to the setting of an archaeological site;

SIGNIFICANCE OF EFFECT

5.4.21. The judgement of the significance of an effect will take into consideration the impact on the archaeological asset's heritage significance (as defined in Appendix 2 of the NPPF).

5.4.22. The scale and significance of the resulting effect of the proposed development on archaeological assets is determined by the significance (importance/value) of the asset and the magnitude and nature of impact to the asset. Table 5.9 presents a matrix that demonstrates how the scale and significance of effect will be established.

Table 5.9
Significance matrix

		Importance / Value				
		Very high	High	Medium	Low	Negligible
Impact magnitude	Large	Major	Major or Moderate	Major or Moderate	Moderate or Minor	Minor
	Medium	Major or Moderate	Major or Moderate	Moderate	Moderate or Minor	Minor or Neutral
	Small	Major or Moderate	Moderate or Minor	Moderate or Minor	Minor	Minor or Neutral
	Negligible	Minor	Minor or Neutral	Minor or Neutral	Neutral	Neutral

5.4.23. Proposed mitigation measures will be identified in order to avoid significant effects where possible. Where inevitable or unavoidable impacts occur, measures will be proposed in order to reduce or compensate for impacts. All potential impacts and mitigation will be assessed against and informed by national and local planning guidance including the NPPF.

5.5. Water Resources

Context

5.5.1. The proposed development has the potential to impact water quality and increase flood risk. The proposed development will also generate additional demand for potable water supply and wastewater drainage.

5.5.2. The Water Resources chapter will address the requirements outlined in the Water Resources Act 1991, Water Industry Act 1991, the Water Framework Directive (2000/60/EC), the Flood and Water Management Act 2010 and the NPPF and associated Technical Guidance on Flood Risk, dated March 2012.

5.5.3. The chapter will be written with reference to the Flood Risk Assessment (FRA) which will be submitted in support of the planning application and will include an assessment of the effects of the development on water quality and potential sources of flooding. The FRA will meet the requirements set out in NPPF and the Environment Agency's (EA) standard advice to planning authorities (http://www.environment-agency.gov.uk/research/planning/33098.aspx).

5.5.4. The assessment will include an analysis of the potential sources of flooding for the site (fluvial flooding, surface water runoff, groundwater, and infrastructure failure), and will ensure that flood risk is not increased as a result of the development.

Baseline conditions

Study area

5.5.5. The assessment will include the impact of the areas within the redline boundary on both the site itself and on surrounding offsite areas including the A10 Great Cambridge Road, the New River (Thames Water Utilities Limited (TWUL) water supply aqueduct), and the local water and wastewater utility networks.

5.5.6. The study area shall be clarified in the EIA, with the water quality and flood risk areas clearly set out, supported by figures where appropriate. The study area shall be adequate to capture the extent of potential impacts, both direct and indirect.

Receptors

5.5.7. The following sources have been used to establish the possible receptors within the study area:

- Topographical survey;
- EA flood risk maps;
- Utility asset maps; and
- Preliminary meeting with the Lead Local Flood Authority (LLFA).

5.5.8. Available desk study data is limited and shall be supplemented as described in paragraph 5.5.20. The design team shall engage with consultees in order to obtain information that will inform a robust baseline for the assessment.

5.5.9. Flood risk maps produced by the EA place the site in Flood Zone 1, low probability of flooding. The EA defines this as land having a less than 1 in 1,000 annual probability of river or sea flooding.

5.5.10. Theobalds Brook runs through an adjacent site, outside the boundary with Theobalds Lane to the north. This adjacent site is identified as Flood Zone 3. The extent of this flooding does not affect the application site. Theobalds Brook flows towards the River Lea, approximately 2 km east of the site.

5.5.11. The UK Government Flood Warning Information Service (19) identifies the site as at high risk of flooding from surface water. Areas at risk are concentrated at Cecil's Pond and at existing low points along the east site boundary (A10), extending along the north boundary (B198). These are the low points within the site and are where the existing run-off accumulates.

5.5.12. The west of the site is bordered by the New River. This is a water supply feature understood to be a Thames Water asset. Furthermore, maps produced by Hertfordshire County Council (HCC) identify the New River as an Ordinary Watercourse.

5.5.13. The south western half of the application site encroaches into a Zone II Source Protection Zone (SPZ), and the southern extent lies within a Zone I SPZ. These SPZs extend north and south of the site, principally centred along the New River.

5.5.14. A small ditch is identified on the topographical survey, between the farm buildings and the southern boundary of the site. No positive outfalls have been identified to date however this should be confirmed.

5.5.15. There are surface and foul water sewer networks remote from the site, to the east of the A10 and south of the M25, identified from TWUL asset records. The application site is bounded to the east by a 600 mm diameter TWUL potable water trunk main along the A10, in addition to a distribution main across the A10, assumed to supply the existing farm buildings.

5.5.16. The existing site is largely unoccupied, except for a small number of farm buildings. It is therefore assumed that the potable water demand and foul water discharge rate from the existing site is negligible.

Key issues and requirement for assessment

5.5.17. The proposed development will significantly increase the area of impermeable surfaces compared with the existing agricultural land use, generating increased surface water runoff during storm events. During construction and in operation, occupation of the site will increase the demand upon local utility networks for potable / non-potable water supply and foul water disposal.

5.5.18. The development should aim to achieve greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible in line with the drainage hierarchy. Any remaining surface water runoff shall be discharged to the local TWUL sewer network, at a rate to be agreed with TWUL.

5.5.19. Potential impacts which shall be assessed and, where feasible, mitigated against include:
- Impact of construction (piling, excavations, etc) on groundwater and surrounding water courses;
- Impact of the development on water quality;
- Assessment of any changes to surface water drainage and flood storage, including integrating Sustainable Drainage Systems (SuDS);
- Assessment of discharge of surface water to the New River;
- The extent of a flood at the development and assessment of escape routes;
- The potential impacts of climate change, and its effect on flood risk at the development;
- Potential impacts on flood risk of surrounding areas;
- The potential implications of surface water drainage discharge to the local sewer network; and
- Impact of the development on the offsite potable water supply and foul water drainage networks.

Assessment methodology

Baseline conditions

5.5.20. The sources identified in paragraph 5.5.8, alongside the following, will be used to establish baseline conditions in the ES:

- Ground investigation, including boreholes and infiltration testing;
- PAS128 utility survey to locate and identify existing buried utility assets; and
- Drainage survey to identify existing piped drainage on site, connection to offsite drainage networks and /or outfalls from onsite drainage ditches.

Assessment scenarios

5.5.21. The water resources assessment will consider all assessment scenarios outlined in paragraph 3.4.4 and Figure 3.1, namely assessment scenarios 1, 2 and 3.

Assessment approach

5.5.22. The water resources, flood risk and drainage assessment will focus on effects associated with the run-off from the site and any physical effects on surface water quality. The assessment will also examine the proposed surface water drainage system and consider the increase in demand for wastewater discharge and potable water supply.

5.5.23. This will be split into two separate phases of work, these are:

- Flood Risk Assessment; and
- ES.

5.5.24. Although the development lies within Flood Zone 1 on the EA Flood Maps, a FRA is required for the site under the NPPF because the development is larger than one hectare and may be affected by sources of flooding other than rivers and seas.

5.5.25. The following aspects will be included as part of the FRA:

- Existing and proposed land uses on the application site;
- Existing and proposed drainage strategy including an assessment of permeable and non-permeable areas;
- Review of hydro-geological conditions based on available desk studies, including EA groundwater vulnerability maps and existing borehole logs;
- An assessment of groundwater, the influence of surrounding water bodies and abstractions;
- The risk of flooding at the application site from all sources (tidal/coastal, fluvial and groundwater etc.);
- Assessment of the introduction of new hardstanding areas on the greenfield run-off rates, using Micro Drainage software;
- Storage requirement calculations to accommodate the 30-year and 100-year storm events, based on computer modelling, including an allowance for climate change; and
- Calculating the sizing of storage features (e.g., ponds, tanks) and Sustainable Drainage Systems (SuDS) required to mitigate against an increase in surface water run-off.

5.5.26. It is anticipated that the key issues to be addressed in the ES chapter are likely to include the following:

- Review of hydro-geological conditions based on available desk studies, including EA groundwater vulnerability maps and existing borehole logs;
- Groundwater, the influence of surrounding water bodies and abstractions;
- Effects of an increase in the quantity of surface water run-off from buildings and areas of hardstanding;
- Effects of flooding both on the proposed development and impacts offsite;
- Effects of increased potable water and wastewater demand upon existing TWUL networks and any associated offsite upgrade works required; and
- An assessment of the impact on local water quality.

5.5.27. Impacts on flood risk will be covered specifically in the FRA and will be referenced within the Water Resources chapter of the ES. Where the FRA has been used to inform the assessment in the ES, this will be clearly set out with cross referencing where appropriate to avoid duplication of information.

5.5.28. A source, pathway, receptor model from the Department for Transport, "Transport Analysis Guidance" (TAG), 2005 will be adopted and modified for use for the assessment.

5.5.29. Consultation will be undertaken with the following bodies:

- EA;
- TWUL;
- Hertfordshire County Council – Lead Local Flood Authority; and
- Broxbourne Borough Council.

Assessment criteria

5.5.30. The ES chapter will determine the sensitivity of each receptor identified in the baseline section, in accordance with the sensitivity criteria identified in Table 3.2 of Chapter 3: EIA methodology.

5.5.31. For each impact considered within the assessment, the magnitude of the impact will be determined, alongside whether it is a beneficial or adverse impact. The magnitude criteria of relevance to the water resources chapter will be as stated within Table 3.3 of Chapter 3: EIA methodology.

5.5.32. The effect – the consequence of the impact – will be assigned a significance. The significance of the effect is informed by the magnitude of the impact, the sensitivity of the receptor and the is ultimately determined through the use of professional judgement. The matrix included in Table 3.4 of Chapter 3: EIA methodology will be used to determine the significance of water resource effects.

5.6. Transport

Context

5.6.1. The proposed development will generate additional trips on the local transport network, including vehicle trips. Vehicle trips will be generated during the enabling works, construction phase and the operational phase.

5.6.2. Reference will be made to relevant transport-related national, strategic, and local policies, comprising:

- National Planning Policy Framework (NPPF), July 2021;

- Local Transport Plan (LTP)4 – Hertfordshire County Council 2018-2031, May 2018;
- Broxbourne Local Plan 2018-2033, June 2020;
- Broxbourne Transport Strategy (2017 Public Consultation Draft);
- Draft Local Cycling and Walking Infrastructure Plan (LCWIP) 2017; and
- Draft Local Infrastructure Plan (IDP- 2018).

5.6.3. Reference is also made to the IEMA 'Guidelines for the Environmental Assessment of Road Traffic' (19) to inform the assessments required.

Baseline conditions

Site Context

LOCAL HIGHWAY NETWORK

5.6.4. The eastern boundary of the site is the A10 Great Northern Road, a dual carriageway road subject to a 50 mph speed limit running north south from M25 junction 25 to the north of Broxbourne. There is an existing signal-controlled junction with Great Eastern Road near the centre of the development frontage.

5.6.5. To the north of the application site, the B198 Lt. Ells Way is a dual carriageway 50 mph road running east/west between the A10 and areas to the west. There are no footways on this link in the vicinity of the site.

5.6.6. The development is bounded to the south by the M25.

PEDESTRIAN ACCESSIBILITY

5.6.7. There is a public footpath (Cheshunt 013) running along the western boundary of the application site adjacent to the New River, this continues to the south over the M25 beyond the Hertfordshire boundary, and also connects to the north. Another public footpath route (footpath Cheshunt 014) crosses the southern part of the site.

5.6.8. A pedestrian (and cyclist) route runs across the A10 just to the north of the B198/A10 junction, this travels across the Paul Cully bridge which connects the Maxwell Farm area and Theobald's Grove railway station.

5.6.9. At the Great Eastern Road junction on the A10, a staggered controlled pedestrian movement provides for the crossing of the A10 dual carriageway. This route then leads to an uncontrolled level crossing over the railway via a gate for pedestrians and cyclists (who are required to dismount) use only. The route provides connections to residential areas to the north and south, as well as the centre of Waltham Cross and public transport connections, this being approximately 1.1km (15 minutes' walk) from the eastern boundary of the application site.

5.6.10. On the eastern side of the A10, where there is an approximate 3m wide shared footway/cycleway from the roundabout with the A121 Winston Churchill Way/B198 Lieutenant Ellis Way to the north and on towards the roundabout with the M25 to the south. As the footway approaches the roundabout with the M25 it narrows, with subway provision below the M25 providing a pedestrian/cycle connection to residential areas north of Enfield.

5.6.11. Currently, a 1.8m footway is present on part of the western side of the A10 dual carriageway, extending approximately 125m to the south from the current at-grade crossing, where it ends and connects to the local Public Right of Way (PRoW) network (route 14).

ACCESSIBILITY BY CYCLE

5.6.12. The description of the walking network describes the presence of a shared footway/cycleway on the eastern side of the A10 Great Cambridge Road and the route across the Paul Cully bridge over the A10. To the north, at the roundabout with the B198 Lieutenant Ellis Way/A121 Winston Churchill Way, there is a toucan crossing and then this route continues along the southern side of Winston Churchill Way and along the eastern side of the A10 Great Cambridge Road north of the roundabout. These routes provide connections to residential areas of Cheshunt to the north and east.

PUBLIC TRANSPORT

5.6.13. A bus station is available at Waltham Cross bus station on the eastern side of the town centre. This is approximately 1.2 km (15 minutes' walk) from the development.

5.6.14. Additional bus stops are located on Bullsmore Lane southeast of the site and High Street (north of Waltham Cross), with some of the services available from the bus station also calling at these bus stops. These bus stops are a similar distance from the site.

5.6.15. Train services are available from both Waltham Cross station and Theobalds Grove station, both of which are approximately 1.4-1.5 km (20 minutes' walk or 6/7 minutes cycle) from the proposed eastern access of the site via Park Lane. Theobalds Grove is also accessible from the Paul Cully bridge and Theobald's Lane to the north of the application site.

Study area

5.6.16. The extent of the study area will be defined using a combination of IEMA Guidelines and the extent of the network being considered as part of the Transport Assessment. The IEMA Guidelines suggest two broad rules to identify the appropriate extent of highways assessment as part of the environmental assessment. These are defined as follows:

- Road links with all vehicles or Heavy Vehicles traffic flow increases in any assessment year of +30%; and
- Road links with Medium or High sensitivity receptors with flow increases greater than 10%.

5.6.17. Locations on the highway network surrounding the application site will be identified and assessed in terms of the potential impact of the proposed development relative to baseline traffic flows, considering the potential for both arriving and departing vehicles at the site.

5.6.18. The Transport Assessment for the development has been scoped and agreed with the highway authority, Hertfordshire County Council, and a highway capacity junction testing study area has been agreed, which includes the two site access junctions on the A10 and B198, the junction of the A10 and Lt. Ellis Way and the junction of Monarchs Way and Winston Churchill Way. It has also been agreed to use SATURN modelling changes in flows to provide estimates for the Transport Assessment, factoring base or other flows up or down by the Department for Transport's (DfT) TEMPro factors.

5.6.19. Taking this and the scoping discussions with Hertfordshire County Council into consideration, an initial study area has been defined by using a combination of recently surveyed traffic flows on the local highway network and traffic generation for the proposed development site (agreed with the highway authority), as well as reference to the Highway Authority's (Hertfordshire County Council) COMET traffic model for the local road network.

5.6.20. Existing traffic flows on the local highway network have been obtained through referencing the DfT road traffic statistics for the local road network. The study area proposed has been defined by the roads within the local road network for which this data exists, these being:

1. B198 Lieutenant Ellis Way, north of Bury Green Road;
2. A10 Great Cambridge Road, north of the roundabout with B198/A121;
3. A121 Winston Churchill Way;
4. A10 Great Cambridge Road, south of junction with Great Eastern Road/proposed Park Plaza West access;
5. M25, West of junction with A10;
6. M25, East of junction with A10; and
7. A10, south of junction with M25.

5.6.21. Using the study area defined above, Annual Average Daily Flow (AADF) information has been obtained for the year 2019, thereby removing any unusual traffic flows as a result of the COVID-19 pandemic. As agreed with the highway authority during scoping for the Transport Assessment, TEMPro growth factors have been applied to factor these traffic flows to current baseline (2021) levels and proposed opening year (2025) levels. The existing AADF estimates for key links around the application site in vehicles per hour are shown in Table 5.10.

Table 5.10
Existing 2021 Baseline Traffic – Annual Average Daily Flow (AADF)

Road link	2021 Flow (vehicles)
1.B198 Lieutenant Ellis Way, north of Bury Green Road	16,236
2.A10 Great Cambridge Road, north of B198/A121 roundabout	44,496
3.A121 Winston Churchill Way	21,487
4.A10 Great Cambridge Road, south of junction with Great Eastern Road/site access	54,796
5.M25, west of junction with A10	156,446
6.M25, east of junction with A10	162,655
7.A10, south of M25	57,074

5.6.22. The locations of these count points are shown in Figure 5.7.

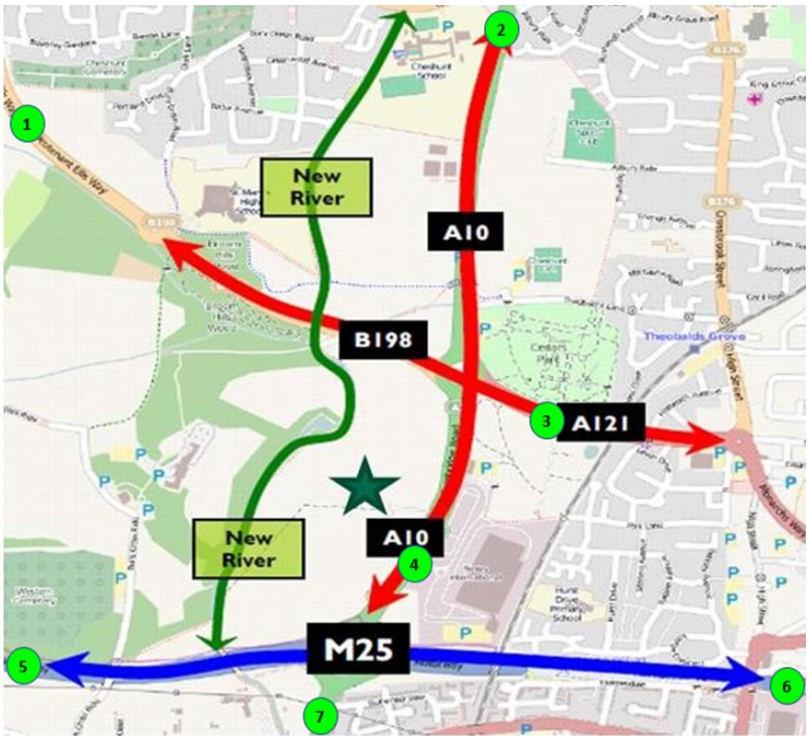

Figure 5.7 Local Highway Network with Traffic Count Information

Receptors

5.6.23. The IEMA guidance, as summarised in Table 5.11 also provides a list of potential receptors to be considered and the sensitivity of these.

Table 5.11
Sensitivity of Receptor

Significance Sensitivity (value)	Typical description
Very high	None
High	– School and playgrounds – Road used by pedestrians without footway provision – Residential development with frontage to roads – Accident blackspots
Medium	– Community areas, surgeries, and hospitals – Roads used by pedestrians with narrow footway provision – Unsegregated cycleways – Retail areas with frontage to roads – Congested junctions
Low	– Public open spaces and conservation areas – Roads with adequate footway and cycleway provision – Churches, listed buildings and tourist attractions
Negligible	– Receptors of lower sensitivity and/or remote from key road network

5.6.24. A review of the potential receptors located within study area does not indicate any high or medium receptors, with the exception of some houses located adjacent to the southbound A10 in the vicinity of location 2 in Figure 5.7. The Transport Assessment will consider accidents in the study area and relevant congested junctions.

5.6.25. Consequently, at this stage the receptors to be considered will comprise pedestrians, cyclists, public transport users and drivers affected by the impacts of traffic generated by the proposed development.

Key issues and requirements for assessment

5.6.26. At this stage, the baseline information included in Table 5.10 has been compared with predicted traffic generation for the proposed development, derived through reference to the traffic generation of similar developments as agreed during the TA scoping.

5.6.27. The impact of the proposed development traffic on individual links within the study area has been determined through reference to the highway authority COMET model, which includes assumptions on employment development on the application site and showed a distribution of these flows. These COMET development flows have been adjusted to reflect the agreed assumptions on trip generation on the application site.

5.6.28. The predicted traffic generation (arrivals and departures) has been determined for the AM (08:00-09:00) and PM (17:00-18:00) peak hours and these flows have been factored therefore to provide a comparison against the DfT's 24 hour data. Factors of 12.04 and 11.13 were derived for the am and pm peak hours respectively through a review of the daily profile of trips at a similar studio development. For the estimates, the highest volume of either the am or pm peak hour was used.

5.6.29. The table below provides a comparison of the existing background flows, the initial estimates of proposed development traffic flows, as well as the percentage impact which has been calculated.

Table 5.12
Operational traffic, all vehicles (including HGVs)

		Proposed development AM Peak 2-way	Proposed development PM Peak 2-way	24 Hour (Peak Hour x factor)	2025 AADF (Vehicles)	Year	Percentage Impact of development (operational)
Road	1.B198 Lieutenant Ellis Way, north of Bury Green Road	134	135	1,613	16,627	2025	10%
	2.A10 Great Cambridge Road, north of B198/A121 roundabout	81	143	1,591	45,568	2025	3%
	3.A121 Winston Churchill Way	48	69	768	22,005	2025	3%
	4.A10 Great Cambridge Road, south of junction with Great Eastern Road/site access	326	272	3,925	56,116	2025	7%

		Proposed development AM Peak 2-way	Proposed development PM Peak 2-way	24 Hour (Peak Hour x factor)	2025 AADF (Vehicles)	Year	Percentage Impact of development (operational)
	5.M25, west of junction with A10	135	123	1,625	163,888	2025	1%
	6.M25, east of junction with A10	89	67	1,072	170,393	2025	1%
	7.A10, south of M25	101	81	1,216	58,448	2025	2%

5.6.30. Additionally, Table 5.13, considers the impact of HGVs only.

Table 5.13
Significance of effect – operational traffic, HGVs

		Proposed development AM Peak 2-way	Proposed development PM Peak 2-way	24 Hour (Peak Hour x 10)	2025 AADF (vehicles)	Year	Percentage Impact of development (operational)
Road	1.B198 Lieutenant Ellis Way, north of Bury Green Road	5	5	60	300	2025	19%
	2.A10 Great Cambridge Road, north of B198/A121 roundabout	3	6	67	2,667	2025	3%
	3.A121 Winston Churchill Way	2	3	33	1,091	2025	3%
	4.A10 Great Cambridge Road, south of junction with Great Eastern Road/site access	13	11	157	3,342	2025	5%
	5.M25, west of junction with A10	5	5	60	22,687	2025	0%
	6.M25, east of junction with A10	4	3	48	19,882	2025	0%
	7.A10, south of M25	5	5	60	4,085	2025	1%

5.6.31. On the basis of the information provided above and the criteria of a traffic increase of 30%, there are considered to be no road links within the study for which the proposed development traffic impact would exceed this criterion.

5.6.32. The predicted HGV impact on the B198 Lieutenant Ellis Way is 19%, which exceeds the 10% threshold whereby any Medium or High sensitivity receptors need to be assessed in terms of impact upon them and therefore this will be assessed and reviewed in the ES when more detailed information on HGV routing is available.

5.6.33. Given the scale of the development and the fact that the Transport Assessment will include more detailed modelling of impacts and these may show some links where flows exceed the IEMA thresholds, it is proposed that a Transport chapter is included in the main volume of the ES. The chapter will be supported by the following technical documents, which will be submitted as part of the planning application:

- Transport Assessment (TA); and
- Outline Travel Plan (TP).

5.6.34. The impact of the peak construction traffic associated with the proposed development will be considered in the Transport Assessment and ES chapter once more information is available on the construction traffic volumes. At this stage it is anticipated that the same study area will be used.

SUMMARY OF EFFECTS

5.6.35. Table 5.14 summarises the transportation impact and potential effects to be assessed during the construction and operational phases of the development in the ES. Further detail on the impacts to be considered are provided in the following paragraphs.

Table 5.14
Summary of transport scope

Receptor	Impact	Potential effect	Scoped in / scoped out
Pedestrians and cyclists	Changes in traffic flows Changes in traffic speeds Changes in traffic composition	Pedestrian delay Pedestrian amenity Fear and intimidation Severance Collisions and road safety	Scoped in
Public transport users	Changes in traffic flows Changes in traffic speeds Changes in traffic composition	Driver delay Collisions and road safety	Scoped in
Drivers	Changes in traffic flows Changes in traffic speeds Changes in traffic composition	Driver delay Collisions and road safety Hazardous loads	Scoped in (except hazardous loads, which is scoped out)

5.6.36. The proposed development is expected to result in additional traffic movements on the local road network, primarily the B198 Lieutenant Ellis Way, the A121 Winston Churchill Way and the A10 Great Cambridge Road (south and north of the roundabout with the B198). The proposed development will also result in additional movements by other modes, including walking/cycling and public transport. The impact of additional traffic movement arising from the proposed development (during all phases) in conjunction with existing traffic movements on the local road network, and these trips by other modes has the potential to result in significant effects.

5.6.37. One existing PRoW Number 14 crosses the southern part of the application site and the proposal includes relocating this through the proposed new southern meadow. The PRoW is currently overgrown in places and usage is believed to be very low. The diversion of this PRoW may have significant impacts on pedestrian users.

5.6.38. An assessment of 'hazardous loads' has been scoped out as it is not anticipated that the construction process would require carriage of material listed in 'The Carriage of Dangerous Goods in the UK'. If these materials become needed during the course of construction, the legal requirements associated with their transit would be strictly enforced.

Assessment methodology

Baseline conditions

5.6.39. The sources identified in paragraph 0 alongside site visits and other available information will be used to establish baseline conditions in the ES.

Assessment scenarios

5.6.40. Three assessment scenarios will be considered in the ES as stated in 3.4.4. These scenarios will require consideration at during all relevant stages identified in Figure 3.1.

5.6.41. For assessment scenario 3, which represents the full build and operation of the proposed development, an assessment will be provided for the opening year and a future 'review' year, expected to be some 10 years after opening.

Assessment approach

5.6.42. The ES chapter assessment methodology will consist of the following key stages:

- Establishment of baseline conditions;
- Assessment of demolition and construction effects;
- Assessment of operational effects; and
- Assessment of residual effects.

5.6.43. The assessment approach for Transport is based on the IEMA Guidance. The majority of roads within the study area are not considered to be sensitive as they do not have relevant development fronting onto the carriageways, whilst analysis undertaken considers that the percentage impact of the proposed development would be below the 10% threshold for assessment of impact on Medium or High sensitivity receptors.

5.6.44. Referencing the IEMA Guidance, this states in paragraph 4.5 that "*for many effects there are no simple rules or formulae which define the thresholds of significance and there is, therefore, a need for interpretation and judgement on the part of the assessor, backed-up by data or quantified information wherever possible. Such judgements will include the assessment of the numbers of people experiencing a change in environmental impact as well as the assessment of the damage to various natural resources*."

Assessment criteria

5.6.45. In accordance with the IEMA Guidelines, the impact of traffic is dependent upon a wide range of factors, including:

- Volume of traffic;
- Traffic speeds and operational characteristics; and
- Traffic composition (e.g., percentage of heavy goods vehicles).

5.6.46. The potential impacts of the proposed development on driver delay, public transport users, pedestrian delay and amenity, fear and intimidation, severance, and collisions and road safety will be assessed in the EIA. Further details on the assessment methodology for each of these potential impacts is provided below.

5.6.47. The sensitivity of each receptor in the study area will be defined on the following scale, with reference to the IEMA Guidelines and the local context of each receptor:

- Very high;
- High;
- Medium;
- Low; and
- Negligible.

5.6.48. The magnitude of change (impact) resulting from the proposed development, will be assessed using the following scale, based on the assessments contained within the Transport Assessment and with consideration of relevant guidance:

- Very Large;
- Large;
- Medium;
- Small; and
- Negligible.

5.6.49. Comprehensive receptor sensitivity and impact magnitude criteria for each potential impact (e.g., driver delay, severance etc.) will be provided in the ES chapter. The criteria will be based on the IEMA Guidelines and professional judgement.

5.6.50. The significance of each effect will then be established based on the assessed sensitivity of the receptor and the magnitude of change, as shown in the significance matrix provided in Table 3.4. Where more than one effect classification exists for any given scenario (e.g., minor, or moderate), professional judgement will be used to assign a single effect classification.

5.6.51. In accordance with EIA Regulations, the likely environmental effects of the proposed development will be identified, and their significance determined.

5.6.52. The following scale of significance will be adopted for the effects, noting whether the effects will be permanent or temporary, direct, or indirect, short, medium, or long-term, and significant or not significant:

- Major Beneficial;
- Moderate Beneficial;
- Minor Beneficial;
- Negligible;
- Minor Adverse;
- Moderate Adverse; and
- Major Adverse.

5.6.53. Effects that are classified as Major or Moderate are considered to be significant. Effects classified as Minor or Negligible are considered to be not significant.

Driver Delay

5.6.54. The Transport Assessment will include junction capacity assessments for the study area using the industry standard software packages. These programs give output Ratios of Flow to Capacity (RFC), Degrees of Saturation (DoS), queue lengths and delays, which give an indication of the overall operational capacity of the junctions.

5.6.55. Changes in delay to drivers will be considered with reference to the delay statistics from the junction capacity assessments. This will be used to inform the criteria for determining the impact of the proposed development on driver delay.

Public Transport Users

5.6.56. The potential impacts on road-based public transport (bus) users in the vicinity of the application site will be assessed in a similar way to driver delay. The increase in delays will be calculated based on the junction capacity assessment results for relevant junctions that key bus services pass through in the study area.

Pedestrian Delay

5.6.57. A change in vehicular demand affects the ability of pedestrians to cross local routes, which results in an impact on delay and on an individual's desire to make a particular walking journey.

5.6.58. The IEMA Guidelines recommends that given the range of local factors and conditions which can influence pedestrian delay, assessors should use their judgment to determine if there is a significant impact. This will be used, together with any relevant local information for this assessment.

Pedestrian Amenity

5.6.59. Pedestrian amenity can be described as the relative pleasantness of a journey and an individual's desire to make that particular walking journey. Changes in the volume, speed or composition of traffic and the physical condition at crossing points affect pedestrian amenity.

5.6.60. The IEMA Guidelines provide a threshold for judging the significance of changes in pedestrian amenity where the traffic flow, or the Heavy Goods Vehicle (HGV) component, doubles. This will be used to inform the criteria for determining the impact of the proposed development on pedestrian amenity.

Fear and Intimidation

5.6.61. Fear and intimidation can also increase as a result of rising traffic flows. This is influenced by a number of factors, including the volume of traffic, HGV content, nature and frequency of cycle infrastructure, and the width of the footway.

5.6.62. In addition, the IEMA Guidelines provides an example of fear and intimidation hazard definition. This will be used to inform the criteria for determining the impact of the proposed development on fear and intimidation.

Severance

5.6.63. Severance is a perceived division that occurs when a traffic link separates part of an existing community. This can occur when a road becomes too heavily trafficked (making crossing the road difficult) or when a new route divides existing land creating a physical barrier.

5.6.64. The Guidelines for the Environmental Assessment of Road Traffic includes indicators for the separation effects of increases in traffic flows. These will be used to inform the criteria for determining the impact of the proposed development on severance.

Collisions and Road Safety

5.6.65. The assessment of collision (accident) risk and highway safety is based upon knowledge of existing accidents. These are used to identify locations of specific concern (commonly referred to as 'accident blackspots'). For example, should a particular link or junction be found to have a high incidence of accidents, then the addition of significant traffic volumes could have a further detrimental impact on highway safety and mitigation measures may be required.

5.6.66. Personal Injury Accident data for the highway network adjacent to the application site will be obtained for the most recent five-year period. This will be used to inform the criteria for determining the impact of the proposed development on collisions and road safety.

5.7. Noise and Vibration

Context

5.7.1. The noise and vibration assessment is concerned with effects on people living and working close to the site.

5.7.2. These effects could potentially arise due to:

- noise from the enabling and construction works for the proposed development;
- road traffic noise from any changes in traffic flow or composition on existing surrounding roads during both construction and operation; and
- operational noise from the proposed development, including vehicle movements within the site, and occupational noise from activities on the application site.

5.7.3. Vibration effects, and operational noise from building services systems, have been scoped out of the assessment, this is subsequently discussed.

5.7.4. The noise assessment will consider baseline information gathered from a proposed baseline noise survey and follows a mixture of quantitative and qualitative methods to determine the effects and their significance.

Baseline conditions

Study area

5.7.5. The study area to pick up noise and vibration impacts as a result of physical works associated with the proposed development will extend up to 300 m from the site. This area will be used to identify the nearest noise sensitive receptors radially from the site boundary. Controlling noise and vibration effects at these nearest receptors will result in compliance at receptors further away. If during the assessment it is evident that effects could occur beyond this distance the study area would be extended to those receptors.

5.7.6. This study area is also in accordance with guidance in BS 5228-1, which states that caution is needed when making construction noise prediction beyond 300 m due to meteorological effects, particularly when soft ground correction factor has been applied.

5.7.7. For traffic noise effects, the area of assessment will extend along all affected roads on the surrounding network (i.e., roads which are subject to a traffic noise change of >1 dB due to one or a combination of flow / speed / composition changes), which will be identified as part of the Transport Assessment.

Receptors

5.7.8. The following sources will be used to establish the possible receptors within the study area:

- Address point data identifying residential and commercial properties; and
- Aerial mapping information.

5.7.9. The baseline noise conditions will be assessed for each noise sensitive receptor following the completion of a baseline noise survey, supplemented with predictions from a noise model of the site and surrounding roads.

5.7.10. The noise conditions around the site are expected to include significant noise contributions from the M25 to the south, the A10 dual carriageway along the eastern site boundary and, to a lesser extent, the B198 to the north. Noise from the railway line which runs approximately 350 m to the east of the site boundary may also provide some noise contributions to receptors on this side of the site. Noise contributions could also be expected from the industrial estate off the A10 on the eastern boundary of the application site.

Key issues and requirement for assessment

5.7.11. The key issues for noise relate to:

- Construction noise activity during the phased works, including construction traffic. To some extent as the development phases continue, there will be some local sound screening around later phases of the development due to the completed buildings.
- Operational noise, which will include vehicular transport within the site. The operational noise effects also include the use of the external 'backlot' space, which will include temporary set construction activities as well as occasional use of impulsive noise sources potentially. The likelihood, frequency and occurrence of such events will be confirmed as part of the assessment. The operational noise also includes building services equipment serving each building.

Assessment methodology

Baseline conditions

5.7.12. A baseline noise survey will be undertaken to establish typical existing ambient noise levels at the nearest sensitive receptors to inform the noise assessment.

5.7.13. A noise model will be produced of the site which will use the measured baseline levels, together with key noise sources in the locality to produce a baseline noise map for use in the assessment.

5.7.14. It should be noted that the National Highways works to improve the junction between the A10 and M25, and the potential works to improve the A10 and the roundabout between the B198 and the A10 proposed by Broxbourne, may result in some disruption of traffic using this junction, as well as increasing noise levels due to construction activities which may have an impact on the measured noise levels used to establish baseline levels. It may be necessary to carry out noise monitoring for an extended period, or to identify periods where construction works do not occur (e.g., weekend periods). Equally, it may be that the construction work has concluded at the time that surveys are carried out. This will be discussed with the Local Planning Authority to agree a suitable baseline methodology, prior to survey work being undertaken.

5.7.15. Any vibration impacts would be assessed based upon exceedance of the guidance thresholds described in the methodology below. The change in vibration from the baseline during construction is of less relevance than the resulting absolute exposure that would occur. Therefore, baseline measurements of vibration to assess potential construction impacts are not proposed.

Assessment scenarios

5.7.16. The assessment scenarios are as follows:

- Future baseline – the continuation of the site with minimal maintenance and management for agricultural purposes. This will use the baseline noise levels measured on the site, together with any corrections for future traffic changes up to the baseline year, to be supplied by others.
- Enabling works – this scenario will consider noise generated during the enabling works. The activities to be included in this phase of works will be clearly stated within ES.
- Construction phase – this scenario will consider noise during the construction period of the proposed development. It will be based on the typical worst case construction phase identified for each receptor and will include construction noise contributions from the proposed construction activities during the identified phase of the construction period.
- Operation of the proposed development – this will consider the completed development, including the sound screening provided by the new buildings and will incorporate predicted changes in operational traffic volumes as well as noise from specific operational activities within the site (to include use of the external backlot areas and vehicles moving around the site).

5.7.17. If appropriate, the assessment reported in the ES will combine the effects of the enabling and construction phase together to ensure a worst-case approach is being assessed at nearby sensitive receptors.

Assessment approach

5.7.18. The following sources of legislation and guidance will be considered in the noise and vibration impact assessment:

- Planning Practice Guidance (PPG) – Noise (2014) (8);
- National Planning Policy Framework (NPPF) (7);
- Noise Policy Statement for England (NPSE) (20);
- BS 5228:2009+A1:2014 Code of Practice for noise and vibration control on construction and open sites, Part 1: Noise (22), and Part 2: Vibration (23);
- British Standard BS 8233:2014 Guidance on sound insulation and noise reduction for buildings;
- BS 6472 (2008), Guide to Evaluation of Human Exposure to Vibration in Buildings;

- BS 7385-2 Evaluation and measurement for vibration in buildings – Guide to damage levels from ground-borne vibration (British Standards Institution, 1993);
- BS 4866 (2010), Mechanical vibration and shock – Vibration of fixed structures – Guidelines for the measurement of vibrations and evaluation of their effects on structures;
- BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound; and
- Design Manual for Roads and Bridges (DMRB) LA 111, Noise and Vibration, Revision 1.

5.7.19. The areas assessment which will be considered within the ES are detailed in Table 5.15.

Table 5.15
Noise and Vibration topics scoped in and out

Subtopic	Enabling / construction	Existence	Operation	Rational for the scope proposed
Construction noise	Scoped in	N/A	N/A	– There is the potential for temporary significant adverse noise effects on people living and working close to the site, particularly from construction and demolition activities. – The need for noise mitigation to address significant adverse effects will be determined during the assessment and identified in the ES. Best Practicable Means (BPM) mitigation would be applied as embedded mitigation to all construction works as a matter of course, whether significant effects are identified or not. This will be set out in the Construction Environmental Management Plan. – Any areas where significant adverse effects are assessed will be considered for additional mitigation depending on the magnitude and duration of the impact and the number of sensitive noise receivers affected. – Construction activities associated with set building are considered as part of the operational noise sources, assessed separately below.
Vibration	Scoped out	N/A	Scoped out	– On the basis that there are no identified sensitive receptors within 100 m of proposed building foundations, the assessment of construction vibration from processes such as installation of piled foundations has been scoped out of the assessment. – Operational vibration effects have been scoped out on the basis that there are no identified processes that generate significant levels of vibration on the application site.
Road traffic noise	Scoped in	N/A	Scoped in	– Some construction traffic would be required for the proposed development and the potential impacts associated with these additional construction traffic movements will be assessed. – The need for noise mitigation to address significant adverse effects will be determined during the assessment and identified in the ES. It

Subtopic	Enabling / construction	Existence	Operation	Rational for the scope proposed
				would be expected that construction traffic access would be controlled to the least disruptive route as embedded mitigation as part of the Construction Environmental Management Plan. – The traffic generated by the proposed development and operational noise impacts surrounding road network could be potentially significant for certain road links. Operational traffic has therefore been scoped into the assessment.
Operational noise from use of the application site	N/A	N/A	Scoped in	– Operational noise from activities on the application site will include assessment of noise from external activities in the backlot area, e.g., temporary set construction activities, noise from special effects etc. – Operational noise will also include the noise generated by traffic within the application site. The detail regarding the nature and timing of operational activities (e.g., likelihood of any night-time operations) will be developed as part of the EIA.
Building services plant noise	N/A	N/A	Scoped out	– During detailed design, any new building services plant will be specified such that they meet the Broxbourne Borough Council noise policy criteria outlined in policy EQ4 which will avoid any significant adverse effects. – Operational building services plant has therefore been scoped out of the assessment.

Assessment criteria

SENSITIVITY

5.7.20. The noise assessment criteria are generally based on residential and other high sensitivity noise sensitive receptors. Sensitivity is therefore built into the assessment. Examples of noise sensitive receptors are dwellings, hospitals, healthcare facilities, educational facilities, public rights of way and cultural heritage assets.

MAGNITUDE AND SIGNIFICANCE

5.7.21. The EIA Regulations require the identification of 'likely significant effects' associated with a proposed development to inform the planning process.

5.7.22. Government noise policy (NPSE and PPG-Noise) requires that thresholds should be set to define the onset of the following levels of effect:

- **Significant Observed Adverse Effect Levels (SOAEL)** - to identify the onset of significant adverse impacts on health and quality of life;
- **Lowest Observed Adverse Effect Levels (LOAEL)** - to identify the onset of adverse impacts on health and quality of life.

5.7.23. Where the modelled noise level indicates an effect that exceeds the relevant SOAEL threshold determined for the assessment (criteria to be determined by the assessor according to the context of the particular EIA), this will be assessed as a likely significant observed adverse effect. Above this threshold, such noise levels are perceived as 'present and disruptive' according to the assessment framework given in PPG-Noise. The NPSE states that these effects should be avoided.

5.7.24. The assessment will also identify likely significant effects where the calculated noise is less than the SOAEL but greater than the relevant LOAEL.

5.7.25. Between these thresholds, such noise levels are perceived as '*present and intrusive*' according to the assessment framework given in PPG-Noise. The NPSE states that these effects should be *mitigated and reduced to a minimum*.

5.7.26. This latter category describes effects at lower noise exposures that are an adverse impact on health and quality of life and may be considered significant in the EIA depending on the degree and context of the impact, but which are not categorised as significant in terms of Government noise policy.

5.7.27. In this case, between the LOAEL and SOAEL, the basis for assessing a likely significant effect is primarily the magnitude of change in noise caused by the development, with consideration of other factors such as the character or duration of the noise change and existing level of noise exposure.

5.7.28. Quantitative criteria for determining exceedance of the LOAEL and SOAEL thresholds for construction and operation will be included in the ES.

CONSTRUCTION NOISE EFFECTS

5.7.29. Construction noise levels and durations will be assessed for the processes that may cause the greatest impact within the worst-case construction phase for each receptor. The construction programme and methodology are not expected to be fully established for the proposed development at the time of undertaking the assessment. The construction noise assessment will, therefore, be necessarily high level in nature, examining the noisiest likely processes within each phase of the works.

5.7.30. BS 5228-1:2009+A1:2014 (22) (23) provides a number of example methodologies for the assessment of significant effects from construction noise. Annex E of BS 5228 describes the 'ABC' method of assessment, which is proposed to establish the threshold of potential significant effect at residential receptors. Additional criteria to identify any effects exceeding the SOAEL will be included in the ES.

5.7.31. If required, noise mitigation measures will be proposed in order to adequately manage the noise impacts of the construction to surrounding sensitive receptors.

5.7.32. Construction traffic routes, diversion, or road closures as a result of the construction works which result in changes to the traffic flow will be also considered where impacts >1dB are indicated (i.e., just above negligible impact threshold). Changes in traffic noise will be predicted using the Calculation of Road Traffic Noise, HMSO' (CRTN) methodology and assessed based on the approach for noise impacts set out in DMRB LA 111, Noise and Vibration, Revision 2, TSO' (DMRB LA 111). LA 111 includes a means for establishing significance of effect, which will be applied for this assessment.

OPERATIONAL NOISE – ROAD TRAFFIC NOISE EFFECTS

5.7.33. Assessment of road traffic noise will be carried out based on the assessment principles of DMRB LA 111. The DMRB approach to assessing traffic noise impact is to compare the noise levels associated with the proposed development scenario against noise levels for the 'do minimum' (without proposed development) scenario. The assessment will examine the anticipated changes in levels of road traffic noise as a result of the proposed development. This will be based on the forecast traffic changes from the Transport Assessment. The assessment will consider the traffic scenarios stated in Section 5.7.16.

OPERATIONAL NOISE – COMMERCIAL ACTIVITIES AND BUILDINGS SERVICES PLANT EFFECTS

5.7.34. Effects from commercial operations (including light industrial) and building services plant noise within the site will be assessed in accordance with the assessment method in BS4142:2014 and, with particular consideration of the following factors:

- The difference between the 'background noise level' and the 'rating level' of the commercial/industrial noise at the receiver location[2];
- The absolute level of noise, i.e. Not just the change, but relative to noise guidance thresholds for different receptor types and settings;
- The character of the new commercial/industrial noise compared to the character of the existing residual or ambient noise; and
- The sensitivity of the receptor.

5.7.35. The details of sources of commercial noise from buildings and freight movements are not yet fully understood for the proposed development. However, noise control measures will be included on all sources of building services noise as part of the design process to limit noise to within appropriate noise levels and to avoid significant effects. These measures can be secured by a suitably worded planning condition. The requirements of such a planning condition can then be discharged during detailed design of the proposed development.

5.7.36. There is no regulatory framework to assess operational noise from a film studio complex, so the assessment of operational noise from use of the site will also make reference to BS4142:2014 (which outlines how to assess noise from industrial noise and commercial sources). Reference may also be made in the assessment to BS8233:2014 (which sets recommended internal noise levels for dwellings and offices) and the World Health Organisation guidelines on Community Noise, 1999, (which suggest criteria for maximum noise levels in habitable rooms).

IN-COMBINATION EFFECTS

5.7.37. Where development phasing is such that a receptor could be affected by both construction and operational impacts simultaneously from different parts of the site, the in-combination effects would be considered. If neither noise source indicated a potentially significant effect individually according to their respective assessment separate criteria, the in-combination effect would be evaluated based on the combined construction and operational noise contribution relative to the baseline noise conditions.

5.7.38. Additional criteria to identify any effects exceeding the SOAEL will be included in the ES.

[2] The 'background level' ($L_{A90,T}$) is the noise existing in the absence of the 'specific noise level' at the receiver location. The 'specific noise level' ($L_{Aeq,Tr}$) from the new facility can be subject to corrections where it displays an identifiable feature or a combination of features (such as tonality, and /or impulsiveness or intermittency) to provide a 'rating level' ($L_{Ar,T}$).

5.7.39. Some other topic areas assess impacts which have levels of significance assigned to the effects (i.e., from major to negligible); it is noted that the significance criteria for noise will be rated significant, or not significant, with no semantic scale of significance. This is consistent with the established assessment methodologies described above.

5.8. Air Quality

Context

5.8.1. This section sets out the proposed scope and methodology for air quality assessment to be included in the ES. A review of relevant air quality guidance and policy has been undertaken together with a desk-based assessment of existing air quality conditions in the vicinity of the application site, to inform the proposed scope of the air quality assessment.

5.8.2. Air quality has been scoped into the ES as the location of the application site and the nature of the proposed development has the potential to affect air quality during the construction and operation phases.

Baseline conditions

Study area

5.8.3. The study area for the baseline conditions has been taken as a 2 km buffer around the application site. This will capture relevant activities and sources which may affect baseline air quality conditions at the site.

5.8.4. This study area considers industry best practice guidance detailed in the following paragraphs and the methodology section.

Industrial Processes

5.8.5. Industrial air pollution sources are regulated through a system of operating permits or authorisations, requiring stringent emission limits to be met, and ensuring that any releases to the environment are minimised or rendered harmless. Regulated (or prescribed) industrial processes are classified as Part A(1), A(2) or Part B processes, and are regulated through the Pollution Prevention and Control (PPC) (24), (25), system. The larger more polluting processes are regulated by the Environment Agency (EA), and the smaller less polluting ones by the local authorities. Local authorities focus on regulation for emissions to air, whereas the EA regulates emissions to air, water, and land.

5.8.6. There are currently no Part A processes with releases to air listed on the EA website (25). The impact of Part A(1), A(2) and B processes further from the site are assumed to be represented in the background concentrations used.

Road Traffic

5.8.7. In recent decades, atmospheric emissions from transport on a national basis have grown to match or exceed other sources in respect of many pollutants, particularly in urban areas. The local air quality of the site is mainly influenced by vehicle emissions associated with the heavily trafficked M25 London Orbital Motorway and A10 Great Cambridge Road which border the site to the south and east, respectively.

Local Air Quality

AIR QUALITY MANAGEMENT AREAS

5.8.8. The Environment Act 1995 requires local authorities to review and assess air quality with respect to the air quality standards for the pollutants specified in the National Air Quality Strategy. Local authorities are required to carry out an assessment and produce an Annual Status Report (ASR) of their area every year. Where objectives are not predicted to be met, local authorities must declare the area as an Air Quality Management Area (AQMA). In addition, local authorities are required to produce an Air Quality Action Plan (AQAP) that includes measures to improve air quality in the AQMA.

5.8.9. Broxbourne Borough Council has declared five AQMAs. All AQMAs were declared due to exceedances of the NO_2 annual mean objective, with the addition of AQMA 1 which was also declared due to exceedances of the PM_{10} annual mean objective. Four of these AQMAs are within 2 km of the application site and so are relevant for further assessment. Those relevant AQMAs are:

- AQMA 1 Arlington Crescent to Abbey Road;
- Monarchs Way/Winston Churchill Way Roundabout;
- AQMA 4 Eleanor Cross Road/Monarchs Way; and
- AQMA 6 Great Cambridge Road (A10).

5.8.10. Enfield Council has declared a borough wide AQMA due to exceedances in NO_2 and PM_{10} annual mean objectives. As the application site is within 100 m of the Enfield AQMA, this AQMA is relevant to the assessment.

BROXBOURNE BOROUGH COUNCIL LOCAL MONITORING

5.8.11. Broxbourne Borough Council do not operate any automatic monitors for air quality measurement purposes. Broxbourne Borough Council operate 38 diffusion tubes which measure NO_2 on a monthly basis. There are 16 diffusion tubes which are located within 2 km of the application site. Details of these monitoring sites are given below in Table 5.16. These results are taken from the 2020 air quality annual status report ASR (27) produced by Broxbourne Borough Council. The locations of these monitoring sites are shown in Figure 5.8.

5.8.12. The results below show that there were exceedances at monitoring sites BB05, BB09, BB11, BB21, BB22, BB28, BB49 and BB40 between 2015 and 2019. These sites are all located within AQMAs which have been declared due to exceedances in the NO_2 air quality objective. The highest concentrations of NO_2 were consistently measured at site BB28 which is within AQMA 6 and in between two traffic light junctions.

Table 5.16
Broxbourne Borough Council operated diffusion tubes

Monitoring site ID	Site name	Site type	Grid reference	
			X	Y
BB47	Turners Hill 2, Cheshunt	Kerbside	535924	202217
BB05	Arlington Crescent Waltham Cross	Roadside	200020	200020
BB09	100 Great Cambridge Rd	Roadside	535306	202351

Monitoring site ID	Site name	Site type	Grid reference	
			X	Y
BB10	Teresa Gardens Waltham Cross	Urban Background	200128	
BB11	35 High Street Waltham Cross	Roadside	536051	200090
BB48	Parkside, outside Greenwich Court (Flats 13- 24), Waltham Cross	Urban Background	200111	200111
BB21	36 Eleanor Cross Road Waltham Cross	Roadside	536292	200374
BB22	Sturlas Way Waltham Cross	Roadside	535999	200747
BB23	Wickes Car Park	Urban Background	536002	200692
BB49	Winston Churchill Way/High Street	Kerbside	536026	200819
BB27	59 College Road, Cheshunt	Roadside	535730	202230
BB28	214 Cambridge Road, Cheshunt	Roadside	535459	202978
BB34	Farm Close, Cheshunt	Roadside	535332	202039
BB35	86 College Road, Cheshunt	Roadside	535571	202271
BB39	College Rd/Goffs Churchgate Academy, Cheshunt	Roadside	535107	202160
BB40	A10/College Rd Junction, Cheshunt	Roadside	535314	202244

Table 5.17
Broxbourne Borough Council diffusion tube results

Monitoring Site ID	NO_2 annual mean concentration ($\mu g/m^3$)				
	2015	2016	2017	2018	2019
BB47	-	-	-	38.3	32.7
BB05	**53.3**	**60.7**	**65.6**	**58.9**	**57**
BB09	**48.5**	**54.3**	**50.7**	**47.4**	**43.8**
BB10	34.1	34.1	33.7	30.1	28.5
BB11	39.1	**43.6**	**42.4**	**41.3**	39.2

Monitoring Site ID	NO_2 annual mean concentration (µg/m^3)				
	2015	2016	2017	2018	2019
BB48	-	-	-	39	34.1
BB21	**47.7**	**48.5**	**48.1**	**44**	**44.1**
BB22	37.2	**41.2**	**42.6**	38.6	33.1
BB23	28.9	29.5	34.8	31.8	31.9
BB49	-	-	-	**46.9**	37.3
BB27	32.1	37.4	38.6	37	33.6
BB28	**67.3**	**73.3**	**71.2**	**63.3**	**61.8**
BB34	33.4	36.6	37.7	34.5	30.6
BB35	32.6	33.2	36.1	33.4	31.9
BB39	-	-	25.1	31.2	27.2
BB40	-	-	**42**	**48.6**	**42.5**

Table Notes:
Air Quality Objective = 40
Exceedances are shown in **bold**

ENFIELD COUNCIL LOCAL MONITORING

5.8.13. A review of the most recent ASR (27) by Enfield Council (EC) indicated no automatic monitoring sites within 2 km of the application site. There is one diffusion tube located within 2 km of the application site, within the borough wide AQMA. Details of this diffusion tube are given below in Table 5.18, and the locations of this is shown in Figure 5.8. The results from 2015 to 2019 are shown in Table 5.19.

5.8.14. The results show that the NO_2 annual mean air quality objective was not exceeded at monitoring site Enfield 7 between 2015 and 2020.

Table 5.18
Enfield Council operated diffusion tubes

Monitoring site ID	Site name	Site type	Grid reference	
			X	Y
Enfield 7	Enfield 7	Roadside	535460	199849

Table 5.19
Enfield Council diffusion tube results

Monitoring Site ID	NO_2 annual mean concentration (µg/m^3)					
	2015	2016	2017	2018	2019	2020
Enfield 7	25.7	33.9	27.6	22.8	20.6	17.3

Table Notes:
Air Quality Objective: 40
Exceedances are shown in **bold**

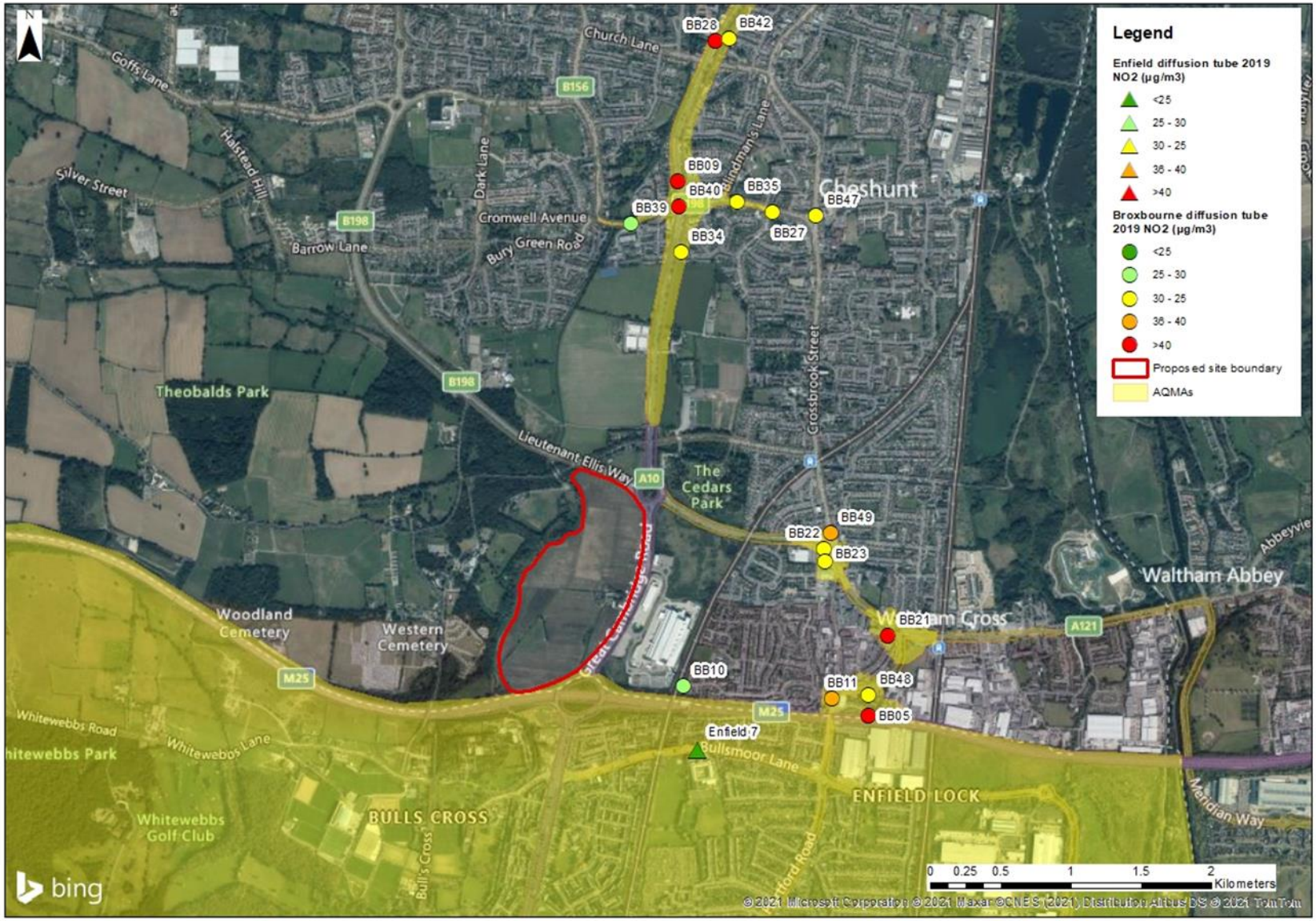

Figure 5.8 Locations of the monitoring sites within 2 km of the proposed site

Background Concentrations

5.8.16. The Defra website includes estimated background air pollution data for each 1 km by 1 km Ordnance Survey grid square in the UK. Background concentrations for 2019 have been taken from the latest Defra maps (28) and are presented in Table 5.20 for the grid square within which the application site is located. The year 2019 was used as the latest available monitoring data is from 2018.

5.8.17. Background concentrations are estimated to be below the air quality objectives for annual mean NO_2, PM_{10} and $PM_{2.5}$.

Table 5.20
Estimated background pollutant concentrations for 2019 at the application site

OS Grid Ref		Local Authority	Annual mean concentration (µg/m^3)		
X	Y		NO_2	PM_{10}	$PM_{2.5}$
535500	200500	Broxbourne	23.9	17.9	11.8

5.8.18. A comparison against monitoring background concentrations has been undertaken for the three urban background sites within 2 km of the application site (BB10, BB48 and BB23). The comparison has been undertaken for the latest year of available monitoring data (2019). Table 5.21 presents the comparison of the monitored NO_2 in 2019 against the Defra background for the same year. No nearby background monitoring sites recorded PM_{10} and $PM_{2.5}$ concentrations, so these have been excluded from the comparison.

Table 5.21
Comparison between Defra and monitored urban background concentrations in 2019

Pollutant	Estimated Defra background concentration (µg/m^3)	Measured concentration (µg/m^3)	Difference between measured and monitored (µg/m^3) and %	
BB10				
NO_2	23.9	28.5	4.6	19.5%
BB48				
NO_2	23.9	34.1	10.2	42.7%
BB23				
NO_2	23.9	31.9	8.0	33.5%

5.8.19. It can be observed that the monitored 2019 background concentrations are higher than the Defra background maps for all sites. As such, the measured concentrations will be used in the assessment as a conservative approach.

Summary

5.8.20. In summary, the concentrations of annual mean NO_2 at the application site where it is over 200 m from roads are likely to be similar to the concentrations recorded in 2019 at BB10 (28.5 µg/m^3), which is the closest urban background site to the application site. Closer to the main roads there is a risk that the existing concentrations will be above the air quality standards. No local monitoring sites nearby to the proposed sites recorded PM_{10} and $PM_{2.5}$ concentrations, however these are likely to be similar to the Defra background concentrations recorded in 2019 (17.95 µg/m^3 and 11.85 µg/m^3 for PM_{10} and $PM_{2.5}$, respectively).

Receptors

5.8.21. Receptors will be identified along the affected road network and receptors potentially impacted by dust during the construction phase will be identified. All identification will be carried out as a desk based exercise using GIS tools.

Key issues and requirement for assessment

Construction phase

5.8.22. During construction the generation of dust on-site has the potential to cause adverse air quality impacts. The potential impacts that may arise as a result of demolition/earthworks and construction works for the proposed development are dust deposition, resulting in the soiling of surfaces; visible dust plumes; elevated PM_{10} and $PM_{2.5}$ concentrations as a result of dust generating activities on site; and an increase in NO_2, PM_{10} and $PM_{2.5}$ concentrations due to exhaust emissions from Non-Road Mobile Machinery (NRMM). There is also the potential for impacts from construction vehicles using the local road network to access the site. This traffic may result in an increase in NO_2, PM_{10} and $PM_{2.5}$ concentrations due to exhaust emissions.

5.8.23. Should the proposed development not be built following enabling works an assessment of risk associated with returning to greenfield conditions will be included due to associated emissions from dust and vehicle movements.

Operational phase

5.8.24. The proposed development has the potential to result in additional road traffic movements on the local road network. There are a number of AQMAs surrounding the application site and the potential impact of increased traffic at areas of existing poor air quality and at sensitive receptor locations (including any relevant ecological receptors) along an affected road network will be assessed. This additional traffic may result in an increase in NO_x, NO_2, PM_{10} and $PM_{2.5}$ concentrations due to exhaust emissions.

5.8.25. The proximity to the M25 and other major roads will be taken into account in the assessment and whilst the proposed development does not add new sensitive receptors (with regards to long term average pollutant concentrations) the future on-site concentrations will be predicted and consideration of any junction 25 alignment changes will be included.

5.8.26. It is understood that the future site will be powered and heated electrically with no on-site combustion. There may be provision of diesel generators for life-safety back up and consideration of their impacts will be included.

Assessment methodology

Baseline conditions

5.8.27. The future baseline will be considered using the Defra predicted background concentrations and a future year scenario without the proposed development in place will be assessed to determine the 'do minimum' situation.

Assessment scenarios

5.8.28. No assessment will be completed for assessment scenario 1 (future baseline) with regards to dust and traffic emissions. This is because this scenario would not be give rise to any significant adverse effects.

5.8.29. The enabling works considered within Assessment scenario 2 and 3 would result in the same effects. Assessment scenario 3, which also includes the main build of the proposed development, represents the scenario most likely to result in air quality effects. Therefore the dust assessment will consider and assess this as the 'worst-case'. In accordance with Institute of Air Quality Management (IAQM) guidance (29), the level and type of mitigation identified as a result of the assessment to be completed and included in the ES is assumed to minimise the residual effects to negligible. Therefore the measures identified as required from the assessment of assessment scenario 3 will also be appropriate for assessment scenario 2 as well.

5.8.30. The construction assessment will consider all effects associated with the enabling works and the construction of the proposed development as well as an assessment of returning the site to greenfield conditions if required.

5.8.31. An assessment of future conditions with (do something) and without the scheme (do minimum) will be carried out for the opening year 2025. A baseline scenario (2019) will also be included to allow for model verification. The scenarios to be assessed are as follows:

- Baseline 2019;
- Do minimum 2025 (without scheme in operation); and
- Do something 2025 (with scheme in operation).

5.8.32. Due to traffic emissions reducing year on year as a result of policy and technological improvements the assessment of the opening year is considered to represent a reasonable worst case scenario.

Assessment approach

5.8.33. The following national planning policies have been taken into account:

- National Planning Policy Framework (2021) (7);
- Planning Practice Guidance (2014) (8);
- Clean Air Strategy (30); and
- Environment Act 2021 (32).

5.8.34. The following regional and local planning policies have been taken into account:

- Borough of Broxbourne Local Plan 2018-2033 (4).

5.8.35. The following policy, standards and guidance have been taken into consideration where relevant:

- Local Air Quality Management Policy Guidance and Technical Guidance (33) (34);

- Institute of Air Quality Management Dust Guidance (34); and
- EPUK/IAQM Land-Use Planning & Development Control (36).

5.8.36. The assessment will consider construction and operational impacts of the proposed development using the following steps.

- Consultation with the Environmental Health Officer (EHO) at Broxbourne Borough Council to agree the scope, approach and inputs to the air quality assessment;
- A baseline assessment will be undertaken to determine existing air quality conditions in the area around the proposed development. Data will be obtained from the council's local air quality management reports and Defra's local air quality management website (37);
- A desk-based study will be undertaken to review the legislation and planning policy relevant to air quality on a national and local level;
- An assessment of dust emissions during the construction phase of the proposed development will be undertaken. The IAQM guidance for the assessment of dust from demolition and construction will be followed;
- Screening of emissions from construction phase traffic will be carried out following the guidance from EPUK/IAQM (36). It has been assumed that all NRMM will meet the relevant emissions standards and therefore their emissions are unlikely to give rise to significant effects on local air quality;
- A detailed air quality assessment will include assessment of road traffic emissions from the proposed development on the highway network around the site. Pollutant concentrations (NO_x, NO_2, PM_{10} and $PM_{2.5}$) will be predicted at existing and future sensitive receptors in the area using the industry standard ADMS-Roads atmospheric dispersion software (37);
- Emissions from any on-site combustion will be screened and assessed if required following the EPUK/IAQM guidance;
- Pollutant concentrations at sensitive receptors (human and ecological, including assessment of nitrogen deposition if required) will be calculated for: a baseline scenario, to enable the model to be verified against monitored data and the first fully operational year (with and without the development), to enable the significance of the changes in local air quality to be determined; and
- Future receptors of the application site will be considered by reviewing future air quality concentrations and comparing to the relevant air quality objectives.

Assessment criteria

CONSTRUCTION DUST ASSESSMENT

5.8.37. The IAQM guidance for the assessment of dust impacts (34) will be used to determine dust risk and significance following any required mitigation.

5.8.38. The IAQM methodology assesses the risk of potential dust and PM_{10} impacts from the following four sources: demolition, earthworks, general construction activities and track-out. It takes into account the nature and scale of the activities undertaken for each source and the sensitivity of the area to an increase in dust and PM_{10} levels to assign a level of risk. Risks are described in terms of there being a low, medium or high risk of dust impacts. Once the level of risk has been ascertained, then site specific mitigation proportionate to the level of risk is identified, and the significance of residual effects determined.

CONSTRUCTION TRAFFIC ASSESSMENT

5.8.39. Exhaust emissions from construction vehicles and plant may have an impact on local air quality adjacent to the routes used by these vehicles to access the application sites and in the vicinity of the application sites itself. Any such impacts will be short-term and temporary in nature. The change in traffic will be screened using the EPUK/IAQM criteria to determine if a quantitative dispersion modelling exercise is required.

OPERATIONAL ROAD TRAFFIC EMISSIONS

5.8.40. The approach provided in the EPUK/IAQM guidance will be used within the assessment to assist in describing the air quality effects of additional emissions from traffic generated by the proposed development once operational.

5.8.41. The EPUK/IAQM guidance provides an approach to assigning the magnitude of changes as a result of a development as a proportion of a relevant assessment level. The change is then examined against the new total concentration and its relationship with the assessment criterion to provide a description of the impact at selected receptor locations.

5.8.42. Table 5.22 presents the IAQM framework for describing the impacts (the change in concentration of an air pollutant) at individual receptors.

Table 5.22
Impact descriptors for individual receptors

Long term average concentration at receptors in assessment year	% change in concentration relative to Air Quality Assessment Level (AQAL)				
	< 0.5	1	2-5	6-10	>10
75% or less of AQAL	Negligible	Negligible	Negligible	Slight	Moderate
76 – 94 % of AQAL	Negligible	Negligible	Slight	Moderate	Moderate
95 – 102 % of AQAL	Negligible	Slight	Moderate	Moderate	Substantial
103 – 109 % of AQAL	Negligible	Moderate	Moderate	Substantial	Substantial
110 % or more of AQAL	Negligible	Moderate	Substantial	Substantial	Substantial

Table Notes:
AQAL may be an air quality objective, EU limit value, or an Environment Agency 'Environmental Assessment Level (EAL).
The table is intended to be used by rounding the change in percentage pollutant concentration to whole numbers, which then makes it clearer which cell the impact falls within. The user is encouraged to treat the numbers with recognition of their likely accuracy and not assume a false level of precision.

5.8.43. Following the prediction of impacts at discrete receptor locations, the EPUK/IAQM document provides guidance on determining the overall air quality impact significance of the operation of a development. The following factors are identified for consideration by the assessor:

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

5.8.44. The significance of an effect will be reported as Negligible, Minor, Moderate or Major. Effects will also be reported as Adverse or Beneficial, Direct or Indirect, Temporary or Permanent and Short, Medium or Long-term.

5.9. Socio-economics

Context

5.9.1. The proposed development has the potential to generate a number of economic and social impacts, some of which have the potential to be significant, and consequently socio-economics has been 'scoped in' to the EIA.

Baseline conditions

Study area

5.9.2. The socio-economic analysis will focus on the impacts to the Broxbourne Council area (which is defined as local). This geographical area matches with the planning authority's boundary and most importantly for economic analysis, is the smallest geography with sufficient available data. For example ONS publishes sectoral employment and GVA data, wages, unemployment, deprivation, skills, etc. Whilst some data is available below the council area, it is not sufficient to accurately model the economic impacts.

5.9.3. The assessment will also consider the impacts at a national scale. It is worth nothing that the development may have an impact on economies that border Broxbourne, for example, Enfield which the application site is close to. Any effects in bordering economies will be considered as part of the wider UK in the national assessment.

Receptors

5.9.4. The following sources have been used to establish the possible receptors within the study area:

- Information provided by the applicant, including:
  - Construction costs;
  - Construction timelines;
  - Floorspace information and use types for each building;
  - An assumption on occupancy rates; and
  - An indication of what is currently on the site.
- Oxford Economics databases and forecasts, which utilise the following published data from the ONS:
  - Employment by sector;
  - GVA by sector;
  - Unemployment and inactivity;
  - Deprivation;
  - House prices;
  - Wages;
  - Demography (births, deaths and migration);
  - UK input-output tables.

5.9.5. The sensitive receptors in the local area of relevance to this technical topic are considered to be:

- Existing local and future employees; and
- Existing local population.

Key issues and requirement for assessment

5.9.6. The proposed development will result in a number of socio-economic impacts during the enabling, construction and operational phases. A brief summary of the potential impacts and likely effects of the proposed development have been included in Table 5.23.

Table 5.23
Potential socio-economic impacts

Impact	Indicator(s)	Geography	Phase	Potential level of significance and description
Jobs	Job years (construction phase) or jobs (operational phase).	Local and national	All	**Likely to be significant at the local level:** This is a large development and will require over 1,800 jobs years of construction employment. However, it will take three years to develop and hence the local sector will enjoy an increase in demand over the course of the construction phase.
GVA	£ million (in constant 2018 prices).	Local and national	All	**Likely to be significant at the local level:** Similarly, the operational phase of the scheme will support additional economic activity, both locally and across the wider economy.
Wages	£ million (in constant 2018 prices).	Local and national	All	**Likely to be significant at the local level:** (see employment above)
Business rates	£ million (in constant 2018 prices).	Local	Operational	**Likely to be significant at the local level:** The presence of new businesses or expanded operations in the local area may boost business rate revenues for the local council.
Government finances	£ million (in constant 2018 prices).	National	All	**Unlikely to be significant at the national level:** The employment and wage impacts will lead to income and corporation tax for the Government.
Population	Thousands	Local	All	**Unlikely to be significant at the local level:** The proposed development may attract new residents to the local economy to take advantage of job opportunities. However, the Proposed Development is not of a magnitude that will materially affect population patterns across the UK.

Impact	Indicator(s)	Geography	Phase	Potential level of significance and description
Labour market	Resident employment and unemployment rates.	Local	All	**Likely to be significant at the local level:** The creation of jobs associated with the proposed development may enable employment to be taken up by Uttlesford residents. It could also result in a reduction in the number of residents who would otherwise be unemployed. However, the Proposed Development is not of a magnitude that will materially affect the UK labour market.

5.9.7. The proposed development will likely boost workplace based employment, wages, and GVA contributions for the local economy (Broxbourne) and the economies that border Broxbourne e.g., Enfield. The majority of the direct jobs as a result of the proposed development are expected to be in Broxbourne, however a proportion of these jobs will likely be taken by residents of Enfield who decide to commute into Enfield. From a resident based point of view, surrounding local economies will likely enjoy a boost to resident based jobs and wages. In addition, Enfield and other surrounding local authority areas will benefit from supply chain spending and consumer spending supported by the proposed development (as spending flows across boarders). The assessment will quantify the scale of these benefits on neighbouring local economies, as part of the national benefits to the wider UK.

Assessment methodology

Baseline conditions

5.9.8. The sources identified in paragraph 5.9.4, will be used to establish baseline conditions in the ES.

Assessment scenarios

5.9.9. Of the three assessment scenarios to be considered within the ES, as identified in paragraph 3.4.4, only assessment scenario 3 - where the application site is to be developed into studios and then operated – has the potential to result in potential significant effects. Therefore, this will be the focus of the socio-economics assessment.

Assessment approach

5.9.10. An economic impact assessment quantifies the total economic benefit created by an investment through a range of different channels. To assess the potential economic impact of the proposed development, three key channels of impact are quantified:

- **Direct impact:** all the activity directly created or sustained during the enabling works, construction and operational phases of the proposed development.
- **Indirect impact:** all economic activity and employment supported in the supply chain of the enabling, construction and operational phases, through the purchases of goods and services from suppliers and also the suppliers' purchases from their own suppliers, and so on.
- **Induced impact:** the economic activity and employment supported by those both directly and indirectly employed in the construction and/or the operational phase, as they spend this income on goods and services in the wider economy.

5.9.11. A fourth channel, the '**catalytic'** or '**dynamic'** benefits represent the wider benefits that society and/or other industries derive from the proposed development. However, as many of these benefits are not typically quantifiable, their potential scale or effect on specific receptors is not estimated.

5.9.12. In order to calculate the economic impact of the proposed development, an economic impact model will be used. This model uses an input-output framework to estimate the indirect and induced impacts that are likely to flow from a given level of investment/activity[3]. An input-output table provides information on how sectors purchase from one another, and how households spend their income. This will draw on input-output tables published by the ONS to determine the economic impacts at a national level.

5.9.13. To estimate the local (Broxbourne) impacts, the UK input-output tables will be adjusted to account for both the size and structure of the local economy. This approach ensures the assessment accounts for leakage: the spillover of economic benefits from the target area to other areas. For instance, firms operating at the proposed development may make purchases from suppliers in neighbouring local authority areas—the assessment approach reflects the 'loss' of this activity to these other areas. As a consequence of the approach, the overall economic impacts that occur at a local (Broxbourne) level are by definition less than estimated nationally.

Assessment criteria

5.9.14. To assess the magnitude of impact and significance of the effect for each receptor, the local economy of Broxbourne will be compared against the impact assessment's results. The unquantifiable catalytic impacts that could arise from the proposed development will also be considered.

5.9.15. The determination of significance will be based on professional judgement and experience as economists.

5.10. Climate Vulnerability

Context

5.10.1. The EIA Regulations 2017 introduced the requirement for the consideration of climate change as part of the EIA process for the first time. The EIA Regulations 2017 seek to account for climate by requiring a description of 'the vulnerability of the project to climate change' (Schedule 4, paragraph 5(f)).

5.10.2. This assessment considers two main elements:

- In-Combination Climate Change Impacts (ICCI) assessment: how climate change could affect, e.g. intensify, the potential environmental impacts identified in the other technical chapters of the ES; and
- Resilience assessment: how climate change could affect the proposed development.

[3] An input-output model uses a matrix representation of a nation's interconnected economy to calculate the effect of changes by consumers, by an industry, or by others, on other industries and therefore on the economy as a whole.

Baseline conditions

Study area

5.10.3. The study area for the assessment of climate vulnerability incorporates the construction footprint of the works and the study areas of each of the other technical disciplines included within the ES. This is to ensure that the assessment considers how climate change, and the impacts associated with extreme weather, would affect proposed development and how it could result in further effects to other receptors in the future.

Baseline

5.10.4. The following sources have been used to establish the baseline within the study area:

- Met Office UK regional climates (39); and
- UK Climate Projections (UKCP18).

5.10.5. The existing climate of southern England is generally characterised by relatively mild winters and warm summers. Temperatures show a seasonal and diurnal variation but the area often experiences some of the highest mean annual temperatures across the UK. Long-term average annual rainfall is lower than the England average and the study area receives fewer heavy rainfall days than is usual for the UK.

5.10.6. The key climate projections for the UK are as follows:

- Summers will become hotter and drier;
- Winters will become milder and wetter;
- Soils will become drier on average;
- Snowfall and the number of very cold days will decrease;
- Sea levels will rise; and
- Storms, heavy and extreme rainfall, and extreme winds will become more frequent.

5.10.7. However, it should be noted that climate change is not only a challenge of the future for the UK but something which is already being observed.

Key issues and requirement for assessment

5.10.8. Climate change has the potential to lead to significant environmental effects on all EIA topic areas. For example, rising sea levels can affect fluvial and coastal flood risks and increases in the frequency of storms and extreme winds can affect wind microclimate conditions in the pedestrian environment at the site level. It is therefore proposed that the effects of climate change that are relevant to each technical topic are considered within the specific technical ES chapter.

5.10.9. The proposed development's vulnerability to the changing climate will also be assessed to ensure that appropriate mitigation is included within the design.

Assessment methodology

Baseline conditions

5.10.10. In addition to the findings inferred from the UKCP18 data, the receptors identified within each technical discipline of the ES will be used to form the baseline conditions of this assessment. The sensitivity of these receptors will be considered with regards to their susceptibility to accept the forthcoming changes in climate.

Assessment scenarios

5.10.11. The ICCI assessment will assess each of the assessment scenarios scoped in to the ES technical chapters.

5.10.12. The resilience assessment is only relevant to assessment scenario 3. This is because the assessment will focus on how the proposed development could be affected by the changing climate.

Assessment approach

5.10.13. The ICCI assessment will be completed within each of the relevant technical ES chapters. The sensitivity of the receptors in the context of future changes will be reviewed against the relevant topics criteria to determine if this is likely to change in the future, e.g. protected species as a result of loss of habitat. Similarly, the magnitude of impacts identified will be considered in the context of climate change to identify whether it is likely that this will change.

5.10.14. If climate change does not affect the assessment of the technical discipline or a particular receptor, this will be stated.

5.10.15. Should climate change be considered likely to introduce a new receptor or impact, these will be included within the assessment.

5.10.16. The resilience assessment will be incorporated in the 'Alternatives, Design Evolution And Climate Adaptation' chapter of the ES. In this chapter, the potential vulnerability of the proposed development to climate change will be discussed alongside the measures embedded within the design to provide the required resilience.

5.11. Effects on Climate: Greenhouse Gas Emissions

Context

5.11.1. The EIA Regulations 2017 also seek to account for climate by requiring a description of 'the impact of the project on climate' (Schedule 4, paragraph 5(f)).

5.11.2. A greenhouse gas emissions (GHG) chapter will be scoped in to the assessment as the construction (including enabling works) and operation of the proposed development has the potential to affect the earth's climate through the emission of GHGs into the atmosphere.

Baseline conditions

Study area

5.11.3. The study area for the assessment of GHG emissions would not be limited by a geographic area but would include all emissions from the on-site and off-site activities required to build and operate the proposed development.

Receptors

5.11.4. The only receptor for the assessment of GHG emissions is the atmosphere, a high sensitivity receptor for which there is no potential for substitution or replacement.

5.11.5. Scientists attribute the 'global warming' trend that has been observed since the mid-20th century to the human expansion of the 'greenhouse effect'. This greenhouse effect is warming that results from the atmosphere trapping heat radiation re-emitted from Earth towards space. The earth absorbs energy from the sun and re-emits some of this energy as thermal infrared radiation. GHGs (such as CO_2) in the atmosphere absorb this radiation and prevent it from escaping into space. The higher the concentration of GHGs in the atmosphere, the more heat is retained, and the higher global temperatures become.

Key issues and requirement for assessment

5.11.6. The assessment of GHG emissions considers only one key impact; anthropologically induced climate change. Although climate change itself leads to myriad indirect effects on humans and the environment, the main consideration of this chapter is GHG emissions to the atmosphere. The impact is global in scale, long-term in duration, and currently irreversible in nature. The impact is also certain where emissions are released.

5.11.7. The proposed development has the potential to affect the atmosphere by releasing emissions of GHGs during the enabling works, construction works and throughout its operational life.

Assessment methodology

Baseline conditions

5.11.8. The baseline for the GHG emissions will consider:

- The existing baseline, which is the GHG emissions currently emitted from the application site boundary; and
- The relevant UK carbon budgets applicable to the proposed development.

Assessment scenarios

5.11.9. Only assessment scenario 3, which involves enabling works, construction works and the operation of the proposed development, is considered likely to have the potential to result in significant environmental effects relevant to the GHG assessment. Therefore, assessment scenarios 1 and 2 will not be considered within the GHG assessment.

Assessment approach

5.11.10. The following guidance will be used to form this assessment:

- IEMA guide to 'Assessing Greenhouse Gas Emissions and Evaluating their Significance' (2017);
- PAS 2080 – Carbon Management in Infrastructure Verification; and
- RICs guide to 'Whole life carbon assessment for the built environment'.

5.11.11. It is recognised that covering all GHG emissions associated with a development is challenging, particularly in the earlier design stages and therefore, the IEMA guidance places emphasis on undertaking a proportionate and appropriate assessment to inform decision making and avoid undue burden to developers and regulators.

5.11.12. A detailed and complete GHG emissions assessment typically covers the whole life cycle of a development (from pre-construction to end of life). The IEMA guidance describes modules A, B and C which should be assessed in life cycle assessments and module D seen as optional as shown in Figure 5.9.

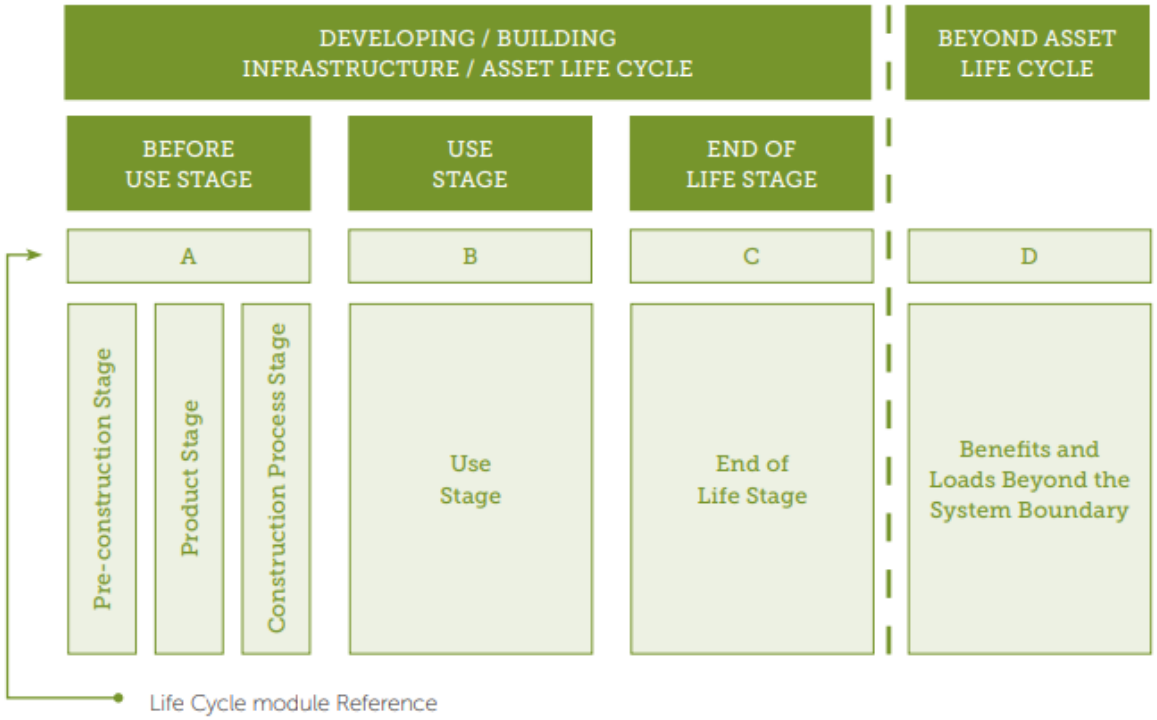

Figure 5.9 Modular Approach of Life Cycle Stages and Modules for EIA GHG Emissions Assessment (Based Upon IEMA 2017)

5.11.13. As shown in Figure 5.9, Module A represents the 'Before Use Stage'. It includes GHG emissions associated with preconstruction activities, products and the demolition and construction process. Module B represents the 'Use Stage' and incorporates emissions associated with the operation of the proposed development. Module C represents the 'End of Life Stage'. It comprises GHG emissions associated with the deconstruction and demolition of proposed development.

5.11.14. Module D, the 'Beyond Asset Life Cycle' stage, encompasses emissions associated with activities beyond the site boundary and life cycle of the proposed development. This module is a voluntary consideration, as it relates to the repurposing of discarded building elements or any energy recovered from beyond a project's lifecycle. It is not proposed that this module will be included in this assessment, as data to quantify these impacts would not be available at the time of assessment.

5.11.15. Where information is available, the ES will include an assessment of the physical building elements and construction works related to the proposed development, including external works within the site boundary and the operation of the proposed development.

Assessment criteria

5.11.16. It is not possible to link individual project emissions with indirect effects on global climate (for example temperature increase) in a quantitative manner. Therefore, the assessment of the effects of the proposed development on climate is limited to quantification of the magnitude of GHG emissions and comparison of these to the carbon budget.

5.11.17. This may be positive (leading to a reduction in emissions) or negative (leading to an increase in emissions).

5.11.18. The emissions from the proposed development will be compared against the UK's relevant carbon budget to contextualise the proposed development's carbon contribution and whether or not it will substantially affect the UK's ability to achieve the carbon budget. Under the principle that all GHG emissions might be considered significant, whether or not the effect is significant will be determined by professional judgement.

5.12. Lighting

Context

5.12.1. Lighting will be required for operational activities and security purposes at all stages of the proposed development. The enabling and construction works will occur during the daytime but will require illumination particularly during the autumn and winter. During operation the proposed development will be illuminated after dark to allow activities to be undertaken safely. These activities may include open air filming on the outdoor production area – the backlot – at the western side of the application site. There will also be lighting for security to pedestrian and cycle routes within the site area to provide access after dark.

5.12.2. Obtrusive light, sometimes referred to as light pollution, may cause nuisance to others or adversely affect fauna and flora. It is subject to policy and statutory requirements.

5.12.3. The National Planning Policy Framework acts as a guidance for the local planning authorities and the National Planning Practice Guidance supporting the framework encourages best practice design so as to limit the impact of light obtrusion on local amenity, intrinsically dark landscapes and nature conservation. Paragraph 185 states that:

> *'planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:[...] c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation'.*

5.12.4. The Environmental Protection Act 1990 (Part III Statutory Nuisance and Clean Air, section 79 of Statutory nuisance and inspections thereof), gives local authorities the power to consider obtrusive artificial light as a Statutory Nuisance. The Act states that *"any artificial light emitted from premises so as to be prejudicial to health or a nuisance"* constitutes "statutory nuisance". It is the duty of the local authority to inspect its area from time to time to detect any statutory nuisances which ought to be dealt with under section 80 of the Act (summary proceedings for statutory nuisances). Where a person living in the local authority's area complains of statutory nuisance, the local authority must take reasonably practicable steps to investigate.

5.12.5. The Clean Neighbourhoods and Environmental Act 2005 (section 102 of the Clean Neighbourhoods and Environmental Act 2005), gives local authorities the power to consider obtrusive artificial light as a Statutory Nuisance. The Act amends the Environmental Protection Act 1990 (section 79) to make *'artificial light emitted from premises so as to be prejudicial to health or a nuisance'* a criminal offence.

Baseline conditions

Study area

5.12.6. Rather than a prescriptive geographic study area, specific receptors which have the potential to be affected by the proposed development have been identified. Given the site is a greenfield location and benefits from some screening by vegetation and topography the extent of potential receptors is expected to be limited to:

- Existing neighbouring properties;
- Sensitive wildlife habitats;
- Receptors within the proposed development; and
- Roads.

5.12.7. Through reference to these receptors and selected viewpoints established by the landscape and visual assessment, a nocturnal baseline study around the application site will be undertaken. This will focus on measurement of the existing light incident on neighbouring properties and wildlife habitats. It will also include calibrated night time photography of the site from visual receptors. Given that the site is not currently occupied or lit, it is concluded that this will provide a robust baseline for the assessment of potential effects.

Receptors

5.12.8. The following receptors have been identified within the study area:

- Ecological receptors from consultation with Baker Consulting Ltd:
  - New River – Along the course of the waterway to the west of the site boundary.
- Neighbouring properties from desktop study:
  - Chestnut Country Club – Located to the north-west of the application site;
  - Birch Hotel - Located to the west of the application site;
  - Theobalds Caravan Park - Located to the south-west of the application site; and
  - Travelodge Motel - Located to the east of the application site.
- Visual impact receptors from the Landscape and Visual Impact Assessment:
  - The Birch Hotel – View east to the application site;
  - The Birch Hotel – View north-east to the application site; and
  - Travelodge Motel - View south-west to the Listed Buildings on the application site.

5.12.9. An initial study of the environmental zones, as defined in the ILP Guidance Note GN01, applicable to the application site suggests that the site is currently located in environmental zone E2, bordering an E3 zone to the east. A description of these environmental zones is shown in Table 5.24. For the purposes of the assessment, the facades bordering the A10 and internal facades and routes will be treated as E3 and all facades and working areas adjacent to the northern, western and southern boundaries shall be treated as E2.

5.12.10. Should the Local Authority disagree with the above assumption, please confirm the environmental zones considered applicable to the application site within the Scoping Opinion.

Table 5.24
Environmental Zone Classification

CATEGORY	DESCRIPTION	EXAMPLES
E0	Dark landscapes	UNESCO Starlight Reserves, IDA Dark Sky Parks
E1	Intrinsically dark landscapes	National Parks, Areas of Outstanding National Beauty, etc
E2	Low district brightness areas	Rural, small village, or relatively dark urban locations
E3	Medium district brightness	Small town centres or urban locations
E4	High district brightness areas	Town/city centres with high levels of night-time activity

Key issues and requirement for assessment

5.12.11. Light spill is the spilling of light beyond the boundary of the application site. In this case, the particular impact of concern will be the effect on fauna along the New River waterway. Bats are affected by both light level and the spectrum of increased incident light. This can modify behaviour away from current foraging routes and increase predation. Assessment is required to establish effective mitigation of light spill onto New River.

5.12.12. Intrusive light is spilled light which particularly affects residential properties either through the intrusion of light into bedrooms causing a nuisance or impedes the view of the night sky from the property. Light intrusion is unlikely to have a significant impact since it can be addressed locally by the use of blinds or curtains already in place. However, assessment is required to establish that limiting values for light intrusion detailed in the ILP Guidance Note GN01 are not exceeded.

5.12.13. Façade Luminance is how bright an illuminated façade appears to the observer. The ILP Guidance Note GN01 details limiting values of façade luminance for different environmental zones. Assessment is required to establish that the limiting values are not exceeded.

5.12.14. Source Intensity is how bright the light source appears to an observer. The brightness of luminaires can impact the view towards the development site and affect the ability of road users to see essential information. The installation should be assessed to ensure that visible luminaires comply with the limiting values of CIE 150 2017.

5.12.15. Skyglow is a combination of Direct Upward Light and Indirect Upward Light. This effect is seen as a glow in the night sky and reduces the view of the stars. The skyglow is quantified in the ILP Guidance Note GN01 by the percentage of the luminous output emitted above the horizontal plane the Upward Flux Ratio, UFR. Assessment is required to ensure that the installation does not contribute more than the limiting percentage of sky glow.

5.12.16. It is assumed that a Construction Environmental Management Plan (CEMP) will be prepared by the Contractor and that construction lighting will follow the recommendations therein as well as the ILP Guidance Note GN01.

Assessment methodology

Baseline conditions

5.12.17. Night time baseline surveys will be undertaken and used as a benchmark for the assessment.

5.12.18. As part of the assessment process, a quantitative and visual survey of the impact of the existing lighting in the locality of the application site and surrounding landscape will be undertaken. The methodology appropriate for such a survey is described in guide CIE 150.

5.12.19. A selection of the viewpoints (VP) identified within the Landscape and Visual Assessment will be used as the basis for undertaking nocturnal lighting measurements. Selection of these locations will be based on discussions with the landscape and ecology specialists within the project team. All of these viewpoints will be located beyond the site boundary, looking back towards the application site. Baseline nocturnal lighting conditions will be recorded at these selected viewpoints.

5.12.20. It is currently proposed that the site survey will measure the following:

- Ecological receptors:
  - New River – Horizontal and vertical illumination along the course of the waterway to the west of the site boundary.
- Neighbouring properties:
  - Chestnut Country Club – Located to the north-west of the application site. Measurement of illumination to east-facing facade.
  - Birch Hotel - Located to the west of the application site. Measurement of illumination to east-facing facade.
  - Theobalds Caravan Park - Located to the south-west of the application site. Measurement of vertical illumination at 1500mm above ground at the north-east boundary.
  - Travelodge Motel - Located to the east of the application site. Measurement of illumination to west-facing facade.
- Visual impact receptors
  - The Birch Hotel – Calibrated night time photographic study of view east to the application site.
  - The Birch Hotel – Calibrated night time photographic study of view north-east to the application site.
  - Travelodge Motel - Calibrated night time photographic study of view south-west to the Listed Buildings on the application site.

Assessment scenarios

5.12.21. The lighting assessment will be undertaken for assessment scenario 3, operation of the proposed development only, as this presents a worse-case assessment.

Assessment approach

5.12.22. The proposed assessment approach will consist of:

- Identification of potential light sources, their characteristics and the location and sensitivity of potential receptors;
- Assessing potential magnitude of the effects and determining their significance; and
- Where necessary identifying the relevant mitigation measures and residual effects.

5.12.23. The assessment of light impacts will first identify the nature of any light obtrusion characteristics. These can be defined as:

- Light Spill. Units: illuminance (E), measured in lux;
- Light into Windows (spill light straying beyond the operational area and into a neighbouring dwelling);
- Façade Luminance. Units: Luminance (L) measured in cd/m^2;
- Source Intensity. Units, Intensity (I), measured in candelas (cd); and
- Skyglow. UFR, percentage of installed lumen output.

5.12.24. The assessment methodology for this assessment will follow recognised industry standards and will incorporate the following guidance:

- Institute of Lighting professionals (ILP) Guidance Note GN01 (2020): Guidance Notes for the Reduction of Obtrusive Light.
- ILP Guidance Note GN08 (2018): Bats and artificial lighting in the UK; Bats and the Built Environment series.
- ILP Professional Lighting Guide PLG 04 (2013): Guidance on Undertaking Environmental Lighting Impact Assessments.
- Commission Internationale de L'Eclairage (CIE) guide 150 (2017): Guide on the limitation of the effects of light obtrusion from Outdoor Lighting Installations.
- CIE 126 (1997): Guidelines for Minimising Sky Glow.
- CIE 136 (2000): Guide to the Lighting of Urban Areas.
- BS EN 12464, Part 2 (2014): Outdoor Lighting.
- BS 5489, Part 1 (2020): Code of Practice for the design of road lighting.
- SLL LG6 (2016): The Exterior Environment.

Assessment criteria

5.12.25. The sensitivity of the assessed receptors identified in 5.12.8 is summarised in Table 5.25:

Table 5.25
Description of receptor sensitivity

Sensitivity (value)	Typical receptor	Typical description
Very high	– Protected habitats e.g. bat roosts. International Dark Sky Reserve Dark landscapes (ILP Environmental Zone E0)	Receptor has negligible ability to absorb change without fundamentally altering its present character and is of very high environmental value/importance.
High	– Unprotected nocturnal wildlife habitats e.g. ecological receptors on New River. Intrinsically dark landscapes (ILP Environmental Zone E1)	Receptor has low ability to absorb change without fundamentally altering its present character and is of high environmental value/importance.
Medium	– Residential properties within ILP Environmental Zone E2 Low district brightness areas (ILP Environmental Zone E2)	Receptor has moderate capacity to absorb change without significantly altering its present character, has some environmental value/importance
Low	– Residential properties within ILP Environmental Zone E3 & E4 Medium district brightness areas (ILP Environmental Zone E3)	The receptor is tolerant of change without detriment to its character, is of low environmental value/importance
Negligible	– Commercial properties High district brightness areas (ILP Environmental Zone E4)	The receptor is tolerant of change without detriment to its character, is of negligible environmental value/importance

5.12.26. The magnitude of the lighting changes due to the proposed development will be assessed by determining the deviation from the recommended values of light parameters for obtrusive light given in ILP Guidance Note GN01. Table 5.26 describes the criteria for determining the magnitude of an environmental impact for the environmental zones E2 and E3 applicable to the development site.

Table 5.26
Criteria for magnitude of change

Impact magnitude	Description	Magnitude quantified
Large	Total loss or major alteration to key features of the baseline conditions which will be fundamentally changed.	All light obtrusion characteristics above Zone E3/E4 recommended limits.
Medium	Loss or alteration to one or more key features of the baseline conditions which will be fundamentally changed.	One or more light obtrusion characteristics exceed the Zone E2/E3 limits by more than 20%.
Small	Minor shift away from baseline conditions. Changes arising from the alteration will be detectable; the underlying character of the baseline condition will be similar	No light obtrusion characteristics exceed the Zone E2/E3 limits by more than 10%.
Negligible	Very little change from baseline conditions. Change is barely distinguishable, approximating to a “no change” situation.	Light obtrusion characteristics unchanged or below Zone E2/E3 limits.
No change	No change from baseline conditions	Light obtrusion characteristics unchanged

5.12.27. The ILP Guidance Note GN01 recommends maximum values of light parameters for obtrusive light in each environmental zone which provide the basis for assessing the magnitude of the environmental effect. Some of the parameters have two values dependent on the time of day, and lighting control strategies must be in place to meet these. These time periods do not vary across the year and they are:

– Pre-curfew 07:00 – 23:00
– Post-curfew 23:00 – 07:00

5.12.28. The light spill limiting values for E2 apply to the New River and to the northern and southern boundaries of the application site. Along the New River the vertical illuminance will be assessed along the eastern embankment at 1.5 m and 3.5 m above ground level to reflect typical bat foraging paths. The light spill limiting values for E3 apply to the eastern boundary of the development site, shown in Table 5.27.

Table 5.27
Maximum values of vertical illuminance

Light Technical Parameter	Application Conditions	Environmental Zone E2	Environmental Zone E3
Illuminance in the vertical plane (E_v)	Pre-curfew	5 lux	10 lux
	Post-curfew	1 lux	2 lux

5.12.29. The limiting values for light intrusion are as shown in Table 5.27. Light intrusion is assessed by determining the vertical illumination originating from the proposed development and calculating the illumination perpendicular to the plane of the window identified as a receptor.

5.12.30. A factor in the night time visual impact of the proposed development is the perceived brightness of the building facades and illuminated signage. The maximum permitted values of average surface luminance for building facades and signage apply to both pre- and post-curfew. The values for environmental zone E2 will apply to building facades adjacent to and facing the northern, western and southern boundaries of the proposed development. All other facades and signage shall be assessed in accordance with the maximum permitted values for environmental zone E3. The relevant values are shown in Table 5.28.

Table 5.28
Maximum permitted values of average surface luminance

Light Technical Parameter	Environmental Zone E2	Environmental Zone E3
Building Façade Luminance (L_b)	5 cd/m^2	10 cd/m^2
Sign Luminance (L_s)	400 cd/m^2	800 cd/m^2

5.12.31. The other key lighting metric that may be used to assess the visual impact of the proposed installation is the luminous intensity of bright luminaires visible to the occupants of premises or from positions where such views are likely to be maintained. The limits for the luminous intensity of bright luminaires are dependent on the viewing distance *d*, (between the observer and the bright luminaire(s)), and the projected area A_p of the bright part of the luminaire in the direction of the observer. Table 5.29 shows maximum values for the luminous intensity of luminaires in designated directions. For observers from Birch House the values for environmental zone E2 will apply. For observers from Travelodge the values for environmental zone E3 will apply.

Table 5.29
Limits for the luminous intensity of bright luminaires

Light Technical Parameter	Application Conditions	Luminaire Group (Projected Area A_p In M^2)					
		$0<A_P\leq0.002$	$0.002<A_P\leq0.01$	$0.01<A_P\leq0.03$	$0.03<A_P\leq0.13$	$0.13<A_P\leq0.50$	$A_P>0.5$
Maximum luminous intensity emitted by luminaire (I in cd)	**E2**						
	Pre-curfew	0.57 *d*	1.3 *d*	2.5 *d*	5.0 *d*	10 *d*	7.500
	Post-curfew	0.29 *d*	0.63 *d*	1.3 *d*	2.5 *d*	5.1 *d*	500
	E3						
	Pre-curfew	0.86 *d*	1.9 *d*	3.8 *d*	7.5 *d*	15 *d*	10,000
	Post-curfew	0.29 *d*	0.63 *d*	1.3 *d*	2.5 *d*	5.1 *d*	1,000

5.12.32. For installations of four or more luminaires the assessment of the sky glow produced is made by calculating the direct and reflected upward component of the light and comparing that to the total flux output of the installation. The ratio of the upward component to the total emitted flux is the Upward Flux Ratio, %. The maximum values of the UFR do not vary between pre- and post-curfew and are shown in Table 5.30.

Table 5.30
Maximum values of upward flux ratio of installation

Light Technical Parameter	Type of Installation	Environmental Zone E2	Environmental Zone E3
Upward Flux Ratio (UFR), %.	Amenity	6	12
	Road	5	8

5.12.33. The interaction of sensitivity and magnitude are considered to determine the significance of an environmental effect using the matrix described in Table 5.31. As a general principle, major and moderate effects are considered to be significant, whilst minor and negligible effects are considered to be not significant; however, professional judgement may be applied.

Table 5.31
Significance matrix

		Sensitivity (value)				
		Very high	High	Medium	Low	Negligible
Impact magnitude	Large	Major	Major or Moderate	Major or Moderate	Moderate or Minor	Minor
	Medium	Major or Moderate	Major or Moderate	Moderate	Moderate or Minor	Minor or Neutral
	Small	Major or Moderate	Moderate or Minor	Moderate or Minor	Minor	Minor or Neutral
	Negligible	Minor	Minor or Neutral	Minor or Neutral	Neutral	Neutral
	No change	Neutral	Neutral	Neutral	Neutral	Neutral

5.12.34. Combining the sensitivity scale with the magnitude criteria in Table 5.26 gives a scale of impact significance for obtrusive light from the proposed development.

Table 5.32
Significance of effect

Significance of effect	Typical description
Major beneficial	Substantial reduction in obtrusive light at sensitive receptors and/or users of the application site such that large scale improvements to visual amenity, human safety or health is delivered. Significantly improves ecological habitats.
Moderate beneficial	Moderate reduction in obtrusive light at sensitive receptors and/or users of the project site such that noticeable improvements to visual amenity, human safety or health are delivered. Improves ecological habitats
Minor beneficial	Minor reduction in obtrusive light at sensitive receptors and/or users of the project site such that perceptible improvements to visual amenity, human safety or health is delivered; perceptible improvement to ecological habitats.
Neutral	No appreciable effect on sensitive receptors. Effects are reversible
Minor adverse	Minor increase in obtrusive light at sensitive receptors and / or users of the project site such as an increase in Glare, Light Trespass to properties, increase in Sky Glow or effects on flora and fauna. Effects are reversible or temporary
Moderate adverse	Moderate increase in obtrusive light at sensitive receptors and / or users of the project site such as an increase in Glare, Light Trespass to properties, increase in Sky Glow or effects on flora and fauna. Requires monitoring and local remedial work. For example, lighting which is visible and causes nuisance to a sensitive receptor outside the application site.
Major adverse	Major increase in obtrusive light at sensitive receptors and / or users of the project site such as an increase in Glare, Light Trespass to properties, increase in Sky Glow or effects on flora and fauna. Requires extensive remedial works. For example, a

Significance of effect	Typical description
	floodlighting installation which directs light into the eyes of oncoming motorists causing disability glare and potential reduction in visual performance leading to an increased risk of collision.

5.12.35. In order to determine the significance of the visual impact effects the assessment criteria for visual impacts detailed in the Landscape Institute Guidelines for Landscape and Visual Impact Assessment (2013) will also be applied.

5.12.36. The significance of potential effects on species and habitats will be assessed in conjunction with the Ecological Impact Assessment. The effect on bats along the New River will depend upon the:

- Specific species of bat present on site;
- Size of appropriate buffer zone to provide sufficient protection against obtrusive light to ecological sites.

5.12.37. In case the need to provide lighting outweighs the needs of bats, it is recommended to a reach a balance between a reduced lighting level appropriate to the ecological importance of each feature and species, and the lighting objectives for that area.

5.13. Human Health

Context

5.13.1. The EIA Regulations 2017 also introduced the requirement for 'population and human health' factors to be included on the list of environmental topics considered in EIA.

5.13.2. Health is largely determined outside of the 'health' service - a point reinforced in the report Securing Good Health for the Whole Population (39), which uses the term 'National Sickness Service'. This service deals with almost an exclusive focus, on the urgent need to improve short-term access and quality to health services. Investments in social systems and places in which people spend their time and live their lives are a requirement of effective health improvements.

5.13.3. The health map (shown in Figure 5.10), originally developed by Barton and Grant (40) shows the complex interrelationships between health, physical, lifestyle, economic and social environments. People are at the core of the map, being surrounded by layers of influences that could theoretically be modified. The first of these is lifestyle, for example a person could decide to give up smoking. Beyond this, the map shows how the individual is situated in a community, a broader social world comprising social networks and social support that can affect an individual's health.

5.13.4. As the health map radiates outwards, wider influences exist that impact on decisions to stop smoking for example. The map also illustrates how human health is intimately connected to the health of the wider environment and ecosystems – pointing to the importance of integrating health and sustainable development agendas.

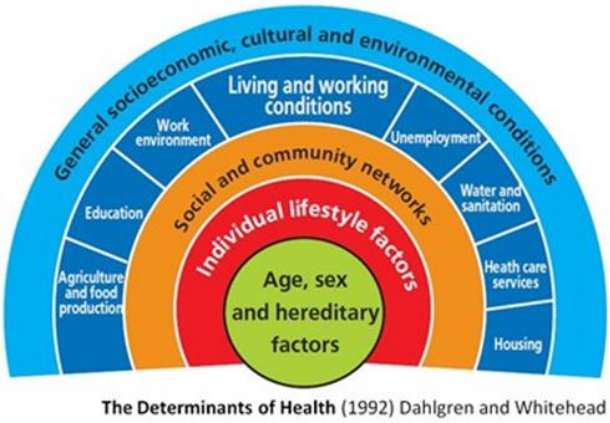

Figure 5.10 A Health Map for the Human Habitat

Baseline conditions

5.13.5. Many of the technical ES chapters proposed for inclusion in the ES will already address the potential implications of their topics on human health by virtue of set target values or objectives based on human health tolerances (e.g. air quality or noise) or through the consideration of policy requirements and targets promoting healthier behaviours (e.g. active travel such as cycling and walking).

5.13.6. Therefore the study area and relevant human health receptors will be identified within the appropriate technical chapters.

5.13.7. Receptors will include:

- Inhabitants of residential properties;
- Users of public spaces including PRoW; and
- Users of nearby community facilities.

Key issues and requirement for assessment

5.13.8. It is proposed that the human health considerations that are relevant to each technical topic will be considered within the specific technical ES chapter. Therefore, effects on human health are already considered to be 'scoped in' to the ES.

Assessment methodology

5.13.9. It is not proposed that human health is the subject of a separate technical ES chapter. Where relevant, it will be stated within each ES technical chapter how the respective technical assessment takes human health factors into consideration. Relevant literature or studies, which draw upon the human health outcomes anticipated as a result of the use of these targets, will be referenced where necessary. For example, with regard to air quality, the limit values are informed by guidelines set by the World Health Organisation (WHO) and therefore, the WHO air quality guidelines would be referenced with regard to the potential impacts on human health.

5.14. Risk of Major Accidents and/or Disasters

Context

5.14.1. The EIA Regulations 2017 also introduced the requirement for EIAs to consider the expected effects arising from the vulnerability of projects to major accidents or disasters. The EIA Regulations 2017 state that the following should be provided within the ES in relation to this topic:

> *"a description of the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters which are relevant to the project concerned."*

5.14.2. Schedule 4 of the EIA Regulations 2017, paragraph 8 requires an ES to contain:

> *"A description of the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to EU legislation such as Directive 2012/18/EU(3) of the European Parliament and of the Council or Council Directive 2009/71/Euratom(4) or UK environmental assessments may be used for this purpose provided that the requirements of this Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies."*

5.14.3. A **disaster** can be defined as *"a sudden, calamitous event that seriously disrupts the functioning of a community or society and causes human, material, and economic or environmental losses that exceed the community's or society's ability to cope using its own resources. Though often caused by nature, disasters can have human origins"*.

5.14.4. An **accident** can be defined as *"an unfortunate incident that happens unexpectedly and unintentionally, typically resulting in damage or injury"*.

Baseline

Study area

5.14.5. For the assessment of major accidents and disaster, it is not considered appropriate to identify a specific geographic study area but instead consideration is given to the likely pathways through which significant environmental effects could occur.

5.14.6. Relevant considerations when considering possible accidents and disasters include the location of the application site (in relation to existing hazard sources), the type of development (if the development itself will introduce a hazard) and existing and future constraints / likely receptors.

Guidance

5.14.7. In the absence of recognised guidance on this subject in the context of EIA, useful sources that provide guidance related to the topic and that have been reviewed include:

- Cabinet Office National Risk Register of Civil Emergencies 2017 Edition;
- UK Government Emergency Response & Recovery Guidance (October 2013); and

– International Federation of Red Cross & Red Crescent Societies Disaster and Crisis Management Guidance.

Receptors

5.14.8. Receptors considered within the major accidents and disasters assessment include:

– Humans; and
– Environmental receptors such as:
  – ecological sites and species;
  – land;
  – water;
  – air; and
  – heritage assets.

Key Issues and Requirements for Assessment

5.14.9. By nature, should a major accident and / or disaster occur significant environmental effects would likely occur. However, the likelihood of such an event is substantially lower than other potential impacts generally considered within an EIA.

5.14.10. In accordance with IEMA guidance, major accidents and/or disasters can be scoped out of the assessment if it can be clearly demonstrated that:

1. There is no source-pathway-receptor linkage of a hazard that could trigger a major accident and/ or disaster or potential for the scheme to lead to a significant environmental effect; or
2. All possible major accidents and/or disasters are adequately covered elsewhere in the assessment or covered by existing design measures or compliance with legislation and best practice.

5.14.11. Major accidents and disasters of potential relevance to the proposed development are included and described in Table 5.33.

Table 5.33
Major accidents and / or disasters to be considered

Major accident / disaster	Consequences of event
Storms / Severe weather	– Evacuation of employees; – Widespread damage to property and infrastructure; – Physical injuries and fatalities; and – Disruption to essential services.
Flood events	– Evacuation of employees; – Widespread damage to property and infrastructure; – Physical injuries and fatalities; and – Disruption to essential services.
Vehicle accidents	– Fatalities and physical / psychological casualties; – Disruption to essential services, particularly transport; – Disruption to business; – Damage to property and infrastructure; – Possible environmental contamination (such as with fuels / cargoes); and – Possible evacuation and shelter of local residents or employees.

Major accident / disaster	Consequences of event
Attacks on publicly accessible locations	– Fatalities and physical / psychological casualties; and – Damage to property and infrastructure.

Assessment Methodology

5.14.12. It is not proposed that risks of major accidents and disasters are the subject of a separate technical ES chapter but instead they will be considered within the relevant technical topics. The assessments will be completed in line with the methodology identified within that technical chapter. However, it should be acknowledged that any such accident or disaster would be a low likelihood event.

6. Topics where potential for likely significant effects is not anticipated

6.1. Ground Conditions and Contamination

Context

6.1.1. It is considered that significant effects relating to ground conditions and contamination are unlikely and as such this topic is 'scoped out' of the EIA. The following section provides a summary of the ground contamination conditions, sensitive geoenvironmental receptors and a summary of the potential for land contamination at the site.

6.1.2. The Environment Agency (EA) Land Contamination: Risk Management (LCRM) guidance (October 2020) sets out a 'staged risk-based approach' for land contamination risk management. A desk study is being prepared in line with a Stage 1 Risk Assessment: Tier 1 Preliminary Risk Assessment (PRA) of this guidance. The PRA includes a review of site specific and readily available desk-based geoenvironmental information, environmental reconnaissance survey, ground investigation data and an outline Conceptual Site Model (CSM). The PRA defines the scope of ground investigation which is currently ongoing and programmed to be completed in early 2022. The PRA (and ground investigation data and assessment) will be submitted to support the planning application.

Baseline Conditions

Study area

6.1.3. The study area for the initial assessment, which has informed the scoping process, comprises the application site. The application site is predominantly arable, greenfield land with the exception of agricultural buildings associated with Theobald's Park Farm.

Receptors

6.1.4. The following sources have been used to establish the possible receptors within the study area:

- Environmental database search report;
- Environmental reconnaissance survey; and
- A preliminary phase of ground investigation undertaken in 2021.

SITE CONDITIONS

6.1.5. The application site is located within the wider catchment of the River Lea which is located about 2.2 km to the east of the site. The New River, which is an artificial waterway, flows to the south and along the western boundary of the site. Theobalds Brook is approximately 45m to the north of the site.

6.1.6. The ground conditions comprise superficial deposits beneath a layer of topsoil (or locally Made Ground), comprising Enfield Silt Member (an Unproductive strata) and River Terrace Deposits (RTD) (Upper - Secondary A Aquifer). RTD is underlain by London Clay Formation (Unproductive strata of negligible permeability). A deeper aquifer is present at depth comprising lower granular units of the Lambeth Group and Thanet Sand Formation (lower basal sands - Secondary A Aquifer). The Chalk Principal Aquifer is present at depth beneath the Thanet Sand Formation.

6.1.7. The southern part of the site is in an inner (zone 1) and outer (zone 2) Source Protection Zone (SPZ). This is associated with a groundwater abstraction from the Chalk located at about 106 m to the south of the site and operated by Thames Water.

6.1.8. The application site has been occupied by open fields since the earliest available Ordnance Survey (OS) map extract of 1872. This shows Theobalds Park Farm in the central eastern part of the site (present day location). Man-made embankments were locally identified in the south of the site identified as a moat believed to be at the location of a former manor house from the 1500s. With the exception of infill to two small ponds in the west of the site no significant changes were noted onsite.

6.1.9. Onsite potential contamination sources are relatively limited to activities around the Theobalds Park Farm, including vehicle maintenance and services, heating oil tank and small scale construction and demolition activities, and local infill to small historical ponds. Potential offsite sources of contamination comprise historical landfills at about 60 m and 125 m to the east and northeast of the site respectively.

KEY RECEPTORS

6.1.10. The following possible receptors have been identified within the study area:

- *Construction workers and site neighbours during construction:* Site operatives and people in close proximity to the site are human health receptors.
- *Future site users:* The proposed film studio comprises a commercial use development. Human health receptors during operation will comprise employees and visitors.
- *Groundwater (RTD Secondary A Aquifer):* The shallow aquifer will provide base flow to rivers and streams in the wider area. Proposed foundations are shallow and will not penetrate to the lower aquifer.
- *The lower aquifer* (and associated abstraction): This is considered to be protected beneath the London Clay (aquitard) and cohesive units of the Lambeth Group and as such is not considered as a plausible receptor.
- Surface Waters:
- The New River (adjacent to the west of the site) is an artificial water course may not be in hydraulic continuity with groundwater onsite.
- Theobalds Brook is approximately 45 m to the north of the site.
- The River Lea is approximately 2.2 km to the east of the site which is a considerable distance and as such is not considered as a plausible receptor.
- *Building materials:* Building materials and services will come into direct contact with soils.
- *Ecological designations:* There are no designated ecological receptors onsite. The proposed development includes soft landscaping and plants could be affected by phytotoxic determinands.
- *Geological designations:* There are no designated geological conservation resources at the site.

Key issues and requirement for assessment

6.1.11. The review of baseline conditions has identified a limited potential for ground contamination to be present at the site, associated with localised onsite sources (Theobalds Park Farm). Offsite sources of contamination that may impact the site comprise landfills from 60 m to the east of the site.

6.1.12. In line with Part IIA of the Environmental Protection Act 1990 (42) for a risk from ground contamination to exist there must be a contaminant linkage defined by a source – pathway – receptor relationship. The significance (of harm) of the risk should reflect the probability of the occurrence and severity of a consequence. A qualitative risk assessment will be presented in line with CIRIA Report C552 (42) in the PRA.

6.1.13. A PRA, ground investigation, contamination risk assessment and remediation strategy report will be submitted with the planning application (i.e., prior to the site being developed), ensuring that human health and controlled waters (and all receptors highlighted in 6.1.10) are safeguarded. It is not expected that significant remediation (if any) will be required for the development. It is anticipated that any remedial requirements would be secured by suitably worded contamination related planning conditions placed on the permission. The ground investigation will be implemented and if any contamination is identified, it will be mitigated or remediated and verified as part of the development. Any mitigation or remediation strategy will be agreed with the local planning authority.

6.1.14. Construction works, including piling, excavation, spoil handling and disposal, will be undertaken in accordance with an approved Construction Environmental Management Plan (CEMP), to prevent pollution of ground and surface waters and to protect human health. A watching brief for any contamination encountered during construction will form part of the CEMP.

6.1.15. Regulations will be adhered to and any potentially enhanced risks associated with contamination will be managed by the undertaking of phased assessment and development of a remediation strategy under planning. This will ensure that exposure to contamination is minimised to an acceptable level which will prevent any significant adverse construction effects occurring.

6.1.16. Where proposed activities are likely to generate soil arisings as part of the construction works, the design will be informed by the requirements of the CL:AIRE Definition of Waste: Code of Practice in order that the sustainable re-use of soils can be embedded within the design and the development remain compliant with current waste regulation. As part of this process a Materials Management Plan (MMP) may form an appropriate route to material re-use subject to conformance with the relevant regulation and guidance. While these considerations are not directly required to meet planning or undertake compliant EIA, early consideration of how excess soils can be managed is likely to lead to future programme and cost benefits at construction stage.

6.1.17. On completion of the proposed development, it is considered that there would not be the potential for any likely significant adverse operational effects on future users as a result of the use of the development. The ground gas regime at the application site will be assessed by the ground investigation and protection measures will be incorporated into the new buildings (if required). It is expected that areas of soft landscaping will be appropriately designed and include provision for a layer of certified clean landscaping soils. If required, this reduces the significance of direct exposure pathways. Overall, the nature of the proposed development and its use does not present a significant contamination risk to human receptors.

Assessment methodology

Assessment approach

6.1.18. The proposed development is not considered to give rise to significant effects from ground contamination. Nevertheless, the proposed process of tiered assessment and the development of remediation and risk management strategies (required to address the National Planning Policy Framework and possible associated planning conditions) will be sufficient to prevent significant effects from ground contamination.

6.1.19. On this basis, further consideration of ground conditions and contamination aspects has been scoped out of the EIA.

6.2. Waste and Materials

Context

6.2.1. Waste will be produced and materials will be consumed during the enabling works and construction and operational phases of the proposed development.

6.2.2. Waste is defined in Article 3 (1) of the European Waste Framework Directive 2008/98/EC (WFD) as 'any substance or object which the holder discards or intends or is required to discard'. The term 'holder' is defined as the producer of the waste or the person who is in possession of it and 'producer' is defined as anyone whose activities produce waste.

6.2.3. Materials are defined to include both primary (virgin aggregates and minerals) and secondary (manufactured construction products such as recycled and reclaimed aggregates) materials.

6.2.4. The revised Waste Framework Directive (rWFD) is a unique EU Directive because it clarifies the definition of 'waste' and of other concepts such as 'recycling' and 'recovery'. It implements a revised Waste Hierarchy, expands the 'polluter pays' principle by emphasising producer responsibility and applies more stringent waste reduction and waste management targets for Member States. It also requires Member States to take measures to promote high quality recycling and to set up separate collections of paper, plastic, metal, and glass. EU environmental legislation such as this will remain in force as part of UK law and can be repealed or amended at the will of Parliament or the devolved parliaments/assembly.

Baseline conditions

6.2.5. The remaining landfill capacity of the Herefordshire and North London area (44) as at end 2020 is approximately 31,837,959 m^4.

6.2.6. The National Soil Map (published at 1:250,000) records the application site as Hamble 2 Association. These soils are described as comprising deep stoneless well drained silty soils and some similar soils affected by groundwater, over gravel.

6.2.7. The application site lies within a Mineral Safeguarding Area for sand and gravel. The NPPF (2021) identifies the need for planning policies to safeguard minerals required to provide the infrastructure, buildings, energy, and goods that the country needs.

Key Issues and Requirement for Assessment

Waste

6.2.8. Waste will be produced during all phases of the proposed development. The reuse of material arising from the enabling and construction works will minimise the amount of waste generated.

6.2.9. Given the greenfield nature of the application site, a significant amount of site won soils would be reused within the construction of the proposed development, thus reducing the quantity of waste to be taken offsite. Appropriate waste management plans (such as a Materials Management Plan and a Site Waste Management Plan) will be developed and implemented to manage the appropriate use and re-use of materials and disposal of waste. Any areas of poor-quality soils that may be encountered are likely to require off-site disposal at an appropriately licensed facility, although it is noted that these are likely to be extremely limited given the former uses of the application site. Measures to ensure the appropriate management of waste produced during the construction phase will be included within a CEMP.

6.2.10. During operation, the proposed development will encourage the separation and recycling of waste to minimise the volume taken to landfill. This will include for the design of access routes to accommodate waste collection vehicles. The proposed development will also include a waste hub which will be used to re-use and repurpose materials used throughout the operational phase minimising waste.

6.2.11. Given the existing nature of the application site and reuse of materials proposed during the works, the quantity of waste produced from the proposed development is unlikely to reduce landfill capacity in a significant way.

6.2.12. Therefore, no significant effects on waste capacity are envisaged as a result of the proposed development and it is considered that inclusion of a waste chapter in the main volume of the ES is not necessary.

Materials

6.2.13. The underlying geology of the UK determines the local availability of mineral products, which are usually only transported long distances when necessary. The surrounding area of the proposed development and the South East of the UK, has a significant supply of sand & gravel and recycled aggregates. The demand for aggregates is expected to grow given construction activities (44), however given the allocation of the site within the Broxbourne Local Plan and the requirement to bring an economic hub to the area, it is considered that the benefits of the proposed development would override the negative effects associated with the temporary loss of the below ground sand and gravel deposits.

6.2.14. Material consumption will be required to construct the proposed development. Given the greenfield nature of the application site, a significant amount of site won soils would be reused within the construction of the proposed development, thus offsetting the need to import this material. The quantities of other materials required to complete the construction of the proposed development would be unlikely to result in major changes to the availability of materials within the region.

6.2.15. Therefore, no significant effects on material availability are envisaged as a result of the proposed development and it is considered that inclusion of a materials assessment chapter in the main volume of the ES is not necessary.

6.3. Utilities

Context

6.3.1. This topic has been included in the EIA Scoping Report at the request of Broxbourne Borough Council.

6.3.2. Distribution of new utilities within the site boundary, new connections to existing local utility networks and possible offsite reinforcement are necessary to support the proposed development.

6.3.3. Whilst the utility demands will affect the existing networks, the impact, connection points and any capacity upgrades will be determined by the Statutory Undertaker. These may be local or remote to the application site.

6.3.4. However, the environmental effects associated with the construction of utility infrastructure to support the development shall be considered in the following relevant chapters of the ES:

- Transport;
- Air Quality;
- Noise and Vibration; and
- Effects on climate: Greenhouse Gas Emissions.

6.3.5. Impacts upon potable water supply, foul water drainage and surface water drainage will be considered in the Water Resources chapter.

6.3.6. It is therefore proposed that Utilities are not addressed as a standalone topic within the ES. However, in accordance with the Broxbourne Local Plan 2018-2033 Policy INF9, the planning application shall be supported by a Utilities Statement describing how the proposed development is to be serviced with electricity, gas (no connection proposed), telecommunications, water, and sewerage.

6.3.7. In accordance with the requirements of Schedule 4 of the EIA Regulations, the description of the proposed development will include the energy demand for the proposed development.

Baseline conditions

Study area

6.3.8. A preliminary assessment of the utilities within the area and the demands of the proposed development has been completed to inform this Scoping Report. The study area for this assessment included the area within the redline boundary and the off-site works expected to accommodate provision of utilities to the application site. The off-site works are typically expected to include new connections to the application site and the potential reinforcement of existing utility networks to meet the demands of the proposed development.

Receptors

6.3.9. The following sources have been used to establish the possible receptors within the study area:

- Topographical survey;
- Public Utility asset plans; and
- Initial consultation with Statutory Undertakers.

6.3.10. As stated in paragraphs 6.3.4 and 6.3.5, the possible receptors associated with the construction of utility infrastructure to support the proposed development shall be established in the relevant technical chapters of the ES.

6.3.11. The application site is predominantly comprised of arable, greenfield land. Existing public utilities on site are understood to be limited to a UKPN overhead power line across the centre of the application site and south alongside the New River. Local utility connections to the farm buildings are assumed to be provided from the A10.

6.3.12. Various utility networks are present in the A10 and B198, bordering the east and north of the site, respectively. These include:

- UKPN overhead power cables;
- UKPN LV and HV underground power cables;
- Thames Water Utilities Ltd trunk water main and distribution mains;
- Cadent medium pressure (MP) gas main; and
- BT Openreach and various other telecommunications providers.

6.3.13. Existing TWUL foul water and surface water sewers are remote from the site, separated by the A10 and M25.

Key issues and requirement for assessment

6.3.14. New utility supplies will be required to support the proposed development and existing services to the farm buildings will be modified and/or replaced.

6.3.15. Diversion of existing UKPN overhead power lines is required to accommodate the proposed development. Consultation with UKPN is in progress to determine a suitable underground route within the site boundary. UKPN Network Planners are currently assessing the network in response to enquiries regarding the capacity of the existing network to support the proposed development.

6.3.16. TWUL has identified that network modelling is required to determine impacts upon the potable water and wastewater networks. This shall inform the nature of proposed reinforcement.

6.3.17. There is no requirement for a gas supply to the new development.

6.3.18. Multiple telecommunications networks exist locally. Individual and shared duct banks are proposed to provide connections to the application site.

6.3.19. As part of the proposed development, new utility supplies shall be required to support the demands of the proposed development and offsite reinforcement may be necessary.

6.3.20. The environmental impact of developments will be minimised through sustainable design and management of resource consumption. The development strategies and the building design parameters (e.g. BREEAM targets, incorporation of renewable energy, non-potable water reuse, etc) shall determine the estimated utility demands of the development. Where feasible, opportunities to reduce demand shall be considered.

6.3.21. Consultation with the relevant Statutory Undertakers shall be undertaken to identify impacts upon the existing utility networks in respect of capacity, routing, and connectivity. These works shall be designed and constructed in accordance with Statutory Undertakers' requirements and specifications.

6.3.22. The environmental effects associated with the construction of utility infrastructure to support the development shall be considered in the relevant chapters of the ES. An explanation of how the proposed development will be serviced in relation to electricity, telecommunications, water, and sewage will be included in the Utilities Statement submitted to support the planning application.

6.3.23. It is therefore considered that the environmental effects associated with utilities works are fully covered elsewhere and it is therefore proposed that Utilities are not addressed as a standalone topic within the ES.

6.4. Daylight, Sunlight & Overshadowing

Context

6.4.1. Daylight, sunlight, and overshadowing assessments are typically undertaken with reference to BRE standards. Daylight, sunlight, and overshadowing effects are principally associated with tall buildings or developments in highly urbanised/developed environments.

Key issues and requirement for assessment

6.4.2. The BRE Guidelines suggest that residential properties on nearby roads/streets can be sensitive in relation to daylight and sunlight alterations from a new proposal, given their expectation for natural light. Surrounding areas of public and private amenity can also be sensitive to overshadowing from new development.

6.4.3. In this instance, residential properties are considered to be at a sufficient distance away to avoid potential significant effects as a result of daylight and sunlight changes.

6.5. Wind Microclimate

Context

6.5.1. Assessments of wind microclimate focus on pedestrian comfort and safety and are typically undertaken with reference to the Lawson Comfort Criteria. Significant effects on wind microclimate are principally associated with tall buildings or developments in highly urbanised/developed environments.

Key issues and requirement for assessment

6.5.2. The proposed development will vary in height, with a maximum height of up to 22 m. At this height, the buildings are not considered to have the potential to significantly alter the wind microclimate within the pedestrian environment at the application site or in the surrounding area. It is therefore proposed that wind microclimate be scoped out from further consideration within the EIA.

7. Summary and conclusions

7.1. Request for a Scoping Opinion

7.1.1. This report is a request for a formal Scoping Opinion under Regulation 15(1) of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended).

7.1.2. In accordance with Regulation 15(3), should Broxbourne Borough Council consider that they have not been provided with sufficient information to adopt a Scoping Opinion, they should notify the person making the request of the points on which they require additional information.

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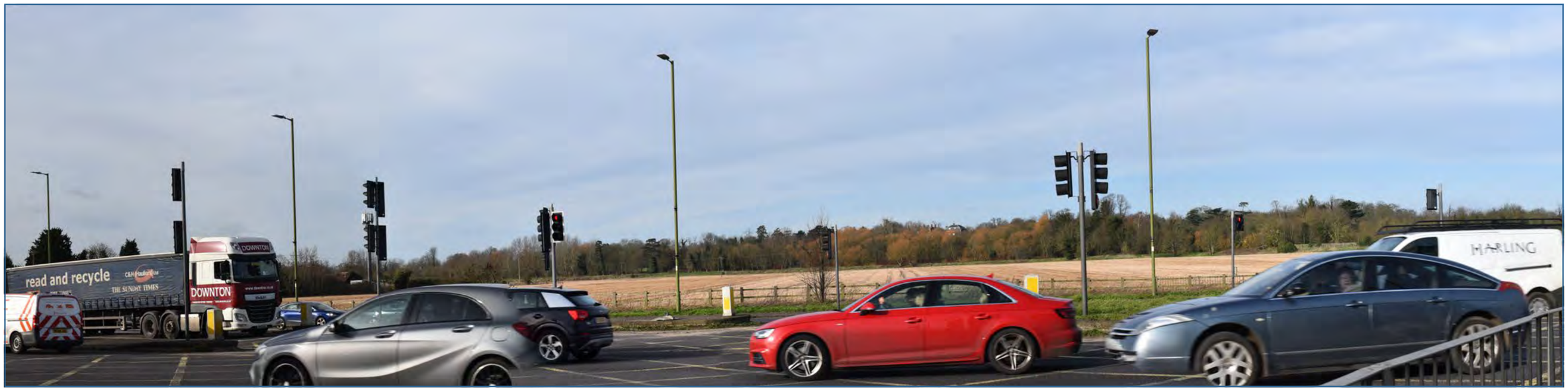
Appendices

Appendix A Representative Baseline Photography



Photoviewpoint 1: Taken from the eastern site boundary, off the A10.

Photoviewpoint 2: Taken from the southern site boundary, at the access to the public footpath on site and the New River recreational route.

Photoviewpoint 3: Taken from the western site boundary, along the New River and Waterside Green Chain HD19 recreational route.

Photoviewpoint 4: Taken from the northern site boundary, along the New River and Waterside Green Chain HD19 recreational route.

Photoviewpoint 5: Taken from the overhead motorway footbridge along the New River.

Photoviewpoint 6: Long distance view taken from a hill above Monkhams Hall, Holyfield.

Photoviewpoint 7: Long distance view taken from an area of high ground to the east.

Appendix B Ecological Appraisal

CONFIDENTIAL

Appendix C Written Scheme of Investigation

THEOBALDS FARM / PARK PLAZA WEST, CHESHUNT, HERTFORDSHIRE,

WRITTEN SCHEME OF INVESTIGATION FOR AN ARCHAEOLOGICAL EVALUATION

OCTOBER 2021

PRE-CONSTRUCT ARCHAEOLOGY

THEOBALDS FARM / PARK PLAZA WEST,

CHESHUNT, HERTFORDSHIRE

WRITTEN SCHEME OF INVESTIGATION

FOR AN ARCHAEOLOGICAL EVALUATION

SITE CODE:	**HPPW21**
LOCAL PLANNING AUTHORITY:	**BOROUGH OF BROXBOURNE COUNCIL**
PLANING APPLICATION NUMBER:	**N/A**
SITE CENTRAL NGR:	**TL 34847 00437**
COMMISSIONING CLIENT:	**ORION HERITAGE on behalf of REVANTAGE REAL ESTATE LTD**
PREPARED BY:	**ZBIGNIEW POZORSKI MCIfA**
VERSION:	**2.0 WITH ORION HERITAGE COMMENTS**

Contractor:	**Pre-Construct Archaeology Limited**
	Unit 54, Brockley Cross Business Centre
	96 Endwell Road, Brockley
	London SE4 2PD
Tel:	**020 7538 8950 | 020 7732 3925**
Email:	zpozorski@pre-construct.com
Website:	www.pre-construct.com

October 2021

CONTENTS

1 INTRODUCTION

1.1 Pre-Construct Archaeology Limited (PCA) has been commissioned to undertake archaeological evaluation on land at Theobalds Farm, Cheshunt, Hertfordshire (Figure 1). The site is part of the development known as Park Plaza West, consists of agricultural fields and is centred at National Grid Reference TL 34847 00437.

1.2 The site is proposed for the development of film studios with a planning application to be submitted in 2022. An archaeological desk-based assessment for the site has been prepared by Orion Heritage (Orion Heritage 2020). It indicated potential of the site to contain finds and features from the prehistoric periods and a known potential to contain medieval and post-medieval features relating to Theobalds Park and agricultural practices.

1.3 A programme of archaeological evaluation by means of trial trenching will be implemented on the site, as Stage 1 of the archaeological work, to support the forthcoming planning application. If the trenches contain significant archaeological remains, then further stages of work may be required by Historic Environment Advisor at Hertfordshire County Council Historic Environment Team (HCC) and may be subject to new WSIs or addendums to the existing document. These works may consist of further evaluation, or an open archaeological excavation of certain areas of the site, with subsequent production of assessment report and publication of the results, or a watching brief (monitoring) on the ongoing construction works. Steps for preservation *in situ* of the most important findings can also be made with the agreement between HCC, the client, Orion Heritage and PCA.

1.4 This document forms the Written Scheme of Investigation (specification) for the Stage 1 work and details the methodology by which the archaeological evaluation will be undertaken.

1.5 The works will be undertaken by a full-time archaeological supervisor and other archaeological staff working for PCA. The works will be monitored by HCC. PCA have been instructed for the project by Orion Heritage on behalf of Revantage Real Estate Ltd.

1.6 All works will be undertaken in accordance with the following documents:

- This Written Scheme of Investigation (pending approval from the Archaeology Advisor to the Local Planning Authority)
- *Standards for Field Archaeology in the East of England* (Gurney 2003)
- *Management of Research Projects in the Historic Environment* (MoRPHE Historic England 2015)
- *Standard and guidance for archaeological field evaluation* (Chartered Institute for Archaeologists CIfA 2020).
- *Hertfordshire Archaeological Archive Standards – A countywide standard for the creation, completion and transfer of Archaeological Archives in Hertfordshire* (Hertfordshire Museums 2018)

1.7 PCA is a Registered Archaeological Organisation (number 23) with the Chartered Institute for Archaeologists and will operate within the Institute's 'Code of Conduct'.

1.8 PCA has the following accreditations:

- ISO9001 registration
- Construction Line registration
- Achilles registration
- SMAS SSIP registration

1.9 PCA carries the following insurance policies

Policy	**Limit of Indemnity**	**Policy Number**	**Insurer**
Public & Products Liability	£10,000,000	PC007887 & 24765101CHC/000133	Zurich & Aviva
Employers Liability	£10,000,000	24765101CHC/000133	Aviva
Professional Indemnity	£5,000,000	PL-PSC100002112906/02	Hiscox
Hired in Plant & Equipment	£500,000	24765101CHC/000133	Aviva

2 BACKGROUND

2.1 Geology, Topography and Site Description

2.1.1 According to the British Geological Survey (BGS) of England and Wales, the local geology of the site consists of clay, silt and sand of the London Clay Formation. Superficial deposits of clay and silt of the Enfield Silt Member are recorded on the site.

2.1.2 The site is located to the west of Waltham Cross and to the south of Cheshunt and lies just north of M25 motorway at its junction with A10 Great Cambridge Road (Figure 1). It consists of agricultural fields with former farm buildings in its east/central part.

2.1.3 The site is situated on a land at c. 100m above Ordnance Datum (OD) with the New River passing along its west boundary.

2.2 Archaeological and Historical Background

2.2.1 The archaeological desk-based assessment has been prepared for the site (Orion Heritage 2020) and it provided background details for the site, including the results of a search of the Hertfordshire Historic Environment Record database. In summary:

2.2.2 The study site has previously been the subject of the following investigations:

- A trial trench excavation at the site of Cullings Moat at the south-east of the study site which was completed by Enfield Archaeological Society in 2008/2009 (Dearne & Pinchbeck 2009).
- The area at the south-west of the study site at Theobalds Park Farm was the subject of systematic fieldwalking survey by Enfield Archaeological Society in 2010.

2.2.3 Undated cropmarks are located in the southern part of the site and may reflect field systems or features associated with Theobalds Park.

Plate 1: Cropmarks in S part of the site

2.2.4 Isolated finds of prehistoric flintwork and pottery are known from area in vicinity of the site. Bronze Age pits were found to the north-west.

2.2.5 Excavations c. 230m to the east of the site recorded ditches and unknown features which are thought to relate to a settlement and stock enclosures. Bronze Age pottery and worked flints were found across that area and a four-post structure alongside some isolated pits were also present.

2.2.6 The route of Roman Ermine Street passes the site c. 300m to the west whilst c. 300m to the east remains suggesting Roman occupation were found. A number of Roman small finds is also known form the wider area.

2.2.7 An early medieval/medieval long house was recorded c. 200m to the east. There were also further eight intercutting pits, ditches and a cess pit associated with the structure.

2.2.8 The study site is known to be located within Theobalds Park. Theobalds Palace and Park was established in the 16th and early 17th century. The study site lies c. 465 east of the medieval 'Old Park', a former deer park first recorded in 1226. The Park was later sub-divided and conciliated again in the 17th century.

2.2.9 The possible site of 'Cullings Moat' at the south-east of the study site is identified by the HHER as an area of archaeological significance. The first cartographic record of the moat feature is when it is shown on a 1611 plan of Theobalds Park by Thorpe, where a square feature forms part of the designed landscape. The 1999 map suggests that only the eastern arm of the moat surviving. The feature has been archaeologically tested by Enfield Archaeology Society who concluded that the presence of a medieval moat in this location was doubtful based upon excavation data (Dearne & Pinchbeck 2009).

2.2.10 Excavations c. 160m to the east of the stud site recorded medieval field boundaries and ditches which contained pottery, daub and charcoal. A pit containing medieval pottery and ceramic building material was recorded during evaluation trench excavations c. 545m to the north-west. Excavations c. 880m to the north-west of the study site recorded two pits containing medieval pottery.

2.2.11 Theobalds Palace is a scheduled monument and is located c. 250m to the north-east of the site. The Palace had its own Deer Park which covered the north and centre of the wider area including the study site. In the early 17th century the park was surrounded by a brick wall. A smaller park, known as Theobalds Park, later occupied a smaller space around the 18th century house c. 270m to the west of the study site.

2.2.12 The south-western part of the site contain partial remains of a rectangular bank earthwork thought to be a 17th century ornamental pond (Cecil's Pond). It is first visible on Thorpe's 1611 map of Theobalds Park, but it is not depicted on 1841 Tithe map and later maps. Environment Agency Lidar data from 2011 shows that residual earthworks on the southern and some of the western boundary survive.

2.2.13 Two more 17th century ornamental ponds are also recorded in the northern part of the site. They are depicted on the 1611 map and other maps until 1960s. The Environment Agency Lidar data does not record those ponds, but they are visible on Google Earth imagery.

Plate 2: Ornamental ponds on Lidar data (Cecil's Pond) and 1611 map (N part of the site)

2.2.14 Theobalds Park Farm is located at the central east of the study site and is located within an area of archaeological significance. A farm/building appears to have been in this area since at least the 1766 county map by Andrews and Drury. the farmhouse dates to the 19th century and the two associated farm buildings are late 17th / early 18th century, all three are listed at Grade II.

2.2.15 The western boundary of the study site is defined by the course of 'New River' which was built between 1608 and 1613 along the contour of the River Lea with the intention of bringing fresh water to London. The New River is thought to encompass some of the artificial river that was present within Theobalds Park in 1602. The New River has been reshaped and straightened numerous times since its initial construction.

2.2.16 The 1611 Plan of Theobalds Park by Thorpe shows the study site to the east of the New River which contains landscape features including water filled features, trees and buildings to the north of the study site. The 1766 map shows a track crossing the site from Waltham Cross and a building near the track. Later maps the site located within parkland partly divided into plots and a farmland.

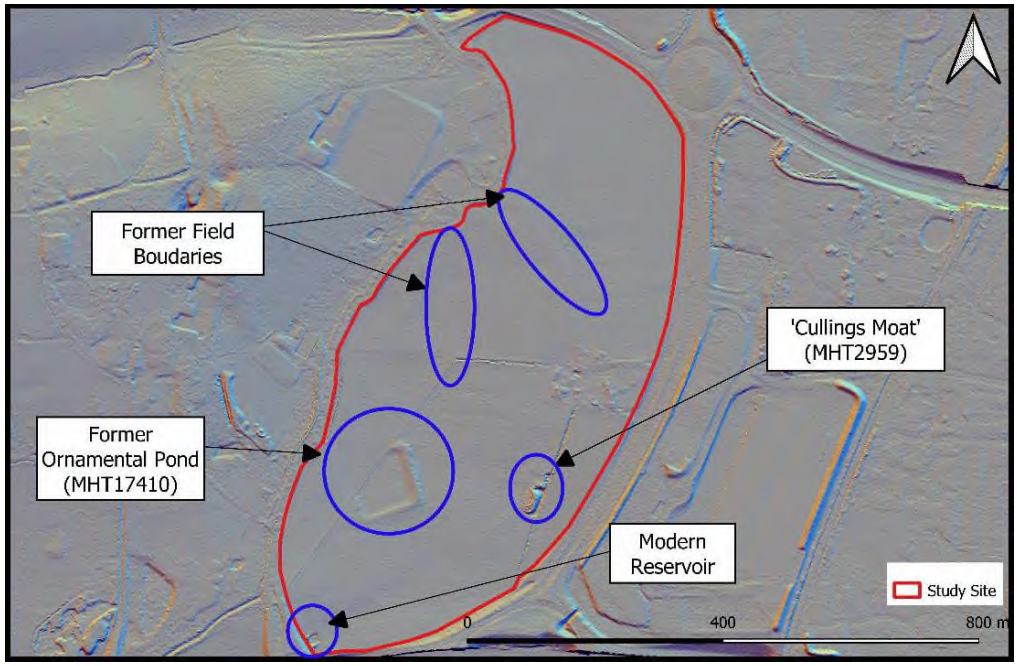


Plate 3: EA Lidar data

3 RESEARCH DESIGN

3.1 The archaeological evaluation by trial trenching is designed to determine the presence or absence of surviving deposits and features at the site and, if present, to investigate and record them, and to clarify the significance of surviving archaeological remains on the site.

3.2 The investigations will also seek to clarify the nature and extent of existing disturbance and intrusions and hence assess the degree of archaeological survival.

3.3 The following site-specific research questions are also posed:

- Is there any evidence for prehistoric activity at the site, and if so, what is the nature of this activity, and can this evidence be related to the findings in close proximity of the site?
- Is there any evidence of Roman activity on the site, and how it relates to the known findings from the area?
- Are there any features on the site related to the cropmarks known from the southern part of the site and of what character and date?
- Is evidence of medieval and post-medieval agricultural use of land, including field boundaries, or farm structures and buildings present on the site?
- Is there any evidence on the site of the 'Cullings Moat', thought to have existed in the south-eastern part of the site?
- Are remains of 'Cecil's Pond' present in the south-western part of the site, as suggested by Lidar and cartographic sources?
- Is there any evidence of the post-medieval ornamental ponds thought to be located in the northern part of the site present and till what extent?
- What is a level of preservation of the medieval/post-medieval features related to the Theobalds Park, described above?
- Are there any other post-medieval remains on the site?

4 SITE METHODOLOGY

4.1 Evaluation

4.1.1 122 trenches are to be excavated on the site (Figures 2-3). The trenches will constitute c. 4% sample of the development area and will measure 40m x 2m each. The expected depth of the trenches is 0.60m maximum and the trenches are designed to reach maximum depth of 1.20m below ground level, if required. Deeper sondages may be excavated within the trenches if natural deposits have not been reached.

4.1.2 The trenches were positioned to avoid areas where exclusion zones are imposed – a 15m wide corridor on each side of the overhead power lines crossing the site east to west and two badger safety zones, 100m in diameter, in the southern part of the site (Figure 2). The trench locations and dimensions may be further adjusted to accommodate site conditions and the final layout will be agreed with HCC.

4.1.3 PCA will use these methods during the evaluation:

- A CAT scanner will be used by PCA prior to the opening of the trench to identify and avoid live services.
- Excavation will be carried out by mechanical tracked excavator, fitted with a toothless ditching bucket. The excavation will be undertaken under a strict PCA's supervision. Spoil will be mounded at least 1m from the edges of the trenches.
- If required, any hardstanding or obstacles will be removed from trenches footprints using a hydraulic breaker attached to the mechanical excavator.
- Machine excavation will continue in spits of 100mm at a time until either significant archaeological strata are found or natural ground exposed, whichever is encountered first. Each trench will be fully investigated and recorded, and features will be tested to ascertain their function, date and significance.
- The proposed trenches are designed to reach a maximum depth of approximately 1.20m below existing ground level (BGL) depending on the stability of the trench edges. If the trenches need to be excavated further, then they will be stepped to provide safe access and secure the sides and excavation will continue to allow recording of the structures. The steps will be 1.2m wide on each side of the trench and no more than 1.2m deep.
- Machine-cut sondages may be excavated within the trenches deeper than 1.20m to locate the natural geology, if required. This will be immediately backfilled once the relevant levels are established.
- All arisings form each trench will be carefully inspected to ensure that any artefacts are recovered.
- The trenches and spoil heaps will be scanned with a metal-detector during the excavation to enable finds recovery.

- The trenches will be backfilled by PCA using the same type of machine as for opening the trenches, replacing the excavated arisings in the reverse order of excavation; however, PCA will undertake no post-backfilling attendance to the site to re-instate or maintain the surfaces. Excess arisings, if present, will be left on site at a place to be agreed.

4.2 Investigation and Recording Techniques

4.2.1 Archaeological excavation may require work by 'pick and shovel'. Such techniques will be used only for the removal of homogeneous and 'low grade' layers where it can reasonably be argued that more detailed attention would not produce information of value. They will not be employed on complex stratigraphy, and the deposits to be removed must have been properly recorded first.

4.2.2 All archaeological features (stratigraphical layers, cuts, fills, structures) will be excavated by hand tools and recorded in plan at 1:20 or in section at 1:10 using standard single context recording methods. Photographs will also be taken as appropriate.

4.2.3 The strategy for sampling archaeological and environmental deposits and structures will be developed by PCA as necessary. If appropriate, the Historic England Regional Archaeological Science Advisor will be consulted.

4.2.4 All features will be investigated and recorded in order to properly understand the date and nature of the archaeological remains on the site and to recover sufficient finds assemblages to assess the chronological development and socio-economic character of the site over time.

4.2.5 If articulated human remains or cremation burials are identified, the client and HCC will be notified immediately. If it is deemed that they can be left in situ, this will be the preferred option. The removal of human remains can only take place following the issuing of appropriate licenses from the Ministry of Justice. Should the removal of human remains not pose a risk to the completion of the work and should further archaeological mitigation be necessary at the site, then any remains will be left in situ, with the agreement of the HCC. It is not proposed that any exhumation will be undertaken during the current phase of work unless additional arrangements have been agreed. However, if to complete the project objectives exhumation is unavoidable, or if additional information is needed concerning dating/significance then agreement will be sought from all necessary parties to excavate/remove burials (cremations or inhumations). Assuming that this is agreed then PCA will apply on behalf of the overall client for a Burial Licence to the Ministry of Justice. If this is granted, human remains must be excavated in the manner specified in the licence and screened from public view. Human remains will be excavated within the area of proposed impact only. Burials will not be 'chased' beyond the edges or base of the trench, beyond construction impact depth. Excavation will be carried out in accordance with the English Heritage *Guidance for Best Practice for Treatment of Human Remains Excavated from Christian Burial Grounds in England (*2005). Burials will be excavated by hand and recorded using standard recording techniques. A rectified photograph of the excavated burial will be taken to assist in digitisation in post-excavation. Charnel will be collected by hand and its location noted.

4.2.6 All gold and other precious metals will be removed to a safe place and reported to the local coroner according to the procedures relating to the Treasure Act 1996. Where removal cannot be effected

on the same working day as the discovery suitable security measures will be taken to protect the finds from theft.

4.2.7 PCA will notify the HCC of the commencement of fieldwork at least one week in advance.

4.3 Access and Safety

4.3.1 Site security is the responsibility of the client. The evaluation trenches will not be fenced off – if required, warning tape and signs and/or netlon and road pins will be used to indicate excavation area. Access to the site is from A10 road via Farm access road, located in the west/central part of the site. PCA's compound will be located to the south of the farm complex.

4.3.2 Reasonable access to the site will be granted to HCC and representatives of the client, advisory bodies or local planning authority who wish to be satisfied, through site inspections, that the archaeological works are being conducted to proper professional standards and in accordance with the agreements made. Full access is also provided for the client and its agents. If any of the above parties cannot attend the site, e.g. due to restrictions related to the coronavirus pandemic, then alternative arrangements will be made by PCA to allow remote site monitoring. This may involve live video calls and meetings, online provision of digital photographs and other means of communication.

4.3.3 All relevant health and safety legislation, CDM, COSHH regulations and codes of practice will be respected. This requirement constitutes one of the non-archaeological requirements on the excavation design. PCAs H&S Policy Statement (2020) and Site Rules (2020) will be followed at all times. A site-specific Risk Assessment will be prepared; this will be reviewed and updated daily by the site supervisor.

4.3.4 There is a duty of care for the overall client to provide all information reasonably obtainable on contamination and the location of live services before site works commence. Should services be encountered during excavation, it will be the assumption of PCA that they are live and will be avoided at all costs.

4.3.5 The welfare/toilet facilities will be provided by the client.

4.3.6 Minimum PPE for work on the site will comprise safety helmet, safety boots and high-visibility vest. Gloves shall be kept at the ready. Contamination-appropriate PPE (such as disposable suits, impermeable gloves, wellington safety boots and dust masks (P3 or half-filter)) will be available if suspected contaminants are encountered.

4.3.7 If asbestos material (suspected or confirmed) is encountered during the excavations its location will be marked, photographed and left in situ. The client will be informed as soon as possible. PCA will not remove any asbestos from site.

4.3.8 If during the course of the archaeological investigation items are observed or found which are considered to be potential UXO objects, all work in the vicinity of the excavation will cease and the client / Principal Contractor will be informed immediately. They will notify relevant bodies and arrange for appropriate attendance from specialists and/or emergency services.

4.3.9 If groundwater is present within the excavated trenches, and requires removal to allow work to proceed safely, it will be pumped from the trenches by PCA by means of a puddle pump (or similar) and generator. The water will be released in location given by the client.

4.3.10 All PCA's staff are CSCS card holders.

5 RECORDING SYSTEMS

5.1 Site Code

5.1.1 PCA will use a unique 'site code' HPPW21 that will serve to identify the site archive, including written, drawn, and electronic records, as well as artefacts.

5.2 Site Records

5.2.1 The recording systems adopted during the investigations will be fully compatible with those most widely used elsewhere in Hertfordshire, which are those developed out of the Department of Urban Archaeology Site Manual and presented in PCAs *Operations Manual 1* (Taylor and Brown 2009, updated 2018). No alternative recording system will be adopted without the prior agreement of HCC.

5.2.2 The site archive will be so organised as to be compatible with the other archaeological archives produced for work within Hertfordshire. Individual descriptions of all archaeological strata and features excavated and exposed will be entered onto prepared *pro-forma* recording sheets which include the same fields of entry as are found on the recording sheets of the Museum of London. Sample recording sheets, sample registers, finds recording sheets, accession catalogues, and the photography record cards will follow the Museum of London equivalents. This requirement for archival compatibility extends to the use of computerised databases.

5.2.3 A 'site location plan' indicating the site north and based on the current Ordnance Survey 1:1250 map (reproduced with the permission of the Controller of HMSO) will be prepared. This will be supplemented by a trench plan at 1:200 (or 1:100), which will show the location of the areas investigated in relation to the investigation area and National Grid Reference. All sections should be located on plan with OS co-ordinates. The location of the OS bench marks used and the site TBM will also be indicated.

5.2.4 A record of the full extent in plan of all archaeological deposits as revealed in the investigation will be made; these plans will be on polyester based drawing film, will be related to the site grid and at a scale of 1:10 or 1:20. 'Single context planning' will be used on site, and the information will be digitised for eventual CAD application. Hachures will be used to record complex and/or intercutting features.

5.2.5 At least one long section of the evaluation trench will be drawn or a representative part including a profile of the top of the natural deposits (extrapolated from cut features etc., if the trench has not been fully excavated). Other sections, including the half-sections of individual layers or features may be drawn as appropriate to 1:10 or 1:20.

5.2.6 The OD height of all principal strata and features will be calculated and indicated on the appropriate plans and sections.

5.3 Stratigraphic Matrix

5.3.1 A 'Harris Matrix' stratification diagram will be used to record stratigraphic relationships. This record will be compiled and fully checked during the course of the excavations. Spot dating should be

incorporated where applicable during the course of the excavation.

5.4 Photographic Record

5.4.1 An adequate photographic record of the investigations will be prepared. This will consist of high quality, colour digital photographs taken in jpeg and RAW formats by an appropriately trained individual, illustrating in both detail and general context the principal features and finds discovered. The photographic record will also include 'working shots' to illustrate more generally the nature of the archaeological operation mounted. The digital images will be preserved on a dedicated and backed up server. The RAW files will be converted to high quality tiff images for eventual preservation by local depository.

5.5 Survey

5.5.1 Trench positions and OS datums will be established on site by PCA using a GPS-system or using the Client's/Principal Contractor's engineering records.

6 TREATMENT OF FINDS AND SAMPLES

6.1 General

6.1.1 All processing will take place at PCA's Brockley premises, or, if appropriate, those of our environmental consultants.

6.2 Environmental

6.2.1 Different sampling strategies may be employed according to the perceived importance of the deposit or feature under investigation. Close attention will be given to sampling for date, structure and environment. Sample size should take into account the frequency with which material is likely to occur. Bulk sieving should be employed both for recovery of environmental evidence to ensure that complete samples of artefactual evidence are collected for significant deposits.

6.2.2 The strategy for sampling archaeological and environmental deposits and structures (which can include soils, timbers, pollen, diatoms, animal bone and human burials) will be developed in consultation with the HCC, and if necessary, the Historic England Regional Archaeological Science Advisor. Subsequent on site work and analysis of the processed samples and remains will be undertaken by our own consultants and specialist sub-contractors.

6.2.3 A high priority will be given to sampling river and other anaerobic deposits, such as peat, where organic materials may be preserved. Organic samples will be subject to appropriate specialist analysis.

6.3 Artefactual

6.3.1 All finds retrieval policies of the Museum of London will be adopted and all identified finds and artefacts, including those retrieved through the topsoil sieving, will be retained according to the stated selection retention and retrieval policy appropriate to the material type and date. No finds will be discarded without the prior approval of the Historic Environment Team of Hertfordshire County Council.

6.3.2 All finds will be treated in a proper manner and to standards agreed in advance with the recipient museum. They will be exposed, lifted, cleaned, conserved, marked, bagged and boxed in accordance with the guidelines set out in the United Kingdom Institute for Conservation's '*Conservation Guidelines No.2*' and the Museum of London's '*Standards for the Preparation of Finds to be Permanently Retained by the Museum of London*'. All metal objects will be x-rayed and then selected for conservation (except in those cases where HCC agrees that this will not be necessary).

6.3.3 Ceramic (pottery, clay tobacco, building material fabric and brick form) reference collections, housed at the Museum of London should be referred to for descriptive and analytical purposes in order to ensure that terminology is consistent.

7 ARCHIVES AND REPORTS

7.1 Report

7.1.1 All fieldwork and results will be fully recorded and a report prepared. Copies of the report will be forwarded to the client and the HCC.

7.1.2 The report will include the following items:

- Non-technical summary;
- Introduction;
- Planning Background;
- Previous archaeological work relevant to the project;
- Topography of the site;
- Research objectives;
- Methodology;
- The results of the fieldwork and their significance;
- An assessment of the results against original expectations and a review of the effectiveness of the fieldwork strategy;
- Statement of potential of the archaeology;
- Conclusions and recommendations, if appropriate;
- Illustrations, drawn and photographic, including site location, trench location and plans, feature plans and sections, trench sample sections, results against historic maps and Lidar data, photographs of each of the trenches and general views of the site;
- Quantification of the archaeological archive;
- Bibliography;
- Acknowledgements;
- HER summary sheet.
- OASIS form.

7.2 Site Archive Destination

7.2.1 After all reporting and when it is known that no further work is required for this phase of work, the resultant site archive will be deposited with the Ware Museum.

7.2.2 The deposition of the archive will be achieved by means of a “Deed of Transfer” which is to be signed by the landowner. This will be organised by PCA as part of its commission to the client.

7.3 General

7.3.1 The integrity of the site archive will be maintained. The finds and records will be available for public consultation. Appropriate guidance is set out in the Museum and Galleries Commission’s *Standards in the Museum Care of Archaeological Collections* (1992) and *Towards an Accessible Archaeological Archive. The Transfer of Archaeological Archives to Museums: Guidelines for Use in England, Northern Ireland Scotland and Wales* (SMA 1995). For deposition with the Lowewood Museum in Hoddesdon, The Hertfordshire Museums document *Hertfordshire Archaeological*

Archive Standards – A countywide standard for the creation, completion and transfer of Archaeological Archives in Hertfordshire (2018) will be followed.

7.3.2 If the finds are not to be donated to the local depositary, arrangements will be made for a comprehensive record of all relevant materials (including detailed drawings, photographs and descriptions of individual finds), which can instead constitute the archaeological archive.

7.3.3 The minimum acceptable standard for the site archive is defined in the MoRPHE 2015. It will include all materials recovered, (or the comprehensive records of such materials as referred to above) and all written, drawn, and photographic records, including a copy of all reports relating to the investigations undertaken. It will be quantified, ordered, indexed, and internally consistent before transfer to appropriate depository. It will also contain a site matrix, a site summary and brief written observations on the artefactual and environmental data.

7.3.4 United Kingdom Institute for Conservation guidelines for the preparation of excavation archives for long term storage (1990) will be followed.

7.3.5 A short summary of the results of the work, even if negative, will be bound into the client report for submission to the client and the Hertfordshire HER along with the OASIS report form as soon as possible after the completion of archaeological works.

7.3.6 Minimum requirements for public dissemination are for OASIS report forms to be submitted to the OASIS Project as soon as possible of within 6 months of completion of fieldwork, and the provision of a short paragraph summary of the results for publication in the local journal. Such publications will meet the minimum requirements set out in *Management of Research Projects in the Historic Environment* (MoRPHE 2015). There is a need to format reports so that the details of the proposed development impact can be separated from the information and enable all archaeological information to be made available to the HHER within 6 months of the completion of fieldwork.

7.3.7 Where the review of the project indicates the need for further assessment and analysis the recommendations set out in the MoRPHE 2015 will be followed.

8 SIZE AND STRUCTURE OF EXCAVATION TEAM

8.1 The investigations will be supervised by a full-time member of PCA's staff who has considerable experience of working in archaeology and on the sites containing prehistoric remains as well as medieval/post-medieval archaeology, and who has an understanding of the issues associated with this site.

8.2 The supervisor will be assisted by a team consisting of assistant supervisor and 4-5 full-time archaeologists in the employment of PCA, in addition to other support staff, such as archaeological photographers, surveyors, finds specialists and logistics.

8.3 A standard working day is 08.00 - 16.30. A morning and afternoon tea break and 45-minute lunch break are included within this period.

9 PROGRAMMING

9.1 It is intended that the work can progress once this WSI is approved by the HCC and once the client is able to grant access to the site. The start date is currently set for the 1st of November 2021. The precise date will be advised to the HCC in advance by Orion Heritage.

9.2 The on-site fieldwork time is programmed for 30 working days. A report will be produced within approximately 4 weeks of the completion of the fieldwork.

10 BIBLIOGRAPHY

CIfA Chartered Institute for Archaeologists, 2020, *Standard and guidance for archaeological field evaluation*.

Dearne, M. & Pinchbeck N., 2009, *Fieldwalking and excavation on the site of Cullings 'manor', Cheshunt, Herts.* Enfield Archaeological Society

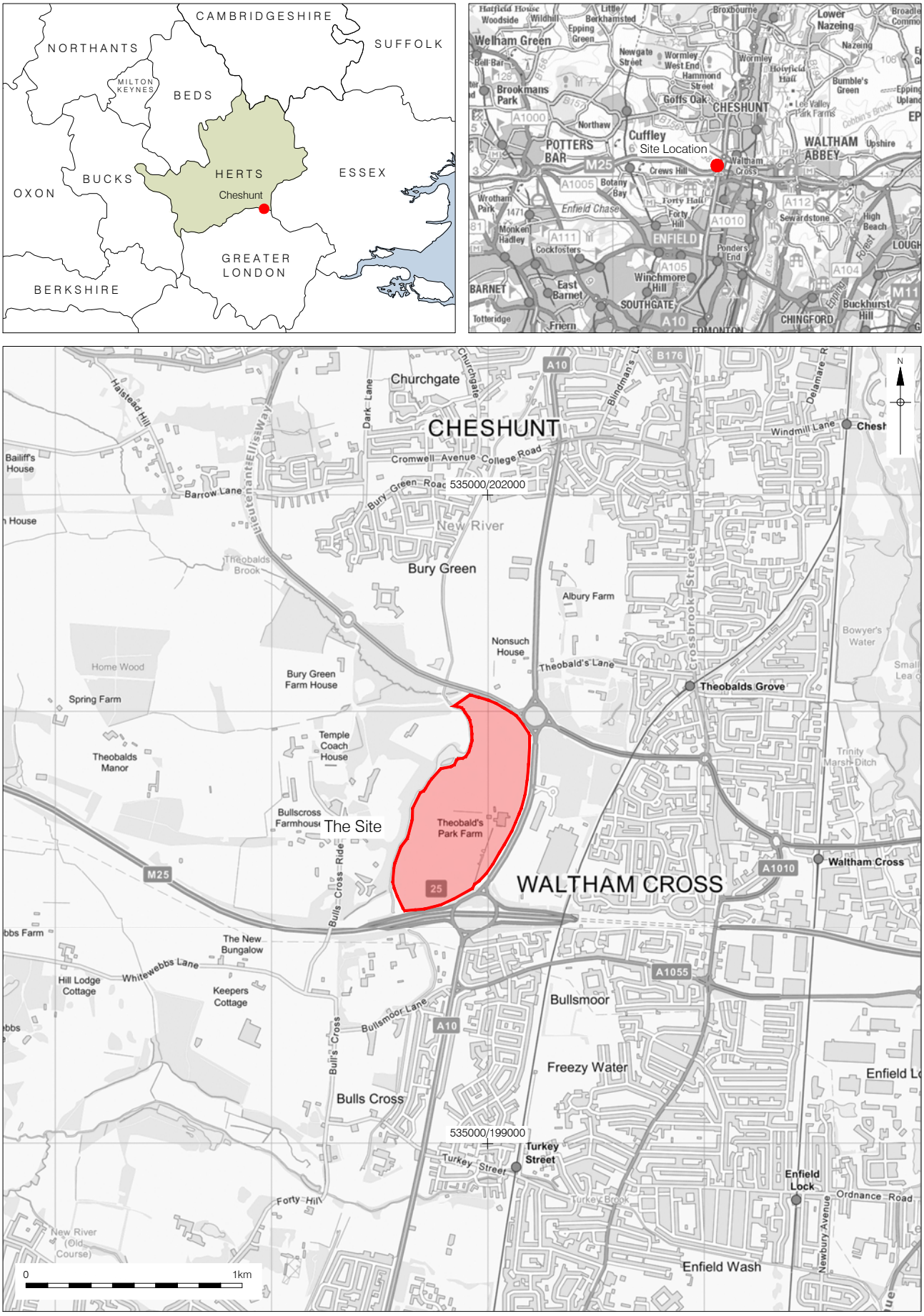
Gurney, D., 2003, *Standards for Field Archaeology in the East of England*, East Anglian Archaeology Occasional Papers 14/ALGAO

Historic England, 2015, *Management of Research Projects in the Historic Environment MoRPHE*

Taylor, J. with Brown, G., 2009, updated 2018, *Fieldwork Induction Manual: Operations Manual* 1, Pre-Construct Archaeology Limited

Websites:

www.bgs.ac.uk British Geological Survey



13/10/21 DV

Figure 1
Site Location
1:2,000,000, 1:250,000, 1:25,000 at A4

Legend

- Site Boundary
- Proposed Trench Location
- Edge of River
- River Buffer (15m)
- Public Footpath
- Footpath Buffer (5m)
- Overhead Cable
- OH Cable Buffer (7.5m)
- Badger Sett Location
- Badger Sett Buffer 50m
- M25 Junction Works Compound

TR 1 TR 2 TR 3 TR 4 TR 5 TR 6 TR 7 TR 8 TR 9 TR 10 TR 11 TR 12 TR 13 TR 14 TR 15 TR 16 TR 17 TR 18 TR 19 TR 20 TR 21 TR 22 TR 23 TR 24 TR 25 TR 26 TR 27 TR 28 TR 29 TR 30 TR 31 TR 32 TR 33 TR 34 TR 35 TR 36 TR 37 TR 38 TR 39 TR 40 TR 41 TR 42 TR 43 TR 44 TR 45 TR 46 TR 47 TR 48 TR 49 TR 50 TR 51 TR 52 TR 53 TR 54 TR 55 TR 56 TR 57 TR 58 TR 59 TR 60 TR 61 TR 62 TR 63 TR 64 TR 65 TR 66 TR 67 TR 68 TR 69 TR 70 TR 71 TR 72 TR 73 TR 74 TR 75 TR 76 TR 77 TR 78 TR 79 TR 80 TR 81 TR 82 TR 83 TR 84 TR 85 TR 86 TR 87 TR 88 TR 89 TR 90 TR 91 TR 92 TR 93 TR 94 TR 95 TR 96 TR 97 TR 98 TR 99 TR 100 TR 101 TR 102 TR 103 TR 104 TR 105 TR 106 TR 107 TR 108 TR 109 TR 110 TR 111 TR 112 TR 113 TR 114 TR 115 TR 116 TR 117 TR 118 TR 119 TR 120 TR 121 TR 122

LIEUTENANT ELLIS WAY

WINSTON CHURCHILL WAY

GREAT CAMBRIDGE ROAD

THEOBALD'S PARK FARM

New River

201000

200500

534500

535000

N

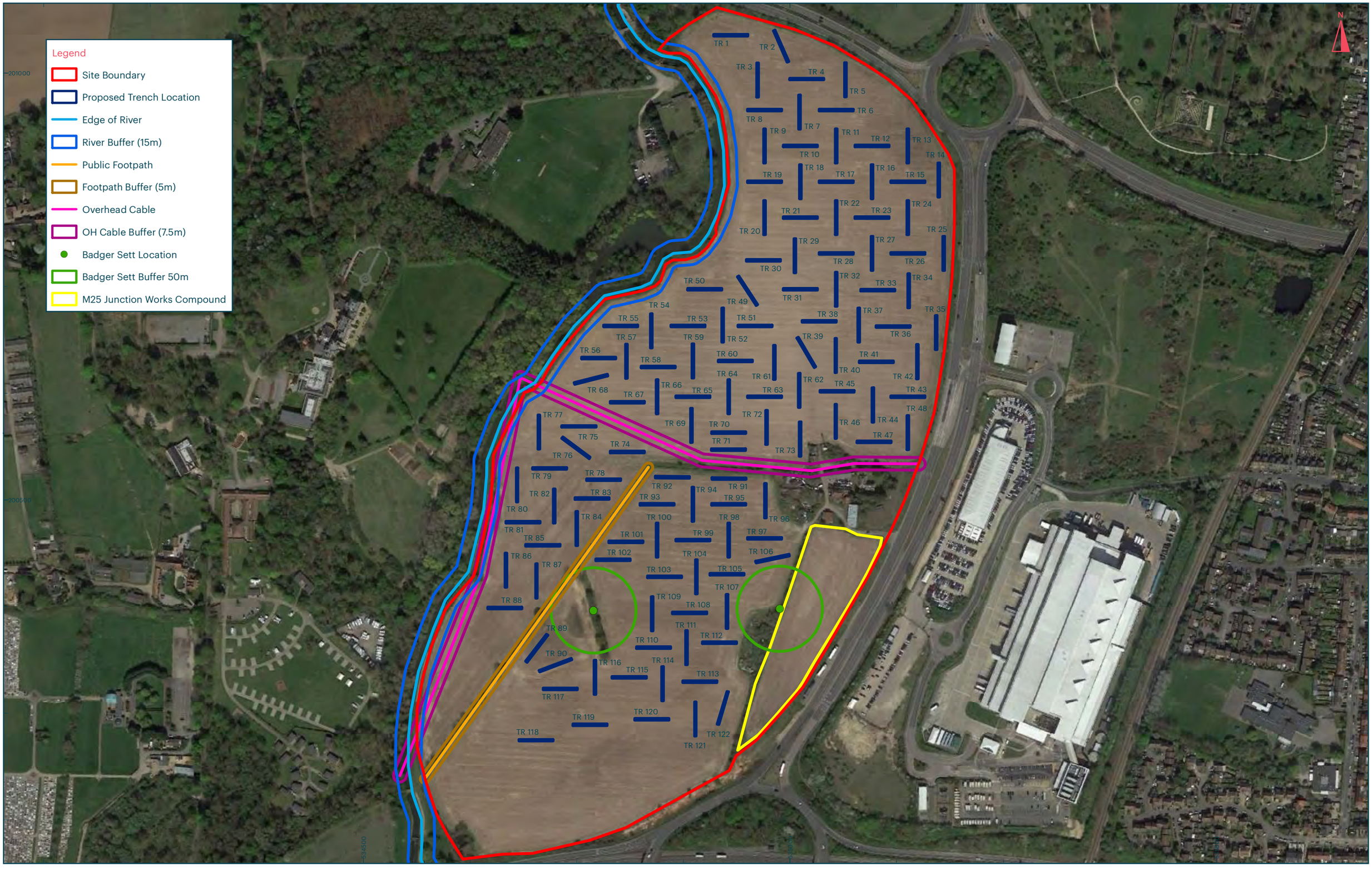
Title:
Proposed Trench Location Plan

Address:
Theobalds Farm, Cheshunt

All Trenches Shown are 40m x 2m

Scale at A3: 1:4,000

0 125m



Title:
Proposed Trench Location Plan

Address:
Theobalds Farm, Cheshunt

All Trenches Shown are 40m x 2m

Scale at A3: 1:4,000

0 125m

orion.

Legend

- Site Boundary
- Proposed Trench Location
- Edge of River
- River Buffer (15m)
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- Overhead Cable
- OH Cable Buffer (7.5m)
- Badger Sett Location
- Badger Sett Buffer 50m
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Title:
Proposed Trench Location Plan

Address:
Theobalds Farm, Cheshunt

All Trenches Shown are 40m x 2m

Scale at A3: 1:4,000

0 125m

APPENDIX 1: LANDOWNER TRANSFER FORM

PCA
PRE-CONSTRUCT ARCHAEOLOGY

PCA London Office
Unit 54 Brockley Cross Business Centre, 96 Endwell Road, Brockley, London, SE4 2PD
t operations ~ 020 7732 3925
administration ~ 0207 358 2197
post-excavation services ~ 020 7639 9091
e info@pre-construct.com
w www.pre-construct.com

PCA Ltd is due to carry out an archaeological investigation on the site below:

Site name: Theobalds Farm / Park Plaza West, Cheshunt, Hertfordshire

Site Address: Great Cambridge Road, Cheshunt, Hertfordshire, EN8 8EU

Site Code HPPW21

We have been instructed / commissioned for the work by Orion Heritage on behalf of Gardiner & Theobald LLP, contact: Rob Bourn, rob.bourn@orionheritage.co.uk tel. 01273 573 803.

Following completion of the site, the full site archive including artefacts worthy of retention will be deposited by PCA with a museum or repository who are committed to curate this archive.

To action this, PCA requires the name and address of the Landowner so that a Transfer of Title can be arranged for the deposition of the archive, by Deed of Transfer between the recipient museum or repository and the Landowner.

Therefore, could you please complete the details below and return this letter by post or e-mail to the following:

Zbigniew Pozorski

zpozorski@pre-construct.com

Pre-Construct Archaeology Ltd
Unit 40, Brockley Cross Business Centre
96 Endwell Road, London SE4 2PD

NAME AND ADDRESS OF SITE OWNER / FREEHOLDER

Name:

Address:

COMPANY REGISTRATION NO. (*Required for sites in Greater London*)

P C A

PCA CAMBRIDGE
THE GRANARY, RECTORY FARM
BREWERY ROAD, PAMPISFORD
CAMBRIDGESHIRE CB22 3EN
t: 01223 845 522
e: cambridge@pre-construct.com

PCA DURHAM
THE ROPE WORKS
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e: durham@pre-construct.com

PCA LONDON
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WINKBURN, NEWARK
NOTTINGHAMSHIRE NG22 8PG
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e: newark@pre-construct.com

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PCA WINCHESTER
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WINCHESTER
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t: 01962 849 549
e: winchester@pre-construct.com

Appendix D Written Scheme of Investigation Approval

From: Andy Instone <Andy.Instone@hertfordshire.gov.uk> **On Behalf Of** Historic Environment
Sent: 29 October 2021 01:30
To: Rob Bourn <rob.bourn@orionheritage.co.uk>; Historic Environment <Historic.Environment@hertfordshire.gov.uk>
Cc: Elias, Laura @ London HH <Laura.Elias@cbre.com>; Blunstone, Hannah @ London HH <Hannah.Blunstone@cbre.com>; David Mosley <D.Mosley@gardiner.com>; Shaun du Plessis <S.DuPlessis@gardiner.com>; Zbigniew Pozorski <ZPozorski@pre-construct.com>
Subject: Park Plaza (Theobalds Farm), Cheshunt

Dear Rob,

Many thanks for the WSI and confirmation of invoicing details.

In general it is a comprehensive document, although I would be grateful if the following points could be clarified:

- 1.3 there should be some contingency available should any archaeology that is found require further information to characterise it
- 7.2.1 can you confirm that the museum receiving the archive is Ware? Normally in Broxbourne Borough it is either Lowewood or Epping Museums, this is important because there have been several recent changes for archives in Broxbourne and because at least one museum in Hertfordshire is currently unable to receive archives and the rest are running out of space too, so we need to confirm this point
- 8.1 we would be grateful if you could give details/CV of the onsite supervisor once they are known and that the suitability of onsite staff are subject to approval by this office

Provided you undertake to do the above we have no objection to onsite investigations commencing, provided we receive the aforementioned CV in advance of work starting. All correspondence should go to the team in-box (historic.environment@hertfordshire.gov.uk).

In answer to your question regarding notice for onsite meetings, as much as you can, a week if this is possible. There are currently only two in the planning advice team so our diaries can fill up quickly. Should highly significant and/or vulnerable archaeology be found we will do our best to make ourselves available at shorter notice.

Regards,

Andy Instone
Senior Historic Environment Advisor | Hertfordshire LEADS | Growth & Infrastructure Unit |Environment & Infrastructure
Hertfordshire County Council
County Hall, Pegs Lane, Hertford, SG13 8DN Postal Point: CHN108
T: 01992 555241 (**Internal:** 25241)
E: andy.instone@hertfordshire.gov.uk

Hertfordshire LEADS provides Landscape, Ecology, Archaeology, Design and Sustainability support to planning departments in Hertfordshire

Please see the Historic Environment Team's charging policy for 2021/2022 here:
charging policy

To contact the Historic Environment team, please direct all enquiries to the team's telephone number and email address:
t: 01992 555021 **Comnet / Internal:** 25021
historic.environment@hertfordshire.gov.uk

Thank you

For more information

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CBRE GLOBAL WORKPLACE SOLUTIONS