Hall Farm/Loddon Valley Strategic Development Location

Environmental Impact Assessment Scoping Report

December 2024

Prepared on behalf of University of Reading, Gleeson Land & Hatch Farm Land Ltd

savills

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Project:	Hall Farm/Loddon Valley Strategic Development Location, Wokingham
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Contents

List of Figures

List of Appendices

1 Introduction

1.1 Introduction

1.1.1 This Environmental Impact Assessment (EIA) Scoping Report has been prepared by Savills (UK) Limited ('Savills'), with input from the EIA project team (see section 1.2), on behalf of the University of Reading (UoR), Gleeson Land (Gleeson) and Hatch Farm Land Ltd ('the Applicants').

1.1.2 It provides preliminary environmental information in relation to the Proposed Development at land at Hall Farm/Loddon Valley, Wokingham (the "Site") and suggests the scope of key issues that the subsequent EIA will need to examine.

1.1.3 This report is provided in support of a request for a 'scoping opinion' from Wokingham Borough Council (WBC) which is the local planning authority (LPA) for the Proposed Development. This 'scoping opinion' request is made pursuant to Part 4, Regulation 15 (1) of The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (EIA Regulations) (as amended).

1.1.4 This Scoping Report contains the information to allow WBC to consult with relevant stakeholders on the proposed scope of the EIA, including the Environment Agency, Highways England and Natural England, so that their comments can be taken into consideration in the EIA undertaken.

1.1.5 Details of the Site location and a summary description of the Site and its surrounds are provided in Chapter 2 (with further details provided in subsequent technical chapters). An overview of the Proposed Development is provided in Chapter 3.

1.1.6 Chapter 4 outlines the approach that will be taken with regards to the consideration of alternatives. Chapter 5 sets out the proposed overarching approach of the EIA, and Chapter 6 outlines the relevant planning policy context.

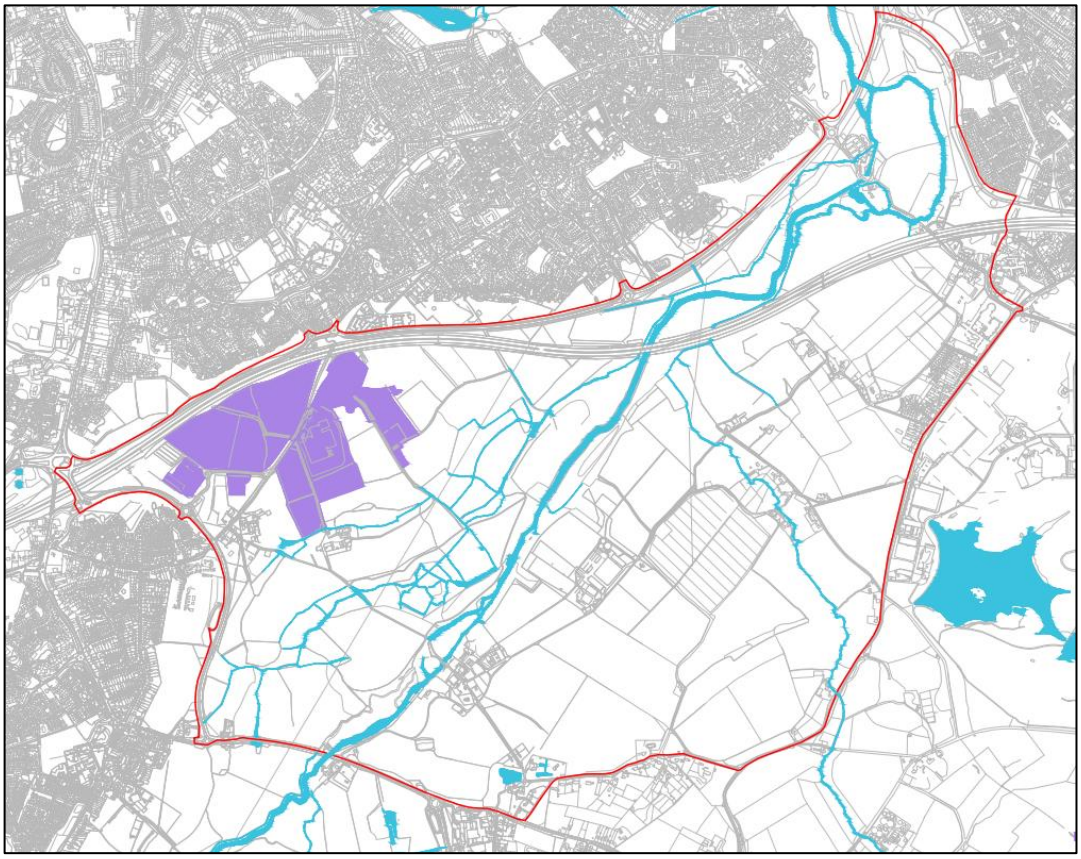
1.1.7 Individual topic chapters (Chapters 7-18) set out the proposed technical scope of the EIA in respect of each environmental topic.

1.1.8 The Proposed Development is expected to be consistent, where possible, with the development principles outlined under emerging Policy for Hall Farm / Loddon Valley Strategic Development Location (SDL) of the forthcoming Local Plan Update. However, this policy has the potential to evolve further as the Local Plan progresses through the submission and Examination phases.

1.1.9 For the purposes of EIA Scoping the Proposed Development comprises the comprehensive development of the Site, delivering around 3,930 dwellings; phased expansion of the Thames Valley Science and Innovation Park (Around 100,000m^2); neighbourhood and district centres (retail, leisure, sports, cultural, health and service facilities); and associated education provision.

1.1.10 The number, form and nature of the application(s) submitted for the Proposed Development will be decided in due course although there are likely to be several, including a combination of outline and hybrid, with timing based on the progression of the emerging Local Plan. A Site Boundary Plan is provided in Figure 1.1.

Figure 1.1 Site Location Plan



Note: The purple highlighted areas on Figure 1.1 are excluded from the EIA Boundary as these indicate areas within the Thames Valley Science Park Expansion area which have already been consented or are the subject or a live planning application. Details of how these will be addressed within the EIA are contained within Chapter 5 (Paragraph 5.4.39).

1.2 Project Team

1.2.1 The EIA project team is being led by consultants Savills, with input from other specialists both internal and external to the company. The project team comprises:

EIA Management and Co-ordination	Savills
Air Quality and Odour	RPS
Archaeology and Built Heritage	RPS
Climate Change and Greenhouse Gases	Daedalus Environmental Limited
Ecology	EPR
Ground Conditions and Contamination	RPS
Human Health	Savills
Hydrology (including Flood Risk and Drainage)	ALP/RPS
Landscape and Visual Impact	Savills
Noise and Vibration	RPS
Socio-Economics	Savills
Transport and Access	ALP

1.3 Proposed Scope of EIA

1.3.1 The proposed scope of the EIA is set out in Table 1.1 below. Further details can be found in Chapter 5. Details on specific elements within each of the below environmental topics which are proposed to be scoped in and out of the assessment are detailed within Chapters 7-18.

Table 1.1: Environmental Topics considered in the EIA Scoping process

Topic	EIA Scoping Report Chapter	Scoped In / Out
Agricultural land and Soils	5	In
Air Quality and Odour	7	In
Archaeology	8	In
Built Heritage	9	In
Climate Change and Greenhouse Gases	10	In
Ecology	11	In
Ground Conditions and Contamination	12	Out
Human Health	13	In
Landscape and Visual Impact	15	In
Noise and Vibration	16	In
Socio-Economics	17	In
Solid Waste Management	5	Out
Transport and Access	18	In
Water Resources (including Flood Risk and Drainage)	14	In

2 Site and Local Context

2.1 Introduction

2.1.1 This chapter provides a description of the Site and its setting. Further details relevant to the proposed scope of the technical assessments are provided in Chapters 7 – 18.

2.2 Site Description

2.2.1 The Site is approximately 700 hectares (ha) in size and is largely rural in character. The majority of the Site is comprised of farmland, along with semi-natural and amenity grassland, copses and woodland, and associated buildings. The M4 runs through the northern section of the Site with the University of Reading's *Centre for Dairy Research* ('CEDAR') located at its centre. The Thames Valley Science Park is located in the north west of the Site beyond which is the built-up residential area of Shinfield. The Site is bounded by the A327 along its southern boundary and Mole Road along its eastern boundary. The area of Sindlesham, which is mainly of a residential nature with some industrial uses, falls within the eastern boundary of the Site.

2.2.2 The Barkham Brook flows through the eastern part of the Site from southeast to northwest and the River Loddon flows through the centre of the Site from southwest to northeast. The Site occupies a valley position, although the land also undulates, with higher ground to the east.

2.2.3 A Site Boundary Plan is provided in Figure 1.1.

The Site and Surrounds

2.2.4 The Site is well located in terms of existing highway infrastructure and benefits from good connections to the local and strategic highway networks, notably the M4 (Junction 11) a short distance to the north west.

2.2.5 Beyond the M4 and northern boundary of the Site is the established residential area of Earley. Reading city centre and train station are located approximately 9km further north west. Train stations are also located at Earley, Winnersh Triangle and Winnersh. To the east of the Site is the Bearwood Lakes Golf Club beyond which is the residential area of Woosehill.

2.2.6 To the south of the Site are the existing villages of Arborfield and Arborfield Cross. Further to the south is Arborfield Garrison; a strategic residential development of 3,500 homes comprising the development of a former army site. The delivery of Arborfield Garrison is well advanced with the building phase commencing in 2016. To the west of the Site is Shinfield, a village that has grown significantly in recent years as part of the 'South of the M4 Strategic Development Location', which was allocated in the previous Core Strategy (2010).

<u>Site Access and Public Rights of Way</u>

2.2.7 The area has a high level of pedestrian and cycle connectivity, due in part to the significant investment in new infrastructure that has been implemented over recent years in conjunction with the Thames Valley Science Park and south of the M4 developments.

2.2.8 The Site has numerous access points, including from the west (Shinfield Eastern Relief Road and Cutbush Lane),the south (A327 Arborfield Road), east (B3030 Mole Road), and north east (Mill Lane).

2.2.9 The Site does not contain any direct bus services, however, nearby links are accessible by foot from Shinfield to the west, Sindlesham to the east, Arborfield and Arborfield Cross to the south and Earley to the north. The western area of the Site benefits from the South of M4 SDL bus service which already routes into the Thames Valley Science Park, providing a frequent service to and from key destinations within Reading such as the rail station, town centre, the Royal Berkshire Hospital and the University of Reading's main campus at Whiteknights.

2.2.10 The Site contains seventeen public rights of way within its extent as listed below:

- SHIN FP 39 I
- SHIN FP 3 I
- SHIN FP 4 II
- SHIN FP 5 I
- SHIN FP 6 I-II
- ARBO FP 1 I-III
- ARBO FP 2 II
- ARBO BW 3 I-II
- ARBO BW 4 I-III
- ARBO BW 5 II-III
- ARBO BW 5 V-VII
- ARBO FP 5 II-IV
- ARBO FP 21 I
- WINN BW 11 I-II
- WINN FP 7 I
- WINN FP 8 I
- EARL FP 15 I

Ground Conditions

2.2.11 A review of historical maps indicates that since 1872 the land has predominantly been within agricultural use with a number of drains/ ditches, gravel pits and ponds located across the Site. From 1971 the M4 motorway and subsequently the B3270 have been constructed on the northern side of the Site.

2.2.12 The superficial deposits are designated as Secondary A Aquifer (River Terrace Deposits and Alluvium) or Secondary B aquifer (Brickearth). The bedrock is designated an Unproductive Aquifer.

2.2.13 The Site is not indicated to be located in a groundwater Source Protection Zone (SPZ) although there is one sensitive groundwater abstraction.

2.2.14 A various assemblage of superficial deposits is present beneath the Site which include: Brickearth; River Terrace Deposits 2, 3, 4 and 5; and Alluvium. Localised areas of Made

Ground are also recorded within the Site, indicated to be mainly associated with highway construction and an isolated area within Oldhouse Farm. The bedrock comprises the London Clay Formation.

2.2.15 Further details on ground conditions and their assessment are provided within Chapter 12– Ground Conditions and Contamination.

Archaeology and Built Heritage

Archaeology

2.2.16 The Scheduled Monument of St Bartholomew's Church is the only statutorily designated archaeological asset within the Site. The remains of this church are also Grade II listed.

2.2.17 Various sections of the Site are located within an area of high archaeological potential as defined by the adopted WBC Planning Policy Proposals Map. This includes areas in the centre of the Site at St John's Copse, the Thames Valley Science Park and a section of land in the north east of the Site, south of the M4.

Built Heritage

2.2.18 Within a 1km search radius of the Site there are fifty-four listed buildings: all at Grade II except one Grade I listed building and one Grade II* listed building. There are also several buildings meriting consideration as non-designated heritage assets, either having been identified on WDC List of Buildings of Traditional Local Character or on the Berkshire Historic Environment Record (HER) or as a result of the application of professional judgement during the Site walkover undertaken in April 2022. One Grade II* registered park and garden falls within this search radius as do two conservation areas.

2.2.19 Within the Site boundary there are twenty-four built heritage assets as listed below:

- Cutbush, Grade II listed (1118135)
- Barn adjoining Cutbush, Grade II listed (1136129)
- Oldhouse Farm (Grade II listed) (NHL ref. 1118136),
- Barn approximately 50 metres south of Oldhouse Farmhouse, Grade II listed (1136136)
- Hall Place Farmhouse, Grade II listed (1135961)
- Remains of Old Church, Grade II listed (1313014)
- Bridge House, Grade II listed (1118159)
- The Old Rectory and The Rectory Close, Grade II listed (1319096)
- The Church of St Bartholomew, Grade II listed (1135983)
- Mole Bridge Farmhouse, Grade II listed (1118121)
- The Glen, Grade II listed (1118161)
- Bearwood College Registered Park and Garden (RPG), Grade II* registered (Register ref. 1000414)

- Park Lodge, Grade II listed (1118163)
- West Lodge, Grade II listed (1136015)
- Carter's Hill House, Grade II listed (1319098)
- Oak Cottage, Grade II listed (1319149)
- Sindlesham Mill, Grade II listed (1136288)
- Berkshire Masonic Centre, Grade II listed (1136256),
- Mole Lodge (Gas works) (HER ref. MRM17538), is identified on the HER and is deemed worthy of non-designated heritage asset status.
- Shinfield Grange is identified on the HER and merits consideration as a non-designated heritage asset (HER ref. WK15636).
- Reading Room Cottage is identified as a building meriting consideration as a non-designated heritage asset though it is not identified on the HER or the LPA List of Buildings of Traditional Local Character.
- Arborfield Cross Conservation Area located approximately 500 metres south of the Site
- Sindlesham Conservation Area located adjacent to the Site.

2.2.20 Further details on built heritage assets and their assessment are provided within Chapter 9 – Built Heritage.

Flood Risk and Drainage

2.2.21 With reference to the Environment Agency's online Flood Map for Planning, the majority of the Site is in either Flood Zone 1 or 2, although there are areas of Flood Zone 3 immediately adjacent to the River Loddon and Barkham Brook. There are also areas that are shown as having a high risk of surface water flooding predominantly along the eastern boundary and some central and southern areas of the Site.

2.2.22 Further details on hydrology, flood risk and drainage and their assessment are provided within Chapter 14 – Water Resources.

Ecology and Nature Conservation

2.2.23 The closest statutory designated sites of national importance are four Sites of Special Scientific Interest (SSSIs) all within 5km of the Site.

- Lodge Wood and Sandford Mill SSSI, located approximately 4km north east – Designated for large populations of the rare Loddon Lily.
- Longmoor Bog SSSI, located approximately 3km south east – Designated for its main features being a well-developed carr of alder Alnus glutinosa, grey willow Salix cinerea, downy birch Betula pubescens and alder buckthorn Frangula alnus and an area of wet heathland dominated by purple moor-grass Molinia caerulea and cross-leaved heath Erica tetralix.

- Bramshill SSSI, located approximately 5.1km south – Designated for a series of shallow acid ponds and associated mire, which support a rich assemblage of dragonfly and damselfly, and rotationally felled conifer plantation, which provides habitat for internationally important populations of nightjar, woodlark and Dartford warbler.

- Stanford End Mill and River Loddon SSSI, located approximately 4.4km south west – Designated for a series of traditionally-managed seasonally waterlogged hay meadows, and a 4 km stretch of the River Loddon, a tributary of the River Thames. The Site is of interest particularly for nationally important populations of two rare plants: the fritillary Fritillary meleagris, a native bulb of unimproved damp meadows now mainly confined to scattered localities in southern Britain, and the Loddon pondweed Potamogeton nodosus, a very rare aquatic species for which this length of the River Loddon is the national stronghold.

2.2.24 Twenty-nine Berkshire Local Wildlife Sites (LWS) are located within a 2km radius of the Site. Of these, five are located within the Site boundary, whilst a further two are located immediately adjacent.

2.2.25 The Loddon Valley South Biodiversity Opportunity Area (BOA) runs across the western and northern parts of the Site. BOA's are considered to be areas of land where there is the greatest potential for habitat creation and restoration.

2.2.26 The southern section of the Site is located approximately 4.4km north of the designated Thames Basin Heaths Special Protection Area (SPA). The Thames Basin Heaths is designated because it supports populations of Dartford warbler Sylvia undata, Nightjar Camprimulgus europaeus and Woodlark Lullula arborea.

2.2.27 Further details on ecological sites and habitats are provided within Chapter 11 – Ecology.

Air Quality

2.2.28 Wokingham Borough Council (WBC) has designated 60m on both sides of the M4, throughout the district, as an Air Quality Management Area (AQMA) due to high levels of nitrogen dioxide (NO_2) pollution from road traffic. The AQMA was declared on 28 September 2001. The northern part of the Site is within this designated AQMA.

2.2.29 Further details on Air Quality and its assessment are provided within Chapter 7 – Air Quality.

Noise

2.2.30 There are a number of existing noise sources within the vicinity of the Site with main source of noise from road traffic from the M4 motorway and surrounding local road network including the A327 and Mole Road. In locations close to the M4 motorway, it is likely there will be very high existing road traffic noise levels. However, these are likely to be significantly reduced in areas of the Site to the south, away from the M4.

2.2.31 Further details on Noise and its assessment are provided within Chapter 16 – Noise and Vibration.

2.3 Summary of Sensitive Receptors

2.3.1 As described in the following technical scoping chapters, a number of sensitive receptors have been identified that have the potential to be significantly affected either directly or indirectly by the Proposed Development. These receptors will be considered in the design and the assessment of the scheme and are outlined below.

- Occupiers of existing dwellings and commercial premises in proximity to the Site;
- The local population in respect of local services, schools, employment opportunities, etc.;
- Users of local roads, transport services and public rights of way both on and in proximity to the Site;
- Ecological habitats and species present both on and in proximity to the Site;
- Surface and groundwater regimes both on and in proximity to the Site, including Site drainage characteristics;
- The landscape character of the Site and its surrounding environs;
- Sensitive receptors that would be introduced to the Site as a result of the Proposed Development, including site workers and future residents, potentially school children, tenants and other site users who would be present during the later phases of construction; and,
- Effects on climate through GHG emissions during the construction and operation phase.

2.3.2 Consideration of whether these receptors are likely to be affected, and if so, to what extent, is provided in each technical assessment chapter (Chapters 7 – 18).

3 Proposed Development

3.1 Development Description

3.1.1. The Proposed Development is expected to be consistent with development principles set out in Policy SS13 of the Local Plan Update (LPU), however, this policy has the potential to evolve as the Local Plan progresses through the submission and Examination phases.

3.1.2. For the purposes of EIA Scoping the Proposed Development comprises the comprehensive development of the Site, delivering around 3,930 dwellings; phased expansion of the Thames Valley Science and Innovation Park; neighbourhood and district centres (retail, leisure, sports, cultural, health and service facilities); and associated education provision.

3.1.3. The maximum parameters for the Proposed Development comprise the following:

- Site preparation and clearance (including elements of demolition)
- Phased delivery of approximately 3,930 dwellings, including:
    - 40% affordable homes, subject to financial viability
    - Specialist accommodation for older people
- Around 100,000m^2 of research and development floorspace or equivalent trip generating activity within use class E(g), B2 and B8 and other complementary uses, through an extension of the Thames Valley Science and Innovation Park.
- Schools, including:
    - Two 3-form entry primary schools
    - An 8-form entry secondary school, of which 5 directly relate to the development, with additional land reserved to enable expansion to 12-form entry
- A district centre providing a range of services and facilities in a location central to the planned community as a whole including retail, leisure, employment, cultural, and health.
- Two local centres providing day to day retail and other community uses/
- A country park which is accessible to settlements beyond the garden village.
- Comprehensive strategic landscaping and network of multi-functional green and blue infrastructure, incorporating River Loddon and Barkham Brook to create a country park supplemented by ecological networks and habitats and promote high levels of connectivity, including to the Loddon long distance footpath and greenways.
- Delivery of biodiversity enhancements to achieve at least a net gain of 10%.
- Delivery of comprehensive drainage and flood alleviation measures.
- Delivery of new link over the M4 to Lower Earley Way, and associated highways works that might include improvements to transport capacity along Lower Earley Way and other neighbouring roads, a new link to Hatch Farm Way and the partial closure of Mill Lane.

- Delivery of new pedestrian, cycleway, greenway infrastructure, and public transport priority routes.

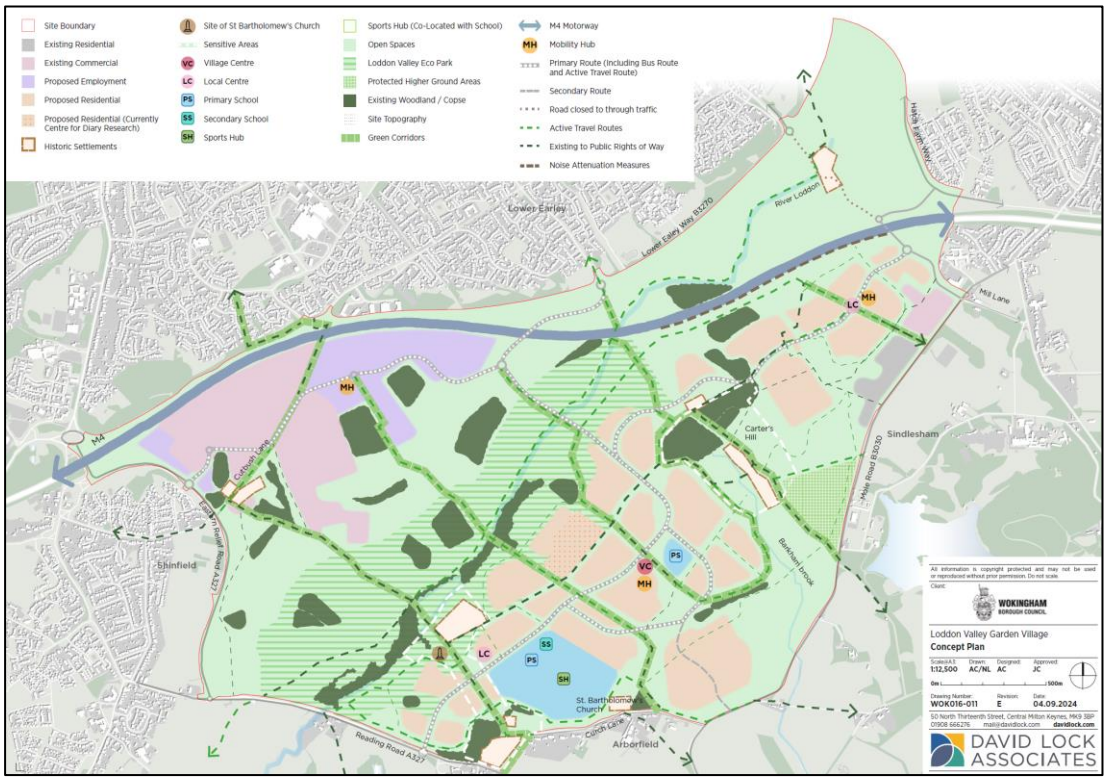
- Any wider land outside the site boundary needed for development specific infrastructure.

3.1.4. Given the envisaged form of the planning application a series of Site-wide Parameter Plans will be prepared showing the board development parcels, form and layout of the Proposed Development. As such the EIA will be based upon these Parameter Plans alongside any more detailed plans prepared for specific areas of the Site.

3.1.5. An Illustrative Masterplan will be produced to demonstrate how the quantum of development proposed could be delivered within the Site, however, this will not be used as the basis of the assessment. Some disciplines may be required to reference the Illustrative Masterplan within the assessment to provide robust conclusions, where this is the case, this will be clearly stated within the ES.

3.1.6. The Illustrative Masterplan will be based upon the principles set out within Policy SS13 Loddon Valley Garden Village of the Local Plan Update. Figure 3.1 shows the concept plan contained with the Regulation 19 LPU submission.

Figure 3.1 - Loddon Valley Garden Village Concept Plan



Indicative Phasing

3.1.7. The phasing of the Proposed Development is yet to be confirmed, albeit Policy SS13 of the LPU envisages at least 2,700 dwellings will be delivered by 31 March 2040.

3.1.8. For the purpose of the EIA indicative phasing will be utilised and assessments will consider phasing implications where relevant. The indicative phasing will include the proposed commencement of development, first occupations and completion of development.

3.1.9. This will enable the duration of construction impacts to be considered as well as any overlap between the first occupations on site (introduction of new receptors) and ongoing construction works.

3.1.10. Where appropriate, the latter will be addressed through the inclusion of an interim (mid-construction) assessment year representing the greatest potential overlap.

3.1.11. The EIA will consider impacts arising from the demolition, construction and operational phases of the Proposed Development. Whilst elements will be redeveloped, replaced and renewed over time, the Proposed Development is designed as a permanent provision and therefore a future demolition phase of the project is not applicable.

Demolition and Construction

3.1.12. The ES will provide an outline of the anticipated demolition and construction programme and related activities and aspects (i.e. enabling works substructure works, etc., construction material quantities, HGV movements and HGV routing). In addition, the standard environmental controls required under legislation and best practice guidance (including relevant codes of construction practice) will be presented.

3.1.13. This information will inform the construction impact assessments. Throughout the construction impact assessments, the assumption will be made that the standard environmental controls required under legislation and best practice guidance are met as a matter of course.

3.1.14. It should be noted that given the nature of the Site and the prominence of undeveloped land, demolition activities are relatively limited.

<u>Construction Environmental Management Plan (CEMP)</u>

3.1.15. Details of measures to protect the environment during the construction of the Proposed Development will be set out in a CEMP to be implemented on a phase by phase basis. Measures will address hours of working, noise, vibration, dust, light spill, wheel washing and control of runoff. It is anticipated that the phased implementation of the CEMP will be a condition of the planning permission(s) and that it will be regularly monitored.

3.1.16. Once finalised and approved by the Local Planning Authority, the CEMP would be held on-site. All site personnel would be made aware of its existence and undertake to adhere to the guidance.

3.1.17. Construction would proceed in accordance with industry-standard best practice techniques and all legislative requirements will be met. During site clearance and construction, the approach to working will seek to optimise construction methods and material use, retain excavated material within the development area, and implement best practice waste management. The potential for pollution or nuisance to be caused during construction will therefore be controlled and managed. Standard measures can be secured through planning

conditions and for such a proposal usually include site waste management and construction management implemented via a Construction Environment Management Plan.

Plant and Equipment

3.1.18. Consideration will be given to the types of plant and equipment that are likely to be used during the construction works. An indication of the typical types of plant and equipment associated with each key element of the works will be set out in the ES.

Site Set-up

3.1.19. A number of facilities will be required during the construction process of the Proposed Development. Onsite facilities will likely include:

- Office and Welfare facilities;
- Locker room;
- W/C's;
- Canteen and Kitchen;
- Reception;
- Site operative area; and
- Materials Storage.

3.1.20. Full details of these facilities are unknown at this time, however the location of these facilities will be considered and indicated on future sequencing plans. These will of course be subject to more detailed assessments as the design detail is determined.

Hoarding / Fencing

3.1.21. The contractor will ensure site security measures around the construction zone are put in place and maintained. More detailed plans will be developed to prior commencement, to ensure minimal environmental impact in providing the required control measures to mitigate anticipated security risks.

Hours and Method of Working

3.1.22. It is anticipated that contractor's compounds will be located as secure areas within the site and will be relocated as each phase nears completion onto the subsequent phase. The EIA will be informed by an indicative phasing strategy.

3.1.23. The working hours are anticipated to be:

- 07:00 - 19:00 hours Monday to Friday inclusive;
- 08:00 - 13:00 hours on Saturday; and
- No work to be carried out on Sundays or Bank Holidays.

3.1.24. In order to maintain these working hours, the contractor(s) may require a period of up to half an hour before and up to one hour after normal working hours for start-up and close down of

activities. This does not include operation of plant or machinery giving rise to noise with the potential to disturb nearby residents or the arrival of any HGV at site before 06:30 hours.

3.1.25. It is anticipated that development would be undertaken on a rolling programme of site preparation and construction, allowing earlier phases to be completed and occupied while subsequent phases are constructed. All materials and plant storage will likely occur on the Site and no off-site compounds are necessary. The on-site materials storage compound will be located in a position compatible with the ongoing phases of development.

Construction Traffic

Source of Traffic

3.1.26. Construction traffic movements will consider the following sources of traffic:

- Workforce movements to and from the Site;
- Deliveries made to the Site;
- Removal/ import of material from the Site; and
- Trips made by associated trades.

Site Access and Egress and Traffic Routing

3.1.27. The estimated peak numbers of construction related vehicle journeys during the demolition and construction phase will likely be calculated based on volumes of excavated waste material, together with imported construction materials. A full assessment of the construction vehicle movements on the surrounding road network will be presented within the ES.

4 Alternatives and Design Iterations

4.1 Development Alternatives

4.1.1 Schedule 4, paragraph 2 of the EIA Regulations requires Environmental Statements to include:

'A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.'

4.1.2 As there are no suitable alternative sites within the Applicants' control, alternative sites will not be considered by the Applicants or assessed in the EIA. Furthermore, the Local Plan Update (LPU) proposes to allocate the Site as a Strategic Development Location via Policy SS13 and has thus been supported through the Local Plan process.

4.1.3 Given the nature and purpose of the Proposed Development, the assessment of alternatives to the development that will be presented in the ES will consider options within the following categories:

- 'Do Nothing': under this scenario no development is implemented at the Site and baseline conditions continue in their current trends;
- A different design: under this scenario the Proposed Development is realised with alternative scales and layouts, often in the context of developmental constraints present at the Site;

4.2 Consultation

4.1.4 In the lead up to the planning application and throughout the development design, a programme of consultation has and will continue to be undertaken with statutory and non-statutory consultees and with members of the public. Further technical consultation will also be undertaken as part of the ongoing EIA process, including consultation with the Environment Agency and authority officers.

4.1.5 A summary of relevant consultation will be presented in the introductory sections of the ES. This will provide details of any environmental issues raised and provide an audit trail of how the EIA process has responded to these issues. Consultation that is specific to particular topics will be reported, where relevant, within the corresponding chapters of the ES.

4.1.6 Details of technical consultation, directly related to the production of this Scoping Report are provided in the methodology and baseline sections of each topic chapter.

5 Approach to Assessment

5.1 EIA Process

5.1.1 EIA is a process through which the likely significant environmental effects of a development proposal can be identified as part of the consenting of the development. In addition, it is an opportunity, where possible, for adverse effects to be avoided or mitigated or beneficial effects enhanced. The EIA process is reported in an Environmental Statement (ES) which will be submitted as part of the application for consent.

5.1.2 The overall aim of the proposed EIA is to provide an objective and systematic account of any likely significant environmental effects of the development and for the decision maker to take these into account in determining any application for consent.

5.2 EIA Screening

5.2.1 The EIA Regulations require that before consent is granted for certain types of development, an EIA must be undertaken. The EIA Regulations set out the types of development which must always be subject to an EIA (Schedule 1 development) and other developments which will only require assessment if they are likely to give rise to significant environmental effects (Schedule 2 developments). Guidance and thresholds are available to help to decide whether EIA is required for a Schedule 2 development. This decision process is known as 'screening'.

5.2.2 The selection criteria for screening Schedule 2 development are provided in Schedule 3 of the EIA Regulations. Schedule 2 projects require EIA if they are likely to have significant effects on the environment by virtue of their nature, size or location. The potential for likely significant effects on 'sensitive areas', as defined in Regulation 2(1) of the EIA Regulations, is a particularly important consideration.

5.2.3 The Proposed Development falls within Schedule 2 Section 10(b) of the EIA Regulations as an "Urban development project" in which "the development includes more than 1 hectare of urban development which is not dwellinghouse development", "the development includes more than 150 dwellings" and "the overall area of the development exceeds 5 hectares".

5.2.4 Given the size and nature of the Proposed Development it is considered that some significant effects are likely to arise. As such the Applicant did not submit a Screening Request to WBC, but concluded that it would qualify as EIA development. As such, an EIA will be undertaken and an Environmental Statement prepared to support the future Planning Application(s).

5.3 EIA Scoping

5.3.1 Part 4, Regulation 15 (1) of the EIA Regulations provides for an Applicant to ask the Local Planning Authority (LPA), in this case WBC, to provide a Scoping Opinion in which the information that should be provided within the ES is stated in writing.

5.3.2 When requesting a Scoping Opinion, under Part 4, Regulation 15 (2) the following must be provided:

- a plan sufficient to identify the land;
- a brief description of the nature and purpose of the development, including its location and technical capacity;
- an explanation of the likely significant effects of the development on the environment; and

- such other information or representations as the person making the request may wish to provide or make.

5.3.3 It is the purpose of this EIA Scoping Report to provide sufficient information for WBC to consider and consult upon the scope of the EIA to support the application(s) for the Proposed Development.

5.4 Scope of Work

Technical Scope

5.4.1 In order to determine the likely scope of the EIA, the process has involved the following steps:

- Identification of the Site and boundary;
- Identification of the key characteristics of the Site and the establishment of the environmental baseline through a series of desk and field studies;
- Identification of where there are gaps in the baseline and the further survey work required to address this;
- Initial consideration of the potential sources and nature of environmental effects through assessment against the environmental baseline; and
- Definition of the assessment methodologies to be used in each study area.

5.4.2 A series of preliminary baseline studies have been undertaken to establish the baseline environment for this Scoping Report. The baseline and assessment work undertaken as part of preparing this Scoping Report is set out within the relevant technical chapter. Full baseline assessments relevant to each environmental topic will be presented within the ES.

5.4.3 In accordance with Schedule 4 of the EIA Regulations, the proposed ES will include:

- A description of the Proposed Development;
- A description of the reasonable alternatives studied by the developer and reasons for the selected option;
- A description of the baseline environment and likely evolution without the Proposed Development;
- A description of the factors specified in specified in Regulation 4(2) likely to be significantly affected by the Proposed Development;
- A description of the likely significant effects of the Proposed Development;
- A description of the forecasting methods and evidence used in the assessment, including any difficulties experienced;
- A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects and, where appropriate, of any proposed monitoring arrangements; and
- Where relevant, a description of the expected significant adverse effects of the development from vulnerability to major accidents or disasters.

5.4.4 Part 1, Regulation 4(2) of the EIA Regulations refers to the following environmental factors to be included in an appropriate manner in an ES: population, human health, biodiversity (fauna and flora), land, soil, water, air, climate, material assets, cultural heritage, and landscape and the interaction between these factors. Regulation 4(4) states that the significant effects to be identified, described and assessed under Regulation 4(2) include the expected significant effects arising from the vulnerability of the proposed development to major accidents or disasters that are relevant to that development.

5.4.5 The ES will be accompanied by a Non-Technical Summary (NTS) providing a concise and accessible account of the EIA process and the environmental effects of the Proposed Development.

5.4.6 The factors referred to in Regulation 4(2) are addressed where appropriate in the environmental topics set out in Table 5.1.

5.4.7 Table 5.1 provides a list of the topics that have been considered in the EIA scoping process. The results of the scoping process for each of the topics is presented in this report in Chapters 7 – 18.

Table 5.1: Environmental topics considered in the EIA Scoping Process

Topic	EIA Scoping Report Chapter	Scoped In / Out
Agricultural land and Soils	5	In
Air Quality and Odour	7	In
Archaeology	8	In
Built Heritage	9	In
Climate Change and Greenhouse Gases	10	In
Ecology	11	In
Ground Conditions and Contamination	12	Out
Human Health	13	In
Landscape and Visual Impact	15	In
Noise and Vibration	16	In
Socio-Economics	17	In
Solid Waste Management	5	Out
Transport and Access	18	In
Water Resources (including Flood Risk and Drainage)	14	In

5.4.8 As part of the EIA scoping process, issues within the topic areas that have been identified as unlikely to give rise to significant environmental effects have been omitted ('scoped out') from the EIA.

Accidents, Fire and Natural Disasters

5.4.9 In the absence of recognised guidance on this subject in the context of EIA, a range of sources providing guidance related to the topic has been reviewed, including:

- Cabinet Office National Risk Register (NRR) of Civil Emergencies 2017 Edition[1];

[1] Cabinet Office. (2017) National Risk Register of Civil Emergencies. [Online]. **https://www.gov.uk/government/publications/national-risk-register-of-civil-emergencies-2017-edition**.

- UK Government Emergency Response & Recovery Guidance[2]; and
- International Federation of Red Cross & Red Crescent Societies Disaster and Crisis Management Guidance[3].

5.4.10 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". An accident can be defined as "an unfortunate incident that happens unexpectedly and unintentionally, typically resulting in damage or injury"[4].*

5.4.11 The Site's location within the UK is such that natural disasters are not considered to represent a likely risk to the Proposed Development. For example, it is considered that the likelihood of an earthquake with a magnitude sufficient to cause damage to buildings and/or loss of life occurring and impacting the site is extremely low. Furthermore, the topography of the Site is not considered to be sufficiently steep such that a major mass movement disaster could arise.

5.4.12 Given the nature of the Proposed Development, the potential for either large volume storage or frequent passage / delivery of fuels and chemicals during either the construction phase or following completion, is considered to be low when compared to more industrial development proposals such as chemical works, storage depots, docks, or major highways.

5.4.13 The Proposed Development will be designed in accordance with recognised and accepted best practice in terms of highway design, specification of drainage and current building regulations.

5.4.14 Two high pressure gas mains run across the Site, located along the northern boundary adjoining the M4, and also centrally through the Site. The Proposed Development will accord with HSE guidelines regarding easement zones for a range of uses and activities.

5.4.15 It is therefore considered that whilst there is always a potential risk that an accident, fire or natural disaster could result in a significant environmental impact, this risk can be appropriately mitigated through embedded design measures and through compliance with statutory design guidelines. As such, significant effects related to Health and Safety and as a result of major accidents and/or disasters associated with the Proposed Development are not considered likely. It is therefore proposed that the EIA will not include health and safety as a specific chapter.

5.4.16 The EIA will address impacts and effects on Human Health through the inclusion of a Human Health Chapter. Further details on the scope of this assessment are found in Chapter 13 – Human Health. Health and safety impacts arising as a result of topic specific impacts (e.g. Transport, Flood Risk, Noise and Air Quality) will also be considered as appropriate elsewhere within the assessment (See Chapters 7-18).

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[2] International Federation of Red Cross and Red Crescent Societies, "The Red Cross Red Crescent approach to disaster and crisis management: Position paper," **http://www.ifrc.org/PageFiles/91314/1209600-DM-Position-Paper-EN.pdf** 2011.

[3] International Federation of Red Cross and Red Crescent Societies, "What is a disaster?," **http://www.ifrc.org/en/what-we-do/disaster-management/about-disasters/what-is-a-disaster/** 2017.

[4] Oxford English Dictionary. 2018. [Online]. **https://en.oxforddictionaries.com/definition/accident**.

Agricultural Land and Soils

5.4.17 As described in in Chapter 2, the Site is partly comprised of undeveloped agricultural land, therefore Proposed Development would remove this land from agricultural use.

5.4.18 Annex 2 of the NPPF defines Best and Most Versatile (BMV) agricultural land as "Land in Grades 1, 2, and 3a of the agricultural land classification". At the time of writing no site specific assessment data is available on the grade of agricultural land. However, with reference to the general agricultural land classification data layer on MAGIC Map, parts of the Site are likely to be Grade 3.

5.4.19 Given some of the constraints of the Site, such as the areas within Flood 3 along the River Loddon and Barkham Brook, it is not considered that redevelopment of this Site will have significant implications on the availability of BMV agricultural land. However, impacts related to agricultural land and soils are proposed to be scoped in to the EIA and will be dealt with via Agricultural Land Classification report which will be appended to the ES, with the findings summarised within the relevant chapter of the ES.

5.4.20 The assessment will include consideration of the change of use from the existing site to that of the Proposed Development in terms of impact on local farm productivity.

Waste

5.4.21 Developments result in both construction and operational (municipal & commercial) waste arisings. Waste Disposal Authorities are responsible for ensuring that the Waste Local Plan provides for sufficient facilities to exist to manage anticipated waste arisings (this includes ensuring that sufficient sites exist for merchant facilities for the management of construction and commercial waste). Waste Collection Authorities (in this case WBC) are responsible for ensuring that sufficient infrastructure exists for the collection of anticipated municipal waste arisings.

5.4.22 Planning permission is granted for a residential / commercial development proposal on the basis that it is, for example, in accordance with the development plan or necessary to meet a housing need. On this basis, the waste arisings of a proposed development are either anticipated because they are already planned for or should be anticipated as the need for additional housing comes out of predictable (and calculated) scenarios that the Waste Collection/ Disposal Authorities should have already taken into account in their forward plans.

5.4.23 Therefore, the management of waste arisings from an urban development project should be considered as a policy issue and not a development specific environmental issue. In addition, given the Site is largely undeveloped currently, demolition works are expected to be minimal. It is envisaged that waste arising during this phase will be suitably controlled through a CEMP.

5.4.24 Therefore, it is **not** proposed that a specific waste chapter will be incorporated into the ES. However, in accordance with the EIA Regulations, the Proposed Development description, upon which the EIA will be based, will include estimated volumes of waste associated with construction activities (Construction, Demolition and Excavation waste) and the operational phase of the Proposed Development (Municipal Solid Waste, Commercial Waste).

Geographic Scope

5.4.25 The geographic scope of the proposed EIA will include the physical extent of the Site, as shown on Figure 1.1. Additionally, the assessment boundary for individual topic chapters will exceed

beyond this red line where necessary for the scope of the assessment. This is set out and explained, where relevant, in each of the topic chapters.

5.4.26 The nature of the current environmental conditions and the manner in which impacts are likely to be generated will mean that the influence of many potential impacts can extend beyond the immediate Site boundary. Where identified and relevant, such impacts will be assessed as part of the EIA.

5.4.27 The geographical extent of the EIA will also consider the potential implications of related and un-related development activities and any other land required for development specific infrastructure outside the current Site boundary.

Temporal Scope

5.4.28 The timing and phasing of the Proposed Development is yet to be confirmed. For the purpose of the EIA indicative phasing will be utilised and assessments will to consider phasing implications where relevant. The indicative phasing will include the proposed commencement of development, first occupations and completion of development.

5.4.29 The EIA will consider impacts arising from both construction (inc. demolition) and operational phases of the Proposed Development. Whilst elements will be redeveloped, replaced and renewed over time, the Proposed Development is designed as a permanent provision and therefore a demolition phase of the project is not applicable.

The Baseline

5.4.30 The assessments will be based on the comparison of qualitative and, where possible quantitative, predicted impacts, compared with the anticipated future baseline environmental conditions. It is currently expected that, in the absence of development, the current nature of the Site would remain broadly unchanged. Any significant changes expected in future baselines (either on or off site) due to environmental trends will be described qualitatively, or in certain cases calculated as quantitative future baseline to allow meaningful future year assessment. These future year baselines can take account of cumulative developments not yet built but in the planning system. These approaches are explained in further detail in the relevant chapters concerned.

Cumulative Scope

Consideration of Hall Farm / Loddon Valley Strategic Development Location delivery through multiple applications

5.4.31 The Proposed Development is expected to be delivered via several planning applications for development within the Hall Farm / Loddon Valley Strategic Development Location.

5.4.32 As applications come forward for specific development parcels, unless demonstrated otherwise (by the respective applicant), each application would be accompanied by an ES reporting on the likely significant environmental effects of both the application proposals and cumulatively with wider development in the allocation area (based upon available information). This will enable the various areas of the Site to be assessed discretely enabling disaggregation of mitigation and planning obligations for each land parcel.

5.4.33 Each ES will present an interim cumulative assessment of the development within the Hall Farm / Loddon Valley Strategic Development Location before then considering the cumulative impact in relation to each of the proposed schemes set out in Table 5.2 below.

5.4.34 Unless stated otherwise within a technical chapter, the proposed EIA will be based upon the following scenarios:

1. Baseline/Future Baseline
2. Baseline/Future Baseline + the Proposed Development
3. Baseline/Future Baseline + the Proposed Development + Wider Development within the LGV (Policy SS13) allocation
4. Baseline/Future Baseline + the Proposed Development + Other Committed Development

Cumulative Effects Assessment

5.4.35 The Planning Practice Guidance: Environmental Impact Assessment (Planning Paragraph: 024 Reference ID: 4-024-20170728: Revision date: 28 07 2017) states the following in relation to the assessment of cumulative effects:

'Each application (or request for a screening opinion) should be considered on its own merits. There are occasions, however, when other existing or approved development may be relevant in determining whether significant effects are likely as a consequence of a proposed development. The local planning authorities should always have regard to the possible cumulative effects arising from any existing or approved development.'

5.4.36 The potential cumulative effects of the Proposed Development in association with other committed developments, both during the construction phase and following completion, will be included.

5.4.37 Taking into account the proposed technical scope of the EIA, it is proposed that the cumulative effects assessment (CEA) will consider residential and other developments within 5km of the Site boundary that are of a substantial size (e.g. 80+ units) that are considered to have the potential to result in significant effects, and which benefit from an extant planning consent. Assessments of likely cumulative effects will be made within the relevant technical chapters of the ES.

5.4.38 Table 5.2 shows existing or approved schemes that produce an uplift of more than 1,000sqm (GEA) of mixed-use floor space or over 80 residential units. A 5km threshold has been applied on the basis that beyond this distance significant cumulative effects are not considered to be likely, therefore primary consideration will be given to schemes within this radius. However, consideration will also be given to committed schemes beyond this radius where the size or nature of the scheme could result in cumulative effects on a wider geographical scale. As such Table 5.2 includes large schemes within a 5km radius of the Site.

5.4.39 As shown in Figure 1.1, some areas within the Thames Valley Science Park have already received planning consent (with construction underway) or are the subject of a live planning application (expected to be determined prior to the submission of the ES). Therefore, whilst these fall within the wider allocation boundary and are situated within the north western part of the Site, these are excluded from the Proposed Development for the EIA on the basis these would fall under the definition of existing or approved development in line with the EIA regulations. These areas are shown in purple on Figure 1.1 and set out below in Table 5.2 and will be assessed as part of the CEA for the EIA.

5.4.40 The Applicants seek to agree a schedule of committed developments in writing with WBC as part of the EIA Scoping process. This schedule will be updated as appropriate both before and during the preparation of the EIA.

5.4.41 It is proposed that these committed schemes form the basis for the proposed assessment of potential cumulative effects alongside high level consideration of related offsite infrastructure provision (highways and drainage) so far as is reasonable taking into account the availability of information at the time of assessment.

Table 5.2: Proposed Cumulative Schemes

Site Address	Application Reference	Residential Units / Non-Residential Floor space/ Scheme size	Local Authority	Approximate Distance from Site Boundary (km)
Reading Fc Training Ground, Park Lane, Finchampstead, Wokingham, Berkshire, RG40 4PT	220822	140 Units	Wokingham Borough Council	3.5km
Land South East of Finchampstead Road South Wokingham Strategic Development Location Wokingham	192325	171 Units	Wokingham Borough Council	4.65km
55 Vastern Road Reading RG1 8BU	200188	210 Units	Reading Borough Council	5km
Vastern Court Caversham Road Reading	200328	1000 Units	Reading Borough Council	5.31km
Land east of Gorse Ride South, south of Whittle Close and to the north and south of Billing Avenue Finchampstead RG40 9JF	202133	249 Units	Wokingham Borough Council	4.27km
Ashridge Farm Warren House Road Wokingham RG40 5QB	201515	153 Dwellings	Wokingham Borough Council	4.36km
Land at Winnersh Farm east of Woodward Close Winnersh RG41 5NW	212404	87 Units	Wokingham Borough Council	2.07km

Toutley East Land adjacent to Toutley Depot, West of Twyford Road, Wokingham RG41 1XA	211777	130 Units	Wokingham Borough Council	3.45km	
Thames Valley Science Park					
Land off Cutbush Lane Shinfield	182059	Full for 15,628sqm research and storage facility Outline for up to 15,000sqm research and storage facility	Wokingham Borough Council	TVSP	Approved and built
Land South Of Cutbush Lane East, Shinfield	232833	Construction of a Collections, Digitisation & Research Centre (approx. 25,000sqm)	Wokingham Borough Council	TVSP	Submitted November 2023 - Decision pending
Land South Of Cutbush Lane East, Shinfield	232995	extension to the Thames Valley Science Park spine road	Wokingham Borough Council	TVSP	Submitted December 2023 - Decision pending
Land North and South of Cutbush Lane Shinfield	211841	Science Park Creative Media Hub (84,291sqm)	Wokingham Borough Council	TVSP	Approved and works commenced

NOTE: – the scope of committed developments for the purposes of the Transport Assessment (TA) will be established via the TA scoping process and will differ from the above schedule (e.g. through the inclusion of Local Plan allocated sites and other highways commitments). The assessment of cumulative effects in the Transport, Noise and Air Quality ES chapters will be based upon the committed schemes agreed for the TA to ensure consistency with the agreed transport modelling.

5.5 EIA Terms of Reference and Methodology

Proposed Development Parameters

5.5.1 In order for the significant environmental effects of the Proposed Development to be identified and assessed, it is necessary to clearly identify all the components of the Proposed Development.

5.5.2 The EIA will principally assess a set of parameter plans that will be derived from the wider masterplan and evolving designs being prepared for the Site and proposed works.

5.5.3 An Illustrative Masterplan will be produced to demonstrate how the quantum of development proposed could be delivered within the Site, however, this will not be used as the basis of the assessment. Some disciplines may be required to reference the Illustrative Masterplan within the assessment to provide robust conclusions, where this is the case, this will be clearly stated within the ES.

5.5.4 In undertaking the assessment of the EIA, parameters will be fixed which allow some flexibility for the Proposed Development within defined limits. The Parameter Plans are anticipated to include:

- Land Use
- Access and Circulation
- Building Heights and Proposed Levels
- Green and Blue Infrastructure

5.5.5 These will be used to provide assessment of the 'robust worst case'. This allows for inherent flexibility for future applications within these parameters. This is known as the 'Rochdale Envelope'[5].

5.5.6 As set out in Chapter 3, the maximum Parameters for the Proposed Development include the following:

- Site preparation and clearance (including elements of demolition)
- Phased delivery of approximately 3,930 dwellings, including:
    - 40% affordable homes, subject to financial viability
    - Specialist accommodation for older people
- Around 100,000m^2 of research and development floorspace or equivalent trip generating activity within use class E(g), B2 and B8 and other complementary uses, through an extension of the Thames Valley Science and Innovation Park.

[5] R. v Rochdale MBC ex parte Milne (No. 1) and R. v Rochdale MBC ex parte Tew [1999] and R. v Rochdale MBC ex parte Milne (No. 2) [2000].

- Schools, including:
    - Two 3-form entry primary schools
    - An 8-form entry secondary school, of which 5 directly relate to the development, with additional land reserved to enable expansion to 12-form entry
- A district centre providing a range of services and facilities in a location central to the planned community as a whole including retail, leisure, employment, cultural, and health.
- Two local centres providing day to day retail and other community uses/
- A country park which is accessible to settlements beyond the garden village.
- Comprehensive strategic landscaping and network of multi-functional green and blue infrastructure, incorporating River Loddon and Barkham Brook to create a country park supplemented by ecological networks and habitats and promote high levels of connectivity, including to the Loddon long distance footpath and greenways.
- Delivery of biodiversity enhancements to achieve at least a net gain of 10%.
- Delivery of comprehensive drainage and flood alleviation measures.
- Delivery of new link over the M4 to Lower Earley Way, and associated highways works that might include improvements to transport capacity along Lower Earley Way and other neighbouring roads, a new link to Hatch Farm Way and the partial closure of Mill Lane.
- Delivery of new pedestrian, cycleway, greenway infrastructure, and public transport priority routes.
- Any wider land outside the site boundary needed for development specific infrastructure.

Impact Assessment Guidance

5.5.7 The assessments that will be presented in the ES for the proposed application(s) will consider the potential for significant environmental impacts to affect the baseline conditions as a direct/ indirect result of the Proposed Development.

5.5.8 A description of the aspects of the environment likely to be significantly affected by the Proposed Development is a requirement of the EIA Regulations. The baseline conditions are defined as the existing state of the environment and how it may develop in the future in the absence of the proposals and with certain committed developments included.

5.5.9 In order to forecast potential future effects, it is necessary to make predictions. To ensure that predictions are as accurate as possible, a description of the methods used to assess the effects of the Proposed Development is also required by the EIA Regulations.

5.5.10 Unless specifically stated otherwise, the proposed assessments will be undertaken in accordance with best practice guidelines published by the relevant professional bodies. Each technical chapter in this Scoping Report provides brief details of the proposed baseline and assessment methodology to be employed for that topic area. The subsequent ES will provide full details of the assessment criteria and terminology used in the context of that technical discipline.

5.5.11 Where there is no topic-specific guidance available, a generic framework of assessment criteria and terminology has been developed to enable the prediction of potential effects and their

subsequent presentation. The development of this framework has drawn upon Savills experience of undertaking EIA.

Generic Assessment Framework

5.5.12 Each technical chapter of the ES will detail the methodology used for its assessment. Unless otherwise specified in the specific technical chapter the ES will generally follow the generic assessment framework detailed below.

Receptor Sensitivity and Impact Magnitude

5.5.13 'Receptors' are those aspects of the environment sensitive to changes in baseline conditions. The sensitivity of a particular receptor depends upon the extent to which it is susceptible to such changes.

5.5.14 'Impact magnitude' is determined by predicting the scale of any potential change in the baseline conditions. Where possible, magnitude is quantified however where this is not possible a fully defined qualitative assessment is undertaken. The assessment of magnitude is carried out taking account of any inherent design mitigation in the proposal that forms part of the development description.

Table 5.3: Receptor Sensitivity

Value (sensitivity) of receptor / resource	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.

Table 5.4: Magnitude of impact and typical descriptions

Magnitude of Impact (degree of change)		Typical description
Major	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.
Moderate	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.
Minor	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.
No Change		No loss or alteration of characteristics, features or elements; no observable impact in either direction.

Effect Significance

5.5.15 As shown in Table 5.5, the effect significance is determined by combining the predicted magnitude of impact with the assigned sensitivity of the receptor. Where two terms are given (e.g. Slight-Neutral) the effect significance is on the boundary between the two assessed effects Table 5.6 sets out the broad definitions of significance.

Table 5.5: Effect Significance

	Magnitude of impact (degree of change)					
		No Change	Negligible	Minor	Moderate	Major
Environmental value (sensitivity)	Very High	Neutral	Slight	Moderate or Large	Large or Very Large	Very Large
	High	Neutral	Slight	Slight or Moderate	Moderate or Large	Large or Very Large
	Medium	Neutral	Neutral or Slight	Slight	Moderate	Moderate or Large
	Low	Neutral	Neutral or Slight	Neutral or Slight	Slight	Slight or Moderate
	Negligible	Neutral	Neutral	Neutral or Slight	Neutral or Slight	Slight

Table 5.6: Definition of Significance

Significance	Definition
Very Large	Effects at this level are material in the decision-making process.
Large	Effects at this level are likely to be material in the decision-making process.
Moderate	Effects at this level can be considered to be material decision-making factors.
Slight	Effects at this level are not material in the decision-making process.
Neutral	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

5.5.16 As required by the EIA Regulations[6], the likely significant effects of the Proposed Development are described as:

- Adverse or beneficial
- Direct or indirect
- Temporary or permanent
- Reversible or irreversible
- Cumulative

5.5.17 Adverse effects are undesirable and result from negative impacts. Beneficial effects are desirable and result from positive impacts.

5.5.18 Each effect will have a source originating from the Proposed Development, a pathway and a receptor. Effects which operate in this direct way are regarded as direct effects. Effects on other receptors via subsequent pathways are regarded as indirect effects.

5.5.19 The definition of the level of significance at which a significant impact arises will be provided within the topic method section of each chapter of the ES. Unless stated otherwise, effects of moderate significance or above are considered to be significant in EIA terms.

Initial and Residual Effects

5.5.20 As stated previously, the EIA process enables the likely significant effects of a proposed development to be identified so that, where possible, adverse effects predicted to arise as a result of the proposal can be avoided or mitigated through the adoption of suitable measures. Additionally, enhancement measures can be incorporated to maximise the beneficial effects of

[6] Schedule 4 para 5 of the 2017 regulations

the development. The adoption of mitigation and enhancement measures results in initial and residual effects. These can be defined as:

- Initial Effects: Effects occurring as a result of the Proposed Development prior to the adoption of any additional mitigation or enhancement measures.
- Residual Effects: Effects occurring as a result of the Proposed Development taking into account the adoption of identified additional mitigation or enhancement measures.

5.5.21 Additional mitigation and enhancement is defined as a measure that is additional to the Proposed Development as initially proposed. Measures that design out significant effects that form an inherent part of the Proposed Development as proposed, known as inherent mitigation, are considered in the initial impact.

5.5.22 For example many environmental constraints, such as flood risk, must be designed out of a project for it to be viable and it would be impractical to consider the Proposed Development without such measures in place.

Interactive Effects

5.5.23 Interactive effects relate to multiple effects from a single development, which may give rise to a potentially significant impact upon a receptor. Alongside identification as part of individual topic chapters, the assessment of interactive effects will take the form of a matrix identifying the sensitive receptors and the different effects arising from the proposed development likely to be experienced at each – for example, an individual receptor close to the Site boundary may be affected by noise and visual effects.

EIA Assumptions and Limitations

5.5.24 The following key assumptions will be made in preparing the ES:

- All legislative requirements will be met. Therefore, any standard guidance which is provided to ensure minimum legal compliance is not considered to constitute mitigation in the EIA. The assessment of effects prior to the adoption of mitigation measures will assume that all legislative requirements will be met.
- The assessment of effects prior to the adoption of mitigation measures will assume that the Proposed Development will be constructed in accordance with industry standard techniques. Such techniques will therefore not be considered as mitigation.
- Where further assumptions have been made for individual topic assessments these will be identified within the relevant topic chapters.
- Any limitations or uncertainties associated with impact prediction or the sensitivity of receptors due to the absence of data or other factors will give rise to uncertainty in the assessment. Any such limitations will be referred to in the relevant technical chapters of the ES.

6 Planning Policy Context

6.1 Introduction

6.1.1 This chapter summarises the planning policy context for the Planning Application(s) and the EIA. The assessments will be undertaken with reference to relevant local and national polices in respect of the environmental topics covered within the EIA. Any applicable standards or targets within this policy will be considered when evaluation potential environmental impacts and effects.

6.2 Planning Policy

6.2.1 The Proposed Development will be considered in accordance with relevant policies and guidance at local and national levels. At the national level the ES will take into consideration the National Planning Policy Framework (NPPF) (2023). At the core of the NPPF is the presumption in favour of sustainable development (Paragraph 11). This intends to ensure development is not delayed by the planning process, providing it accords with the development plan. The NPPF is accompanied by Planning Practice Guidance (PPG) which is considered within this Environmental Statement.

6.2.2 The adopted Development Plan for Wokingham Borough Council (WBC) is comprised of a collection of planning documents as follows:

- Wokingham Borough Core Strategy Development Plan Document (adopted January 2010);
- Wokingham Borough Development Plan Managing Development Delivery Local Plan (MDD) (adopted February 2014);
- Supplementary Planning Documents (SPD), including the Infrastructure Deliver and Contributions SPD (2011), Sustainable Design and Construction SPD (2010), and the Affordable Housing SPD (2013).

6.2.3 The Core Strategy outlines a requirement for the provision of at least 12,460 new homes in the borough within the period 2006-2026.

Emerging Local Plan Update

6.2.4 Work is underway on a new local plan which will replace the Development Plan documents listed above. This new local plan will guide where and how growth will take place in the borough in the years up to 2038.

6.2.5 WBC completed a Regulation 18 consultation on a full draft of the Local Plan Update (LPU) in January 2022 which proposed to allocate the Site as a new Garden Community via Policy SS3: Hall Farm / Loddon Valley Strategic Development Location. The rationale for the selection of the Site as a proposed allocation is provided in paragraphs 5.41 to 5.43 of the Revised Growth Strategy (RGS). The proposed wording for Policy SS3, alongside a site plan showing its boundary and an illustrative masterplan is provided in Appendix G of the RGS. The Policy is divided into 4 sections as follows:

- Development Principles
- Delivery Principles

- Place Shaping Principles
- Other criteria

6.2.6 The Regulation 19 Local Plan Submission was published for consultation in September 2024. This identified the Site as a preferred site allocation for a new Garden Village under Policy SS13. The Regulation 19 consultation ran between September - November 2024.

6.2.7 The land identified in the Revised Growth Strategy (RGS) for the Strategic Development Land (SDL) includes the Thames Valley Science Park and the Centre for Dairy Research at Hall Farm. Phase 1 of the Thames Valley Science Park (TVSP) delivered highway infrastructure, the Gateway Building and Rutherford Centre. Planning permission for phase 2 was approved in outline in 2018 (Application Reference: 163609). On 13 December 2021, full planning permission (Application Reference: 211841) was granted for 85,000 sqm of floor space for use as a film and television studio campus at the TVSP on the Phase 2 land, which is currently being implemented by Shinfield Studios. This part of Policy SS13 now proposes a further 100,000sqm of research and development floor space at the TVSP.

6.2.8 Where relevant, the ES will further summarise key polices which relate to the assessment of environmental topics scoped into the EIA.

7 Air Quality

7.1 Introduction

7.1.1 This chapter of the ES Scoping Report has been produced by RPS Consulting Services Ltd.

7.1.2 For the construction phase, the most important consideration is dust. Without appropriate mitigation, dust could cause temporary soiling of surfaces, particularly windows, cars and laundry. For the operational phase, arrivals at and departures from the Proposed Development may change the number, type and speed of vehicles using the local road network. Changes in road vehicle emissions are the most important consideration during this phase of the development.

7.1.3 The air quality assessment will cover:

- An evaluation of the temporary effects from fugitive construction dust and construction vehicle exhaust emissions;
- An evaluation of the impacts of the development traffic on the local area once the Proposed Development is operational; and
- An evaluation of the impacts on future occupants of the Proposed Development from their exposure to the prevailing levels of air pollution, which can be a factor in the suitability of the Site for its proposed uses.

7.1.4 An assessment of odour impacts has been **scoped out** of the air quality assessment as there are no known odour sources introduced by the Proposed Development. Similarly, no existing odour sources have been identified that might affect the suitability of the Site for its proposed uses.

7.2 Assessment Criteria & Methodology

Previous Assessment

7.2.1 The assessment of baseline conditions will use information published in Wokingham Borough Council's Air Quality Annual Status Reports.

Legislative Context, Technical Guidance and Best Practice

Legislative Context

7.2.2 The following legislation is specifically relevant to air quality and its assessment:

- Defra, 2007, The Air Quality Strategy for England, Scotland, Wales and Northern Ireland. Volume 2.
- Defra, 2010, The Air Quality Standards Regulations.
- Defra, 2020, The Environment (Miscellaneous Amendments) (EU Exit) Regulations.

Guidance and Best Practice

7.2.3 The following guidance and best practice documents have been used to establish the scope and method of the air quality assessment:

- Environmental Protection UK (EPUK) & Institute of Air Quality Management (IAQM), January 2017, *Land-Use Planning & Development Control: Planning for Air Quality*.
- IAQM, 2024, *Guidance on the assessment of dust from demolition and construction*.
- Defra, 2022, *Local Air Quality Management Technical Guidance, 2022* (LAQM.TG22).

Baseline Data Collection

7.2.4 Air quality in the area will be established with specific regard to the findings of Wokingham Borough Council's Review and Assessment process, the results of available local authority monitoring and data available in the Defra maps. Measurements made before the Covid-19 pandemic will be considered, avoiding the low concentrations measured during 2020 and 2021 when traffic flows were affected by lockdowns. A six-month NO_2 diffusion tube monitoring campaign undertaken from December 2022 to May 2023 measured annual-mean NO_2 concentrations in four background locations across the study area to supplement the results of local authority monitoring.

Proposed Assessment Methodology

7.2.5 The Environmental Health Officer at Wokingham Borough Council was consulted by email in March 2023 to agree the scope of the monitoring.

Assessment of Impacts during Construction

7.2.6 Dust can contain a wide range of particles of different sizes. The normal fate of suspended (i.e. airborne) dust is deposition. The rate of deposition depends largely on the size of the particle and its density; together these influence the aerodynamic and gravitational effects that determine the distance it travels and how long it stays suspended in the air before it settles out onto a surface. In addition, some particles may agglomerate to become fewer, larger particles; whilst others react chemically.

7.2.7 The effects of dust are linked to particle size and two main categories are usually considered.

- PM_{10} particles, those up to 10 µm in diameter, remain suspended in the air for long periods and are small enough to be breathed in and so can potentially impact on health; and
- Dust, generally considered to be particles larger than 10 µm which fall out of the air quite quickly and can soil surfaces (e.g. a car, window sill, laundry). Additionally, dust can potentially have adverse effects on vegetation and fauna at sensitive habitat sites.

7.2.8 The risk of dust and emissions during demolition / construction of the Proposed Development will be assessed using the method set out in the IAQM, 2024, *Guidance on the assessment of dust from demolition and construction*[1].

[1] IAQM, 2024, Guidance on the assessment of dust from demolition and construction

7.2.9 Concentration-based limit values and objectives have been set for the PM_{10} suspended particle fraction, but no statutory or official numerical air quality criterion for dust annoyance has been set at a UK, European or World Health Organisation (WHO) level. Construction dust assessments have tended to be risk based, focusing on the appropriate measures to be used to keep dust impacts at an acceptable level.

7.2.10 The IAQM dust guidance estimates the impacts of both PM_{10} and dust through a risk-based assessment procedure. The IAQM dust guidance document states: "*The impacts depend on the mitigation measures adopted. Therefore the emphasis in this document is on classifying the risk of dust impacts from a site, which will then allow mitigation measures commensurate with that risk to be identified.*"

7.2.11 Consistent with the recommendations in the IAQM dust guidance, a risk-based assessment will be undertaken for the Proposed Development, using the well-established source-pathway-receptor approach:

- The dust impact (the change in dust levels attributable to the development activity) at a particular receptor will depend on the magnitude of the dust source and the effectiveness of the pathway (i.e. the route through the air) from source to receptor.

- The effects of the dust are the results of these changes in dust levels on the exposed receptors, for example annoyance or adverse health effects. The effect experienced for a given exposure depends on the sensitivity of the particular receptor to dust. An assessment of the overall dust effect for the area as a whole will be made using professional judgement taking into account both the change in dust levels (as indicated by the Dust Impact Risk for individual receptors) and the absolute dust levels, together with the sensitivities of local receptors and other relevant factors for the area.

7.2.12 The IAQM guidance provides a basis for categorising the sensitivity of people, property and designated ecological sites to dust and PM_{10}. The IAQM guidance provides a classification for the magnitude of the dust source. The method determines the sensitivity of the area based on the receptor sensitivity, the number of receptors within distance bands and the background PM_{10} concentration. A set of matrices then allows the dust impact risk in the absence of mitigation to be classified.

7.2.13 The IAQM dust guidance provides a methodological framework but notes that professional judgement is required to assess effects: *"This is necessary, because the diverse range of projects that are likely to be subject to dust impact assessment means that it is not possible to be prescriptive as to how to assess the impacts. Also a wide range of factors affect the amount of dust that may arise, and these are not readily quantified."*

7.2.14 The vehicle movements generated by construction activities will be compared with the relevant threshold criteria in the EPUK & IAQM 2017 *Land-Use Planning & Development Control: Planning For Air Quality* document for determining when an air quality assessment is required. If none of the criteria are met then there should be no requirement to carry out an air quality assessment for the impact of the proposed development on the local area, and the impacts can be considered to have insignificant effects. If the criteria are not met, an assessment of construction-related vehicle emissions would be undertaken using the approach for operational vehicle emissions.

Assessment of Impacts Once the Proposed Development is Operational

7.2.15 For the operational phase of the Proposed Development, the main pollutants from road traffic with potential for local air quality impacts are nitrogen oxides (NO_X) and particulate matter. Emissions of total NO_X from combustion sources comprise nitric oxide (NO) and NO_2. The NO

oxidises in the atmosphere to form NO_2. The assessment of operational impacts will therefore focus on changes in NO_2 and PM_{10} concentrations. The impact from fine particulate matter, known as $PM_{2.5}$ (a subset of PM_{10}) concentrations will also be considered.

7.2.16 In urban areas, pollutant concentrations are primarily determined by the balance between pollutant emissions that increase concentrations, and the ability of the atmosphere to reduce and remove pollutants by dispersion, advection, reaction and deposition. An atmospheric dispersion model is used as a practical way to simulate these complex processes; such a model requires a range of input data, which can include emissions rates, meteorological data and local topographical information.

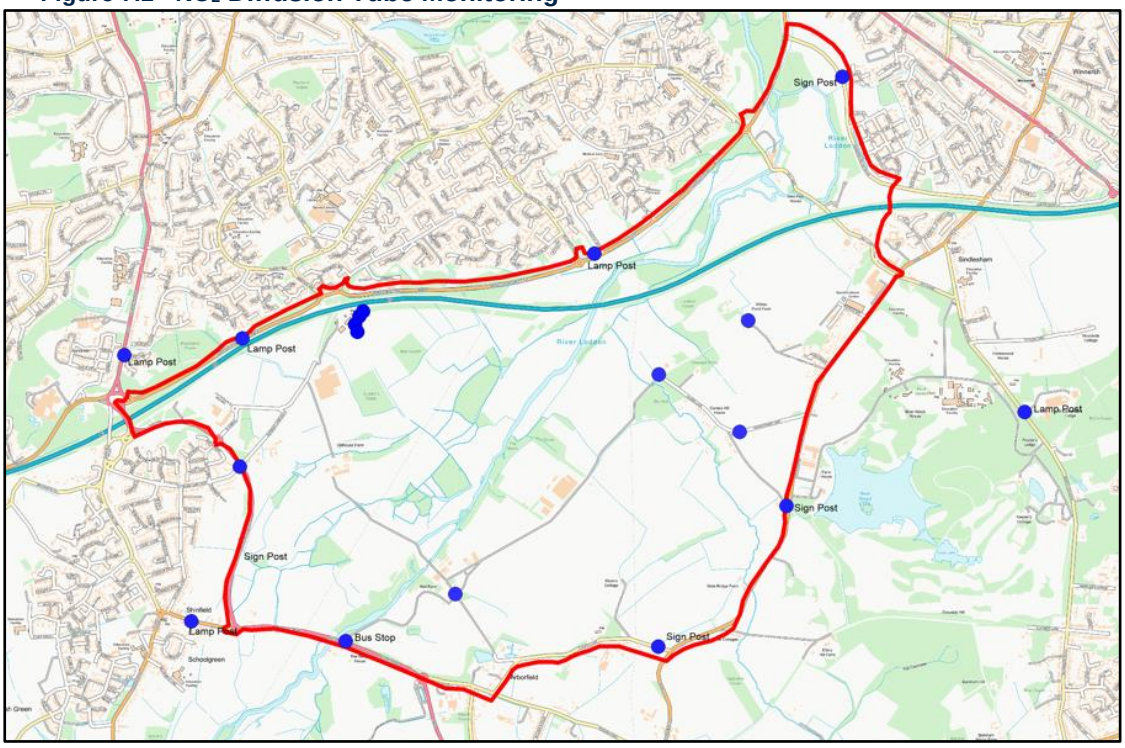
7.2.17 The atmospheric pollutant concentrations in an urban area depend not only on local sources at a street scale, but also on the background pollutant level made up of the local urban-wide background, together with regional pollution and pollution from more remote sources brought in on the incoming air mass. This background contribution needs to be added to the fraction from the modelled sources, and is usually obtained from measurements or estimates of urban background concentrations for the area in locations that are not directly affected by local emissions sources. The results of the baseline assessment will be background pollution concentrations for use in the modelling of the impacts.

7.2.18 The ADMS-Roads model will be used to predict the air quality impacts from changes in traffic on the local road network and from building emissions. This is a version of the Atmospheric Dispersion Modelling System (ADMS), a formally validated model developed in the UK by Cambridge Environmental Research Consultants Ltd (CERC) and widely used in the UK and internationally for regulatory purposes.

7.2.19 The six-month diffusion tube monitoring campaign measured annual-mean NO_2 concentrations which will allow the model to be verified. This involves a comparison of modelled and monitored pollutant concentrations. If appropriate, a model correction factor may be determined and applied to the modelled concentrations.

7.2.20 Monitoring was undertaken at a total of 18 locations (as shown in Figure 7.1), comprising the four background locations mentioned earlier, four locations along a transect south of the M4 and 10 locations on roads most likely to be used by traffic generated by the Proposed Development.

Figure 7.1 - NO_2 Diffusion Tube Monitoring



7.2.21 Existing air pollution levels at monitoring locations will be predicted using the detailed dispersion model, ADMS Roads, with a view to verifying and, if necessary, adjusting model input parameters and correcting the model output. The ADMS Roads model will use traffic data provided by the project's traffic consultants. The model will be run using hourly sequential meteorological data collated at Odiham in 2022.

7.2.22 The verified model will be used to predict future air pollution levels at existing receptors around the Site, without the Proposed Development, to determine the future baseline air quality conditions.

7.2.23 The verified model will then be used to predict future air pollution levels at existing and proposed receptors for the following two scenarios:

- With the Proposed Development in its first fully operational year; and
- With the Proposed Development and Other Committed Development in its first fully operational year.

7.2.24 All human-health receptors are classified as being highly sensitive to air pollution.

7.2.25 The impact on existing receptors will be described with reference to the predicted increase in pollutant concentrations, associated with the forecast change in traffic flows, and the absolute concentration at sensitive receptors using the descriptors in the EPUK & IAQM 2017 *Land-Use Planning & Development Control: Planning for Air Quality*. The following table sets out the impact descriptors.

Table 7.2 Impact Descriptors for Individual Sensitive Receptors

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

1. AQAL = Air Quality Assessment Level, which may be an air quality objective, limit value, or an Environment Agency 'Environmental Assessment Level (EAL)'.
2. 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. Changes of 0%, i.e. less than 0.5% will be described as negligible.
3. The table is only designed to be used with annual mean concentrations.
4. Descriptors for individual receptors only; the overall significance is determined using professional judgement. For example, a 'moderate' adverse impact at one receptor may not mean that the overall impact has a significant effect. Other factors need to be considered.
5. When defining the concentration as a percentage of the AQAL, use the 'without scheme' concentration where there is a decrease in pollutant concentration and the 'with scheme;' concentration for an increase.
6. The total concentration categories reflect the degree of potential harm by reference to the AQAL value. At exposure less than 75% of this value, i.e. well below, the degree of harm is likely to be small. As the exposure approaches and exceeds the AQAL, the degree of harm increases. This change naturally becomes more important when the result is an exposure that is approximately equal to, or greater than the AQAL.
7. It is unwise to ascribe too much accuracy to incremental changes or background concentrations, and this is especially important when total concentrations are close to the AQAL. For a given year in the future, it is impossible to define the new total concentration without recognising the inherent uncertainty, which is why there is a category that has a range around the AQAL, rather than being exactly equal to it.

7.2.26 The significance of the illustrated effects on the surrounding area will be described using criteria definitions and professional judgement. The human-health impact descriptors above apply at individual receptors. The EPUK & IAQM guidance states that the impact descriptors *"are not, of themselves, a clear and unambiguous guide to reaching a conclusion on significance. These impact descriptors are intended for application at a series of individual receptors. Whilst it maybe that there are 'slight', 'moderate' or 'substantial' impacts at one or more receptors, the overall effect may not necessarily be judged as being significant in some circumstances."*

7.2.27 Professional judgement by a competent, suitably qualified professional is required to establish the significance associated with the consequence of the impacts. This judgement is likely to take into account the extent of the current and future population exposure to the impacts and the influence and/or validity of any assumptions adopted during the assessment process.

7.2.28 Predicted pollutant concentrations at proposed receptors will be compared with the relevant health-based limit values and objectives to determine the suitability of the Site for future occupants. As the northern part of the Site is located within the AQMA, there is the potential for significant air quality effects at proposed receptors close to the M4.

Geographical Scope

7.2.29 The IAQM '*Guidance on the assessment of dust from demolition and construction'* sets out 250 m as the distance from the site boundary and 50 m from the site traffic route(s) up to 250 m of the entrance, within which there could potentially be nuisance dust and PM_{10} effects on human receptors. For sensitive ecological receptors, the corresponding distances are 50 m in both cases.

7.2.30 Once the Proposed Development is operational, the key concern is likely to be an increase in pollutant concentrations. Air quality practitioners generally accept that pollutant concentrations reach background levels at a distance of 200 m from the centre of a road. The assessment will therefore consider representative receptors within 200 m of roads affected by development traffic.

Temporal Scope

7.2.31 The dust impact assessment will cover the period of demolition, earthworks and construction.

7.2.32 The assessment of operational impacts will be undertaken in the earliest year that the development is operational. As vehicle emissions are expected to decrease over time, predicted concentrations in future years and the resultant effect should be a conservative estimate for the entire period of occupation.

7.3 Baseline Environment

7.3.1 Wokingham Borough Council has designated 60 m on both sides of the M4, throughout the district, as an Air Quality Management Area (AQMA) due to high levels of nitrogen dioxide (NO_2) pollution from road traffic. The north part of the Site is within this designated AQMA.

7.3.2 The major sources of pollution in the borough are road traffic emissions. There are no other major sources of pollution to air surrounding the Site.

7.3.3 The diffusion tube monitoring across the Site at background locations provided an average baseline background concentration of 10.66 μgm^{-3}. This value will be compared with Defra Mapped concentrations to derive the most appropriate baseline.

7.3.4 The following table sets out the Defra mapped concentration estimates for the Site.

Table 7.1 Defra Mapped Pollutant Concentrations for the Site

Pollutant	Concentration μgm^{-3}.	Relevant Air Quality Limit Value/Objective
NO_2	12.9	40
PM_{10}	14.7	40
$PM_{2.5}$	9.9	20

7.3.5 The data show that both the Defra mapped and diffusion tube concentrations are well below the relevant air quality limit value/Air Quality Strategy objective. This indicates that air quality at the Site is generally likely to be good.

7.4 Potential Environmental Impacts & Effects

Construction Impacts and Effects

7.4.1 The risk of an increase in deposited dust and suspended particulate matter will be assessed. Both on-site activities and tracked out dust will be considered. Mitigation measures that are consistent with the level of risk will be drawn from the IAQM dust guidance. The IAQM dust guidance states that provided the mitigation measures are effectively implemented; the resultant effects of the dust exposure will normally be 'not significant'.

Occupation Impacts and Effects

7.4.2 The chapter will describe the impacts at receptors with reference to increases in key traffic-related pollutant concentrations and absolute concentrations at existing and proposed receptors.

7.5 Scoping Summary

7.5.1 In summary, the air quality assessment will focus on:

- An evaluation of the temporary effects from fugitive construction dust and construction vehicle exhaust emissions;
- An evaluation of the impacts of the development traffic on the local area once the development in operational; and
- An evaluation of the impacts on future occupants of the development from their exposure to the prevailing levels of air pollution, which can be a factor in the suitability of the site for its proposed uses.

7.5.2 There are no proposed sources of odour or emissions from centralised combustion sources so assessment of odour and point-source emissions has been scoped out. The amount of traffic generated during the construction phase is expected to be minimal and therefore detailed assessment of construction related traffic has been scoped out.

8 Archaeology

8.1 Introduction

8.1.1 This chapter of the ES Scoping Report has been produced by RPS Group and addresses the potential for significant effects on archaeology arising from the Proposed Development.

8.1.2 It is anticipated that this topic will be scoped into the EIA due to the identification of sensitive receptors including a Scheduled Monument and existing Archaeological Priority Areas and Historic Environment Records (HER) within the Site as depicted in Figure 8.1, as well as the potential for further areas of archaeological deposits to exist elsewhere in areas not previously investigated.

8.2 Assessment Criteria & Methodology

Previous Assessment

8.2.1 The Site has been the subject of a number of non-intrusive investigations which formed a part of wider research programmes, including:

a) A fieldwalking survey of the Loddon Valley was undertaken in 1990-91;

b) Historic aerial photography analysis; and

c) The East Berkshire Historic Landscape Characterisation (HLC) project funded by Historic England and undertaken by Berkshire Archaeology (June 2019).

8.2.2 Discrete areas of the Site have also been the subject of archaeological investigations associated with development, and relevant results are summarised below, in sections in accordance with the four quadrants of the ownership boundary which separates the Site into south-west (SW), north-west (NW), north-east (NE), and south-east (SE) areas, as depicted in Figure 8.1.

SW Area

- Magnetic susceptibility survey of four sites in 1997 revealed two discrete areas of magnetic enhancement which may be associated with human activity.
- An archaeological watching brief was carried out in July 2005 during the excavation of a new gas pipe trench at Hall Farm, adjacent to the scheduled site of St Bartholomew's Church. The only finds recovered during the watching brief included fragments of late nineteenth century and early twentieth century brick and tile and these relate to construction work to the nearby farm and church.
- The Berkshire Archaeological Society carried out a geophysical survey on four discrete areas at Hall Farm in 2019. The survey identified anomalies which probably represent the remains of structures relating to the Medieval village of Arborfield.
- The Environment Agency commissioned a watching brief during the excavation of a new fish and wildlife channel within a loop of the River Loddon, west of Arborfield. No archaeological features were identified during the course of that watching brief.

- An archaeological watching brief was also carried out during groundwork associated with the erection of a storage barn at Hall Farm. The strip only observed made-ground, but a deeper pit recorded a possible cut feature of uncertain date.

8.2.3 As a result of the above-mentioned fieldwalking and aerial photography surveys, archaeological potential is also identified to the south-east of Church Lane, and another to the south of Cutbush Lane East, which continues westward across the Eastern Relief Road.

NW Area

8.2.4 The area around Badger / Cutbush Farm is identified as having archaeological potential associated with the deposits for earlier phases of the farm, including an L-shaped feature believed to be a pond or moat.

8.2.5 Archaeological monitoring was undertaken during construction of the Shinfield Eastern Relief Road). A single ditch was observed during the course of the recording action, and this was of relatively modern date. The prior evaluation and geophysical survey had recorded anomalies of possible interest and the various cropmarks intercepted by the works, but they did not appear to be of archaeological origin.

8.2.6 A desk-based assessment was undertaken for an area around the proposed construction of a wind energy development at Rushy Mead. It identified known or potential presence of archaeological evidence dating from the Neolithic and Early bronze Age; below-ground remains of Arborfield Hall; below ground remains of structures associated with Hall Place Farmhouse and the associated settlement at Arborfield; the site of Lowerwood Farm; the site of the 'Starfish Decoy' and archaeological evidence of unknown date showing on aerial photographs. Further investigation was recommended, however, that planning application was refused.

NE Area

- An archaeological evaluation was carried out at land west of Mole Road. Features recorded were interpreted as possibly relating to horticultural activity associated with the estate flower nursery dating from when the area formed part of the Bearwood Estate.

- An archaeological field evaluation was carried out at the former Sindlesham Special School. No archaeological features or artefacts were observed in any of the evaluation trenches.

SE Area

8.2.7 Other than the above-mentioned fieldwalking surveys across all areas of the Site, the only other previous archaeological fieldwork in this area recorded in the HER is an archaeological watching brief carried out at Cedar Hall Farm, at the Centre for Dairy Research. It revealed the remains of a field boundary ditch, dated to the Early Iron Age, which had been badly truncated by modern ploughing, and the presence of a burnt root hole suggested possible land clearance of that area at some point.

Legislative Context, Technical Guidance and Best Practice

Legislative Context, policy and guidance

Legislation

8.2.8 National legislation regarding archaeology, including scheduled monuments, is contained in the Ancient Monuments and Archaeological Areas Act 1979, amended by the National Heritage Act

1983 and 2002, and updated in April 2014. The 1979 Act protects the fabric or physical form of areas designated as scheduled monuments.

8.2.9 Heritage is dealt with in Chapter 3 of the Levelling Up and Regeneration Act 2023, whereby amendments enacted to the Town and Country Planning Act 1990 and the Planning (Listed Buildings and Conservation Areas) Act 1990 are set out. The effect of the 2023 Act [Clause 102] in regard to the setting to scheduled monuments is that these now have the same statutory status to the setting of listed buildings. Clause 102 also enacts amendments to the two Acts such that a desirability to not only 'preserve' a designated asset (including scheduled monuments) and its setting, but now a desirability to 'preserve or enhance' such a designated asset and its setting.

National Planning Policy

8.2.10 In March 2012, the government published the National Planning Policy Framework (NPPF), which was most recently updated in December 2023. The NPPF is supported by the National Planning Practice Guidance (NPPG), which was published online 6th March 2014 and has since been periodically updated[1].

8.2.11 Section 16 of the NPPF, entitled *Conserving and enhancing the historic environment* provides guidance for planning authorities, property owners, developers and others on the conservation and investigation of heritage assets. Overall, the objectives of Section 16 of the NPPF can be summarised as seeking the:

- Delivery of sustainable development;
- Understanding the wider social, cultural, economic and environmental benefits brought by the conservation of the historic environment;
- Conservation of England's heritage assets in a manner appropriate to their significance; and
- Recognition that heritage makes to our knowledge and understanding of the past.

8.2.12 Section 16 of the NPPF recognises that intelligently managed change may sometimes be necessary if heritage assets are to be maintained for the long term. Paragraph 194 states that planning decisions should be based on the significance of the heritage asset and that level of detail supplied by an applicant should be proportionate to the importance of the asset and should be no more than sufficient to review the potential impact of the proposal upon the significance of that asset.

8.2.13 Heritage Assets are defined in Annex 2 of the NPPF as: a building, monument, site, place, area or landscape positively identified as having a degree of significance meriting consideration in planning decisions. They include designated heritage assets (as defined in the NPPF) and assets identified by the local planning authority during the process of decision-making or through the plan-making process.

8.2.14 Annex 2 also defines Archaeological Interest as a heritage asset which holds or potentially could hold evidence of past human activity worthy of expert investigation at some point.

[1] https://www.gov.uk/government/publications/national-planning-policy-framework--2

8.2.15 A Designated Heritage Asset comprises a: World Heritage Site, Scheduled Monument, Listed Building, Protected Wreck Site, Registered Park and Garden, Registered Battlefield or Conservation Area.

8.2.16 Significance (for heritage policy) is defined as: The value of a heritage asset to this and future generations because of its heritage interest. This interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting.

8.2.17 Setting is defined as: The surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate that significance or may be neutral.

8.2.18 In short, government policy provides a framework which:

- Protects nationally important designated Heritage Assets;
- Protects the settings of such designations;
- In appropriate circumstances seeks adequate information (from desk based assessment and field evaluation where necessary) to enable informed decisions;
- Provides for the excavation and investigation of sites not significant enough to merit in-situ preservation.

8.2.19 The NPPG reiterates that the conservation of heritage assets in a manner appropriate to their significance is a core planning principle, requiring a flexible and thoughtful approach. Furthermore, it highlights that neglect and decay of heritage assets is best addressed through ensuring they remain in active use that is consistent with their conservation. Importantly, the guidance states that if complete, or partial loss of a heritage asset is justified, the aim should then be to capture and record the evidence of the asset's significance and make the interpretation publicly available. Key elements of the guidance relate to assessing harm. An important consideration should be whether the proposed works adversely affect a key element of the heritage asset's special architectural or historic interest. Additionally, it is the degree of harm, rather than the scale of development, that is to be assessed. The level of 'substantial harm' is considered to be a high bar that may not arise in many cases. Essentially, whether a proposal causes substantial harm will be a judgment for the decision taker, having regard to the circumstances of the case and the NPPF. Importantly, harm may arise from works to the asset or from development within its setting. Setting is defined as the surroundings in which an asset is experienced and may be more extensive than the curtilage.

8.2.20 A thorough assessment of the impact of proposals upon setting needs to take into account, and be proportionate to, the significance of the heritage asset and the degree to which proposed changes enhance or detract from that significance and the ability to appreciate it.

Hedgerow Regulations

8.2.21 Under the Hedgerow Regulations 1997, as amended by The Hedgerows (England) (Amendment) Regulations 2002, hedgerows are deemed to be historically Important if they are more than 20 m long and over 30 years old and if they meet at least one of these criteria:

- They mark all or part of a parish boundary that existed before 1850;

- They mark an archaeological feature of a site that is a Scheduled Monument or noted on the Historic Environment Record;
- They mark the boundary of an estate or manor or looks to be related to any building or other feature that is part of the estate or manor that existed before 1600; and
- They are part of a field system or looks to be related to any building or other feature associated with the field system that existed before the Enclosure Acts (that is before 1845).

8.2.22 In practice (and following case law) hedgerows are deemed important under the above regulations if they can be demonstrated to exist on the appropriate pre-1845 parish tithe or enclosure map.

Local Planning Policy

8.2.23 The Site is located within Wokingham Borough Council (the Local Planning Authority henceforth referred to as "LPA"), straddling the Shinfield and Arborfield & Newham parishes. Wokingham Borough Council's adopted local plan contains a number of documents with relevant policy, as set out below.

Wokingham Borough Development Plan – Adopted Managing Development Delivery Local Plan – February 2014

Policy TB13: Science and Innovation Park

Policy TB24: Designated Heritage Assets (Listed Buildings, Historic Parks and Gardens, Scheduled Ancient Monuments and Conservation Areas)

Policy TB25: Archaeology

Policy TB26: Buildings of Traditional Local Character and Areas of Special Character

Wokingham Borough Local Development Framework – Adopted Core Strategy Development Plan Document – January 2010

CP3 - General Principles for development

Wokingham Borough Council - Draft Local Plan Public Consultation – February to March 2020

Policy DH5: The Historic Environment

Policy DH6: Archaeology

Wokingham Borough Council – Local Plan Update: Revised Growth Strategy Consultation – November 2021 to January 2022

Policy SS3: Hall Farm / Loddon Valley Strategic Development Location

Guidance

8.2.24 The NPPF and NPPG are additionally supported by three Good Practice Advice (GPA) documents published by Historic England: GPA 1: The Historic Environment in Local Plans; GPA 2: Managing Significance in Decision-Taking in the Historic Environment (both published March 2015). The second edition of GPA3: The Setting of Heritage Assets was published in December 2017.

Baseline Data Collection

8.2.25 An archaeological desk-based assessment will inform the ES chapter. This assessment will review the available archaeological evidence for the Site and the archaeological/historical background of the general area, and, in accordance with NPPF, will consider the potential for any as yet to be discovered archaeological evidence on the Site.

8.2.26 The assessment will review known archaeological assets within a 200 m radius of the Site boundary, as held on the Berkshire Historic Environment Record (HER) and the National Monuments Record, together with LiDAR data, and a historic map regression exercise charting the development of the study area.

8.2.27 This data is supplemented by review of relevant archival material, fieldwork reports, publications and grey literature, aerial photography and relevant online sources, and further informed by a site walkover.

Proposed Assessment Methodology

8.2.28 A detailed description of the general assessment methodology is presented in Chapter 5. The generic assessment methodology is presented in the introductory chapters in order to avoid repetition and give context to the general EIA approach.

8.2.29 A three-stage approach is adopted in order to reach an understanding of the level of any effect that a proposed development may have on an archaeological receptor. Firstly, it is necessary to understand the value/sensitivity of the asset. Then, it is necessary to determine the predicted magnitude of impact (degree of change) arising to the asset as a result of the Proposed Development. Finally, using a matrix that cross-refers to both receptor value/sensitivity and magnitude of impact (degree of change), an assessment of the effect significance of the Proposed Development on the receptor is produced.

8.2.30 Recent studies implemented within the site and surrounding area, as baseline studies to this chapter, have been used to inform its preparation; in particular to identify heritage receptors and the likely magnitude of change arising as a result of the Proposed Development.

8.2.31 The sensitivity of archaeological assets depends on factors such as the condition of the asset and the level of architectural, historic, evidential and/or communal value it is assessed to have.

8.2.32 Determination of the sensitivity of archaeological receptors takes account of any existing statutory designation and, for non-designated heritage receptors, professional judgement and any criteria relating to local designation adopted by the relevant Local Planning Authority (such as Areas of High Archaeological Potential, as identified in the Local Plan).

Table 8.1 Criteria for Assessing the Sensitivity of Archaeological Receptors

Sensitivity	Definition
Very High	- World Heritage Sites
High	- Scheduled Monuments - Protected Wreck Sites - Registered Battlefields
Medium	- Areas of High Archaeological Potential
Low	- Non-designated archaeological assets

8.2.33 The magnitude of impact (degree of change) is assessed by taking into consideration the extent/proportion of the site/feature affected, its type, its survival/condition, its fragility/vulnerability and its potential amenity value. In considering the above factors the criteria for assessing magnitude of predicted change on cultural heritage resources are given in Table 8.2 below. Both physical (direct) and setting (indirect) effects are included, because harm to significance can result through loss to/of, or development within the setting of an asset.

Table 8.2 Criteria for Appraisal of Magnitude of Impact (degree of change) on Archaeological Receptors

Magnitude	Definition
High	Total or substantial loss of / major improvement to the significance of an archaeological asset. Substantial harm / improvement to an asset's setting, such that the significance of the asset would be totally lost or substantially reduced (e.g. the significance of a designated heritage asset would be reduced to such a degree that its designation would be questionable; the significance of an undesignated asset would be reduced to such a degree that its categorisation as an asset would be questionable); or improvement that would result in the enhancement of the asset's significance
Moderate	Partial loss or alteration of the significance of an asset. Harm / improvement to an asset's setting, such that the asset's significance would be materially affected/considerably devalued (but not totally or substantially lost) / increased.
Low	Slight loss of / improvement of significance of an asset. This could include the removal / restoration of fabric that forms part of the asset, but that is not integral to its significance (e.g. the demolition / restoration of later extensions/additions of little intrinsic value). Some harm / improvement to the asset's setting, but not to the degree that it would materially compromise / enhance the significance of the asset. Perceivable level of harm / improvement, but insubstantial relative to the overall interest of the asset.
Negligible	A very slight change to an asset. This could include a change to a part of an asset that does not materially contribute to its significance. Very minor change to an asset's setting such that there is a slight impact not materially affecting the asset's significance.
No Impact	No change to an asset or its setting.

8.2.34 The effect significance is determined by combining the predicted magnitude of impact (degree of change) with the assigned value/sensitivity of the receptor. The matrix is set out in Chapter 5, which also identifies Moderate, Large and Very Large effects to be considered significant effects in EIA terms.

Geographical Scope

8.2.35 The assessment and ES chapter will review known archaeological assets within a 200 m radius of the Site boundary.

Temporal Scope

8.2.36 The assessment and ES chapter will cover effects from the Proposed Development during the demolition, construction and occupation phases.

8.3 Baseline Environment

Designated Assets

8.3.1 The Scheduled Monument of St Bartholomew's Church (**SM1**) is the only statutorily designated archaeological asset within the Site. The remains of this church are also Grade II listed (currently on the Heritage At Risk Register), and their significance and setting will be assessed in detail in the Built Heritage Assessment.

8.3.2 This parish church would have served the original village of Arborfield, which is now located to the south-east. The extent of the original settlement has been identified through aerial photography and geophysical survey, and cropmarks visible in aerial photography identify a road which linked Arborfield Hall to the Medieval village of Arborfield. The principal buildings of the Medieval settlement would have been the hall, farm (and mill), and church, forming a settlement of power combining the manorial and ecclesiastical seats.

8.3.3 Scheduled Monuments and their settings are protected by law and deemed of high heritage significance. The original extent of the Medieval settlement it served, although much changed from that time, forms its historic setting, together with the area of the Medieval manor, believed to have been in the location of the later Arborfield Hall, and the farm. This historic setting, although changed through time, makes a positive contribution to the significance of the Scheduled Monument.

Non-designated Assets

SW Area

8.3.4 There is some background potential for archaeological deposits dating to the Prehistoric period in the SW area, including that identified as an Area of High Archaeological Potential (AP1), as depicted in Figure 8.1. Elsewhere, this is mostly associated with undated finds from fieldwalking survey to the south, east and north-east of Hall Farm, and cropmarks identified through aerial photography surveys to the south of Hall Farm, also identified as Area of High Archaeological Potential in Figure 8.1 (AP2 and AP3).

8.3.5 Evidence from a study area around the Site suggests that the area was cleared of natural woodland and the landscape was extensively farmed and settled from the late Prehistoric period. However, there is no evidence to suggest that Iron Age or Roman settlement occurs within the Site and topographic differences between the Site and known settlement sites elsewhere in the wider area suggest that the Site may always have been in agricultural use rather than a focus of settlement.

NW Area

8.3.6 Residual flints from the Shinfield studios site (outside the site boundary but surrounded by it) and a possible Bronze Age cremation found during an archaeological evaluation *c.* 200 m to the west of the NW area, indicate that there may be some background potential for archaeological deposits dating to the Prehistoric period in this area.

8.3.7 Two large areas of cropmarks have been identified within this area and are identified as Areas of High Archaeological Potential, as depicted in Figure 8.1 (AP4 and AP5). These were interpreted as representing Late Iron Age or Early Roman settlement activity; however, subsequent geophysical survey and trial trenching over part of these areas did not identify these features. There is no evidence of Iron Age or Roman activity relating directly to this area of the Site itself.

8.3.8 Although the route of a possible Roman road has been suggested locally, detailed examination of the available evidence suggests that the route is highly speculative. As a result, given the topographic location of existing Iron Age and Romano-British settlement sites and the differing topography of the Site, allied to an absence of site-specific evidence, it is concluded that, on balance, deposits of the later Prehistoric/Romano-British period are unlikely to occur in this area of the Site.

8.3.9 Although a number of settlement *foci* are identified within the wider area, these lie off site and it is suggested that historic land-use within this area of the Site is dominated by agriculture. A low potential is therefore identified for the Medieval period, although an area of ridge and furrow and an L-shaped pond of probable post-Medieval date is identified in the HER. This area is identified a an Archaeological Priority Area (AP6) as depicted in Figure 8.1.

8.3.10 Post-Medieval agricultural building remains may be present associated with historic farms. However, later development in this area is likely to have removed or truncated earlier post-Medieval deposits.

NE Area

8.3.11 There is some background potential for archaeological deposits dating to the Prehistoric period in the NE area, as attested by finds recorded during fieldwalking, close to the location of cropmarks identified as a possible late Neolithic to early Bronze Age ring ditch and other features. These are identified as Areas of High Archaeological Potential (AP9 and AP10) in Figure 8.1.

8.3.12 A Roman artefact scatter was discovered by fieldwalking for the Loddon Valley Survey in 1990 to the north of Parkcorner Lane, close to an area of cropmarks showing several ditched features cut by later drainage visible on aerial photographs. This is also identified as an Area of High Archaeological Potential (AP7) in Figure 8.1.

8.3.13 It is likely that historic land-use on this area of the Site is dominated by agriculture in the Medieval period, and a low potential is identified for archaeological deposits.

8.3.14 Remains of recent horticultural activity off Horrow Way, previously part of the Bearwood Estate record the location of the estate flower nursery but are not likely to extend beyond the areas already developed.

8.3.15 Sindlesham Mill is a former post-Medieval Mill on the River Loddon. A possible post-Medieval hollow way is recorded to the north of the mill and cropmark features are noted to the west of the mill and leet which may be associated with it.

SE Area

8.3.16 Extensive Prehistoric and Roman artefact scatters recorded during fieldwalking survey, and records of cropmarks visible in aerial photography are indicative of archaeological potential. These are also identified in an Area of Archaeological Potential (AP3) in Figure 8.1.

8.3.17 Scatters of Medieval and post-Medieval pottery were recorded during fieldwalking close to an area of ridge and furrow cropmarks recorded in aerial photography and further finds of Medieval pottery were recorded in this area of the study site. This is identified as an Area of High Archaeological Potential (AP11) in Figure 8.1. However, it is likely that historic land-use was dominated by agriculture in this period, and a low potential is therefore identified for archaeological deposits in the SE area overall.

8.3.18 A WWII fire-based decoy site known as a Permanent Starfish near or at Cedar Hall Farm and associated deposits may survive.

8.4 Potential Environmental Impacts & Effects

Construction Impacts and Effects

8.4.1 Sources of impacts on archaeological resources identified in each area of the Site during the demolition and construction phases include:

- Soil stripping and terracing;
- Cutting of new roads, foundations and associated services
- General hard and soft landscaping of the site; and
- Indirect setting impacts.

8.4.2 The first three bullet points represent direct, physical impacts on archaeological receptors within the Site and could result in their removal and/or truncation/disturbance. The fourth bullet point relates to potential impacts caused by changes to an archaeological receptor's setting, i.e., the way in which a receptor is experienced. Setting does not always have a direct correlation with significance and so a change in setting does not necessarily equate to a change in significance.

Occupation Impacts and Effects

8.4.3 No direct, physical impacts on archaeological receptors within the Site are anticipated during the occupation phase, however, indirect effects of the completed development for archaeological receptors are considered to be the same as those identified for the construction phase due to the degree of change proposed to the receptors' settings.

8.5 Scoping Summary

8.5.1 It is proposed the archaeology is scoped into the EIA and the ES chapter will seek to achieve the following:

- Quantify any receptors within and beyond the Site which may be non-physically impacted upon by the Proposed Development.
- Provide an evaluation of archaeology receptor value (importance) based on professional judgement where receptors have no formal designation. It concludes that all non-designated heritage assets should be scoped out of the EIA;
- Assess development impacts and hence the significance of effects arising from the Proposed Development (both the construction and operation phases);
- Provide recommendations for further mitigation that would reduce or eliminate any adverse effects, if required;
- Provide recommendation for enhancement, where possible and appropriate; and
- Quantify any residual effects (those that might remain after any mitigation).

9 Built Heritage

9.1 Introduction

9.1.1 This chapter of the ES Scoping Report has been produced by RPS Consulting and addresses the potential for significant effects on built heritage arising from the Proposed Development.

9.1.2 It is anticipated that this topic will be scoped into the EIA due to the prevalence of built heritage assets within and around the Site.

9.2 Assessment Criteria & Methodology

Previous Assessment

9.2.1 The below planning application has been determined on parts of the Site which has helped inform built heritage baseline conditions within the context of the Proposed Development on the Site. Specifically, this is set out below:

Table 9.1: Relevant historic planning application on Site with previous built heritage input

Application No.	Location	Description of Development	Decision and determination date
101726	Land at Rushy Mead, South of Lower Earley Way (Upperwood Farm) Shinfield Reading RG2 9AA	The proposed erection of 25 year operation and subsequent decommissioning of a wind energy development comprising of the following elements: four wind turbines, each with a maximum overall height (to vertical blade tip) of up to 130 metres, together with new and upgraded access tracks, temporary works, hard standing areas, control and metering building, cabling, improved vehicular access from Cutbush Lane and the A327, an anemometry mast and compensatory flood storage.	28 April 2011 Refused

Legislative Context, Technical Guidance and Best Practice

Legislative Context

9.2.2 Where any development may affect certain designated heritage assets, there is a legislative framework to ensure proposed works are developed and considered with due regard to their impact on designated heritage assets. This extends from primary legislation under the Planning (Listed Buildings and Conservation Areas) Act 1990.

9.2.3 The relevant legislation in this case extends from section 66 of the 1990 Act which states that special regard must be given by the decision maker, in the exercise of planning functions, to the desirability of preserving or enhancing listed buildings and their setting.

9.2.4 Section 69(1) of the Act requires LPAs to 'determine areas of special architectural or historic interest the character or appearance of which it is desirable to preserve or enhance' and to designate them as conservation areas. Section 69(2) requires LPAs to review and, where necessary, amend those areas 'from time to time'.

9.2.5 For development within a conservation area section 72 of the Act requires the decision maker to pay *'special attention […] to the desirability of preserving or enhancing the character or appearance of that area'*. The duty to give special attention is considered commensurate with that under section 66(1) to give special regard, meaning that the decision maker must give considerable importance and weight to any such harm in the planning balance. However, unlike the parallel duty under section 66, there is no explicit protection for the setting of a conservation area.

Planning Policy Context

National Planning Policy

9.2.6 In March 2012, the government published the National Planning Policy Framework (NPPF), which was most recently updated in December 2023. The NPPF is supported by the National Planning Practice Guidance (NPPG), which was published online 6th March 2014 and has since been periodically updated.

9.2.7 Section 16 of the NPPF, entitled Conserving and enhancing the historic environment provides guidance for planning authorities, property owners, developers and others on the conservation and investigation of heritage assets.

Local Planning Policy

9.2.8 The Site is located within Wokingham Borough Council, straddling the Shinfield and Arborfield & Newham parishes. Wokingham Borough Council's adopted local plan contains a number of documents with relevant policy. Specifically, the following Development Plans and polices are relevant to this Chapter

Wokingham Borough Development Plan – Adopted Managing Development Delivery Local Plan – February 2014

- Policy TB24: Designated Heritage Assets (Listed Buildings, Historic Parks and Gardens, Scheduled Ancient Monuments and Conservation Areas)
- Policy TB26: Buildings of Traditional Local Character and Areas of Special Character

Wokingham Borough Local Development Framework – Adopted Core Strategy Development Plan Document – January 2010

- CP3 - General Principles for development

9.2.9 The LPU (Local Plan Update) is currently under preparation with the latest policy document referenced below and therefore the most recent draft policies set out in the public consultation are also identified below.

Wokingham Borough Council - Draft Local Plan Public Consultation – Feb to March 2020

- Policy DH5: The Historic Environment

Guidance and Best Practice

9.2.10 The assessment will be prepared in accordance with the relevant industry standard and guidance issued by Historic England. It will also be prepared in accordance with the principles set out within the National Planning Policy Framework (2023), the relevant provisions of the National Planning Policy Guidance (PPG)

9.2.11 Historic England have published a series of documents to advise applicants, owners, decision-takers and other stakeholders on managing change within the historic environment. These include Historic Environment Good Practice Advice in Planning (GPAs) documents and Historic England Advice Notes (HEANS). Specifically, those relevant to this Chapter, and which have been referred to in baseline studies, comprise: GPA1: The Historic Environment in Local Plans (March 2015); GPA2: Managing Significance in Decision-Taking in the Historic Environment (March 2015); GPA3: The Setting of Heritage Assets (Second Edition; December 2017); and, HEAN12: Statements of Heritage Significance: Analysing Significance in Heritage Assets (October 2019).

9.2.12 The Design Manual for Roads and Bridges (DMRB) LA 106 (Revision 1) (2020) has also been referred to. Although the latter was designed for road schemes in relation to EIAs, it is accepted as good practice for the assessment of cultural heritage in relation to listed buildings and historic landscapes within EIAs. These documents do not provide a prescriptive approach to assessment but identify principles and good practice that have been applied in the methodology for this assessment.

Baseline Data Collection

9.2.13 A Built Heritage Statement (BHS) will be undertaken to inform the ES Chapter, including the findings from a site and surrounds walkover undertaken in April 2022. Principal baseline data will be obtained from the Council's Historic Environment Record (HER) and from Historic England's National Heritage List for England (NHLE). This data would be supplemented by review of relevant archival material, fieldwork reports, publications and grey literature, historic mapping, aerial photography and relevant online sources.

Proposed Assessment Methodology

9.2.14 A detailed description of the general assessment methodology which is proposed to be adopted for the Built Heritage assessment is presented in Chapter 5.

9.2.15 A three-stage approach is adopted in order to reach an understanding of the level of any effect that a proposed development may have on a built heritage receptor. Firstly, it is necessary to understand the importance/sensitivity of the asset (criteria for which is detailed at Table 9.2 below). Then, it is necessary to determine the predicted magnitude of change/impact arising to the receptor as a result of the Proposed Development (criteria for which is detailed at Table 9.3 below). Finally, using a matrix that cross-refers to both receptor sensitivity and impact magnitude, an assessment of the significance of effect of the Proposed Development on the receptor is produced. This approach, including the matrix (Table 9.4), is set out in detail below.

Table 9.2: Criteria for Assessing the Sensitivity of Built Heritage Receptors

Sensitivity	Definition
Very High	- World Heritage Sites
High	- Scheduled Monuments - Listed Buildings - Registered Parks and Gardens
Medium	- Conservation Areas
Low	- Non-designated built heritage assets and locally listed buildings

Table 9.3: Criteria for assessing the Magnitude of change/impact

Magnitude of Impact	Definition
Major	• Change to key elements of a heritage asset such that its importance is totally altered • Comprehensive changes to setting such that is importance is substantially damaged or lost
Moderate	• Changes to key materials/ fabric such that the heritage asset is significantly modified • Considerable changes to setting such that its importance is significantly altered
Minor	• Changes to materials/ fabric such that the heritage asset is slightly different • Change to the setting of a heritage asset such that its importance is slightly altered
Negligible	• Very slight change to material/fabric of a heritage asset that makes little contribution to its importance • Very slight change to the setting of a heritage asset that has an extremely limited effect on its importance
No change	• No impact to material/fabric or to an element that does not contribute to importance • No change to setting, or a change to element of setting that does not contribute to the importance of the heritage asset, or where the contribution remains unchanged

9.2.16 The Built Heritage Statement which considers built heritage receptors within the Site and surrounding area, forms the baseline study to this Chapter, and has been used to inform its preparation; in particular to identify heritage receptors and the likely magnitude of change (as per Table 9.3 above) arising as a result of the Proposed Development.

9.2.17 The sensitivity of a built heritage receptor depends on factors such as the condition of the asset and the level of architectural, historic, and/or archaeological interest it is perceived to have (as defined in the National Planning Police Framework (NPPF) and Planning Practice Guidance (PPG)).

9.2.18 Determination of the sensitivity of built heritage receptors takes account of any existing statutory designation and, for non-designated heritage receptors, professional judgement and any criteria relating to local listing adopted by the relevant Local Planning Authority. Generally effects of Moderate significance or above are considered to be significant in EIA terms.

Table 9.4: Effect Significance

Magnitude of impact (degree of change)						
Environmental value (sensitivity)		**No Change**	**Negligible**	**Minor**	**Moderate**	**Major**
	Very High	Neutral	Slight	Moderate or Large	Large or Very Large	Very Large
	High	Neutral	Slight	Slight or Moderate	Moderate or Large	Large or Very Large
	Medium	Neutral	Neutral or Slight	Slight	Moderate	Moderate or Large
	Low	Neutral	Neutral or Slight	Neutral or Slight	Slight	Slight or Moderate

Geographical Scope

9.2.19 Given the topography of the Site, high levels of woodland planting surrounding the Site and the edge-of-settlement context in which much of the Site sits, a 1km search radius has been used in order to identify built heritage assets potentially affected by the Proposed Development. For ease of reference the Site and surrounds have been divided into the NW, SW, SE and NE Zones as detailed in Figure 9.1. The built heritage receptors are categorised within these zones.

9.2.20 Outside of this search radius, significant effects are not considered likely and therefore effects on more distant heritage receptors have been scoped out of the assessment.

Temporal Scope

9.2.21 The assessment will cover effects from the Proposed Development during the demolition, construction and occupation phases.

9.3 Baseline Environment

9.3.1 Within the 1km search radius of the Site there are fifty-four listed buildings: all at Grade II except one Grade I listed building and one Grade II* listed building. There are also several buildings meriting consideration as non-designated heritage assets, either having been identified on Wokingham District Council List of Buildings of Traditional Local Character or on the Berkshire Historic Environment Record or as a result of the application of professional judgement during the Site walkover in April 2022. One Grade II* registered park and garden falls within this search radius as do two conservation areas.

9.3.2 The site walkover survey and associated archival and cartographic research demonstrates that the bulk of these identified heritage assets share no visual, functional or historic association with the Site. As such, the Proposed Development will have no impact on their setting, or significance, or have such a small impact as to not materially impact that significance and have been discounted from further assessment within this report. This includes all listed buildings within the settlement edges of Shinfield, Sindlesham, Arborfield Cross and within the urban edge of Reading.

9.3.3 It is considered, therefore, that the following twenty-three built heritage assets (either within the boundary of the Site or within 1km of the Site) have the potential to be affected by the Proposed Development owing to their inter-visibility with the Site or through sharing a functional association with the Site. These are detailed at Table 9.5 and Figure 9.2. The baseline Built Heritage Statement and ES Chapter will establish whether the Site, as part of their setting, contributes to the significance of these heritage assets, and any impact from the Proposed Development. Those built heritage assets with the potential to be impacted comprise:

Table 9.5: Built Heritage Receptors with capacity to be impacted by Proposed Development

Area	Built Heritage Receptor	ID no. detailed also on Fig 9.1)	Sensitivity
NW	Cutbush (Grade II listed) (NHL ref. 1118135)	HB1	High
NW	Barn adjoining Cutbush (Grade II listed) (NHL ref. 1136129)	HB2	High
NW	Shinfield Grange is identified on the HER and merits consideration as a non-designated heritage asset (HER ref. WK15636).	HB3	Low
SW	Oldhouse Farm (Grade II listed) (NHL ref. 1118136),	HB4	High
SW	Barn approximately 50 metres south of Oldhouse Farmhouse (Grade II listed) (NHL ref. 1136136)	HB5	High
SW	Hall Place Farmhouse (Grade II listed) (NHL ref. 1135961)	HB6	High
SW	Remains of Old Church (Grade II listed) (NHL ref. 1313014)	HB7	High
SW	Bridge House (Grade II listed) (NHL ref. 1118159)	HB8	High
SW	The Old Rectory and The Rectory Close (Grade II listed) (NHL ref. 1319096)	HB9	High
SW	The Church of St Bartholomew (Grade II listed) (NHL ref. 1135983)	HB10	High
SE	Mole Bridge Farmhouse (Grade II listed) (NHL ref. 1118121	HB11	High
SE	The Glen (Grade II listed) (NHL ref. 1118161)	HB12	High
SE	Bearwood College Registered Park and Garden (RPG) (Grade II* registered) (Register ref. 1000414)	HB13	High
SE	Park Lodge (Grade II listed) (NHL ref. 1118163)	HB14	High
SE	West Lodge (Grade II listed) (NHL ref. 1136015)	HB15	High
SE	Mole Lodge (Gas works) (HER ref. MRM17538), is identified on the HER and is deemed worthy of non-designated heritage asset status.	HB16	Low
SE	Reading Room Cottage is identified as a building meriting consideration as a non-designated heritage asset though it is not identified on the HER or the LPA List of Buildings of Traditional Local Character.	HB17	Low
SE	Arborfield Cross Conservation Area located approximately 500 metres south of the Site	HB18	Medium
NE	Carter's Hill House (Grade II listed) (NHL ref. 1319098)	HB19	High
NE	Oak Cottage (Grade II listed) (NHL ref. 1319149)	HB20	High
NE	Sindlesham Mill (Grade II listed) (NHL ref. 1136288)	HB21	High
NE	Berkshire Masonic Centre (Grade II listed) (NHL ref. 1136256),	HB22	High
NE	Sindlesham Conservation Area located adjacent to the Site.	HB23	Medium

9.4 Potential Environmental Impacts & Effects

9.4.1 This section sets out the anticipated potential impacts and effects on Built Heritage receptors and identifies those impacts which are considered likely to result in significant effects and are therefore proposed to be 'scoped in' to the assessment. Any effects that are not predicted to be significant (and therefore are proposed to be 'scoped out') are also identified.

NW Area

Cutbush Farm and separately listed Barn

9.4.2 The Proposed Development, as it stands, has the capacity to give rise to a less than substantial degree of harm to the overall significance of the two separately listed built heritage receptors, through a change to their settings. The impact to their significance may give rise to a significant effect and therefore should be **scoped into** the EIA.

Shinfield Grange

9.4.3 Development in the immediate surrounds (private landscaped gardens) has the capacity to harm the significance of the built heritage receptor through a loss of an important component of the country house; its landscaped grounds in which country houses were built to enjoy. As such this is unlikely to be a significant effect and is proposed to be **scoped out** of the EIA.

SW Area

Oldhouse Farm and separately listed Barn

9.4.4 Development in the surrounds of the farmhouse and barn have the capacity to result in a level of less than substantial harm which, dependent upon the degree of visual connection with the undeveloped Loddon corridor, and sensitive use of the immediate former farm complex, may be at the lower or upper end of this spectrum of harm. The impact to their significance may give rise to a significant effect and therefore should be **scoped into** the EIA.

Hall Place Farmhouse and Remains of Old Church

9.4.5 Development within the setting of the farmhouse and church remains has the capacity to result in a less than substantial degree of harm to the significance of these built heritage receptor given the change to their setting. The impact to their significance may give rise to a significant effect and therefore should be **scoped into** the EIA.

Bridge House

9.4.6 The setting has the capacity to change as a result of the Proposed Development and this could result in a low level of less than substantial harm, which reflects the degree of screening proposed and the relative distance from the currently proposed built development area. This harm is likely to arise from the nearby road junction and the scope for light spill which may arise from the proposed built development. As such this is unlikely to be a significant effect and is proposed to be **scoped out** of the EIA.

Old Rectory and the Church of St Bartholomew

9.4.7 Depending on the visual ties that would remain between the former parish church and the heritage asset following any proposed development and the degree of enclosure in which the Proposed Development sits around the Old Rectory, there is capacity for the Proposed Development to result in a less than substantial degree of harm to the significance of the built

heritage receptor, through development within its setting and the scope for visual disruption along the presently undeveloped corridor between the former parish church and the Old Rectory. A similar degree of harm may also be seen for the current Church of St Bartholomew. The impact to their significance may give rise to a significant effect and therefore should be **scoped into** the EIA.

SE Area

Molebridge Farmhouse and The Glen

9.4.8 The Proposed Development has the capacity to give rise to a less than substantial degree of harm through development within their settings and removing the rurality in which they have always enjoyed and were built to serve. The impact to their significance may give rise to a significant effect and therefore should be **scoped into** the EIA.

Bearwood College RPG and Mole Road Lodges (three separate lodges)

9.4.9 Development on the Site has the capacity to give rise to a less than substantial degree of harm to the significance of the RPG and statutorily listed lodges, through a loss of rurality and the urbanising affects arising from development of this part of the Site. There is, accordingly, capacity for a minor level of harm to the significance of the non-designated built heritage receptor Mole Lodge. The impact to their significance may give rise to a significant effect and therefore should be **scoped into** the EIA.

Reading Room Cottage

9.4.10 Dependent upon the degree of open space surrounding the heritage asset, allied to screening and potential traffic flow passing alongside the built heritage receptor into the Site, the proposed development has the capacity to, at most give rise to a negligible degree of harm. Given its non-designated heritage receptor status, this degree of harm is unlikely to result in a significant effect and can therefore be **scoped out** of the EIA.

Arborfield Conservation Area

9.4.11 It can be said that the development of the Site has the capacity to give rise to a level of less than substantial harm, but that this could be at the lower end of the spectrum dependent upon landscaping treatments along the southern edge the Site. As such this is unlikely to be a significant effect and is proposed to be **scoped out** of the EIA.

NE Area

Carter's Hill House and Oak Cottage

9.4.12 Development on the Site has the capacity to give rise to a less than substantial degree of harm to the significance of the built heritage receptors through development within their currently predominantly rural setting. The impact to their significance may give rise to a significant effect and therefore is proposed to be **scoped into** the EIA.

Sindlesham Mill

9.4.13 The proposals contain no built development areas nearby; being on the Loddon flood plain, though two roads will fall within the wider setting and are likely to share some intervisibility with the built heritage receptor. Whilst this will change the wider rural surrounds, when the wider hotel development is also factored in, it is deemed that the roads infrastructure on the wider

landscape is unlikely to materially impact the overall significance of the former mill. As such this is unlikely to be a significant effect and is proposed to be **scoped out** of the EIA.

Berkshire Masonic Centre

9.4.14 The Proposed Development is unlikely to materially impact the significance of the built heritage receptor. Were the built development immediately adjacent to the receptor to be acquired and demolished this would change the setting, though changing from a position of negative impact presently. As such this is unlikely to be a significant effect and is proposed to be **scoped out** of the EIA.

Sindlesham Conservation Area

9.4.15 The Proposed Development is considered unlikely to materially impact the significance of the heritage asset. Were the built development immediately adjacent to the built heritage receptor to be acquired and demolished, this would change the setting, though changing from a position of negative impact presently. As such this is unlikely to be a significant effect and is proposed to be **scoped out** of the EIA.

Construction Impacts and Effects

9.4.16 During the construction phase, groundworks, landscaping and ancillary works and structures have an effect on the setting of built heritage receptors. Accordingly, an adverse effect on heritage receptors would result without appropriate mitigation.

9.4.17 Mitigation during the construction phase comprises a thorough adherence to good site practice measures. These measures are likely to include site hoarding, a construction logistics plan, incorporation of a construction lighting strategy and provision of time limits on construction works to reduce the impacts of noise, dust and light pollution on the nearby built heritage receptors. As these measures are standard best practice, they have already been assumed in the above assessment.

Occupation Impacts and Effects

9.4.18 During the operational phase, potential impacts may arise through changes to the setting through built form, additional noise and light pollution. Accordingly, an adverse effect on built heritage receptors would result without appropriate mitigation.

9.4.19 A number of mitigation measures relating to landscaping have been fed into the emerging Proposed Development scheme. These measures will be incorporated into the design of the Proposed Development and, as such, appropriate mitigation will be inherent to the Proposed Development.

Scoping Summary

9.4.20 It is proposed that Built Heritage will be **scoped into** the EIA due to the prevalence of built heritage assets with and around the Site.

9.4.21 As set out within this Chapter, the assessment is proposed to include, and seeks to achieve, the following:

- A robust Built Heritage Statement will be undertaken to quantify the baseline conditions across the Site and near surrounds in respect of sensitive built heritage receptors likely to be affected by the Proposed Development.

- This information will be used to help identify likely built heritage receptor impacts at construction and operational phases as a result of the Proposed Development. Where necessary, appropriate mitigation measures will be proposed.

- As detailed in Table 9.6, it is proposed that sixteen built heritage receptors should be scoped into the EIA and seven built heritage receptors scoped out of the EIA.

Table 9.6: Built Heritage Receptors to be scoped in or out of EIA process.

Area	Built Heritage Receptor	Scoped in or Out
NW	Cutbush (Grade II listed) (NHL ref. 1118135)	IN
NW	Barn adjoining Cutbush (Grade II listed) (NHL ref. 1136129)	IN
NW	Shinfield Grange is identified on the HER and merits consideration as a non-designated heritage asset (HER ref. WK15636).	OUT
SW	Oldhouse Farm (Grade II listed) (NHL ref. 1118136),	IN
SW	Barn approximately 50 metres south of Oldhouse Farmhouse (Grade II listed) (NHL ref. 1136136)	IN
SW	Hall Place Farmhouse (Grade II listed) (NHL ref. 1135961)	IN
SW	Remains of Old Church (Grade II listed) (NHL ref. 1313014)	IN
SW	Bridge House (Grade II listed) (NHL ref. 1118159)	OUT
SW	The Old Rectory and The Rectory Close (Grade II listed) (NHL ref. 1319096)	IN
SW	The Church of St Bartholomew (Grade II listed) (NHL ref. 1135983)	IN
SE	Mole Bridge Farmhouse (Grade II listed) (NHL ref. 1118121	IN
SE	The Glen (Grade II listed) (NHL ref. 1118161)	IN
SE	Bearwood College Registered Park and Garden (RPG) (Grade II* registered) (Register ref. 1000414)	IN
SE	Park Lodge (Grade II listed) (NHL ref. 1118163)	IN
SE	West Lodge (Grade II listed) (NHL ref. 1136015)	IN
SE	Mole Lodge (Gas works) (HER ref. MRM17538), is identified on the HER and is deemed worthy of non-designated heritage asset status.	IN
SE	Reading Room Cottage is identified as a building meriting consideration as a non-designated heritage asset though it is not identified on the HER or the LPA List of Buildings of Traditional Local Character.	OUT
SE	Arborfield Cross Conservation Area located approximately 500 metres south of the Site	OUT
NE	Carter's Hill House (Grade II listed) (NHL ref. 1319098)	IN
NE	Oak Cottage (Grade II listed) (NHL ref. 1319149)	IN
NE	Sindlesham Mill (Grade II listed) (NHL ref. 1136288)	OUT
NE	Berkshire Masonic Centre (Grade II listed) (NHL ref. 1136256),	OUT
NE	Sindlesham Conservation Area located adjacent to the Site.	OUT

10 Climate Change and Greenhouse Gases

10.1 Introduction

10.1.1 This chapter of the ES Scoping Report has been produced by Daedalus Environmental Limited.

10.1.2 The need to rapidly address the impact of increased greenhouse gases (GHG) within the atmosphere – and specifically the resultant increase in average annual global temperature and the knock-on impacts this will have – is now undisputed. As such we are approaching a scientifically defined environmental limit, and therefore all GHGs and their climate impact, no matter how small in quantity, could be considered significant.

10.1.3 Moreover, the consequences of a changing climate also have environmental impacts that extend to other related disciplines and topics within this EIA, including flood risk, ecology, soils, population etc. This interrelated and interconnected dimension to this specific issue for a development of this scale means it would be inappropriate to deal with it separately from other environmental issues under consideration in the EIA process.

10.1.4 Given the scale and nature of the Proposed Development, it is the opinion of the authors that greenhouse gases, and their impact on climate change, should be scoped into this EIA process. In doing so, and at this early stage, we can understand the impacts, and establish approaches and solutions that optimise, GHG performance through design, through construction and under 'operating' conditions i.e. throughout the lifecycle of the development.

10.2 Assessment Criteria & Methodology

Previous Assessment

10.2.1 At the time of writing, there has been no previous assessment of GHGs for the project, and therefore no baseline of the existing site exists. It is therefore proposed that a baselining exercise will form part of the main assessment under this part of the EIA.

Legislative Context, Technical Guidance and Best Practice

Legislative Context

10.2.2 The Legislative Context is perhaps best summarised by the UK's Committee on Climate Change (CCC), as follows:

The Climate Change Act 2008 is the basis for the UK's approach to tackling and responding to climate change. It requires that emissions of carbon dioxide and other greenhouse gases are reduced and that climate change risks are adapted to. The Act also establishes the framework to deliver on these requirements.

The Act supports the UK's commitment to urgent international action to tackle climate change. Through the Climate Change Act, the UK government has set a target to significantly reduce UK greenhouse gas emissions by 2050 and a path to get there. The Act also established the Committee on Climate Change (CCC) to ensure that emissions targets are evidence-based and independently assessed. In addition, the Act requires the Government to assess the risks and opportunities from climate change for the UK, and to adapt to them.

The Climate Change Act requires the government to set legally-binding 'carbon budgets' to act as stepping stones towards the 2050 target. A carbon budget is a cap on the amount of greenhouse gases emitted in the UK over a five-year period. Budgets must be set at least 12 years in advance to allow policy-makers, businesses and individuals enough time to prepare.

The budgets are designed to reflect a cost-effective way of achieving the UK's long-term climate change objectives. Once a carbon budget has been set, the Climate Change Act places an obligation on the Government to prepare policies to ensure the budget is met.

The Climate Change Act requires the UK Government to produce a UK Climate Change Risk Assessment (CCRA) every five years. The CCRA assesses current and future risks to and opportunities for the UK from climate change. In response to the CCRA, the Climate Change Act also requires the UK government to produce a National Adaptation Programme (NAP).

(extract from theccc.org.uk[1])

10.2.3 The National Planning Policy Framework (NPPF) Section 2, paragraph 8 states that the purpose of the planning system is to contribute to sustainable development, and it therefore has three overarching objectives 'to be pursued in mutually supportive ways':

- An economic role, contributing to a strong, responsive, competitive economy;
- A social role, supporting vibrant and healthy communities and;
- An environmental role, protecting and enhancing our natural, built and historic environment.

10.2.4 As such, the NPPF at its heart contains a 'presumption in favour of sustainable development'. The NPPF sets out a number of principles which should underpin both plan-making and decision-taking, and of which many are particularly relevant to this document. In this context, planning should (in summary):

- Promote healthy and inclusive places that encourage social interaction, enhance healthy lifestyles, and which are safe and accessible (paragraph 135);
- Seek to secure a high-quality of design and a good standard of amenity for occupants; (paragraph 130);
- Support the transition to a low-carbon future, avoid increased vulnerability to climate change impacts, take account of flood risk and coastal change and seek to reduce greenhouse gas emissions. Plans should include a positive strategy for dealing with more sustainable forms of energy and, in particular, renewable sources; (paragraph 157);
- Help conserve and enhance the natural environment, achieve net gains in biodiversity and reduce the impact of all forms of pollution (paragraphs 185, 191);
- Plan and manage development to make full use of public transport, walking and cycling; and take into account the emerging changes in, and requirements of, the transport industry around electric vehicles and other ultra low emission vehicles (paragraph 116);

[1] A legal duty to act - Climate Change Committee (theccc.org.uk)

- Support the expansion of high quality communications networks which are seen as integral to economic growth and wellbeing (for example the application of full fibre connections to the building) (paragraph 118).

10.2.5 In June 2019, parliament passed legislation requiring the government to reduce the UK's net GHGs by 100% relative to 1990's levels, and to do so by 2050. The UK's 6th Carbon budget, fixed in April 2021, incorporated the UK's share of international aviation and shipping emissions for the first time, and was set in order to bring the UK more than three-quarters of the way to net zero by 2035.

10.2.6 Also at a national level, the transition towards zero emission buildings is accelerating. Recent changes to Part L of the Building Regulations have tightened design and construction performance standards in terms of energy use and emissions, and these are set to tighten further with the introduction of the Future Homes Standard around 2025. This will see buildings need to meet a 70-80% reduction in emission when compared against similar buildings constructed prior to 2022. Part S of the Building Regulations 2022 also (indirectly) deals with transport emissions, requiring that all new dwellings have access to EV charging capability, including the requirement to have a charging point installed for all properties with an on-plot parking space.

10.2.7 At a local level, the existing Wokingham Borough Council adopted Local Plan is now considerably out of date, now over 14 years since adoption. It aspires to:

- 'Promote sustainable use and disposal of resources while mitigating and adapting to climate change'; and

- Policy CP1 Sustainable Development makes some reference to the need to minimise energy and water consumption through design, layout and construction, whilst taking account of microclimate effects.

10.2.8 The council has adopted a Sustainable Design and Construction SPD but it is somewhat dated (adopted 2010), although does provide a more comprehensive framework of which developers must take account when submitting planning applications. There is no mention, however of either the need to include GHGs within an EIA, nor of specific carbon reduction targets – other than a 'Merton Rule' type approach to the quantum of renewable energy generated on the site (10% in this case).

10.2.9 The new Draft Local Plan is anticipated to be published in 2024, and the EIA will have due regard to any emerging policies, aspirations and targets within it.

10.2.10 Outwith the planning policy sphere, the Council declared a climate emergency in July 2019, with the aim to reduce '*our carbon footprint to be net carbon zero by 2030*'. A climate emergency action plan was approved at council in January 2020, and an update was given in July 2021, outlining the planned steps towards that goal. These documents helpfully provide a local context to emissions in the Borough, which we propose to use as part of the contextualisation of the GHG EIA chapter.

Guidance and Best Practice

10.2.11 The Guidance we propose to use as the background for the assessment is provided by IEMA entitled: *IEMA GHG Emissions Guidance* (2022) which is a revision of the 2017 IEMA guidance on *Assessing Greenhouse Gas Emissions and Evaluating their Significance*. This provides a framework and recommendations for defining the process for scoping, baselining, assessment methodology, understanding significance, and mitigation.

10.2.12 Further guidance in respect of calculating whole lifecycle emissions will be drawn from Embodied and whole life carbon assessment (RIBA, 2017) which also draws heavily from British Standard BS EN 15978:2011 which sets out the overall principles of embodied and whole life carbon measurement in the built environment.

10.2.13 The IEMA EIA Guide to Climate Change Resilience and Adaptation (2020) is the preferred reference point and guidance for considering climate change resilience and adaptation in EIA or supporting significant assessments for climate change.

Baseline Data Collection

10.2.14 The baseline for the Site will be the emissions associated with its current uses, and assuming no future development. The GHG baselining will be undertaken via desktop study using:

- The site survey and habitat data undertaken by the project team – this also establishes the extent of any carbon sink / carbon positive areas within the Site boundary.
- Information provided by the landowners and client in respect of existing uses and buildings within the site boundary.
- Data related to emissions associated with these uses – which will be presented in a standardised format of tonnes of carbon dioxide (equivalent) - will be drawn from recognised government sources described below.
- Wider data sources include
    - the council's own data on local emissions and associated reporting in the context of its own declaration of a climate emergency
    - BEIS published data on Grid intensity
    - Natural England data on carbon absorption potential of different habitats

10.2.15 Additional sources are identified in the following section.

Proposed Assessment Methodology

10.2.16 Generally, where an EIA is required, several topics require assessment, and in most topic areas the assessment methodology and approach is very well established – for example in respect of ecology, heritage, etc. In respect of GHGs, this remains a developing area of impact assessment with an increasing number of project examples.

10.2.17 The impact of any emissions can and will be felt at a global, and therefore regional and local, level, and as such it remains challenging to be definitive in respect of impact 'boundaries'. By inference the impact on receptors where there is no physical, geographical, limit is very difficult to quantify meaningfully. We therefore need to adopt an approach which adapts the standard EIA methodology set out in Chapter 5, making it fit for purpose for GHGs.

10.2.18 The aim remains to deliver a robust, appropriate and consistent assessment to enable GHGs to be estimated, reported and mitigated accordingly – but to do so the context and approach to assessment must evolve from the standard approach described in Chapter 5. The overall method can be summarised as:

- Calculate (pre-development) baseline GHG emissions and extrapolate over full lifecycle period

- Calculate GHG emissions from the proposals, before and after mitigation
- Assess whether post-mitigation GHG emissions meet the significance criteria identified in paragraphs 10.2.21 - 10.2.23, below

10.2.19 It is planned that the calculations of GHG emissions (and presentation of findings) will be based in $tCO_2(e)$ [tonnes of carbon dioxide equivalent] for consistency. It is also expected that of the 6 major greenhouse gases identified in the Climate Change Act (2008) – only carbon dioxide, methane and nitrous oxide will have a measurable or significant impact in this location for this type of project, so the other three (sulphur hexafluoride, perfluorocarbons and hydrofluorocarbons) will not be within the scope of the assessment.

10.2.20 The table below provides the calculation methodology for assessing the GHG emissions for the first 2 stages:

Table 10.1 Baselining and Context Phase

CONTEXT		
The scale of emissions for the development will be set in the local context for Wokingham Borough as a whole and the boroughs own annual and potential lifetime emissions where this data is available. To do this we will draw from the council's own published annual reporting and data in respect of its declaration of a climate emergency and progress towards its 2030 target, with further background data where necessary drawn from HM Government's 6th Carbon Budget (and the Climate Change Committee).		
Emissions Source	**Calculation Description**	**Data**
Emissions to be calculated over the same period as 'construction phase plus 60 years'.		
CEDAR – Buildings and Livestock	Building: either from usage data or estimate from floor area and operational parameters to establish energy use. Conversion to GHG emissions using BEIS / Building Regulations data on Grid carbon intensity and carbon intensity of other fuels e.g. gas. Livestock: based on average total head of cattle on an annual basis we will calculate the estimate emissions per kg food product or yield.	Building: energy supplier/operator or CIBSE baseline data on energy use. BEIS / HM Treasury Green Book annual published data on carbon intensity of existing and future Grid operation and other fuel sources. Livestock: DEFRA & Journal Data (e.g. Science [Poore and Nemecek, 2018)
Other Buildings (to be replaced / demolished	Building: energy demand estimate from floor area and operational parameters. Conversion to GHG emissions using BEIS / Building Regulations data on Grid carbon intensity and carbon intensity of other fuels e.g. gas.	Building: energy supplier/operator of CIBSE baseline data on energy use. BEIS / HM Treasury Green Book annual published data on carbon intensity of existing and future Grid operation and other fuel sources.
Natural Habitats	Each different form of habitat stores/sequesters or emits different levels of carbon on an annual basis, and using site surveys and associated areas	Natural England: Carbon Storage and Sequestration Data

	we can attribute an annual value to the carbon impact.	

Table 10.2 Lifecycle Emissions (Embodied)

Emissions Source	Calculation Description	Data
Emissions to be calculated over construction phase (Indicative phasing, including the duration of the construction phase, will be agreed with the Project Team).		
EMBODIED EMISSIONS – BUILDINGS		
General: at this early stage, we will not have detailed data covering supply chain, logistics and transport movements, materials choices, etc. We will therefore take a 'TARGET' approach which 1. Firstly provides an estimate of standard practice for buildings using existing and emerging research, cast in terms of kg or tonnes of CO_2/m^2 of floor area constructed (drawn from the masterplan and associated schedule of accommodation). This enables us to create a 'standard performance value' for the whole site. 2. Secondly then examines the opportunities for enhanced performance targets (using the same metric) which should form the 'target performance value'. Achieving this target is then the subject of mitigation measures in the ES chapter, to be agreed with the project team, client and stakeholders. BS EN 15978 provides the structure for assessing information on embodied carbon across the project lifecycle. There are 4 stages, A-D. A-C include the period to end of life, for which research data exists. Stage D covers the period for beyond the project lifecycle, for which suitable research data does not yet exist – and therefore is proposed to be scoped out of this approach to the assessment.		A range of background data and research has been undertaken by credible parties, including: RIBA, LETI, CLF, World Building Council for Sustainable Development, Institute for Structural Engineering, etc which will be used to inform this analysis.
EMBODIED EMISSIONS – OTHER INFRASTRUCTURE		
As above, we will not have detailed data covering supply chain, logistics and transport movements, materials choices, etc. We will therefore take a similar 'TARGET'-based approach which 1. Firstly seeks to provide an estimate of standard practice for different types of infrastructure using existing and emerging research, potentially cast in terms of kg or tonnes CO_2/unit of infrastructure. This enables us to create a 'standard performance value' for the whole site. 2. Secondly then examines the opportunities for enhancing that performance value which should form the 'target performance value'. Working towards this target is then the subject of mitigation measures in the ES chapter, to be agreed with the project team, client and stakeholders. PAS 2080:2016 provides a common framework for managing whole life carbon management when delivering infrastructure assets, and is likely to form the basis for ongoing management of infrastructure emissions. Prior to this the Infrastructure Carbon Review (2013), was published by HM Treasury and within the review the opportunity for infrastructure value chain participants to cooperate in the development of low carbon infrastructure projects was recognised.		PAS 2080:2016 Carbon management in infrastructure Infrastructure Carbon Review (HMG/Mott Macdonald)

Table 10.3 Lifecycle Emissions (Operational)

Emissions Source	Calculation Description	Data
Emissions to be calculated over the same period as 'construction phase plus 60 years'.		
OPERATIONAL EMISSIONS		
Buildings	The annual energy demands for each building will be estimated on the basis of the proposed mix / schedule and associated floor areas – aligned to ongoing evolutions in Building Regulations (including Future Homes Standard, for example) over the construction period. Demands for heat (DHW and space heating), light and other power will be compiled on the basis of kWh (or MWh) per annum to enable conversion to carbon emissions in line with carbon intensity data.	Estimated energy demand calculated via BR compliance or equivalent software for comparable buildings – both domestic and non-domestic. Institute of Engineering and Technology – energy yields from different technology solutions. BEIS / HM Treasury Green Book annual published data on carbon intensity of existing and future Grid operation and other fuel sources.
Transport	Combining data from the Transport Assessment in terms of vehicle movements and distances travelled, and combining this with average emissions data from the existing – and future – vehicle fleet mix in the UK, we can generate a GHG emissions profile for the lifecycle of the development. This will take account of predictions in emissions reduction resulting from the expected rapid transition to EV over the next decade.	Transport Assessment Office for Rail and Road (ORR)
Natural Habitats	Each different form of habitat stores/sequesters or emits different levels of carbon on an annual basis, and using the masterplan and schedule of natural habitat areas we can attribute an annual value to the carbon impact. We envisage that existing habitats (where retained) will be enhanced and therefore, on per m^2 basis, provide greater abatement opportunities.	Natural England: Carbon Storage and Sequestration Data

Method for Assessing Significance

10.2.21 All emissions are significant. As identified within IEMA guidance:

1) all projects create GHG emissions that contribute to climate change;

2) climate change has the potential to lead to significant environmental effects; and

3) there is a GHG emission budget that defines a level of dangerous climate change whereby any GHG emission within that budget can be considered as significant.

Therefore, in the absence of any significance criteria or a defined threshold, it might be considered that all GHG emissions are significant and an EIA should ensure the project addresses their occurrence by taking mitigating action

(IEMA, February 2022)

10.2.22 Rather than trying to establish or demonstrate otherwise, the focus of the ES chapter on GHG will be on:

- Articulating the scale of mitigated GHG emissions in the context of Wokingham as a whole, and as a percentage of the UK's 6th Carbon Budget
- Mitigation opportunities throughout the lifecycle of the development (see 10.4.4 below) to:
    - Achieve embodied emissions targets that demonstrate best practice
    - Ensure the proposals meet nationally set legislative targets to be operationally net zero by 2050, and align to Wokingham's own climate emergency targets for the scope of GHG emissions agreed.

10.2.23 Where these latter two points can be demonstrated, it will be assumed that environmental impact of GHG emissions arising from the Proposed Development will be acceptable.

Geographical Scope

10.2.24 The geographic scope of the assessment will be

- the Site boundary in respect of emissions arising directly from the construction and operation of the Proposed Development; and
- in respect of personal vehicle and (non-train) public transport emissions related to commuting and general mobility, consideration of distances to key commuter locations for employment will be included.

Temporal Scope

10.2.25 The temporal scope will cover the period of construction and occupation phases of the Proposed Development: the lifecycle emissions assessment will cover the construction period plus 60 years.

Climate Adaptation and Resilience

10.2.26 Climate adaptation solutions that ensure the buildings remain usable and habitable, that ensure the external realm and microclimates are comfortable, and which ensure that green spaces thrive, are accepted as hugely important in the design/construction process.

10.2.27 However, they are not specifically designed to mitigate GHGs that arise and as such their impact is not robustly measurable in the same way. Climate adaptation will, necessarily, be a key focus of the design and development process on an ongoing basis, but in line with the IEMA Guidance referenced above, we propose that adaptation is included within the scope of the EIA. It will, through necessity, be assessed differently from the impact of GHG emissions described above.

10.2.28 Furthermore, the nature of climate adaptation issues is not the concern of a single discipline, as the nature of a changed climate affects many of the other disciplines involved in the EIA process, including (but not exclusively):

- drainage / flood risk and hydrology
- ecology
- human health
- ground conditions
- socio-economics

10.2.29 Moreover, it is important to understand that assessing climate adaptation impact is fundamentally different from other standard approaches – rather than assessing the impact of the Proposed Development on the environment, climate adaptation assessment requires the project team to examine the impact of a changing environment on the Proposed Development. The 'receptors' in this case will therefore be the buildings and occupiers of the Proposed Development over time, with the geographical and temporal scope broadly aligned to that for emissions, as follows:

Geographical Scope

- the Site boundary in respect of the impact of a changed climate on occupiers and completed buildings

Temporal Scope

- covering the period beyond construction to 2080 (in line with RCP data)

10.2.30 Sensitivity is determined using quantifiable data, where available – however it should be noted that given the stage of the project detailed dynamic simulation modelling of buildings will not be possible. It also involves consideration of existing designations, and relevant local/national/international legislation and standards. To ascribe the sensitivity of receptors in relation to potential climate change effects, it is likely that we will consider (in line with IEMA guidance):

- Value/importance of receptor
- Susceptibility of the receptor (e.g. ability to be affected by a change) (the opposite of resilience); and
- Vulnerability of the receptor (e.g. potential exposure to a change).

10.2.31 There are therefore several things to consider.

- Firstly, the assumed assessment parameters in respect of anticipated climate change over time. For this the Project Team will be using the UKCP18 probabilistic projections for the

South East of England. Probabilistic projections combine climate model data, observations and advanced statistical methods to simulate a wide range of climate outcomes for different emission scenarios (the MET Office publishes four sets of representative concentration pathways or RCPs - RCP2.6, RCP4.5, RCP6.0, RCP8.5). We propose to use the RCP8.5 (50th percentile) figures, representing high expected emissions (See Appendix 10.1).

- Secondly, each discipline undertaking an ES chapter will be reviewing the impact of expected climate change on their field.

10.2.32 The Climate Change and Greenhouse Gases ES chapter will therefore do two things in respect of climate adaptation:

- Provide an overarching summary/commentary of the different ES chapters' assessment of, and response to, climate adaptation, where this is covered

- Assess, at high level, the potential risks to buildings in respect of specific impacts of climate change under the identified climate scenario / RCP, and identify the likely design-driven adaptation processes, standards and opportunities that will need to be implemented in order to minimise this risk to an acceptable level

10.2.33 It is likely that this latter risk assessment, using the Design for Future Climate strategy framework and associated evidence (or similar)[2], will cover impacts on the built environment such as risk of overheating and securing a habitable/usable internal environment, the risk of water ingress and associated detailing, and operational affordability.

10.3 Baseline Environment

GHG Emissions

10.3.1 The baseline environment is expected to include GHG emissions resulting from the operation of the Centre for Dairy Research (CEDAR). It will also include the carbon abatement impact of the existing mosaic of different habitats that make up the remainder of the Site.

10.3.2 GHG emissions from any other buildings that are to be replaced or improved as part of the proposals will also be included in the baseline.

10.3.3 All other buildings and uses that remain on the Site and are unaffected by the development (i.e. are not to be demolished or replaced) such as the Thames Valley Science Park (as shown in issued drawing 'Areas to be excluded from the EIA Scoping' Rev. A 09/07/24) and the 24 heritage structures listed in Chapter 2 are assumed to have a neutral impact when comparing the baseline and completed GHG scenarios. They are therefore scoped out of the assessment.

Adaptation and Resilience

10.3.4 The future baseline scenario will be anticipated climate variable (both summer/winter, mean air temperature, precipitation, wind speed) under the following projections (please also see Appendix 10.1 of the Scoping Report):

- RCP8.5, 50th percentile, 2050(s), 'medium term'

[2] D4FC, Bill Gethin, 2010

- RCP8.5, 50th percentile, 2080, 'long term'

10.4 Potential Environmental Impacts & Effects

Construction Impacts and Effects

10.4.1 The likelihood is that the impact of the construction phase will lead to an increase in emissions against the baseline. It is also anticipated that the embodied emissions associated with the proposals will dwarf operational/occupation emissions from energy use (and potentially transport) once mitigation measures are considered.

Occupation Impacts and Effects

10.4.2 The GHG emissions from occupation will increase when compared to the baseline, and therefore have a negative climate impact, based on the points made in Section 10.1, above. However, when compared against embodied emissions, which will arise through the construction phase (related to supply chain, logistics and materials choices), operational emissions are anticipated to be considerably lower over the 60 year lifecycle of the assessment. This is because the approach to operational energy and emissions will be such that over time it is expected these will be negligible, when considering that a) there are unlikely to be any fossil fuels used on site and b) the Grid will rapidly decarbonise over the next 20 years.

10.4.3 Operational GHG emissions will, however, be scoped into the assessment.

Mitigation

10.4.4 In terms of mitigation measures, those that will likely be considered include:

- Enhancing building performance (layout, energy efficiency and quality of build) for both energy use but also adaptability in the face of a changed climate
- Quality and choice of materials and finishes
- Alternative and innovative approaches to energy supply – particularly in respect of zero emission and low emission technologies
- Other forms of on-site sustainable energy infrastructure including energy storage and large-scale solar arrays
- Long term management and operational solutions that support and accelerate emissions reduction
- Offsite offsetting solutions and/or investment in offsite sustainable energy generation infrastructure
- Options to accelerate the transition to more sustainable mobility including design / layout solutions and implementation of technologies
- Options to reduce the need for transport off site
- Options for local food production

10.5 Scoping Summary

10.5.1 The proposed scope of the assessment can be summarised as

- Pre-Construction
    - Creating a baseline GHG emissions profile of all existing uses and areas/habitats within the site boundary
- Construction phase
    - the operational greenhouse gas emissions resulting from construction of infrastructure and buildings
    - the embodied carbon emissions (using targets-based approach) within buildings and infrastructure covering stages A-C within BS EN 15798
- Operational phase
    - The operational greenhouse gas emissions from all buildings and personal/public transport to, from and around the site
- Adaptation and Resilience
    - Assessing the impacts of a changed climate on the built environment and the solutions / standards that need to be implemented
    - Summarising the adaptation impacts of different disciplines from across the ES

10.5.2 The assessment of GHG emissions impact will be based specifically within the Site boundary and cover a period of 60 years from the point of completion of the final building.

10.5.3 It is planned that the calculations of GHG emissions (and presentation of findings) will be based in $tCO_2(e)$ [tonnes of carbon dioxide equivalent] for consistency. It is also expected that of the 6 major greenhouse gases identified in the Climate Change Act (2008) – only carbon dioxide, methane and nitrous oxide will have a measurable or significant impact in this location for this type of project, so the other three (sulphur hexafluoride, perfluorocarbons and hydrofluorocarbons) will not be within the scope of the assessment.

11 Ecology

11.1 Introduction

11.1.1 This chapter of the ES Scoping Report has been produced by Ecological Planning & Research Ltd. (EPR).

11.1.2 The Site includes a number of designated areas, including Local Wildlife Sites (LWS), Ancient Woodland and Biodiversity Opportunity Areas (BOAs). Ecological survey work has identified the presence of Section 41 Priority Habitats and Species, alongside other protected and notable species, including European Protected Species (EPS). The Site is located within 5km of the Thames Basin Heaths Special Protection Area (SPA).

11.1.3 Due to the ecological sensitivity of the nearby designated sites and Important Ecological Features (IEFs), the ES will include a Chapter and supporting Technical Appendices on Ecology. The ES will also be supported by a report containing information for Habitats Regulations Assessment (HRA), which will provide the Council, as the Competent Authority under the Conservation of Habitats and Species Regulations 2017 (as amended) with the information that they require to undertake a HRA of the Proposed Development.

11.2 Assessment Criteria & Methodology

Legislative Context, Technical Guidance and Best Practice

Legislative Context

11.2.1 Key articles of nature conservation legislation of relevance to the ecological assessment of the Proposed Development include:

- The Biodiversity Net Gain (Town and Country Planning) (Modifications and Amendments) (England) Regulations 2024;
- The Environment Act (2021);
- The Conservation of Habitats and Species Regulations 2017 (as amended);
- The Wildlife and Countryside Act 1981 (as amended);
- The Natural Environment and Rural communities (NERC) Act 2006; and
- [redacted]

Guidance and Best Practice

11.2.2 The ecological impact assessment of the Proposed Development will take account of best practice guidance in the Chartered Institute of Ecology and Environmental Management (CIEEM) *Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland: Terrestrial, Freshwater, Coastal and Marine. Version 1.2* (CIEEM, 2018), and will also have regard to the following additional biodiversity and planning practice guidance:

- Biodiversity 2020: A strategy for England's wildlife and ecosystem services (DEFRA, 2011);

- Biodiversity: Code of practice for planning and development published by the British Standards Institute (BS 42020:2013);
- Revised and updated Planning Practice Guidance (PPG) (MHCLG, 2014); and
- Thames Basin Heaths Special Protection Area Delivery Framework (TBH Joint Strategic Partnership Board, 2009).

Baseline Data Collection

11.2.3 Baseline data was collected across the entire Site between 2022 and 2023, with limited updates being undertaken across 2024/2025. Surveys completed are outlined in Table 11.1 below.

11.2.4 Surveys currently in the process of being updated including habitats, breeding birds, bat activity and static detector surveys, and Water Vole and Otter surveys.

Table 11.1 – Summary of surveys completed

Survey Type	Month	Year
Habitat Survey	April	2022
	May – June	2024
Botany Surveys	April – September	2022
	May – June	2024
Hazel Dormouse Habitat Assessment	April	2022
[redacted]		
Breeding Bird Survey	April – July	2022
	April – June	2024
Bat Static Detector Surveys	April – October	2022
	June	2024
Bat Activity Surveys	April – October	2022
	June	2024
Great Crested Newt eDNA	April	2022
	June	2024
Emergence/re-entry Surveys for bats	June – September	2022
	April – September	2023
Invertebrate Surveys	June – October	2022
	April – June	2023
Hazel Dormouse Presence/Absence Survey	August – November	2022
	April – July	2023
River Corridor Survey	September	2022
Winter Bird Surveys	January, February, November & December	2023
Bat Building Inspections	January & February	2023
White-clawed Crayfish eDNA	July	2023
Great Crested Newt Population Assessment	April – May	2023
Ground Level Tree Assessment for bats	March, April & September	2023
	January – February	2024
Veteran Tree Surveys	March, April & September	2023
	January – February	2024
Ground Level Tree Assessment for bats	January – February	2024
Freshwater Fish survey	June	2024

Proposed Assessment Methodology

11.2.5 The approach to Ecological Impact Assessment (EcIA) to be utilised within the Ecology Chapter of the ES takes account of guidance provided by CIEEM within the Guidelines for Ecological Impact Assessment v1.2 (CIEEM, 2018).

11.2.6 In accordance with the above guidance, EPR takes the following step-wise approach to EcIA.

11.2.7 Important Ecological Features within the Site will be identified utilising the data gained through desktop and field surveys, as outlined above. IEFs are features within the Site whereby the ecological importance is valued at the Local geographical level or above. To determine whether an ecological feature is of Local value or higher, an assessment will be made using the relevant guidance, knowledge and local information for the ecological feature. For example, the national and local distribution and/or abundance of a species/habitat within the landscape will affect its ecological importance. In some instances, guidelines are available against which to measure an IEF, such as the standard evaluation method used for bird assemblages developed by Fuller[1].

11.2.8 Activities associated with the delivery and operation of the Proposed Development that are likely to result in biophysical changes will be identified, where these activities are considered likely to lead to significant effects (either positive or negative) upon the IEFs.

11.2.9 The Zone of Influence (ZoI) is the area over which these biophysical changes will impact upon the identified IEFs. The size will be dependent upon the activity and the sensitivity of the ecological receptor to the anticipated biophysical changes.

11.2.10 An effect is considered to be significant if it is likely to change the structure and function of defined sites and ecosystems or the conservation status of habitats and/or species.

11.2.11 The conservation status of habitats is determined by considering the cumulative influences on a habitat that may impact upon its '*extent, structure and functions*[2]' alongside its distribution and species composition. The conservation status of species is determined by considering the cumulative influences that may impact upon the abundance and distribution. Some habitats and/or species may have a known conservation status, with objectives and targets against which the impact can be considered. For other habitats/species, a professional judgement must be made using available data, in agreement with the relevant statutory nature conservation body.

11.2.12 Once significant impacts on IEFs have been determined, refinement of the Proposed Development will be made to avoid impacts, and/or mitigate measures for negative impacts on IEFs. Opportunities to provide enhancements will also be identified, such as habitat creation to increase the cover of priority habitats which will in turn provide opportunities for IEFs on the Site.

[1] Fuller, RJ. (1980) *A method of assessing the ornithological interest of sites for nature conservation*. Biological Conservation. 17, 229-239.
Fuller, RJ. (1982) *Bird Habitats in Britain, London*, T & AD Poyser.
[2] CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.2. Chartered Institute of Ecology and Environmental Management, Winchester.

11.2.13 An assessment of the significant residual effects on IEFs will be undertaken, and an identification of any policy drivers for the requirement of additional mitigation and/compensation in the event of residual significant negative effects.

11.2.14 Whereby an ecological feature is not considered to be an IEF, advice will be provided on relevant policy and legislation to ensure conformity.

Geographical Scope

11.2.15 Many of the biophysical changes generated by the Proposed Development have the potential to impact IEFs within the Site and its immediate environs. However, some impact pathways have the potential to affect more distant receptors, including potentially significant ecological effects arising from increased recreational pressure, hydrological change and air pollution within offsite nature conservation sites up to a radius of 5km or more.

11.2.16 Whilst the ZoI will vary depending upon the activity and to some extent the receptor, in this instance the largest ZoI is likely to relate to operational impacts upon the Thames Basin Heaths, which will be a radius of 7km[3].

Temporal Scope

11.2.17 The temporal scope of the ecological assessment will cover the construction and occupation phases of the Proposed Development

11.3 Baseline Conditions

Internationally Designated Sites

11.3.1 Part of the Thames Basin Heaths Special Protection Area (SPA) lies within a 5km of the Site, approximately 4.4km to the south (**Figure 11.1**). The Thames Basin Heaths is designated because it supports populations of Dartford warbler *Sylvia undata*, Nightjar *Camprimulgus europaeus* and Woodlark *Lullula arborea*.

11.3.2 The Habitat Regulations Assessment (HRA) of Wokingham Borough Council's Emerging Local Plan identified recreational pressure and atmospheric pollution as the main impact pathways likely to have a significant impact on the SPA.

Nationally Designated Sites

11.3.3 Four Sites of Special Scientific Interest (SSSI) are located within 5km of the Site: Lodge Wood and Sandford Mill SSSI; Longmoor Bog SSSI; Bramshill SSSI; and Stanford End Mill and River Loddon SSSI (**Figure 11.1**).

11.3.4 The Site lies within a number of SSSI Impact Risk Zone's, however due to the distance of the Site none of these impact zones consider residential development to be a risk. A number of commercial uses however, particularly those associated with combustion and pollution, are considered a likely to risk to nearby SSSI's.

[3] Thames Basin Heaths Joint Strategic Partnership Board. January 2009. *Thames Basin Heaths Special Protection Area Delivery Framework*.

Locally Designated Sites

11.3.5 Thirty-two Berkshire Local Wildlife Sites (LWS) are located within a 2km radius of the Site (**Figure 11.2**). Of these, five are located within the Site boundary, whilst a further two are located immediately adjacent.

11.3.6 The Loddon Valley South Biodiversity Opportunity Area (BOA) runs across the western and northern parts of the Site. BOA's are considered to be areas of land where there is the greatest potential for habitat creation and restoration.

11.3.7 Opportunities within the Loddon valley South BOA are targeted at the River Loddon and include lowland meadows, wet woodland, reedbeds and parkland.

Habitats

11.3.8 Initial habitat surveys of the Site were undertaken in April 2022, utilising the UK Habitats Classification System with update surveys taking place during 2024 (**Figure 11.3a – 11.3b**).

11.3.9 The Site largely comprises of agricultural land, with a mix of arable and cattle grazed pasture fields. Whilst these areas may offer limited foraging resources for some protected species, they are of little to no botanical value.

11.3.10 The more ecologically valuable habitats are largely found adjacent to the River Loddon, which bisects the Site, and within its floodplains. Within these areas are more diverse grasslands, wetlands, woodlands and scrub including Section 41 Habitats of Principle Importance such as Purple Moor Grass and Rush Pasture and Wet Woodland.

11.3.11 Pockets of woodland are scattered throughout the Site, including the Ancient Woodlands of St Johns Copse, Loaders Copse, Newbury's Copse and Furzen Coppice. Furthermore, a number of Veteran Trees were identified across the Site.

Bats

11.3.12 A desktop study identified fourteen species of bat within a 5km radius of the Site. These comprised:

- Barbastelle *Barbastella barbastellus.*
- Brown Long-eared bat *Plecotus auratus;*
- Common Pipistrelle *Pipistrellus pipistrellus;*
- Daubenton's bat *Myotis daubentoniid*;
- Leisler's bat *Nyctalus leisleri*;
- Long-eared bat species *Plecotus sp;*
- Myotis species *Myotis sp;*
- Nathusius *Pipistrellus nathusii;*
- Noctule *Nyctalus noctula*;
- Pipistrelle species *Pipistrellus sp;*

- Serotine *Eptesicus serotinus;* and
- Soprano Pipistrelle *Pipistrellus pygmaeus.*

11.3.13 Previous survey work undertaken by EPR [4] in the wider Shinfield area has identified assemblages that largely match that as identified in the desktop study, including low number of Barbastelle.

11.3.14 In line with Good Practice Guidelines at the time, bat activity surveys, alongside static detector surveys, were undertaken monthly between April and October 2022[5].

11.3.15 Species identified during the activity surveys were: Common Pipistrelle; Soprano Pipistrelle; Long-eared species; Noctule; Serotine; Myotis species; and Barbastelle.

11.3.16 Common Pipistrelle were the most recorded species, observed frequently across all areas of the Site. Soprano Pipistrelle and Noctule were also recorded across the Site, albeit less frequently. Low concentrations of Myotis species were recorded across the Site, with recordings largely centred around the River Loddon. A single Barbastelle was recorded in October.

11.3.17 Bat activity has been recorded across the Site, however foraging and commuting activity has largely been concentrated around the River Loddon and flowing watercourses, in and around woodlands and along well-established treelines and hedgerows (**Figure 11.4a – 11.4i**).

11.3.18 In addition to the species recorded during the activity surveys, the static detector surveys have identified Leisler's within the Site. Both have been recorded infrequently and at very low levels at a small number of locations across the Site.

11.3.19 Common Pipistrelle were the most frequently recorded species followed by Soprano Pipistrelle and Noctule respectively. All other species were recorded inconsistently and infrequently across the Site, whilst Barbastelle accounted for less than 1% of all calls recorded across the Site.

11.3.20 The assemblage of foraging/commuting bats within the ZoI of the Site is considered to be of County level importance and would therefore be included within an impact assessment.

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[4] Ecological Planning & Research Ltd (March 2009) *University of Reading Science and Innovation Park Environmental Statement – Chapter 9 : Ecology and Nature Conservation.*
Ecological Planning & Research Ltd (May 2012) *Land North of Cutbush Lane, Shinfield Environmental Statement – Chapter 8*
Ecological Planning & Research Ltd (November 2014) *Thames Valley Science Park, Shinfield – Update Ecological Survey Report.* P08/02-4B
Ecological Planning & Research Ltd (December 2016) *Thames Valley Science Park Phase 2, Shinfield – Update Ecological Survey Report.* P08/02-6D
Ecological Planning & Research Ltd (May 2018) *Land South of Cutbush Lane – Ecological Impact Assessment.* P16/44-1C
Ecological Planning & Research Ltd (2019) *British Museum Archaeological Research Collection (ARC) – Ecological Impact Assessment.* 1723-1B
Ecological Planning & Research Ltd (May 2021) *Shinfield Studios Creative Media Hub, Thames Valley Science Park Environmental Statement – Chapter 8: Biodiversity*

[5] Collins, J (ed) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London.

11.3.21 Further to the above, consideration has been given to roosting bats, with ground-level tree assessments, preliminary building assessments and emergence/re-entry surveys undertaken across the Site.

11.3.22 A number of bat roosts are known to be present on the Site and the immediately surrounding areas, including:

- Minor day roosts for Common and Soprano Pipistrelle in trees within the adjacent Shinfield Studios Site;
- Minor day roost for Common Pipistrelle and Brown Long-eared at Oldhouse Farm;
- Multiple roosts within Shinfield Grange;
- Several minor day roosts for Common Pipistrelle at Hatch Farm; and
- Common Pipistrelle and Brown Long-eared roosts at Upperwood Farm;
- Brown Long-eared and Soprano Pipistrelle maternity roosts at Hall Farm; and
- Minor day roosts for Common Pipistrelle, Soprano Pipistrelle and Brown Long-eared at Hall Farm.

11.3.23 The majority of roosts support low number of common species and are therefore considered to be of Local level importance. The maternity roosts are considered to be of County importance.

11.3.24 A European Protected Species Licence will be obtained prior to any works on a known bat roost.

Breeding Birds

11.3.25 The desktop study identified a large number and wide variety of bird species within a 2km radius of the Site, including farmland and riparian species.

11.3.26 Breeding bird surveys were undertaken in line with guidance released by the Bird Survey & Assessment Steering Group[6].

11.3.27 Six breeding bird surveys were undertaken across the Site between April to July 2022, including one dusk survey.

11.3.28 A total of 87 species have been recorded , of which 69 are considered to be 'breeding species'. Of the species recorded so far, 24 are Amber listed Species of Conservation Concern, whilst a further 15 are Red listed species.

11.3.29 A number of farmland birds have been recorded, including Skylark *Alauda arvensis*, Yellowhammer *Emberiza citronella* and Bullfinch *Pyrrhula pyrrhula*.

11.3.30 The assemblage of breeding bird species within the ZoI of the Site is considered to be of Regional level importance and would therefore be included within an impact assessment

[6] Bird Survey & Assessment Steering Group. (2022). *Bird Survey Guidelines for assessing ecological impacts, v.0.1.6*. https://birdsurveyguidelines.org. Accessed: March 2022

Wintering Birds

11.3.31 Four wintering bird surveys were undertaken between across 2023, plus a nocturnal visit.

11.3.32 A total of 65 species were recorded which included 24 are Amber listed Species of Conservation Concern, whilst a further eight are Red listed species.

11.3.33 Large flocks of wintering waterfowl were recorded on the floodplains of the Loddon, including Widgeon *Mareca penelope*, Shoveler *Spatula clypeata* and Gadwall *Anas strepera*.

11.3.34 The assemblage of wintering bird species within the ZoI of the Site is considered to be of County level importance and would therefore be included within an impact assessment

Hazel Dormice

11.3.35 The desktop study identified a single record of Hazel Dormouse *Muscardinus avellanarius*, located approximately 2.4km to the north of the Site, although the M4 motorway acts as a major barrier to movement.

11.3.36 A habitat suitability assessment was undertaken in April 2022 which determined that whilst large areas of the Site provided sub-optimal habitat for Dormice, the presence of Ancient woodland and historic linear features provided optimal habitats and good connectivity (**Figure 11.5a**).

11.3.37 Dormouse surveys, targeted at optimal habitats with good connectivity were undertaken across 2022/2023 to confirm either presence/likely absence. The methodology followed that detailed in the Dormouse Conservation Handbook[7] (**Figure 11.5b**).

11.3.38 No Dormice were found during the course of the surveys, and they are considered to be absent from the Site. They will not be considered in further assessments.

Invertebrates

11.3.39 Whilst the arable land within the Site is of limited value to invertebrates, they are numerous historical features, including Ancient Woodland and Veteran trees that are likely to support valuable species or assemblages. Similarly, semi-natural habitats along the river corridor, and the River Loddon itself are likely to support species and/or assemblages of value.

11.3.40 Invertebrate surveys comprising of 10 visits were undertaken between 2022 and 2023. A total of 852 taxa were recorded, of which 25 had a conservation designation.

11.3.41 The pockets of floodplain wetlands support a diverse assemblage with nationally scare taxa, including Loosestrife Bee *Macropis europea* and Flea Beetle *Lythraria salicariae.*

11.3.42 Based on the diversity of the assemblage, and presence of notable species, invertebrates will be included within the assessment.

[7] Bright, P. Morris, P & Mitchell-Jones, T (2006) *The Dormouse Conservation Handbook*. 2nd Ed. Published by English Nature (now Natural England).

Reptiles

11.3.43 All four common species of reptile, Slow Worm *Anguis fragilis*, Grass Snake *Natrix helvetica*., Adder *Viper berus* and Common Lizard *Zootoca vivipara* were identified within a 2km radius of the Site during the desktop study.

11.3.44 Of these the closest were records of Grass Snake located approximately 370m to the west. However, these records were from 2008 and were identified during surveys for development which has now taken place, altering the levels of suitable habitats in the immediate landscape.

11.3.45 Surveys undertaken in the wider Shinfield area have identified low numbers of reptiles, with the most recent surveys undertaken at Shinfield Studios, identifying a single Grass Snake

11.3.46 The majority of the Site contains sub-optimal habitats, with short, grazed grasslands, or arable crops with little to no field margins. A number of fields, largely concentrated around the River Loddon, may provide suitable habitats but are relatively isolated.

11.3.47 Given the lack of reptiles in the immediate vicinity, and the largely unsuitable habitats across the Site it is considered that reptiles, if present are likely to be in low numbers.

11.3.48 Reptiles will therefore be scoped out of the assessment.

11.3.49 All species of reptile will however require consideration in line with the relevant nature conservation legislation.

Water Vole & Otter

11.3.50 The desktop study identified Otter *Lutra lutra* records to the north of the Site, approximately 230m downstream on the Loddon. Anecdotal evidence suggests that they are occasionally present within the stretch of the River Loddon running through the Site. Whilst a survey has not yet been carried out, it is believed that Otter use this stretch of the river for foraging and commuting, and a holt is not present.

11.3.51 A number of Water Vole *Arvicola amphibius* records were identified within a 5km radius of the Site, with the closest of these being approximately 1.7km to the north. This however was the only record within 2km of the Site and is more than 25 years old.

11.3.52 In addition to the river, the Site hosts a vast ditch network, many of which are wet throughout the year, and provide suitable habitats for Water Vole.

11.3.53 Two visits for Water Vole and Otter were undertaken across the summer of 2022. As part of these surveys the River Loddon was surveyed by boat to increase access to difficult to reach parts of the river.

11.3.54 No evidence of Water Vole was found, and they are considered to be likely absent from the Site.

11.3.55 Signs of Otter were found along the River Loddon, including spraint and feeding remains. No signs of a holt were observed, and it is considered likely that Otter use this stretch of the River Loddon for foraging and commuting (**Figure 11.6**).

11.3.56 Otter are considered to be of Local level importance only and would therefore be included within the assessment.

White-clawed Crayfish

11.3.57 Anecdotal evidence suggests that White-clawed Crayfish *Austropotamobius pallipes* are present in Barkham Brook, upstream of the Site.

11.3.58 eDNA samples were taken at multiple points along Barkham Brook in 2023, as well as several points on the River Loddon.

11.3.59 All samples came back as negative for the presence of White-clawed Crayfish, and they are therefore considered to be absent from the stretches of the River Loddon and Barkham Brook.

11.3.60 Signal Crayfish *Pacifastacus leniusculus* are known to be present within the River Loddon, and were observed during the Water Vole surveys. The presence of this invasive species will notably reduce the suitability of the river to support White-clawed Crayfish.

[redacted]

included within the assessment.

Great Crested Newt

11.3.65 A number of Great Crested Newt records were identified within 5km of the Site, with the closest records located within and directly adjacent to the north boundary of the Site.

11.3.66 A total of 29 ponds were identified on and within 250m of the Site boundary. A small number of those offsite were ruled out of the assessment due to the presence of significant barriers to movement, including the A327 and the Eastern Relief Road (**Figure 11.7)**.

11.3.67 Large areas of the Site provide poor suitability terrestrial habitat for Great Crested Newt, however the woodlands, grasslands and hedgerows provide suitable habitats which may allow Great Crested Newt to move through the local landscape.

11.3.68 Habitat Suitability Index (HSI) Assessments of the accessible ponds were completed in April 2022 and eDNA samples were taken of 10 ponds, those which were accessible and carrying water at the time of survey.

11.3.69 Of the 10 ponds sample, a single pond (Pond 25) returned a positive result for the presence of Great Crested Newt. All other ponds provided negative results.

11.3.70 A population assessment was undertaken on Pond 25 in the Spring of 2023. With a peak count of 11 individuals, the pond is considered to support a medium population of Great Crested Newt.

11.3.71 Great Crested Newt are considered to be of Local level importance and would therefore be included within an impact assessment.

11.4 Potential Environmental Impacts & Effects

Construction Impacts and Effects

11.4.1 Consideration will be given to the following potential impacts and effects on IEFs during the Construction phase:

- Temporary land-take (habitat loss and fragmentation);
- Temporary and/or permanent damage to retained habitats;
- Habitat creation;
- Direct harm to protected/notable species and/or damage to breeding sites or resting places;
- Temporary disturbance to protected/notable species (visual, noise, vibration, lighting); and
- Hydrological change and pollution (dust generation, pollution of terrestrial and aquatic habitats, changes to ground and surface water quality and quantity).

Occupation Impacts and Effects

11.4.2 Consideration will be given to the following potential impacts and effects on IEFs during the operational phase:

- Permanent land-take (habitat loss and fragmentation);
- Air pollution;
- Hydrological change (ground and surface water quality and quantity);
- Lighting;
- Increased traffic-related mortality;
- Increased levels of predation;
- Recreational pressure (e.g. disturbance, trampling) to newly created habitats and/or nearby designated sites and associated protected/notable species; and
- Implementation of habitat management and monitoring plans.

11.5 Scoping Summary

11.5.1 Table 11.2 below provides a summary of the key issues scoped in for further EcIA to be reported in the ES.

11.5.2 For those Ecological Features currently lacking in data, a precautionary approach has been adopted and they have been scoped in until such a time that sufficient data is available to determine whether they are IEFs. This scoping will take place as part of the EcIA process and will be set out within the Environmental Statement.

Table 11.2 – Scoping Summary

Ecological Feature	Effect	Scoped In	Proposed Impact Avoidance/Mitigation
Internationally Designated Sites	• Damage to retained habitats • Disturbance (visual, noise, vibration, lighting) • Hydrological change and pollution (dust generation, pollution of habitats, change in surface and groundwater quality and quantity) • Changes in air quality • Recreational pressure (disturbance, trampling) • Increased levels of predation	Y	• Provision of Suitable Alternative Natural Greenspace (SANG) • SAMM contributions
Nationally Designated Sites		Y	• Provision of Suitable Alternative Natural Greenspace (SANG)
Locally Designated Sites		Y	• Implementation of semi-natural buffer zones • Implementation of suitable access management strategies • Implementation of Construction Environment Management Plan • Implementation of sensitive lighting strategies • Implementation of conservation-led management regimes (on-site only)
Habitats/Botany	• Damage to retained habitats • Disturbance (visual, noise, vibration, lighting) • Hydrological change and pollution (dust generation, pollution of habitats, change in surface and groundwater quality and quantity) • Changes in air quality	Y	• Retention/enhancement of ecologically valuable habitats (where possible) • Implementation of suitable access management strategies • Implementation of Construction Environment Management Plan
Bat Assemblage		Y	• Retention of roosts (where possible) • Acquisition of appropriate mitigation licences • Retention/enhancement of suitable habitats (where possible)

	• Recreational pressure (disturbance, trampling) • Habitat creation • Direct harm to protected/notable species • Increased risk of road traffic mortality • Implementation of habitat management and monitoring plans • Increased levels of predation		• Implementation of sensitive lighting strategies • Implementation of Construction Environment Management Plan
Breeding Bird Assemblage		Y	• Retention/enhancement of suitable habitats (where possible) • Implementation of Construction Environment Management Plan
Winter Bird Assemblage		Y	• Retention/enhancement of suitable habitats (where possible) • Implementation of Construction Environment Management Plan
Hazel Dormouse		N	
Invertebrates		Y	• Retention/enhancement of suitable habitats (where possible) • Implementation of Construction Environment Management Plan
Water Vole		N	
Otter		Y	• Implementation of Construction Environment Management Plan
Great Crested Newt		Y	• Acquisition of appropriate mitigation licence • Implementation of Construction Environment Management Plan
Reptiles		N	• Use of habitat manipulation and precautionary working methods

			• Implementation of Construction Environment Management Plan
[redacted]			

12 Ground Conditions and Contamination

12.1 Introduction

12.1.1 This chapter of the ES Scoping Report has been produced by RPS. It describes the assessment methodology, the baseline conditions at the Site and surroundings and the potential effects the Proposed Development may have on the hydrogeology, geology, ground conditions and mineral resources at the Site.

12.1.2 It is proposed that Ground Conditions and Contamination be **scoped out** of the EIA, with any potential issues being addressed through standard construction practices (to be presented within a Construction Environmental Management Plan (CEMP)) and adherence to regulations.

12.2 Assessment Criteria & Methodology

Previous Assessment

12.2.1 A Desk Top Study and Preliminary Risk Assessment (DTS and PRA) has been completed for the Site dated June 2022 (Appendix 12.1). The principal objectives of this assessment were as follows:

- To assess potential sources of contamination at the Site, associated with historical and current land uses both on Site and in the surrounding area;
- To review the environmental setting to assess the sensitivity of the surrounding area to contamination / pollution;
- To produce an outline Conceptual Site Model (CSM) detailing how any contamination may impact the identified receptors via pollutant linkages;
- To present a preliminary geotechnical appraisal, including identification of any significant ground stability issue; and
- Identify the requirement for further ground investigation to further characterise the identified pollutant linkages and any significant ground stability issues.

Legislative Context, Technical Guidance and Best Practice

Legislative Context

12.2.2 The relevant legislation and planning policy is provided below:

- DEFRA Environmental Protection Act 1990: Part 2A - Contaminated Land Statutory Guidance (2012);
- Environment Act 1995;
- Environmental Protection Act (EPA) 1990 (as amended);
- Contaminated Land (England) Regulations 2006, as amended 2012;
- Water Act 2014;

- Water Resources Act 1991, as amended 2009;
- Water Supply (Water Quality) Regulations 2016, as amended 2018;
- Water Environment (Water Framework Directive) (England and Wales) Regulations 2017;
- Environment Damage (Prevention and Remediation) (England) Regulations 2015, as amended 2019;
- Environmental Permitting (England and Wales) Regulations 2016, as amended (EU Exit) 2019;
- Control of Substances Hazardous to Health (COSHH) 2002 (as amended);
- Control of Pollution (Oil Storage) (England) Regulations 2001;
- National Planning Policy Framework (2023);
- Wokingham Borough Local Development Framework Adopted Core Strategy Development Plan Document (2010); and
- Central and Eastern Berkshire Minerals and Waste Plan (adopted 2023).

Guidance and Best Practice

12.2.3 A summary of guidance and best practice relevant to the assessment is provided below:

- West Berkshire Council Guidance for House Builders and Developers (online resource);
- British Standard BS10175 Investigation of potentially contaminated sites - Code of practice (BS10175:2011+A2:2017);
- Land Contamination: Risk Management (LCRM) (Environment Agency, 2020, amended 2023);
- British Standard BS8485 Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings (BS8485:2015+A1:2019);
- Construction Industry Research and Information Association (CIRIA) Document C665: Assessing Risks Posed by Hazardous Ground Gases to Buildings (CIRIA, 2007);
- CIRIA Document C552 -Contaminated Land Risk Assessment: A Guide to Good Practice (CIRIA, 2001a); and
- CIRIA Document C532 -Control of Water Pollution from Construction Sites: Guidance for Consultants and Contractors (CIRIA, 2001b).

Baseline Data Collection

12.2.4 The baseline environment is established within the DTS and PRA (Appendix 12.1). The DTS and PRA utilises information from publicly available records, data provided by a Groundsure Report and also ground conditions studies undertaken for the Site associated with previous planning applications. This includes data provided from the following sources:

- Environment Agency (EA) - regarding groundwater quality mapping, landfill sites and waste facilities, environmental permits, pollution incidents;

- British Geological Survey (BGS) - geology, radon risk and borehole records; and
- Ordnance Survey (OS) - historical mapping.
- Wokingham Borough Council (WBC) Planning Website[1]

12.2.5 Data requests were made to the local authority requesting details of sites to be considered within their contaminated land strategy and a site inspection was undertaken on 5th and 6th May 2022.

12.2.6 Two ground investigations have been undertaken between 2022 and 2024 by Ramboll and RPS, respectively, to support design of the proposed Collections and Research Centre for the National History Museum and access roads. Whilst this area is no longer included within the scoping development boundary, it was undertaken in the broader Site area, and the findings from each investigation were consistent with published baseline data available on BGS i.e. limited Made Ground and no confirmed evidence of soil contamination.

12.2.7 Figure 12.1 shows the Ground Contamination Constraints Plan.

12.2.8 An assessment will also be made to determine the potential for sterilisation of mineral resources upon redevelopment at the Site through the production of a Mineral Resources Assessment. Proposed Assessment Methodology

12.2.9 The framework presented in LCRM (Environment Agency, 2020 amended 2023) forms the basis of the risk assessment approach adopted in the DTS and PRA. The baseline characterisation of the Site in relation to ground contamination enables the development of a conceptual site model ('CSM'), which uses the source-pathway-receptor (pollutant linkage) approach as follows.

- Source: Referring to the potential source of contamination.
- Pathway: The mechanism by which a contaminant could move/migrate to a receptor.
- Receptor: Identified features that could be affected by a contaminant, based on the sensitivity of the site.

12.2.10 The CSM examines these elements for the Site in its current form and use. Following this approach, the likelihood of contamination to exist has been considered based on all these elements being present and forming a pollutant hazard, pathway and receptor linkage.

12.2.11 Similarly a qualitative assessment of significant ground stability issues is undertaken within the DTS and PRA.

12.2.12 As noted above, it is proposed that ground conditions and contamination is scoped out of the EIA, however, if it is concluded that ground conditions and contamination cannot be scoped out, the following assessment methodology will be implemented to determine the significance of impact. The approach considers the sensitivity of the receptors and the magnitude of the impact as set out below.

[1] https://www.wokingham.gov.uk/planning/

12.2.13 The sensitivity of potential receptors will be qualitatively described and categorised based on the terminology in Table 12.1.

Table 12.1: Receptor Sensitivity Criteria

Sensitivity	Typical Descriptors	Examples
High	High importance and rarity, and limited potential for substitution.	On site future site occupants e.g. future site users through chronic exposure to contamination Principal aquifer with licensed groundwater abstractions Excellent quality surface water bodies
Medium	Medium importance and rarity, limited potential for substitution.	Off-site future site occupants e.g. general public on adjacent sites Secondary A aquifer Good quality surface water bodies
Low	Low importance and rarity.	Secondary undifferentiated aquifer Satisfactory quality surface water bodies
Negligible	Very low importance and rarity.	Unproductive strata Poor quality surface water bodies

12.2.14 The magnitude of potential impacts will be qualitatively described and categorised based on the terminology in Table 12.2.

Table 12.2: Impact Magnitude Criteria

Magnitude	Criteria	Example / Description
High	Results in loss of attribute and likely to cause exceedance of statutory objectives and/or breaches of legislation.	Category 1 – Soil contamination that could result in a 'contaminated land' designation under Part IIA, i.e. significant possibility of significant harm to human health or controlled waters. Or A change of planning use deems that the concentrations of contaminants in the land may be harmful to receptors Remedial Action under Part IIA will be required Or Loss of resource or severe damage to characteristics, features or elements e.g. of a geologically designated site.
Medium	Results in impact on integrity of attribute or loss of part of attribute possibly with / without exceedance of Statutory objectives or with/ without breaches in legislation.	Category 2 - Soil contamination that could provide a strong case for considering that the risks are of significant concern so as to be designated as 'contaminated land' designation under Part IIA. Or A change of planning use deems that the concentrations of contaminants in the land may be harmful to receptors Remedial Action under Part IIA will be required on a precautionary basis.

		Or Partial loss of / damage to characteristics, features or elements e.g. of a geologically designated site.
Low	Results in minor impact on attribute.	Category 3 – Soil contamination could arise but the concentrations would not be considered significant or there is a low likelihood of serious pollution. Or A change of planning use deems that the concentrations of contaminants in the land are not capable of harming receptors. It is unlikely that remedial action will be required, however land owners may consider remedial actions to reduce contamination outside of the Part IIA or planning regime. Or Minor damage to characteristics, features or elements e.g. of geological feature of interest.
Negligible	Results in no discernible change or an impact on attribute of insufficient magnitude to affect the use / integrity.	Soil contaminants present, but risk assessment suggests negligible / low risk to human health. Or Very minor damage to characteristics, features or elements e.g. of geological feature of interest.

1.1.22 The significance of an effect will be determined from the predicted magnitude of an impact and the sensitivity of the receptor using the matrix provided in Table 12.3.

Table 12.3: Significance Criteria

Sensitivity	**Magnitude of Impact**			
	Negligible	Low	Medium	High
Negligible	Neutral	Neutral or Slight	Neutral or Slight	Slight
Low	Neutral or Slight	Neutral or Slight	Slight	Slight or Moderate
Medium	Neutral or Slight	Slight	Moderate	Moderate or Large
High	Minor	Minor or Moderate	Moderate or Large	Very Large

Geographical Scope

12.2.15 The study area includes the Site and a buffer of up to 500 metres surrounding the Site. This is considered to be sufficient based on professional judgment to enable the identification of off-site potential sources of contaminants of concern, and other factors which may have influenced site conditions and/or sensitive off-site receptors that require consideration. Beyond this buffer impacts are considered unlikely.

Temporal Scope

12.2.16 The temporal scope would cover the construction and occupation phases of the Proposed Development.

12.3 Baseline Environment

12.3.1 The baseline environment is detailed within the DTS and PRA and summarised below.

Published Geology

12.3.2 A various assemblage of superficial deposits is present beneath the Site which include:

- Brickearth;
- River Terrace Deposits 2, 3, 4 and 5; and
- Alluvium.

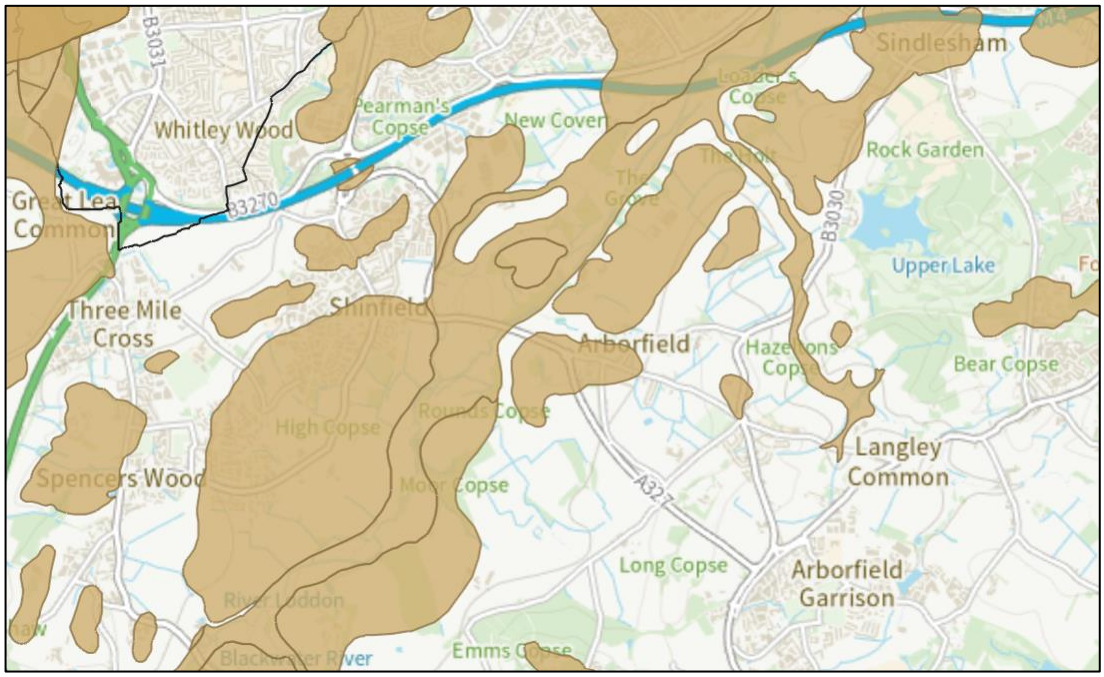
12.3.3 Localised areas of Made Ground are also recorded within the Site, indicated to be mainly associated with highway construction and an isolated area within Oldhouse Farm.

12.3.4 The bedrock comprises the London Clay Formation.

Safeguarded Mineral Resources

12.3.5 The Central and Eastern Berkshire Minerals and Waste Plan (adopted 2023) identifies much of the Site to be underlain by 'Sand and Gravel' Mineral Safeguarding Areas and 'Sand and Gravel' Areas of Search. The sand and gravel mineral resources are attributed to the River Terrace Deposits beneath the Site. Figure 12.2 details the extent of the Mineral Safeguarding Areas.

Figure 12.2 - Extent of Sand and Gravel Mineral Safeguarding Areas



12.3.6 The mineral deposits are focused on the River Loddon channel and are likely to be in hydraulic continuity with the river. Intrusive investigation and subsequent groundwater level monitoring works have identified a shallow near surface, water table within the mineral deposits.

Hydrogeology

12.3.7 The superficial deposits are designated a Secondary A Aquifer (River Terrace Deposits and Alluvium) or Secondary B aquifer (Brickearth).

12.3.8 The available ground investigation surveys indicate a very shallow, near surface groundwater table within the River Terrace Deposits.

12.3.9 The bedrock is designated an Unproductive Aquifer.

12.3.10 The Site is not indicated to be located in a groundwater Source Protection Zone (SPZ). There is one sensitive groundwater abstraction within the Site boundary.

Hydrology

12.3.11 The Barkham Brook cuts through the eastern part of the Site trending approximately south-east to north-west and the River Loddon cuts through the centre of the Site trending approximately south-west to north-east.

Site History

12.3.12 A review of historical maps indicates that since 1872 the land has predominantly been within agricultural use with a number of drains/ ditches, gravel pits and ponds located across the Site. From 1979 the M4 motorway and subsequently the B3270 have been constructed on the norther perimeter of the Site.

12.3.13 Off-site historical potential sources of contaminants of concern include a gas works, sawmills, paper mill and sewage works.

Site Inspection

12.3.14 A number of potentially contaminative land uses including builder's yards/compounds and storage areas associated with the farms, commercial premises and research facilities were identified.

Environmental Data

12.3.15 Three historical landfills are identified in the eastern half of the Site. Where records are available waste deposited is indicated to include inert and industrial wastes.

Regulatory Consultation

12.3.16 The Environmental Health Department at WBC identified a small number of potentially contaminated sites and gas consultation zones on Site. These aligned with the locations of former landfills and historical land uses on and adjacent to the Site.

Conceptual Site Model

12.3.17 The outline CSM produced within the DTS and PRA has identified a number of potential pollutant linkages that may be active upon the redevelopment of the Site. Significant Made Ground and widespread gross contamination is not anticipated at the Site and consequently the potential risks to identified receptors are assessed as low over the majority of the Site. Whilst this is the case potential localised sources of contamination have been identified where there is the potential for contamination which may pose a moderate risk to sensitive receptors and consequently will be subject to further investigation and assessment. These include a small

number of historical landfills, previously developed areas and farms where localised contamination and Made Ground may be expected.

12.3.18 The CSM has been used to define potential ground contamination constraints as shown on Drawing JER9482-900.

Ground Stability Hazards

12.3.19 A preliminary geotechnical risk register has not identified any significant ground stability issues at the Site.

12.4 Potential Environmental Impacts & Effects

Mitigation Measures

Construction

12.4.1 A Phase 2 ground investigation will be undertaken prior to the construction phase to investigate potential contamination sources identified on Drawing JER9482-900 and to verify the risk levels identified within the CSM.

12.4.2 Where contamination is identified that is assessed as presenting an unacceptable risk to receptors, a Remediation Strategy will be prepared which will comprise the following:

- Options appraisal setting out how the selected remediation option will mitigate the risks from the relevant contaminant linkages identified in the CSM;
- Implementation plan setting out the objectives and requirements of the remediation;
- Validation sampling to confirm that remediation objectives are met; and
- Verification report.

12.4.3 The scope of the Remediation Strategy will include all contamination remediation requirements and will be agreed with the WBC prior to its implementation. The verification report will also be sent to the WBC for approval. Subject to the scope and detail of the Remediation Strategy, the following would be undertaken where appropriate to inform the detailed design of buildings:

- Detailed ground gas risk assessment and gas control measures to be incorporated into building design.

12.4.4 Furthermore, the requirements for buried utility pipes will be assessed in more detail and confirmed with service providers prior to construction.

12.4.5 Should any previously unidentified contamination be encountered at the Site during the construction phase, work in the area would cease. A suitability qualified environmental consultant would attend the Site to advise on an appropriate course of action. Details of the conditions encountered will be reported to the WBC, and a suitable risk assessment and management strategy for dealing with the contamination would be submitted to these authorities for approval.

12.4.6 The construction process will include standard best practice measures to intercept run-off and ensure that discharges from the Site are controlled in quality. Specific measures to control surface water runoff will be implemented in line with a detailed CEMP to be implemented on a phase by phase basis.

12.4.7 A CL:AIRE Materials Management Plan (MMP) will be prepared prior to construction to document the management of soils on Site, and include a risk assessment procedure to demonstrate that the soils do not present a risk to human health or the environment. Excavation works will be carried out in such a way to enable effective segregation of suitable materials for reuse on Site wherever practicable.

12.4.8 Appropriate ground investigation and assessment will also be undertaken prior to the construction phase to inform foundation design in accordance with best practice guidance which includes NHBC Standards 2024.

12.4.9 A Mineral Resources Assessment will be undertaken to determine the extent of sand and gravel mineral resources at the site. Where it is concluded that there are significant mineral resources at the Site, consideration will be made to sterilisation related to existing structures and sensitive land uses and the viability and practicability of extraction.

Operation

12.4.10 During operation of the Proposed Development any plant and equipment will be appropriately sited on areas of hardstanding / within bunds, as per best practice and in and adherence to industry standards. Operational management systems and procedures will include the use of accidental spill kits. Where the handling / storage of hazardous substances is required as part of operations this will be regulated under relevant legislation including COSHH.

Construction Impacts and Effects

12.4.11 Potential impacts during construction of the Proposed Development are assessed as follows:

- Runoff from construction areas to soils (and subsequent leaching into groundwater, including effects on surface waters).
- Mobilisation / creation of new pathways relating to existing contamination and associated impact on controlled waters and human health receptors.
- Contamination risk to construction workers, including dermal contact and ingestion of existing soil or groundwater contamination, or inhalation of any accumulated ground gases / vapours.
- Contamination risk to adjacent site users, e.g. airborne migration and subsequent inhalation of soil derived dusts.
- Contamination risk to end users, including dermal contact and ingestion of existing soil or groundwater contamination, or inhalation of any accumulated ground gases / vapours.

12.4.12 Taking into consideration the mitigation measures to be implemented as part of the Proposed Development significant effects during construction are not predicted.

Occupation Impacts and Effects

12.4.13 Potential impacts during operation of the Proposed Development are assessed as follows:

- Accidental spillages /leaks during routine operation and maintenance of any plant and equipment resulting in new contamination sources.

12.4.14 Taking into consideration the mitigation measures to be implemented as part of the Proposed Development significant effects during operation are not predicted.

12.5 Scoping Summary and Rationale for Scoping Out

12.5.1 It is proposed that the ES will be supported by a number of technical appendices which will include the DTS and PRA (Appendix 12.1), an outline CEMP, Phase 2 Ground Investigation, a MRA and where required a Remediation Strategy. The phase 2 Ground Investigation in support of the ES will focus on the identified Gas Consultation Zones and Priority Inspection Sites, as identified by the local authority. It is considered that these will mitigate the risk from any contamination and there are unlikely to be significant environmental impacts associated with either ground contamination or land stability or to minerals. Therefore it is proposed that ground conditions may be **scoped out** of the ES.

13 Human Health

13.1 Introduction

13.1.1 This chapter of the ES Scoping Report has been produced by the Savills (UK) Health and Social Impact Assessment Team (HSIA) within the Environment and Infrastructure department.

13.1.2 The topic of 'human health' is proposed to be scoped in to provide greater transparency as to how and where health is addressed by the overlapping technical disciplines, and further facilitate more health conscientious planning and development. The proportionality of the assessment, and further detail on what specific health determinants are proposed to be assessed are outlined in Section 13.4 (Potential Environmental Impacts & Effects).

13.2 Assessment Criteria & Methodology

Previous Assessment

13.2.1 No previous assessment has been undertaken at the Site relevant to the proposed population and health assessment.

Legislative Context, Local Planning Policy, Technical Guidance and Best Practice

Legislative Context

13.2.2 There is no specific legislation that is relevant to the population and health assessment.

Local Planning Policy

13.2.3 Relevant local policy documents comprise the Wokingham Borough Council Local Development Framework Adopted Core Strategy (Wokingham Borough Council, 2010) and the Wokingham Borough Council Local Plan Update: Draft Plan 2020 (Wokingham Borough Council, 2020). Local policies pertinent to health and wellbeing are outlined in more detail below.

Local Development Framework Adopted Core Strategy

13.2.4 Policy CP2 (Inclusive communities) states that to ensure that new development contributes to the provision of sustainable and inclusive communities (including the provision of community facilities) to meet long term needs, planning permission will be granted for proposals that address the requirements of (amongst other factors) the challenges associated with an ageing population, particularly in terms of housing, health and wellbeing. Health is a central pillar to the strategy, and presses the need to facilitate healthy independent living for longer, and foster healthy, vibrant and cohesive communities.

Local Plan Update: Revised Growth Strategy Consultation

13.2.5 Policy SS1 (Spatial Strategy) states that new growth will be balanced by ensuring that Wokingham Borough's identified development needs can be met with adequate provision of infrastructure, in a manner that enables improvements to quality of life, reduces the need to travel, adapts to and mitigates against the impacts of climate change to achieve a 'net zero carbon' future, and maintains and strengthens the sense of place, including the role and

separate identity of settlements. Amongst other factors, promoting healthy lifestyles and wellbeing is again pressed as a core objective.

13.2.6 Policy SS13 (Loddon Valley Garden Village) states that the development will be delivered in accordance with a number of development, delivery and place shaping principles, including the delivery of three neighbourhood centres providing health facilities (amongst other community facilities). Furthermore, the delivery principles defined include beautifully and imaginatively designed homes with gardens, combining the best of town and country to create healthy communities and including opportunities to grow food. Place shaping principles include that each neighbourhood should be planned to be high quality, resilient, compact and safe, and include access for all to a range of local employment opportunities and community services and facilities, including health/wellbeing, education, retail, culture, civic spaces, multi-functional open space and sports and leisure facilities.

13.2.7 Policy C2 (Mitigation of Transport Impacts and Highways Safety and Design) states that with regards to highways safety and design, all development proposals must (amongst other factors) Contribute towards a high quality public realm designed in accordance with Living Streets (or any successor document), user access hierarchy and demonstrate how the principles of Healthy Streets have been incorporated.

13.2.8 Policy C8 (Green and Blue Infrastructure and Public Rights of Way) states that the existing areas of green and blue infrastructure of Wokingham Borough will be protected and be enhanced for the biodiversity, recreational, amenity, health and townscape and landscape value, and contribution towards mitigating and adapting to climate change.

13.2.9 Policy H9 (Accommodation for Older People and Vulnerable Communities) states that development proposals for purpose built or specialist accommodation for vulnerable people and/or older people will be supported, provided that (amongst other factors) the accommodation is well located, close to an identified town, district or local centre with access to a good range of services and facilities, including existing public transport routes, or incorporates essential community facilities and services, such as healthcare services or day care for older people.

13.2.10 Policy DH1 (Place Making and Quality Design) states that all development will contribute to a strong sense of place through high quality design which should endure over the lifetime of the development. Development is required to (amongst other factors) create places that foster active and healthy lifestyles.

13.2.11 Policy HC1 (Promoting Healthy Communities) states that:

1. Strong, vibrant and healthy communities will be promoted through a high quality environment with local services to support health, social and cultural wellbeing and reduce inequalities.

2. Development proposals should include measures to contribute to healthier communities and reduce health inequalities. This includes making a positive contribution to creating high quality, active, safe and accessible places.

3. Development proposals will be supported which:

a. Contribute to the priorities of the Health and Wellbeing Board and partners to help reduce health inequalities;

b. Support the provision of new or improved health facilities, in consultation with Berkshire West Clinical Commissioning Group and NHS England;

c. Protect existing health facilities in line with Policy HC2: Community Facilities.

4. Proposals for all major development schemes will be required to include a HIA.

13.2.12 Policy HC5 (Environmental Protection) states that development proposals will only be supported where it can be demonstrated that individually, or cumulatively in combination with other schemes, they do not have an unacceptable impact, either during the construction phase, or when completed, on: human health, wellbeing or safety, residential amenity, environmental quality or landscapes, other sensitive receptors.

13.2.13 Policy HC9 (Contaminated Land and Water Development) states that proposals on or near sites which are known, or suspected to be potentially contaminated, or proposals for sensitive land uses will be supported where it can be demonstrated that the following receptors will not be exposed to levels of potential contamination which would give rise to unacceptable risks or harm to health (amongst other factors).

13.2.14 Policy NE5 (Landscape and Design) states that development proposals should promote landscape spaces, public realm and green infrastructure with associated planting to improve ecological connectivity, create a sense of place, mitigate and adapt to climate change and improve health and wellbeing.

Guidance and Best Practice

13.2.15 The following guidance and best practice is proposed to be followed for the assessment of human health:

- National Planning Practice Guidance (Department for Levelling Up, Housing and Communities, 2022);
- IEMA Guide to Effective Scoping of Human Health in EIA (IEMA, 2022); and
- IEMA Guide to Determining Significance for Human Health in EIA (IEMA, 2022).

Baseline Data Collection

13.2.16 Different communities have varying circumstance and sensitivity to population, health and socio-economic changes (both adverse and beneficial) as a result of social and demographic structure, behaviour and relative economic circumstances.

13.2.17 A desktop study will be undertaken to establish local population and health circumstance, priority and need. This will involve the collection and interpretation of published demographic, socio-economic and existing public health and healthcare capacity data, contrasted against regional and national data. The following open source websites and datasets are anticipated to be used in order to develop the population and health baseline:

- Office for Health Improvement and Disparities (OHID) Local Health tool (Office for Health Improvement and Disparities, n.d.);
- PHE Fingertips health baseline (Office for Health Improvement and Disparities, n.d.); and
- Office for National Statistics (ONS).

13.2.18 For the purpose of informing this scoping exercise, a high-level community baseline has been created from the collated data and is presented in Section 13.3.

Proposed Assessment Methodology

Receptor sensitivity

13.2.19 Within a defined population, individuals will range in level of sensitivity due to a series of factors such as age, socio-economic deprivation, and the prevalence of any pre-existing health conditions which could become exacerbated. Sensitive individuals can be considered particularly vulnerable to changes in environmental and socio-economic factors (both adversely and beneficially), whereby they could experience disproportionate effects when compared to the general population.

13.2.20 As an example, the elderly, young children and individuals with chronic pre-existing respiratory conditions would be more sensitive to adverse changes to air quality, with the potential for emergency admission to hospital more likely than for someone of working age who has good respiratory health. On the other hand, an individual who has been unemployed for a long period would benefit more from employment opportunities and associated effects on their wellbeing generated by the Proposed Development in comparison to an individual who is already employed.

13.2.21 The health sensitivity methodology criteria shown in Table 13.1 is proposed to be used to inform the assessment of significance.

Table 13.1 Impact magnitude criteria

Magnitude of impact	Definition
High	High levels of deprivation (including pockets of deprivation); reliance on resources shared (between the population and the project); existing wide inequalities between the most and least healthy; a community whose outlook is predominantly anxiety or concern; people who are prevented from undertaking daily activities; dependants; people with very poor health status; and/or people with a very low capacity to adapt.
Medium	Moderate levels of deprivation; few alternatives to shared resources; existing widening inequalities between the most and least healthy; a community whose outlook is predominantly uncertainty with some concern; people who are highly limited from undertaking daily activities; people providing or requiring a lot of care; people with poor health status; and/or people with a limited capacity to adapt.
Low	Low levels of deprivation; many alternatives to shared resources; existing narrowing inequalities between the most and least healthy; a community whose outlook is predominantly ambivalence with some concern; people who are slightly limited from undertaking daily activities; people providing or requiring some care; people with fair health status; and/or people with a high capacity to adapt.
Very low	Very low levels of deprivation; no shared resources; existing narrow inequalities between the most and least healthy; a community whose outlook is predominantly support with some concern; people who are not limited from undertaking daily activities; people who are independent (not a carer or dependant); people with good health status; and/or people with a very high capacity to adapt.

Magnitude of impact

13.2.22 The health magnitude methodology criteria shown in Table 13.2 is proposed to be used to inform the assessment of significance.

Table 13.2 Health magnitude methodology criteria

Category/level	Indicative criteria
High	High exposure or scale; long-term duration; continuous frequency; severity predominantly related to mortality or changes in morbidity (physical or mental health) for very severe illness/injury outcomes; majority of population affected; permanent change; substantial service quality implications.
Medium	Low exposure or medium scale; medium-term duration; frequent events; severity predominantly related to moderate changes in morbidity or major change in quality-of-life; large minority of population affected; gradual reversal; small service quality implications.
Low	Very low exposure or small scale; short-term duration; occasional events; severity predominantly related to minor change in morbidity or moderate change in quality-of-life; small minority of population affected; rapid reversal; slight service quality implications
Negligible	Negligible exposure or scale; very short-term duration; one-off frequency; severity predominantly relates to a minor change in quality-of-life; very few people affected; immediate reversal once activity complete; no service quality implication.

Sensitivity of effect

13.2.23 The significance of the effect is determined based on the sensitivity of a receptor and the magnitude of an impact. The method proposed for the human health assessment is presented in Table 13.3. Where a range of significance levels are presented, the overall assessment for each effect will be based upon expert judgement.

13.2.24 In all cases, the elevation of receptor sensitivity, impact magnitude and significance of effect has been informed by professional judgement and is underpinned by narrative to explain the conclusions reached.

Table 13.3 Significance matrix

Magnitude		Sensitivity			
		High	**Medium**	**Low**	**Very low**
	High	Major	Major/moderate	Moderate/minor	Minor/negligible
	Medium	Major/moderate	Moderate	Minor	Minor/negligible
	Low	Moderate/minor	Minor	Minor	Negligible
	Negligible	Minor/negligible	Minor/negligible	Negligible	Negligible

13.2.25 Table 13.4 provides a description of each significance level. For this assessment, any effects with a significance level of minor or less are not considered to be significant in terms of the EIA Regulations.

Table 13.4 Significance conclusion and reasoning related to public health

Category/level	Indicative criteria
Major (significant)	The narrative explains that this is significant for public health because: - Changes, due to the project, have a substantial effect on the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by referencing relevant policy and effect size (magnitude and sensitivity levels), and as informed by consultation themes among stakeholders, particularly public health stakeholders, that show consensus on the importance of the effect. - Change, due to the project, could result in a regulatory threshold or statutory standard being crossed (if applicable). - There is likely to be a substantial change in the health baseline of the population, including as evidenced by the effect size and scientific literature showing there is a causal relationship between changes that would result from the project and changes to health outcomes. - In addition, health priorities for the relevant study area are of specific relevance to the determinant of health or population group affected by the project.
Moderate (significant)	The narrative explains that this is significant for public health because: - Changes, due to the project, have an influential effect on the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by referencing relevant policy and effect size, and as informed by consultation themes among stakeholders, which may show mixed views. - Change, due to the project, could result in a regulatory threshold or statutory standard being approached (if applicable). - There is likely to be a small change in the health baseline of the population, including as evidenced by the effect size and scientific literature showing there is a clear relationship between changes that would result from the project and changes to health outcomes. - In addition, health priorities for the relevant study area are of general relevance to the determinant of health or population group affected by the project.
Minor (not significant)	The narrative explains that this is not significant for public health because: - Changes, due to the project, have a marginal effect on the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by effect size of limited policy influence and/or that no relevant consultation themes emerge among stakeholders. - Change, due to the project, would be well within a regulatory threshold or statutory standard (if applicable); but could result in a guideline being crossed (if applicable). - There is likely to be a slight change in the health baseline of the population, including as evidenced by the effect size and/or scientific literature showing there is only a suggestive relationship between changes that would result from the project and changes to health outcomes. - In addition, health priorities for the relevant study area are of low relevance to the determinant of health or population group affected by the project.

Negligible (not significant)	The narrative explains that this is not significant for public health because: - Changes, due to the project, are not related to the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by effect size or lack of relevant policy, and as informed by the project having no responses on this issue among stakeholders. - Change, due to the project, would not affect a regulatory threshold, statutory standard or guideline (if applicable). - There is likely to be a very limited change in the health baseline of the population, including as evidenced by the effect size and/or scientific literature showing there is an unsupported relationship between changes that would result from the project and changes to health outcomes. - In addition, health priorities for the relevant study area are not relevant to the determinant of health or population group affected by the project.

Geographical Scope

13.2.26 The Proposed Development would be within the Hawkedon, Winnersh, Shinfield South and Arborfield wards, located within the Unitary Authority of Wokingham.

13.2.27 Environmental health determinants (such as changes to air quality and noise exposure) are likely to have a local impact where the potential change in hazard exposure is limited by physical dispersion characteristics. As a result, the local study area for health-specific baseline statistics relating to population and health effects would focus on Hawkedon, Winnersh, Shinfield South and Arborfield wards, using the Unitary Authority (UA) of Wokingham, regional (South East) and national (England) averages as comparators. Where data is not available at the ward level, UA-level data is presented as a representative alternative.

13.2.28 Wider socio-economic health determinants (such as employment and related income generation) have a wider geographic scope of influence than environmental health determinants, due to the willingness to commute significant distances to work. On this basis, the wider study area for socio-economic baseline data would focus on Wokingham Borough, using regional and national averages as comparators.

13.2.29 The study area defining the relevant sensitive receptors identified for assessment purposes would remain consistent with the inter-related technical disciplines assessed within the ES, which the human health topic relies upon.

Temporal Scope

13.2.30 The human health ES chapter will assess potential effects across a range of health determinants during both the construction and occupation phases of the Proposed Development.

13.3 Baseline Environment

13.3.1 Table 13.5 outlines existing local health circumstance within the ward study area, using district, region and national averages as relevant comparators.

13.3.2 For the relevant study area, the following colour coding has been applied to aid analysis:

- Better than the national average – green; and

- Worse than the national average – orange.

Table 13.5 Local health circumstance

Indicator	Date	Average across ward study area	Wokingham	South East	England
Deprivation and socio-economic circumstance					
Index of Multiple Deprivation (IMD) Score	2019	6.9	5.8	16.6	21.7
Income deprivation (%)	2019	4.5	4.4	9.1	12.9
Child poverty (%)	2019	5.9	5.6	12.4	17.1
Older people in poverty (%)	2019	5.3	5.6	10.2	14.2
Older people living along (%)	2011	24.4	25.9	30.4	31.5
Overcrowded houses (%)	2011	4.1	3.7	7.5	8.7
Households in fuel poverty (%)	2020	5.3	5.2	8.6	13.2
Unemployment (%)	2021-22	2.5	2.3	4.2	5
Long term unemployment (%)	2021-22	1.1	0.5	1.2	1.9
Physical health					
Life expectancy at birth for males (years)	2016-20	81	82.2	80.2	79.5
Life expectancy at birth for females (years)	2016-20	84.5	85.6	83.8	83.2
Healthy life expectancy at birth for males (years)	2018-20	n/a	70.9	65.5	63.1
Healthy life expectancy at birth for females (years)	2018-20	n/a	71.2	65.9	63.9
Emergency hospital admissions for all causes (SAR)	2015-16 to 2019-20	78	75.4	92	100
Emergency hospital admissions for coronary heart disease (SAR)	2015-16 to 2019-20	57.9	53.1	78	100
Emergency hospital admissions for stroke (SAR)	2015-16 to 2019-20	76.8	81.5	90.2	100
Emergency hospital admissions for Myocardial Infarction (heart attack) (SAR)	2015-16 to 2019-20	63.4	56.5	85.1	100
Emergency hospital admissions for Chronic Obstructive Pulmonary Disease (COPD) (SAR)	2015-16 to 2019-20	61.6	47.5	72.9	100
Incidence of all cancer (SIR per 100)	2015-19	85.6	93.1	100	100
Deaths from all causes all ages (SMR)	2016-20	90.2	79.9	92.1	100
Deaths from all cancer all ages (SMR)	2016-20	80	83.7	95.2	100
Deaths from circulatory disease all ages (SMR)	2016-20	84.4	75.9	91.9	100
Deaths from coronary heart disease all ages (SMR)	2016-20	84.1	71.1	83.5	100
Deaths from stroke all ages (SMR)	2016-20	83.7	81.8	92.8	100
Deaths from respiratory diseases all ages (SMR)	2016-20	81.5	75.1	89.7	100
Deaths from causes considered preventable under 75 years (SMR)	2016-20	68.5	60.8	84.5	100
Mental health and behavioural risk factors					
Emergency hospital admissions for intentional self-harm (SAR)	2016-17 to 2020-21	78.2	89.3	108.3	100
Suicide rate (per 100,000 population)	2022-22	n/a	6.4	10.4	10.4

Hospital admissions for alcohol attributable conditions (Narrow definition) (SAR)	2016-17 to 2020-21	51.3	56.4	80.8	100
Smoking prevalence at 15 years (regular) (%)	2014	2.2	2.2	5.8	5.4
Reception: prevalence of overweight (including obesity) (%)	2017-18 to 2019-20	18.7	18.9	21	22.6
Reception: prevalence of obesity (including severe obesity) (%)	2017-18 to 2019-20	7.4	7.7	8.9	9.9
Year 6: prevalence of overweight (including obesity) (%)	2017-18 to 2019-20	29.8	28.2	32.8	35.8
Year 6: prevalence of obesity (including severe obesity) (%)	2017-18 to 2019-20	15	15	18.9	21.6
Percentage of adults classified as overweight or obese (%)	2022/23	n/a	65.6	62.8	64
Percentage of physically active adults (%)	2022/23	n/a	71.9	70.2	67.1

13.3.3 From the initial baseline, local communities living within the four wards are not considered disproportionately sensitive to environmental health determinants, expressing a relatively low burden of poor health, high life expectancy and a high proportion of life spent in good health. However, continuous support to encourage healthy lifestyles and behaviours while promoting good social and mental health is needed through design features that facilitate health and wellbeing, and specifically, to meet the needs of an ageing population.

13.3.4 The data presented here as part of the baseline will be further expanded upon in the ES, and applied to inform healthy urban design features.

Local public health priorities

13.3.5 Berkshire West Health and Wellbeing Strategy 2021-2030 (Wokingham Borough Council, 2021) outlines the following five key priorities to consider when placemaking:

- reduce the differences in health between different groups of people;
- support individuals at high risk of bad health outcomes to live healthy lives;
- help children and families in early years;
- promote good mental health and wellbeing for all children and young people; and
- promote good mental health and wellbeing for all adults.

13.3.6 Healthy urban design features will be explored during the pre-application process that specifically supports the priorities outlined above.

13.4 Potential Environmental Impacts & Effects

13.4.1 The aim of the assessment stage of the chapter is to draw from and build upon appropriate technical topic areas within the EIA and will seek to establish the distribution and significance of potential human health effects.

13.4.2 Key health determinants considered to be relevant to the residential nature of proposed development with the potential to impact human health (physical, social and mental) include:

- changes in local air quality;
- changes in noise exposure;

- changes in transport nature and flow rate;
- changes in socio-economic factors (income and employment); and
- healthcare capacity (occupation phase only).

13.4.3 The remainder of this section explores in more detail the above health determinants, identifying whether or not they should be scoped in or out of the human health ES chapter.

Construction Impacts and Effects

Changes to air quality

13.4.4 Construction of the Proposed Development is anticipated to contribute to local and temporary changes in air quality (dust, particulate matter and nitrogen dioxide) associated with on-site construction activities and additional traffic movements required for the delivery of construction materials and worker travel to/from the Site.

13.4.5 Embedded mitigation measures would be implemented in order to reduce the generation of dust and release of air pollutants, contained within a Construction Environmental Management Plan (CEMP), Construction Transport Management Plan (CTMP) and Travel Plan. Given local community proximity and sensitivity, this topic will be scoped into the ES to further communicate how known hazards are addressed to prevent any material risk to human health.

13.4.6 The human health topic would draw from and build upon key outputs from the Air Quality technical discipline in order to carry out the assessment and reach a conclusion regarding the significance of effect in health terms.

Changes to noise exposure

13.4.7 Similar to the above, construction of the Proposed Development is anticipated to contribute to local and temporary changes in noise exposure associated with on-site construction activities and additional traffic movements required for the delivery of construction materials and worker travel to/from the site.

13.4.8 While construction hours and embedded mitigation measures would be implemented in order to reduce noise impacts, contained within a Construction Environmental Management Plan (CEMP), the human health effects associated with changes in noise exposure during the construction phase can generate community health concerns, and would be scoped into the ES to more effectively assess and communicate the magnitude of impact, the sensitivity of the receiving community to such changes, and the resultant significance of effect on health, if any.

13.4.9 The human health topic would draw from and build upon key outputs from the Noise and Vibration technical discipline in order to carry out the assessment and reach a conclusion regarding the significance of effect in health terms.

Changes in transport nature and flow rate

13.4.10 Construction of the Proposed Development would generate changes in transport nature and flow rate associated with delivery of construction materials and worker travel to/from the site, which could have resultant effects on community severance, pedestrian amenity and risk of road traffic accidents/injury.

13.4.11 As such, the human health effects associated with changes in transport nature and flow rate during the construction phase would be scoped into the ES to more effectively communicate

the themes most relevant to health and wellbeing (e.g. severance, pedestrian amenity, risk of accident/injury).

13.4.12 The human health topic would draw from and build upon key outputs from the Traffic and Transport technical discipline in order to carry out the assessment and reach a conclusion regarding the significance of effect in health terms.

Changes in socio-economic factors (income and employment)

13.4.13 Construction of the Proposed Development would generate temporary direct employment opportunities (primarily for construction workers), with associated indirect and induced employment opportunities from supply chain activity (indirect) and local spending on goods and services by employees (induced).

13.4.14 On the basis that having a consistent income and being in long-term employment are two of the most important wider determinants of health, construction of the Proposed Development is anticipated to offer positive health and wellbeing effects. However, due to the highly mobile nature of the construction industry, there is potential for the effects to be more widely distributed.

13.4.15 As such, the human health effects associated with changes in socio-economic factors during the construction phase would be scoped into the ES, building on the socio-economic outputs to communicate the magnitude of impact, the sensitivity of the receiving community to such changes and the resultant significance of effect on health, if any.

13.4.16 The human health topic would draw from and build upon key outputs from the Socio-economic technical discipline in order to carry out the population and health assessment and reach a conclusion regarding the significance of effect in health terms.

Occupation Impacts and Effects

Changes to air quality

13.4.17 The occupation of residential developments has the potential to generate changes in local air quality, primarily associated with residents owning private vehicles and using these vehicles to travel away from their residence (i.e. for travelling to/from the workplace and accessing community facilities and services that are not provided within walking distance) or from incoming traffic (i.e. those visiting friends/family who occupy the units or visiting to use commercial aspects of the proposed development).

13.4.18 In addition, there would be sources of air pollutants on-site; for example, from any energy generation units (for both residential and commercial aspects of the proposed development).

13.4.19 Another element to consider is the suitability of the Site for occupation, whereby the existing air quality and predicted change in air quality should be acceptable and protective of physical health.

13.4.20 As such, the human health effects associated with changes to air quality during the occupation phase would be scoped into the ES to assess the magnitude of impact, the sensitivity of the receiving community to such changes and the resultant significance of effect (for both existing residents in the surrounding area and new residents who would be occupying the proposed development).

13.4.21 The human health topic would draw from and build upon key outputs from the Air Quality technical discipline in order to carry out the assessment and reach a conclusion regarding the significance of effect in health terms.

Changes to noise exposure

13.4.22 Similar to the above, the occupation of residential developments has the potential to generate changes in noise exposure from residents owning private vehicles, individuals visiting the commercial aspects of the proposed development, and other on-site sources of noise associated with commercial aspects.

13.4.23 The suitability of the site in terms of its noise environment would also have to be considered in order to ensure protection of the health and wellbeing of existing residents during both the day and night time periods.

13.4.24 As such, the human health effects associated with changes to noise exposure during the occupation phase would be scoped into the ES to assess the magnitude of impact, the sensitivity of the receiving community to such changes and the resultant significance of effect (for both existing residents in the surrounding area and new residents who would be occupying the proposed development).

13.4.25 The human health topic would draw from and build upon key outputs from the Noise and Vibration technical discipline in order to carry out the assessment and reach a conclusion regarding the significance of effect in health terms.

Changes in transport nature and flow rate

13.4.26 Traffic will be generated through the occupation of the Proposed Development. While this is the case, the Proposed Development is expected to deliver a new link over the M4 to Lower Earley Way, and associated highways works that might include improvements to transport capacity along Lower Earley Way and other neighbouring roads, a new link to Hatch Farm Way and the partial closure of Mill Lane. Therefore, it will be important to understand the changes in factors such as community severance, pedestrian amenity and risk of road traffic accidents/injury associated with changes in transport nature and flow rate in the context of the proposed transport infrastructure improvements.

13.4.27 Furthermore, the Proposed Development includes:

- the delivery of a new pedestrian, cycleway, greenway infrastructure, and public transport priority routes; and
- comprehensive strategic landscaping and network of multi-functional green and blue infrastructure, incorporating River Loddon and Barkham Brook to create a country park supplemented by ecological networks and habitats and promote high levels of connectivity, including to the Loddon long-distance footpath and greenways.

13.4.28 This has the potential to generate beneficial human health effects associated with contributing to a walkable neighbourhood and increasing participation in physical activity.

13.4.29 As such, the human health effects associated with access, accessibility, changes in transport nature and flow rate during the occupation phase would be scoped into the ES to assess the magnitude of impact, the sensitivity of the receiving community to such changes and the resultant significance of effect on health (for both existing residents in the surrounding area and new residents who would be occupying the Proposed Development).

13.4.30 The human health topic would draw from and build upon key outputs from the Traffic and Transport technical discipline in order to carry out the assessment and reach a conclusion regarding the significance of effect in health terms.

Changes in socio-economic factors (income and employment)

13.4.31 The Proposed Development includes the delivery of neighbourhood and district centres providing a range of retail, leisure (including indoor and outdoor sports), cultural, health and service facilities. Such community facilities would generate long-term direct employment opportunities, with associated indirect and induced employment opportunities from supply chain activity (indirect) and local spending on goods and services by employees (induced).

13.4.32 On the basis that having a consistent income and being in long-term employment are two of the most important wider determinants of health, the delivery of neighbourhood and district centres are anticipated to have beneficial health and wellbeing effects. Furthermore, there is potential for the effects to be more widely distributed than locally due to the mobile nature of workforces.

13.4.33 As such, the human health effects associated with changes in socio-economic factors during the occupation phase would be scoped into the ES to assess the magnitude of impact, the sensitivity of the receiving community to such changes and the resultant significance of effect.

13.4.34 The human health topic would draw from and build upon key outputs from the Socio-economic technical discipline in order to carry out the assessment and reach a conclusion regarding the significance of effect in terms of health.

Healthy urban design

13.4.35 Local policy establishes and reinforces the responsibility of developments to not only remove and manage potential health risk, but support the delivery of local health priorities and needs through placemaking and healthy urban design. The delivery of healthy, vibrant and cohesive communities, coupled with healthy independent living for longer is a mutual objective, and will be tested by applying the Healthy Urban Development Unit HIA checklist to structure an appropriate appraisal.

Changes in local healthcare capacity

13.4.36 The delivery of new homes as part of the proposed development would result in a redistribution of population from within and outside of the local area. This has the potential to impact the capacity of primary healthcare facilities in the surrounding area and their ability to accept new patients and provide accessible/adequate care.

13.4.37 As such, the impact on healthcare capacity during the operational phase would be scoped into the ES to assess the magnitude of impact, the sensitivity of the receiving community to such impacts and the resultant significance of effect for both existing residents in the surrounding area and future residents.

13.5 Scoping Summary

13.5.1 The population and health topic is proposed to be scoped in, with the health determinants assessed determined by the nature of what is proposed to ensure a proportionate assessment.

13.5.2 The relevant health determinants to be assessed during the construction and occupation phases of the Proposed Development include changes to changes to air quality, changes to noise exposure, changes in transport nature and flow rate, and changes in socio-economic factors (income and employment). The population and health topic would draw from and build upon key outputs from the relevant technical disciplines within the ES in order to carry out the population and health assessment and reach a conclusion regarding the significance of effect.

Additionally, the changes in local healthcare capacity would be assessed for the occupation phase of the proposed development, and the healthy urban design principles will be tested and communicated.

13.5.3 Overall, the assessment would support the local public health priorities outlined in Berkshire West Health and Wellbeing Strategy 2021-2030 by exploring healthy urban design features that further enhance the local health circumstance.

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14 Water Resources

14.1 Introduction

14.1.1 This chapter of the ES Scoping Report has been produced by Abley Letchford Partnership Ltd and RPS.

14.1.2 It is proposed that the following topics relating to water resources will be scoped into the EIA:

- Flood Risk and Drainage including fluvial, pluvial and reservoirs
- Hydrogeology
- Surface Water Quality
- Water Supply and Treatment

14.1.3 It is proposed that groundwater flooding is scoped out of the EIA.

14.2 Assessment Criteria & Methodology

Previous Assessment

14.2.1 The Site lies adjacent to the River Loddon, Barkham Brook and numerous surface water flow routes. A study is ongoing in consultation with the Environment Agency and Wokingham Borough Council as Lead Local Flood Authority (LLFA) to produce an improved baseline flood model which will become the basis of the site-specific assessment of flooding impacts.

14.2.2 Modelling has previously been undertaken to refine the flood outlines for fluvial and pluvial flooding and this will be extended to cover the Site as a whole.

Legislative Context, Technical Guidance and Best Practice – Flood Risk

Legislative Context

14.2.3 The National Planning Policy Framework (NPPF), updated most recently in December 2023, sets out the Government's planning policies for England and how they are expected to be applied. In terms of Water Resources and Flood Risk, the NPPF sets strict tests to protect people and property from flooding which all local planning authorities are expected to follow, with a view to achieving sustainable development.

14.2.4 To accompany the updated NPPF, the web-based Planning Practice Guidance (PPG) provides additional technical guidance on flood risk and coastal change. The PPG retains key elements of former Planning Policy Statement (PPS) 25 Development and Flood Risk (withdrawn on adoption of the NPPF) as an interim measure, pending a wider review of guidance to support planning policy. The original technical guidance published in 2012 has also been replaced by this web-based resource.

14.2.5 In terms of the general planning approach to development and flood risk, the Flood Risk and Coastal Change PPG sets out the following main steps to be followed:

- Assess Flood Risk;

- Avoid Flood Risk; and
- Manage and Mitigate Flood Risk.

14.2.6 The guidelines also state that in plan-making, local planning authorities apply a sequential approach to site selection so that development is, as far as reasonably possible, located where the risk of flooding (from all sources) is lowest, taking account of climate change and the vulnerability of future uses to flood risk. In plan-making this involves applying the 'Sequential Test' to Local Plans and, if needed, the 'Exception Test' to Local Plans. Guidance on when and how should the 'Sequential' and 'Exception' Tests be applied to planning applications is also provided in the PPG.

14.2.7 In addition, the guidelines reiterate that local planning authorities and developers should seek flood risk management opportunities (e.g. safeguarding land), and to reduce the causes and impacts of flooding (e.g. through the use of SuDS in developments).

Policy

14.2.8 Wokingham Borough Adopted Core Strategy Development Plan Document, January 2010 sets the broad vision and policies of the adopted Core Strategy (adopted on 29th January 2010) for the Borough having been informed by the views of the community through consultation, the vision of Wokingham Borough Council (WBC) and Community Strategy, together with national policy. The Core Strategy sets out where development will occur within the Borough to 2026, taking account of health, well-being and quality of life.

14.2.9 Policy CP1 (Sustainable Development) states that:

'Planning permission will be granted for development proposals that…

Limit any adverse effects on water quality (including groundwater);

Ensure the provision of adequate drainage…

Incorporate facilities for recycling of water…

Avoid increasing (and where possible reduce) risks of or from all forms of flooding (including from groundwater) …'

14.2.10 Policy CP3 (General Principles for Development) states that:

'Planning permission will be granted for proposals that…

c) Have no detrimental impact upon important… water courses;'

14.2.11 Wokingham Borough Adopted Managing Development Delivery Local Plan Document, February 2014 supports the policies within the Adopted Core Strategy and sets out additional detail on where new homes will be delivered within the Borough. The policies ensure that any new housing will be built to a high quality taking cognisance of sustainable drainage, landscaping and environment factors.

14.2.12 Policy CC09 (Development and Flood Risk) states:

'All sources of flood risk should be considered during the planning application process. Proposals must be consistent with the guidance in the NPPF and the accompanying NPPF Technical Guidance, and should demonstrate how the Strategic Flood Risk Assessment (SFRA) has been used to determine the suitability of the proposal.

Development should be guided towards areas of the lowest flood risks by applying the sequential approach. Development proposals within Flood Zones 2 or 3 must ensure that flood risk is not increased due to the Project and must take into account the vulnerability of the Proposed Development.

Development will only be considered in areas of flood risk if it can be considered that: the development provides wider sustainability benefits to the community which outweigh flood risk; the development will be safe for its lifetime taking into account the vulnerability of its users and the development will not increase flood risk, and where possible, will reduce flood risk overall.'

14.2.13 Policy CC10 (Sustainable Drainage) states:

'Surface water arising from the Proposed Development must be managed in a sustainable manner, taking into account the effects of climate change.

Where practically possible, development proposals should incorporate SuDS, which must be designed to meet the long-term needs of the development. If a development discharges surface water into a public sewer, adverse impacts to the public sewerage network serving the development should not be experienced.'

14.2.14 Wokingham Borough Council Strategic Flood Risk Assessment (SFRA) Level 1, May 2023 (published May 2024) aims to collate and analyse the most up to date flood risk information from all sources, to provide an overview of flood risk across Wokingham. The Wokingham Borough Council SFRA Level 2, August 2023 (published May 2024) goes on to provide detailed assessments of the proposed site options for the emerging local plan.

14.2.15 Wokingham Borough Council has produced several Supplementary Planning Documents (SPD) that have been adopted for the purposes of development control. Of relevance to hydrology is the Sustainable Design and Construction SPD . The SPD provides an up to date and comprehensive approach to considering sustainable design and construction in new development. It is a material planning consideration for all planning applications.

14.2.16 Section 11 sets out expectations in respect to water efficiency and resource management. All developments are expected to include water efficiency measures to reduce overall water consumption in line with requirements such as BREEAM.

14.2.17 Section 12 outlines the approach to flooding, flood resilience, sustainable drainage, and requirement for a site-specific Flood Risk Assessment in support of Policy CP1 within the Adopted Core Strategy.

14.2.18 Shinfield Parish Council has developed a Neighbourhood Development Plan February 2017, which covers the period from 2016 through to 2026.

14.2.19 Policy 3 states that:

'Shinfield Parish Council positively encourages the…

4) Demonstration of how the development will facilitate the use of, and recycling of, all resources including water'

14.2.20 Policy 8: Flooding states:

'Where appropriate, new developments must incorporate the existing open watercourses, points and ditches within the development site, to lessen the risk of flooding to property, fields and roads.

Existing open watercourses, ponds and ditches shall be preserved in new developments and substituted only where necessary or otherwise appropriate.

The creation of Sustainable Drainage Systems (SuDS) in new developments should be promoted wherever practicable and should be incorporated into the site layout and landscape design, matching with the requirements of existing adjacent land and with regard to provision of fauna, flora and habitats. Provisions for the maintenance and management of the features must be made by the developer.

14.2.21 No development will be permitted which reduces the ability of the site to alleviate flooding, or which results in increases in surface water run-off rates that would have a detrimental effect off-site, unless suitable mitigation is put in place.

Guidance and Best Practice

14.2.22 Current best practice guidance on the planning for and design of SuDS treatment is provided by C753 The SuDS Manual36, The Design Manual for Roads and Bridges (DMRB) HA 103/06 Vegetative Treatment Systems for Highway Runoff37, and the DMRB HD 33/06 Surface and Subsurface Drainage Systems for Highways38. In the context of the Proposed Development, the assessment guidance described in the C753 The SuDS Manual34 is the most appropriate method of assessment to determine the risk to the water environment and the need for treatment measures, and this is described in more detail later in this chapter'

Legislative Context, Technical Guidance and Best Practice – Surface Water Quality

Legislative Context

14.2.23 The relevant policies include but are not limited to the legislation below:

- The Water Resources Act (1991)
- Land Drainage Act (1994)
- The Environmental Act (1995)
- Anti-pollution Works Regulations (1999)
- Water Framework Directive
- The Water Act (2014)
- The Environmental Permitting Regulations (2019)

Policy

14.2.24 The Site lies within the administrative boundaries of Wokingham Borough Council (WBC). The local planning policy in relation to water quality is outlined below.

14.2.25 The Thames River Basin District Management Plan (2015) sets out the baseline classification for the River Thames and tributaries which include the Loddon together with the statutory objectives for protected areas and these rivers including the River Loddon. The plan also summarises the programme of measures to achieve statutory objectives.

14.2.26 Wokingham Borough Development Plan Document, February 2014 sets out how the borough will develop up until 2026 and adds additional details to the Wokingham Core Strategy. The Document has a section on Water Resource Management which includes the following:

14.2.27 "2.34: The Borough's water resources and supplies shall be protected by resisting development proposals that would pose an unacceptable threat to surface water. Proposals that seek to increase water availability shall be encouraged."

Baseline Data Collection

14.2.28 As discussed above an updated hydraulic model will be produced and agreed as the baseline for assessing flooding impacts.

14.2.29 Publicly available data on groundwater resources will be collated together with consultation responses.

14.2.30 Water quality data and descriptors will be collected from publicly available sources.

14.2.31 Details of potable and waste water assets will be collated together with consultations with Thames Water, the EA and WBC.

14.2.32 Further information will be gathered through desk study using publicly available information from:

- Natural England's MAGIC Map application;
- Catchment Data Explorer Website;
- British Geological Survey 1:50,000 scale geological map (England and Wales, Bedrock and Superficial Deposits) Website;
- National Soils Resource Institute Website; and
- Wokingham Borough Council Strategic Flood Risk Assessment Level 1 and Level 2.

14.2.33 The following data sources will be reviewed to inform the baseline environmental setting and assessment process within the Surface Water Quality chapter of the ES:

- British Geological Survey (1977) Hydrogeological Map of England and Wales (scale 1:625,000);
- British Geological Survey 1:50,000 scale geological map (England and Wales, Bedrock and Superficial Deposits);
- British Geological Survey (1994). National Rivers Authority, Policy and Practice for the Protection of Groundwater;
- Centre of Ecology and Hydrology (1999). Flood Estimation Handbook;
- Environment Agency records on licensed abstractions (surface and groundwater);
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- Environment Agency, River Basin Management Plan, Thames River Basin District;
- Environment Agency Website (www.environment-agency.gov.uk);
- Groundwater Source Protection Zones (Environment Agency, 2018);
- Institute of Geological Sciences. Hydrogeological Map of England and Wales (Scale 1;250,000);
- Local Authority records on private water supplies (surface and groundwater);
- Ordnance Survey 1:10,000 Scale Electronic Data Mapping for assessment area;
- OrdnanceSurveyOpenData [https://www.ordnancesurvey.co.uk/opendata/viewer/index.html];

- Principal and secondary aquifers (superficial deposits and bedrock) (Environment Agency, 2017);
- Soil Survey of England and Wales (1983). Soils Map of England and Wales (Scale 1:250,000);
- The Centre for Ecology and Hydrology (CEH) (www.ceh.ac.uk).

Proposed Assessment Methodology

Flood Risk and Drainage

14.2.34 The following section deals with the methodology to assess the impacts in respect of flood risk and drainage.

14.2.35 A site-specific Flood Risk Assessment will be undertaken in accordance with the MHCLG's (updated 2020) NPPG: Flood Risk and Coastal Change. The assessment methodology in line with Chapter 5 will be followed and findings will be discussed with Wokingham Borough Council as the Lead Local Flood Authority alongside the Environment Agency.

14.2.36 In order to assess the significance of any potential impacts, a matrix approach has been adopted to map the potential impacts to the vulnerability of potential receptors. We have adopted the vulnerability categories for flood risk as set out in the NPPG as below.

14.2.37 The assessment methodology stages, can be outlined as follows:

Table 14.1: Value/sensitivity assessment

Receptor value / sensitivity	Receptor type
High	Highly Vulnerable/Essential Infrastructure
Medium	More Vulnerable
Low	Less Vulnerable
Negligible	Water Compatible

14.2.38 Magnitude of impact, is based on an assessment of two factors. Firstly, how flood levels might change as a result of impacts on the fluvial floodplain and secondly, qualitatively how surface water flows might be increased as a result of the proposed drainage strategy.

Table 14.2: Magnitude of impact

Magnitude	Description
High	Greater than 100mm increase in fluvial levels/significant Increase in SW run off rates
Medium	Greater than 50mm increase in fluvial levels/minor Increase in SW run off rates
Low	10mm to 50mm increase in fluvial levels/no increase in SW runoff rates
Negligible	Less than 10mm increase in fluvial levels/no increase in SW runoff rates

14.2.39 The predicted level of effect is based upon the consideration of magnitude of impact and sensitivity of the resource/receptor and a degree of professional judgement of how important this effect is.

Table 14.3: Level of effect

Receptor Sensitivity	Magnitude of Impact			
	High	**Medium**	**Low**	**Negligible**
High	Major	Major	Moderate	Negligible
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Minor	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

14.2.40 The proposed drainage system for the Proposed Development will be developed and described, including the extent to which Sustainable Drainage Systems (SuDS) will be used.

14.2.41 The outputs will be reported within an FRA and overall Drainage Strategy and summarised within the ES chapter.

Hydrogeology and Groundwater

14.2.42 The following section deals with the methodology to assess the impacts in respect of hydrogeology and groundwater.

14.2.43 Shallow groundwater is expected to be present on the Site. Groundwater will be largely restricted to the granular fluvial sand and gravel deposits typically present in the valleys of the River Loddon and River Thames. These deposits are designated Secondary A aquifer units and are perched upon underlying clay deposits of the Thames Group. Given the shallow nature this groundwater body, the Proposed Development may affect groundwater levels, quality and flow in those aquifer units. This in turn may affect other groundwater dependent receptors, most notably the River Loddon and existing groundwater abstractions (private or licensed).

14.2.44 A hydrogeological conceptual model shall be developed for the Site that includes key groundwater dependent receptors. That model shall be based on publicly available data sources, a consultation process and a Water Features Survey. The significance of groundwater effects shall be assessed using the model and, where required, appropriate mitigation measures identified and/or monitoring strategy defined.

14.2.45 In order to assess the significance of any potential impacts, a matrix approach has been adopted to map the potential impacts to the vulnerability of potential receptors. We have adopted the vulnerability categories for flood risk as set out in the NPPG as below. Criteria for the definition of groundwater sensitivity and magnitude are reported in Tables 14.4 and 14.5. These consider groundwater sensitivity in the context of hydrogeological conditions, including groundwater resources and ecological receptors with potential groundwater dependency. The assessment methodology stages, can be outlined as follows:

Table 14.4. Sensitivity Criteria

Sensitivity	Description
Very High	Groundwater aquifer(s) with very high productivity or Water Framework Directive (WFD) good groundwater quality and quantity status. Exploitation of groundwater resource is extensive for public, private domestic and/ or agricultural use (i.e. feeding ten or more properties) and/ or industrial supply. Important sites of nature conservation dependent on groundwater as per importance criteria attributed in Chapter 11: Ecology or groundwater is considered likely to support wetland vegetation which is highly groundwater dependent. Surface water features with hydrological importance to designated sensitive ecosystems of national/ international importance (refer to Chapter 11: Ecology)

Sensitivity	Description
High	Groundwater aquifer(s) with moderate/ high productivity or WFD good groundwater quality and quantity status. Exploitation of groundwater resource is not extensive (i.e. private domestic and/ or agricultural supply feeding less than ten properties). Local areas of nature conservation dependent on groundwater as per importance criteria attributed in Chapter 11: Ecology, or groundwater is considered likely to support wetland vegetation which is moderately groundwater dependent. Surface water features with hydrological importance to sensitive ecosystems of regional importance (refer to Chapter 11: Ecology).
Medium	Groundwater aquifer(s) with low productivity or WFD variable groundwater quality and quantity status. No current known exploitation of groundwater as a resource and aquifer(s) properties make potential exploitation appear unlikely. Minor areas of nature conservation with a degree of groundwater dependency, as per importance criteria attributed in Chapter 11: Ecology. Surface water features with some but limited hydrologic importance to sensitive or protected ecosystems of authority area importance (refer to Chapter 11: Ecology)
Low	Groundwater aquifer(s) with very low productivity or WFD poor groundwater quality and quantity status. No known past or present exploitation of groundwater aquifer(s) as a resource. Areas of vegetation with no groundwater dependency. Surface water features with minimal/insignificant hydrological importance to sensitive ecosystems of less than authority area importance (refer to Chapter 11: Ecology).

Table 14.5. Magnitude Criteria

Magnitude	Description
High	Major or long-term change to groundwater aquifer(s) flow, water level, quality or available yield. Groundwater resource use is irreparably impacted upon, with a major or total loss of an existing supply or supplies. Changes to water table level or quality would result in a major or total change in or loss of a groundwater dependent area, where the value of a site would be severely affected. Changes to groundwater aquifer(s) flow, water level and quality would result in major changes to groundwater base flow contributions to surface water and/ or alterations in surface water quality, resulting in a major shift away from baseline conditions such as change to WFD status. Dewatering effects create significant differential settlement effects on existing infrastructure and buildings
Medium	Moderate changes to groundwater aquifer(s) flow, water level, quality or available yield. Groundwater resource use is impacted slightly, but existing supplies remain sustainable. Changes to water table level or quality would result in partial change in or loss of a groundwater dependent area, where the value of the site would be affected, but not to a major degree. Changes to groundwater aquifer(s) flow, water level and quality would result in moderate changes to groundwater base flow contributions to surface water and/ or alterations in surface water quality, resulting in a moderate shift from baseline conditions that may be long-term or

Magnitude	Description
	temporary. Dewatering effects create moderate differential settlement effects on existing infrastructure and buildings.
Low	Minor changes to groundwater aquifer(s) flow, water level, quality or available yield. Changes to water table level, quality and yield result in little discernible change to existing resource use. Changes to water table level or quality would result in minor change to groundwater dependent areas, but where the value of the site would not be affected. Changes to groundwater aquifer(s) flow, water level and quality would result in minor changes to groundwater base flow contributions to surface water and/ or alterations in surface water quality, resulting in a minor shift from baseline conditions (equivalent to minor but measurable change within WFD status). Dewatering effects create minor differential settlement effects on existing infrastructure and buildings.
Negligible	Very slight change from groundwater baseline conditions, approximating to 'no change' conditions. Dewatering effects create no or no noticeable differential settlement effects on existing infrastructure and buildings.

Table 14.6. Matrix for Determination of Impact Significance

Receptor Sensitivity	Magnitude of Impact			
	High	**Medium**	**Low**	**Negligible**
High	Slight	Moderate	Moderate / Large	Large
Medium	Neutral / Slight	Slight / Moderate	Moderate	Moderate / Large
Low	Neutral	Neutral / Slight	Slight / Moderate	Moderate
Negligible	Neutral	Neutral	Neutral / Slight	Slight

Water Quality

14.2.46 The following section deals with the methodology to assess the impacts in respect of surface water quality.

Scope of Assessment

14.2.47 The assessment methodology is based on guidance provided within the Institute of Environmental Management and Assessment (IEMA) Guidelines for Environmental Impact Assessment (2014) and the Design Manual for Roads and Bridges (DMRB), LA113: Road Drainage and the Water Environment, (March 2020). Whilst the DMRB is not specific to the assessment of surface water and hydrology, it provides an accepted approach to the assessment of development impacts.

14.2.48 The assessment of likely effects on surface water resources would take account of the impacts from the Proposed Development on the prevailing hydrological, surface water drainage, flooding and water quality environments.

Assessment methods

14.2.49 A detailed baseline study will be undertaken to establish the current conditions of the water environment. Information will be drawn from a variety of sources as detailed above.

14.2.50 The assessment of impacts on water resources will be undertaken using a source-pathway-receptor model and a risk based assessment. This will be based on combining assessments of both the likelihood and consequence of any potential impact in line with the IEMA guidance. This approach embraces principles of the WFD.

14.2.51 The evaluation of the significance of potential effects on the water environment will be in accordance with the EIA methodology set out in Chapter 5 of this report. Criteria such as the Environment Agency's water quality ratings and ecological designations will be drawn upon in order to define the sensitivity of the water environment.

Sensitivity, Value or Importance

14.2.52 The sensitivity or value of a hydrological receptor or attribute is largely determined by its quality, rarity and scale.

14.2.53 The determination of value or sensitivity takes into account the scale at which the attribute is important. This can be defined as being at a local level (e.g. on development site or immediately adjacent); district level (beyond development boundary but within the district); county level (e.g. Devon); regional level (e.g. Southwest); national (e.g. United Kingdom) or international level (e.g. Europe).

14.2.54 The definitions set out in Table 14.7 below have been followed in the consideration of sensitivity for the Scheme. This table takes into account guidance provided in Table 2 1 and A4.3 of the DMRB (Highways Agency et al., 2009) and professional judgement.

Table 14.7 Sensitivity or Value Criteria (Water Resources & Hydrology)

Sensitivity or Value	Description
Very high	The receptor has little or no capacity to absorb change without fundamentally altering its present character, is of very high environmental value, or of international importance. Receptor is high value or critical importance to local, regional or national economy. Receptor is highly vulnerable to impacts that may arise from the project and recoverability is long term or not possible. Surface water: WFD Current Overall Status of High.
High	The receptor has low capacity to absorb change without fundamentally altering its present character, is of high environmental value, or of national importance. Receptor is of moderate value with reasonable contribution to local, regional or national economy. Receptor is generally vulnerable to impacts that may arise from the project and recoverability is slow and/or costly. Surface water: WFD Current Overall Status of Good .
Medium	The receptor has moderate capacity to absorb change without significantly altering its present character, has some environmental value, or is of regional importance. Receptor is of minor value with small levels of contribution to local, regional or national economy. Receptor is somewhat vulnerable to impacts that may arise from the project and has moderate to high levels of recoverability. Surface water: WFD Current Overall Status of Moderate.

Low	The receptor is tolerant of change without detriment to its character, is low environmental value, or local importance. Receptor is of low value with little contribution to local, regional or national economy. Receptor is not generally vulnerable to impacts that may arise from the project and/or has high recoverability. Surface water: WFD Current Overall Status of Poor.
Negligible	The receptor is resistant to change and is of little environmental value. Receptor is of negligible value with no contribution to local, regional or national economy. Receptor is not vulnerable to impacts that may arise from the project and/or has high recoverability. Surface water: WFD Current Overall Status of Bad.

Magnitude

14.2.55 The magnitude of any predicted impact is dependent on its size, duration, timing (e.g. seasonality) and frequency (permanent, seasonal etc.). A qualitative appraisal of the likely magnitude of the predicted impact will be provided within the assessment, taking into account the measures proposed to be adopted as part of the Scheme to control such impacts. The magnitude of the predicted impact will be described using the criteria outlined in Table 14.5 below. This table takes into account guidance provided in Table 2 1 and A4.4 of DMRB (Highways Agency et al., 2009) and professional judgement.

Table 14.8 Impact Magnitude Criteria (Water Resources & Hydrology)

Magnitude	Description
High	Total loss or major alternation to key elements/features of the baseline conditions such that post development character/composition of baseline condition will be fundamentally changed.
Medium	Loss or alteration to one or more key elements/features of the baseline conditions such that post development character/composition of the baseline condition will be materially changed.
Low	Minor shift away from baseline conditions. Changes arising from the alteration will be detectable but not material; the underlying character/composition of the baseline condition will be similar to the pre-development situation.
Negligible	Very little change from baseline conditions. Change is barely distinguishable, approximating to a “no change” situation.

Significance

14.2.56 The significance of predicted effects will be determined using publicly available environmental data to take into account the sensitivity of the receptor and the magnitude of each impact. Table 14.6 will be used to inform the evaluation of the significance of effects. For the purposes of the assessment any effect that is moderate or major is considered to be ‘significant’ in EIA terms. Any effect that is minor or below is considered ‘not significant’.

Table 14.9 Assessment of Significance (Surface Water and Hydrology)

Magnitude of Impact	Sensitivity or Value of Receptor				
	Very High	**High**	**Medium**	**Low**	**Negligible**
High	Major	Major	Moderate	Moderate	Minor
Medium	Major	Moderate	Moderate	Minor	Negligible

Low	Moderate	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Minor	Negligible	Negligible	Negligible

Water Supply and Treatment

14.2.57 The following section deals with the methodology to assess the impacts in respect of water supply and treatment.

14.2.58 The water supply and treatment assessment will cover issues relating to the supply of potable water and the treatment of waste water for the Proposed Development.

14.2.59 The assessment will examine the degree to which the existing quantity, character and quality of these resources will be affected directly or indirectly by the Proposed Development, and will cover the potential impacts of the Proposed Development on these during the construction phase and during the operation and lifetime of the Proposed Development.

14.2.60 The methods used to identify key issues will include:

- Desk studies to review existing potable water resources and options for waste water treatment for the Proposed Development and surrounding areas;
- Consulting with the stakeholders such as Thames Water, the Environment Agency and WBC as appropriate to ascertain existing arrangements, discharge permits and constraints, ground and surface water quality, aquifer flows and abstraction potential etc.

14.2.61 The assessment methodology stages, can be outlined as follows:

Table 14.10 Sensitivity or Value Criteria

Sensitivity or Value	Description
Very high	Receptor with little to no capacity to accommodate change, is high value or critical importance to the local, regional or national economy. Receptor is highly vulnerable to impacts that may arise from the development and recoverability is long term or not possible. Surface Water: WFD current overall status of high. The surface water body supports sensitive aquatic ecological receptors and is extensively used for public water supply and large-scale agricultural use. Groundwater: Groundwater body supports public and/or large-scale industrial water supply and/or is a principal aquifer. [LM2]
High	Receptor with a low a capacity to accommodate change, is of moderate value with reasonable contribution to the local, regional or national economy. Receptor is generally vulnerable to impacts that may arise from the development and recoverability is slow and/or costly.Surface Water: WFD current overall status of good. Surface water body may support sensitive aquatic ecological receptors and is used is used for public water supply/medium scale industrial or agricultural use. Groundwater: Groundwater body supports public water and/or large-scale industrial water supply and/or is a principal or secondary A aquifer
Medium	Receptors with a moderate capacity to accommodate change, is of minor value with small levels of contribution to the local, regional and national economy. Receptor is somewhat vulnerable to impacts that may arise from the development and has moderate to high levels of recoverability. Surface Water: WFD current overall status of moderate. The surface water features may be locally important for spawning of salmonid

	species. Surface water body is used for private water supply or small scale industrial/agricultural use. Groundwater: Secondary A aquifer and/or a groundwater body which supports private water supply or medium scale agricultural/industrial abstractions.
Low	Receptor with a high capacity to accommodate change, is of low value with little contribution to the local, regional or national economy. Receptor is not generally vulnerable to impacts that may arise from the development and/or has high recoverability. Surface Water: WFD current overall status of poor. Surface water bodies are not significant in terms of sensitive ecological receptors or fish spawning. Small scale (single residential or commercial use) abstraction licences are present in close proximity. Groundwater: Secondary undifferentiated strata with no abstraction licences.
Negligible	Receptor with a very high capacity to accommodate change, is of negligible value with no contribution to local, regional or national economy. Receptor is not vulnerable to impacts that may arise from the development and/or has high recoverability. Surface Water: WFD current overall status of bad. No sensitive ecological receptors or fish spawning are present within the surface water bodies. No abstraction licences present within the area. Groundwater: Unproductive strata with no abstraction licences.

Table 14.11 Impact Magnitude Criteria

Magnitude	Description
High	Total loss or major alternation to key elements/features of the baseline conditions such that post development character/composition of baseline condition will be fundamentally changed.
Medium	Loss or alteration to one or more key elements/features of the baseline conditions such that post development character/composition of the baseline condition will be materially changed.
Low	Minor shift away from baseline conditions. Changes arising from the alteration will be detectable but not material; the underlying character/composition of the baseline condition will be similar to the pre-development situation.
Negligible	Very little change from baseline conditions. Change is barely distinguishable, approximating to a “no change” situation.

Table 14.12 Assessment of Significance

Magnitude of Impact	Sensitivity or Value of Receptor				
	Very High	**High**	**Medium**	**Low**	**Negligible**
High	Major	Major	Moderate	Moderate	Minor
Medium	Major	Moderate	Moderate	Minor	Negligible
Low	Moderate	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Minor	Negligible	Negligible	Negligible

Geographical Scope

14.2.62 In addition to the area of the Proposed Development, the Flood Risk Assessment will consider the impacts upstream and downstream of the Site itself. In planning policy terms there should be no increase in flood levels beyond the Site and therefore no negative impacts but there may be beneficial impacts and so the assessment would extend from approximately 1 kilometre (km) upstream of the Site to the confluence with the River Thames.

14.2.63 All aspects of the assessment (flood risk, drainage, water supply, water quality, groundwater) will be assessed against the 1 km geographical scope.

Temporal Scope

14.2.64 Typically for residential development the Flood Risk Assessment will consider the potential changes in risk for a period of 100 years into the future and commercial development would be 60 years into the future.

14.2.65 All aspects of the assessment (flood risk, drainage, water supply, water quality, groundwater) will be assessed against the 100-year temporal scope.

14.3 Baseline Environment

Flood Risk

14.3.1 The majority of the Site is in either Flood Zone 1 or 2, although there are significant areas of Flood Zone 3 immediately adjacent to the River Loddon and Barkham Brook. There are also areas that are shown as having a high risk of surface water flooding.

14.3.2 Figure 14.1 shows the Site in the context of fluvial flood risk in the form of published Environment Agency's Flood Map for Planning. The majority of the Site lies within Flood Zone 1 which comprises land where flooding from fluvial sources is very unlikely. There is less than a 0.1% (1 in 1000) chance of flooding occurring each year. Land immediately adjacent to the River Loddon and Barkham Brook is classed as Flood Zone 2 and 3. Flood Zone 2 is land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% - 0.1%). Flood Zone 3 is land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%).

14.3.3 Figure 14.2 shows the Site in the context of pluvial flood risk taken from the Environment Agency's Risk of Flooding from Surface Water dataset. This dataset identifies where land is subject to flooding from pluvial sources wherein excess surface water run off flows over the ground surface following the natural topography to nearby rivers and streams. Areas are presented against anticipated storm return periods i.e. 1/30 year, 1/100 year etc.

14.3.4 Review of the EA's surface water map indicates the Site is predominantly at 'very low risk' of surface water flooding. Areas of the site at 'high risk', whereby each year this area has a chance of flooding of greater than 3.3%, correspond with the tributary in the south west of the site.

Water Supply and Treatment

14.3.5 Surface water abstractions within the study area are to be obtained from the Environment Agency and assessed as part of the assessment. Sewer assets plans and Thames Water pre-development enquiries relevant to site associated with the drainage strategy of development proposals will also be obtained to assess sewer capacity within the study area.

Surface Water Quality

14.3.6 The River Loddon, an EA main river, runs through the centre of the Site. The River Loddon flows northwards and into the River Thames. Additionally, there are numerous ordinary watercourses on the site that join the River Loddon.

14.3.7 The Site is not in an Internal Drainage Board (IDB).

14.3.8 The EA Catchment Data Explorer defines the River Loddon (Swallowfield to River Thames confluence) as having 'Moderate' ecological quality and a 'Fail' for chemical quality.

14.3.9 Surface water discharge consents and pollution incidents to surface water and groundwater within the study area are to be obtained from the Environment Agency and assessed as part of the assessment.

14.3.10 Mapping indicates that part of the Site is covered by a Nitrate Vulnerable Surface Water Zone. These Surface Waters are defined within the Nitrates Directive as polluted if they contain or could contain, if preventative action is not taken, nitrate concentrations greater than 50mg/l.

14.3.11 The following sensitive receptors will be assessed within the ES:

- The River Loddon;
- On-site surface water features including ponds, field drains/culverts

Hydrogeology

14.3.12 Shallow groundwater is expected to be present on the Site. Groundwater will be largely restricted to the granular fluvial sand and gravel deposits typically present in the valleys of the River Loddon and River Thames. These deposits are designated Secondary A aquifer units and are perched upon underlying clay deposits of the Thames Group.

14.3.13 There is a Source Protection Zone area classified as an Outer Protection Zone and Inner Protection Zone located south of the Site.

14.3.14 Further downstream, around the confluence with the River Thames the Loddon enters a Groundwater Site. In this case Groundwaters are defined within the Nitrates Directive as polluted if they contain or could contain, if preventative action is not taken, nitrate concentrations greater than 50mg/l.

14.4 Potential Environmental Impacts & Effects

Flood Risk

14.4.1 Built development that is not within Flood Zone 1 or areas at very low risk of surface water flooding has the potential to increase flood risk by occupying flood storage or obstructing flow routes. A full assessment of the impacts of fluvial and pluvial flooding will be undertaken as part of the site-specific Flood Risk Assessment.

14.4.2 Additionally, where development has the potential to increase surface water run-off, and therein risk. A full assessment of the impacts of the future drainage strategy will be included.

14.4.3 Mitigation for the potential impacts above will be a full Sustainable Drainage Strategy and Flood Risk Assessment (including flood compensation and design options).

Construction Impacts and Effects

14.4.4 An assessment of the likely significant effects of the Proposed Development on hydrology will be undertaken for the construction phase across flood risk and surface water quality receptors that could be affected.

Occupation Impacts and Effects

14.4.5 An assessment of the likely significant effects of the Proposed Development on hydrology will been undertaken for during the operational phase (the completed development) across flood risk and surface water quality receptors that could be affected.

Water Quality (Surface Water and Groundwater)

14.4.6 The baseline characterisation set out above enables the identification of the nature and likely significance of effects. This considers both surface water and groundwater. The hydrological assessment will consider the potential impacts to environmental receptors and the pathways by which the receptors may be affected. The following terms have the following meanings in this section:

- Source: potential contaminant sources, ground/channel disturbance;
- Pathway: the mechanism by which the source may affect a receptor; and
- Receptor: identified features that may be affected, based on the sensitivity of the site.

14.4.7 This includes consideration of the probability of harm occurring, taking into account potential sources of contamination and receptors that may be affected by such contamination.

14.4.8 The significance of potential effects likely to occur during construction and operation of the Scheme has been determined by consideration of the sensitivity of the key attributes of the hydrology and flood risk that may be affected and the magnitude of the potential impact.

14.4.9 An initial assessment of potential effects associated with the Scheme has been undertaken for each stage of the development on hydrology in the study area. A summary of the anticipated likely significance impacts upon hydrology receptors as a consequence of each of development is given below.

Construction Impact and Effects

14.4.10 The identified potential impacts on surface water quality resulting from the construction of the Scheme are as follows:

- Sediment mobilisation in surface runoff from exposed soil surfaces during construction;
- Potential contamination of surface water features or groundwater by oils, lubricants and fuels originating from construction vehicles or store areas;
- Changes in the risk of flooding (groundwater, fluvial and pluvial) along with changes in the surface water regimes.

14.4.11 The identified potential impacts on flood risk resulting from the construction of the Scheme are temporary changes to natural surface water drainage patterns and run-off rates and resultant potential for flooding on, or arising from construction of above ground infrastructure.

Occupation Impacts and Effects

14.4.12 The identified potential impacts on surface water resulting from the operation and maintenance of the Scheme are as follows:

- Increase in potable water demand;
- Permanent increase in surface run-off as a result of increased impermeable surface areas and resultant potential for flooding on or arising from above ground infrastructure; and
- Temporary changes to natural surface water drainage patterns and run-off rates and resultant potential for flooding on, or arising from maintenance of above ground infrastructure.
- Increase in foul water flows – possible changes in the quality and quantity of watercourses within the development
- Change to water balance and levels alongside the pattern and rate of surface water flows/groundwater recharge due to change in surface cover permeability and new drainage infrastructure.

Opportunities for Mitigation

14.4.13 The potential significant effects above have been identified that will require further assessment and development of mitigation measures at the next stage of assessment.

14.4.14 Pollution control measures will be put into place during the construction phase of the development in order to minimise the risk posed to receiving water features.

14.4.15 With respect to the operational phase, the development has the potential to change the flood risk, the water balance and the surface water regime.

14.4.16 The above sources have not been scoped out at this stage of the assessment and the following mitigation measures will be explored at later stages of the assessment:

- Preventing soil erosion;
- Maintaining grass buffer zones/riparian zones, environmentally sustainable embankment of ditches or streams
- Fencing water courses
- Provision of specific bunded storage area; and
- Development of pollution incident reaction plan.

Hydrogeology

14.4.17 Shallow groundwater is expected to be present on the Site. Groundwater will be largely restricted to the granular fluvial sand and gravel deposits typically present in the valleys of the River Loddon and River Thames. These deposits are designated Secondary A aquifer units and are perched upon underlying clay deposits of the Thames Group.

14.4.18 There is a Source Protection Zone area classified as an Outer Protection Zone and Inner Protection Zone located south of the Site.

14.4.19 Further downstream, around the confluence with the River Thames the Loddon enters a Groundwater Site. In this case Groundwaters are defined within the Nitrates Directive as

polluted if they contain or could contain, if preventative action is not taken, nitrate concentrations greater than 50mg/l.

14.4.20 Mitigation measures would be incorporated into the construction techniques to ensure the continued protection of groundwater flow and quality. During any piling and / or foundation excavation the area would be isolated from surface water until completed. Should any groundwater be encountered during excavation, appropriate dewatering methods would be considered.

Construction Impacts and Effects

14.4.21 Where subsurface structures/foundations and dewatering are proposed, these might intercept or alter groundwater flows/levels, which may contribute to watercourse baseflow.

14.4.22 There is a potential risk of untreated runoff from construction sites discharging through permeable surface geology direct to the aquifer.

Occupation Impacts and Effects

14.4.23 Subsurface structures and deep foundations which are part of the permanent design may cause a barrier to groundwater flow. This may lead to potential effects on baseflow contribution to surface water features and local groundwater abstractions.

14.4.24 The deep foundations may also introduce a permanent rapid vertical flow pathway into the groundwater body for potentially contaminated runoff.

Water Supply

14.4.25 Should upgrading of the off-Site sewer network be required, this may help alleviate the risk of sewer flooding. This will be dependent on the scale of the capacity upgrades and their location.

14.4.26 It is anticipated an increased population as a result of the occupation of the Proposed Development will lead to increases in local potable water demand.

14.5 Scoping Summary

14.5.1 It is proposed that the following topics relating to water resources will be scoped into the EIA:

- Flood Risk and Drainage including fluvial, pluvial and reservoirs
- Hydrogeology
- Surface Water Quality
- Water Supply and Treatment

14.5.2 It is proposed that groundwater flooding is scoped out of the EIA.

14.5.3 A site-specific Flood Risk Assessment in respect to fluvial (river) and pluvial (surface water) flooding will be prepared.

14.5.4 A full Drainage Strategy will be prepared in respect to surface and foul water disposal.

14.5.5 A hydrogeological conceptual model will be prepared for the Site that includes key groundwater dependent receptors. The significance of groundwater effects shall be assessed using the

model and, where required, appropriate mitigation measures identified and/or monitoring strategy defined.

14.5.6 A surface water quality study will be undertaken taking into account the above elements.

14.5.7 A site specific water supply and treatment study will be prepared.

15 Landscape and Visual Impact

15.1 Introduction

15.1.1 This chapter of the ES Scoping Report has been produced by Savills Urban Design Studio. It has been prepared by a Chartered Member of the Landscape Institute and Recognised Practitioner of the Urban Design Group

15.1.2 As described below, due to its rural setting and number of potential visual receptors that could be affected, effects on landscape and visual amenity should be **scoped in** to the Environmental Statement.

15.2 Assessment Criteria and Methodology

Previous Assessment

15.2.1 No previous landscape and visual assessments have been undertaken relating to the Proposed Development land to the east of the River Loddon.

15.2.2 A number of landscape and visual assessments have been undertaken in relation to proposed buildings at the Innovation Valleys/ Thames Valley Science Park on the eastern side of the Site, namely:

- Planning Application Reference 09216 - Phase 1&2 Outline + Access Road (Approved 2009)
- Planning Application Reference 101505 - Eastern Relief Road (Non determined)
- Planning Application Reference 182059 - British Museum (Approved 2018)
- Planning Application Reference 211841 - Shinfield Studios Planning (Approved 2021)
- Planning Application Reference 232833 – Natural History Museum (Pending, submitted 2023)
- Planning Application Reference 232995 – Natural History Museum Access Road (Pending, submitted 2023)

15.2.3 Two Landscape Character Assessments cover the study area:

- National Landscape Character Assessment (Natural England, updated 2014)
- Wokingham Borough Landscape Character Assessment (LUC, on behalf of Wokingham Borough Council, 2019)

15.2.4 In addition, Wokingham Borough Council have published the Valued Landscape Topic Paper (January 2020). This covers the character of land within the emerging Valued Landscape designation, one of which covers part of the site.

Legislative Context, Technical Guidance and Best Practice

Legislative Context

15.2.5 There is no relevant legislative context.

Guidance and Best Practice

15.2.6 The Landscape and Visual chapter (LVIA) will be informed by the following:

- *Guidelines for Landscape and Visual Impact Assessment 3rd edition* (Landscape Institute and Institute of Environmental Management and Assessment, 2013) ('GLVIA').
- *An Approach to Landscape Character Assessment* (Natural England, October 2014)
- *Technical Guidance Note 06/19 Visual Representation of Development Proposals* (Landscape Institute 2019) NB: This TGN currently under review. If a new version is published prior to the drafting of the Environmental Statement this will be used instead.
- *Technical Guidance Note 08/19 Camera Auto Settings* (Landscape Institute 2019)
- *Technical Guidance Note 09/19 Earth Curvature* (Landscape Institute 2019)

Baseline Data Collection

15.2.7 Baseline data will be collected via a desk-based survey and site visit(s).

15.2.8 The desk-based survey will include a review of:

- Aerial photography
- OS mapping
- GIS database of national and local landscape and heritage designations
- National and local planning policy relating to landscape and visual matters
- National and local landscape character assessments, including Natural England's National Landscape Character Areas and the Wokingham Landscape Character Assessment

15.2.9 The baseline surveys will include a set of drawings showing the location of relevant designations (see Figure 15.1), landscape context (see Figure 15.2), movement/ access/ rights of way (see Figure 15.2), landscape character assessments (see Figure 15.3) and landform and water bodies (see Figure 15.4). These appended figures will be supplemented with more detailed analysis of site landscape features and character.

15.2.10 The site survey will be undertaken during the winter months when there is the minimum of foliage on hedges and trees. This will ensure that the maximum levels of visibility will be assessed. The site surveys will appraise landscape character, landscape features and key public views into the Site. It will include walking the Site and surrounding public footpaths and walking/ driving the surrounding roads. The focus of the visit will be on the 'Zone of Theoretical Visibility' which will be computer generated and based on the proposed building locations/ heights as shown in the parameter plans. This will indicate where new homes may be visible from, based on the bare earth terrain. Prior to visiting the Site we will liaise with the local planning authority to agree key views that they may wish us to appraise.

Proposed Assessment Methodology

15.2.11 The assessment methodology will be based on that set out in the Guidelines for Landscape and Visual Impact Assessment (3rd edition). This will comprise separate assessments for landscape character, landscape features and visual amenity.

Landscape Assessment Methodology

15.2.12 The assessments will all be based on an initial appraisal of the 'sensitivity' of the landscape (see Table 15.3). This will be a combination of the 'value' of the receptor (see Table 15.1) and its 'susceptibility to accept change' (see Table 15.2).

Table 15.1: Landscape Value Criteria

Landscape Value	Criteria
Very High	A Landscape element or area of very high importance and rarity, international scale and very limited potential for substitution, eg World Heritage Site
High	A landscape element or area of high scenic/ perceptual qualities in good condition. Highly valued for its quality and/or Landscape character, and may be designated at national level, such as National Parks and Landscapes and Registered Parks and Gardens.
Medium	A Landscape element or area of medium scenic/ perceptual qualities, in at least moderate condition. May be designated at a regional or local level, for example, Conservation Areas. It may also include undesignated Landscapes with some of the following: ▪ High scenic quality ▪ Intact Landscape character ▪ Presence of distinctive elements/ features in the landscape ▪ Features of particular landscape or cultural heritage importance ▪ Recreation value ▪ Historical associations
Low	An undesignated landscape that has some landscape features that contribute to its sense of place and are of value to the local community, but that may be in mixed condition and include some detractors that weaken its overall character and scenic quality.
Negligible	A landscape with few or no scenic/ perceptual qualities and in poor condition, not particularly valued, and not designated.

Table 15.2: Landscape Susceptibility to Change Criteria

Landscape susceptibility to change	Criteria
High	An area where landscape character would be noticeably changed by the proposed scheme, either due to the loss of important landscape features, or due to the introduction of new features that are not typical of the area. The potential for intrusive development may also be due to a relatively open character with few elements that could screen the proposed development.
Medium	A landscape which is partially tolerant to change of the type proposed. This may be due to the presence of existing landscape detractors or the relative lack of a strong concentration of typical landscape characteristics. The capacity of the landscape to accept change may also be due to the presence of some elements that may screen the proposed scheme, such as vegetation, buildings or landform features.

Landscape susceptibility to change	Criteria
Low	An area that is tolerant of substantial change of the type proposed. This may be due to a lack of existing distinctive landscape elements or characteristics, the presence of a number of landscape detractors, or the presence of elements that may screen the proposed scheme.

Table 15.3: Overall Landscape Sensitivity

Landscape susceptibility to change (from Table 15.2)	Landscape Value (from Table 15.1)				
	Very High	High	Medium	Low	Negligible
High	Very High	High	Medium	Medium	Low
Medium	High	Medium	Medium	Low	Low
Low	Medium	Medium	Low	Low	Negligible

15.2.13 The magnitude of the changes arising from the proposals will then be appraised according to the criteria set out in Table 15.4. The potential landscape effects will also be judged according to whether they are:

- Adverse, beneficial or neutral
- Direct or indirect
- Temporary or permanent
- Reversible or irreversible
- Cumulative

15.2.14 Adverse landscape effects are undesirable and result from negative impacts. Beneficial effects are desirable and result from positive impacts. Neutral effects are neither adverse or beneficial.

Table 15.4: Magnitude of Landscape Effect

Landscape Scale/ Size of Change	Criteria
Major adverse/ beneficial	The proposed development would be at total variance (adverse) or totally accord (beneficial) with the key characteristics of the existing landscape, and/or there would be a very noticeable loss or change in landscape elements, features or characteristics. Beneficial effects would restore, recreate, or permanently benefit the condition or character of the landscape at a large scale.
Moderate adverse/ beneficial	The proposed development would noticeably be at odds (adverse), or fit well (beneficial) with the key characteristics of the existing landscape, would noticeably improve or harm the condition or character of the landscape, and/or would result in the partial loss or alteration to one or more key landscape elements, features or characteristics. It would not adversely affect the overall integrity of the landscape.
Minor adverse/ beneficial	The proposed development would result in some measurable changes to landscape attributes. It would not quite fit (adverse) or have a degree of fit (beneficial) with the key characteristics of the existing landscape, and/or there would be minor loss or alteration of landscape elements, features or characteristics. Beneficial effects would go some way towards improving the condition or character of the landscape.

Landscape Scale/ Size of Change	Criteria
Negligible adverse/ beneficial landscape impact	The proposed development would create a just discernible loss/ change, or improvement to the key characteristics of the existing landscape. The proposals may not be uncharacteristic of the existing landscape.
No change	The proposed development would not cause any change to the key characteristics of the existing landscape. No observable impact.

15.2.15 The overall significance of the effects will then be considered by utilising the categories set out in Table 15.5. As recommended by the GLVIA 3rd edition, the rationale for this process will be described wherever possible, rather than relying solely on the matrix. For the purposes of the assessment, impacts of moderate and above will be considered to be significant.

Table 15.5: Overall Significance of Landscape Effects

Sensitivity of Landscape Receptor (from Table 13.3)	Magnitude of Landscape Change (from Table 13.4)			
	Negligible	Minor	Moderate	Major
Very High	Slight	Moderate or Large	Large or Very Large	Very large
High	Slight	Slight or Moderate	Moderate or Large	Large or Very Large
Medium	Negligible or Slight	Slight	Moderate	Moderate or Large
Low	Negligible or Slight	Negligible or Slight	Slight	Slight or Moderate
Negligible	Negligible	Negligible or Slight	Negligible or Slight	Slight

Visual Assessment Methodology

15.2.16 The assessments will all be based on an initial appraisal of the 'sensitivity' of the key views/ visual receptors. These will be selected as a representative selection of key views, as agreed with Wokingham Borough Council. Initially the sensitivity of the visual receptors will be appraised, (see Table 15.8) based on a combination of the 'value' of the receptor (see Table 15.6) and its 'susceptibility to accept change' (see Table 15.7).

Table 15.6: Visual Receptor - Value Criteria

Value	Criteria
High	Views with high scenic value, views to heritage assets or valued landscape features. Recognition of value shown through planning designations or in relation to heritage assets. Views may be referenced in tourist guides or maps and accompanied by facilities to facilitate their enjoyment, such as parking or interpretation boards.
Medium	Views of medium scenic value. Views not necessarily promoted widely for their value, but may be appreciated by the local community as a popular place to walk/ visit.
Low	Views are of low value, for example, due to landscape detractors, and may only be seen for periods of shorter duration such as visibility from roads or railways.

Table 15.7: Visual Receptor - Susceptibility to Change Criteria

Susceptibility to Change	Criteria
High	Residents at home. People engaged in outdoor recreation whose attention is likely to be focused on the townscape and particular views. Visitors to heritage assets or other attractions where views are an important contributor to the experience. Communities where views contribute to the townscape setting enjoyed by residents.
Medium	Travellers on road, rail or other transport, where travel involves recognised scenic routes. People at their place of work where views are an important contributor to the setting and quality of working life.
Low	Vehicle users on roads used principally for passage, where the attention is not necessarily focused on the view. People engaged in outdoor sport or recreation which does not involve or depend upon appreciation of views of the townscape. Occupants of places of work whose attention may be focused on the work and where the setting is not important to the quality of working life.

Table 15.8: Visual Receptor: Overall Sensitivity

	Value (From Table 15.6)		
Susceptibility to change (from Table 15.7)	High	Medium	Low
High	High	Medium	Medium- Low
Medium	Medium	Medium	Medium - Low
Low	Medium-Low	Medium-Low	Low

15.2.17 The magnitude of the changes to visual amenity arising from the Proposed Development will then be appraised according to the criteria set out in Table 15.9. The potential effects will also be judged according to whether they are:

- Adverse, beneficial or neutral
- Direct or indirect
- Temporary or permanent

- Reversible or irreversible
- Cumulative

15.2.18 Adverse visual effects are undesirable and result from negative impacts. Beneficial effects are desirable and result from positive impacts. Neutral effects are neither adverse or beneficial.

Table 15.9: Magnitude of Visual Change: Definitions

Size/ Scale of Effect	Criteria
Major	Where the development would cause a dominant or complete change to the composition of the view, and the appreciation of landscape character, contrasting in terms of form, scale and mass, height, colour and/or texture. Views of the scheme are unlikely to be screened to any extent.
Moderate	Where the development would cause a clearly noticeable change in the existing view, which would have some effects on its composition, and/or the appreciation of landscape character. It would not result in a dominant change to the view however and the overall effect is likely to be mitigated either due to distance from the viewer, complementary colours and textures, or the presence of some screening elements.
Minor	Where the development would cause a perceptible change in the existing view, but would not materially affect its composition, or the appreciation of landscape character, either due to its distance from the viewer, the presence of screening elements or complementary colours and textures. Views of the proposals are more likely to be glimpsed rather than full.
Negligible	Where the development would cause a barely perceptible change in the existing view, either due to the presence of screening elements or distance from the viewer. Whilst the development would be visible, it would not result in a change to the overall composition of the view or landscape character of the area.
No change	No observable change to the view.

15.2.19 The overall significance of the effects will then be considered using by utilising the categories set out in Table 15.10. As recommended by the GLVIA3, the rationale for this process will be described wherever possible, rather than relying solely on the matrix. For the purposes of the assessment, impacts of moderate and above will be considered to be significant.

Table 15.10: Overall Significance of Visual Effects

	Magnitude of Visual Change (From Table 15.9)			
Sensitivity of Visual Receptor (From Table 15.8)	Negligible	Minor	Moderate	Major
High	Slight	Slight or Moderate	Moderate or Large	Large
Medium	Negligible or Slight	Slight	Moderate	Moderate or Large
Medium - Low	Negligible or Slight	Slight	Slight or Moderate	Moderate
Low	Negligible or Slight	Negligible or Slight	Slight	Slight or Moderate

15.2.20 As part of the assessment process, we will prepare a number of Visualisations, compliant with the *Visual Representation of Development Proposals Technical Guidance Note 06/19* (\\e, 2019). These will be prepared following discussions with Wokingham Borough Council

landscape and planning officers. The majority are likely to be Type 1 visualisations (Annotated Viewpoints), however Type 3 visualisations (Photomontages/ Photowires) can also be prepared for key views where agreed with Wokingham Borough Council officers. These will also be supplemented with photographs stitched together to illustrate the wider panoramic view.

Geographical Scope

15.2.21 From our initial site visits, it is anticipated that landscape and visual effects will be focussed on the Site itself and its immediate surrounding area, however we will undertake further visits up to 2.5km from the Site boundary to test this further.

Temporal Scope

15.2.22 Our landscape and visual assessment will cover the construction and occupation phases of the Proposed Development. The assessment will include two periods of final occupation for each phase. These will be at Year 0 (when that phase has just been completed) and Year 15 (15 years after the completion of that phase). This allows for the screening effects of proposed vegetation to be taken into account once it has matured. Given the long term nature of the implementation, we will also consider the effects that the individual phases of the proposals will have.

15.3 Baseline Environment

Designations

15.3.1 There are no national designations relating to landscape or visual amenity covering the Site, however parts of the Site lie within the 'Loddon Valley' and 'Barkham and Bearwood' draft Valued Landscapes, covered by Policy NE6 of the Draft Local Plan (2020).

15.3.2 Whilst the effects on the settings of assets such as listed buildings, scheduled monuments and registered parks and gardens will be covered by the heritage chapter, the contribution that these heritage assets make to the wider landscape will also be considered. These include the Grade II listed St Bartholomew's Church and Hall House Farm and the St Bartholomew's Scheduled Monument, as well as listed buildings on Cutbush Lane, at Carter's Hill and along Mole Road. Consideration will also be given to the inter-relationship of the Proposed Development with the Bearwood College Registered Park and Garden.

Landscape Character and Features

15.3.3 Given the size of the Site, its landscape character varies. It is especially influenced by the River Loddon and its associated terraces, that run in an approximate north-south direction through the Site. The landscape is subdivided into four main areas in the Wokingham Borough Council Landscape Character Assessment, namely:

- A2 Loddon River Valley
- C1 Arborfield River Terrace
- J2 Arborfield and Barkham Settled and Farmed Clay
- J3 Spencers Wood Settled and Farmed Clay

15.3.4 The Landscape Assessment will test the boundaries of these landscape character areas and the presence of existing key characteristics and their susceptibility to change. It will also review

the 'Landscape Guidelines' for each of the landscape character areas and identify how the Proposed Development can conserve and enhance key characteristics of the existing landscape within the new/ retained landscape structure. Likely characteristics are summarised in Table 15.11.

Table 15.11: Baseline Key Characteristics to be Tested (Wokingham Borough Landscape Character Assessment, 2019)

Landscape Character Area
A2 Loddon River Valley
Key Characteristics ▪ Broad, flat alluvial floodplain ▪ River Loddon, following a meandering course with streams and tributary rivers ▪ Wooded backdrops with semi-natural woodland with ancient woodland (all designated as LWSs) ▪ Pasture and arable farmland in medium and large irregular geometric fields; pasture and wet meadow closest to the river ▪ Wetland character, including BAP priority habitats of floodplain grazing marsh, wet woodland, lowland fen and lowland meadows ▪ Important historic riverside features include traditional brick humpback bridges and water mills ▪ Tranquil and rural character away from river crossings and visual influence of large scale settlement in adjacent areas; the south of the area is also a resource of 'dark skies' ▪ Little public access to the floodplain; busy roads cross the flood plain, including the A33, M4 and Winnersh and Shinfield Eastern Relief Roads, and create physical and visual severance along the floodplain ▪ Pylons, residential and commercial development are distinctive visual features in this open and flat landscape **Valuable Landscape Attributes** ▪ The naturalness of the meandering course of the River Loddon and wide floodplain landscape which provide a strong sense of place ▪ The wooded backdrop of mature broadleaved woodland copses and natural riparian corridors, including ancient woodland which provides scenic quality and a sense of place, as well as framing views across, into and out of the area ▪ Important wetland features/ habitats including BAP priority habitats wet woodland and floodplain grazing marsh remnants designated as LWSs, and the nationally important Stanford End Mill and River Loddon SSSI that are uncommon in the borough and provide important ecological habitats ▪ Historic riverside features including medieval moated sites, old brick watermills and bridges,.. the GHQ Stop Line and associated Second World War features which follow the course of the rivers ▪ Sparse settlement pattern of farmsteads … characterised by a strong local vernacular which contributes to the scenic quality of the area and imparts a sense of time depth ▪ Remote and rural landscape in the south of the area due to the limited access to the floodplain and absence of development on the valley floor ▪ Localised areas with a strong sense of tranquillity particularly in the south, with naturalistic qualities and experience of dark skies away from roads and visual influence of large scale settlement in adjacent areas.
C1 Arborfield River Terrace
Key Characteristics

- Gently undulating river terrace landform between 45-50m AOD to the east of the River
- Loddon floodplain; the area is underlain by London Clay and river terrace gravels which give rise to loamy soils which are better drained than the floodplain, and therefore intensively farmed
- Small water features including tributary stream running through the Holt and drainage channels and ponds
- Intensive arable farmland with medium to large fields bound by indistinct boundaries, mainly post and wire fencing, with occasional gappy remnant hedgerows; some horse paddocks and cattle grazing at the University of Reading farm and Centre for Dairy Research
- Small woodland and copses break up the agricultural plain; BAP priority habitat mixed lowland deciduous woodland dominates, with some wet woodland designated as LWS (Cuckoo Pen, Gravel Pit Wood/ The Holt, Loaders Copse, Winnersh Woodland); Pound Copse and Great Wood LWS also contain small areas of ancient and semi-natural woodland
- Remnant historic parkland associated with the former Arborfield Hall; the presence of mature oaks provides a strong silhouette against the open sky
- Low-density settlement of farmsteads (typically red brick with weather boarded barns), manor houses and hamlets, except for the area north of the M4 where development has extended onto the river terrace on the edge of Winnersh
- Large, modern agricultural buildings are prominent features of the landscape
- Tree-lined narrow lanes, tracks, byways and footpaths allow recreational access to the river terrace, and access to the Loddon floodplain
- Clear long-distance views across the adjacent floodplain due to the unvaried topography
- The spire of Arborfield Church provides a landmark feature in distant views
- Rural character and sense of remoteness, due to the predominance of narrow lanes and tracks and very low density settlement; this is interrupted by the transport corridors in the north of the area, the M4, and new Winnersh Relief Road, as well as the proposed Arborfield Cross Relief Road in the centre of the area

Valuable Landscape Attributes

- Surface water, including ponds, historic moats and drainage ditches, adds visual interest and provides potential for small-scale wetland habitats
- Small deciduous woodlands, some of ancient origin and containing BAP priority habitat punctuate the agricultural landscape providing visual diversity within the open arable fields, and form a backdrop to views, as well as providing important ecological habitats
- Dispersed settlement pattern linked by tree-lined rural lanes, emphasises the open and rural character of the landscape
- Valued area for recreation with a network of bridleways and public footpaths which allow enjoyment of the landscape
- Historic parkland landscapes at Swallowfield and Arborfield provide time-depth; mature oaks create visual interest and strong silhouettes against the open sky
- Clear views to adjacent character areas due to the gently undulating, open landscape
- A tranquil area with a sense of remoteness, removed from roads and visual intrusion of settlement

J2 Arborfield and Barkham Settled and Farmed Clay

Key Characteristics

- A gently undulating landscape between 50m and 65m AOD, underlain by London Clay with localised areas of River Terrace Gravels; shallow wooded valleys follow the course of the Barkham Brook, which is geologically marked by areas of alluvium
- Consistent pattern of water bodies including streams, drainage channels, ditches and open water bodies of various sizes resulting from the clayey and loamy soils which impede drainage
- Wooded context provided by characteristic mature hedgerow and in-field trees, combined with woodland belts, with BAP priority habitats and ancient woodland, and the wooded horizons of the surrounding hills; this creates a loose sense of enclosure
- Arable farming dominates, with pasture on higher ground and horse paddocks near settlement; fields are large and geometric, bound by fragmented hedgerows supported by post and wire; fields used for paddocks are often subdivided with horse tape
- Small-scale wet woodland and wetland habitats scattered on the edge of the area, often designated as LWS; BAP priority habitat wet woodland and wet meadow and wet grassland
- A dense settled character influenced by modern development including the new garden village on the site of Arborfield Garrison and the southern edge of Wokingham which incorporates an industrial estate; there is little consistent style or form
- Older scattered settlement of farms, hamlets and small nucleated villages at Barkham and Arborfield Cross; the buildings have a traditional vernacular of timber framing and clay tiles, exemplified by the Conservation Area at Arborfield Cross; a number of farmhouses are listed
- A network of busy local roads crosses the area; they tend to be rural in character, with ditches, hedges and hedgerow trees, sometimes opening directly onto the arable fields
- Public rights of way run between the settlements, and provide access for recreational use
- A rural character away from development and roads, with views across to adjacent character areas including across the Loddon Valley
- A historic road, now represented by footpaths, lanes and Victorian carriageways, that appears on Norden's map of 1607, connecting Swallowfield Park via Arborfield Cross and the Coombes (in LCA L1), with Wokingham

Valuable Landscape Attributes

- Barkham Brook and associated wetland which provide important ecological habitats including wet meadow and BAP priority habitat wet woodland
- Pattern of arable and pastoral fields, which provides a rural character away from settlement and creates an important separation between settlements
- Mature hedgerow trees and in-field trees which provide a wooded character and visual interest within the landscape
- Historic Second World War pillboxes and other defence works, which are now a scenic part of the landscape
- Rural settlement pattern of farms, hamlets and small nucleated villages outside the urban area which provides a rural character and a link to the past
- Recreational value of the network of rights of way between settlements
- Views across the landscape to surrounding character areas, particularly across the river valleys to the west and to the wooded hills to the north and south provides a loose sense of enclosure

J3 Spencers Wood Settled and Farmed Clay

Key Characteristics

- Rolling clay ridge above the Loddon Valley to the east and the lowlands to the west, rising to a flat sandy plateau at 66m AOD
- Small scattered mixed deciduous woodland blocks and copses including some of ancient origin, many designated as LWS, most located on the steep west and south facing slopes of the ridge.
- Fragmented unimproved meadow habitats, with BAP priority habitat lowland meadow, are found on lower slopes, for example Clare's Green Road LWS
- Large arable fields with some pasture, with an intact hedgerow network and hedgerow oaks; horse paddocks feature on the edge of settlements or around large farmsteads; smaller and irregular field boundaries are still evident, indicating early enclosure
- Remnant parkland at Shinfield Grange, Loddon Court, Shinfield Lodge etc; a number of these are clustered along the top of the ridge overlooking the clay lowlands of Grazeley to the west; these parklands contain BAP priority habitat lowland wood pasture and parkland and ancient woodland; visually prominent parkland veteran trees include many Wellingtonias, there is a prominent avenue of these trees along the drive to Wellington Court, originally the Stanbury Park estate
- The GHQ Stop Line and associated Second World War features built during the summer of 1940 to contain the threatened German invasion
- Densely settled landscape, with new large-scale residential estate development around the substantially 20th century settlements of Shinfield, Spencers Wood and Three Mile Cross, as part of South of the M4 SDL
- To the south of the area, settlement is more scattered with traditional farmsteads many with a strong vernacular of polychromatic Reading brick and weatherboarding; a number of farmhouses are listed including Grade II* Sheepridge Court; there is a permanent mobile home site at Loddon Court Farm and some agricultural buildings have been converted to other uses e.g. Lambs Farm Business Park
- Network of rural lanes bordered by water-filled ditches connect the original settlement pattern; some B roads have urbanised features including kerbs and pavements; the A33 forms the western border and is very busy, while the M4 crosses the area north of Shinfield, and introduces noise and movement
- Sense of elevation from the ridgeline and good views over surrounding lowlands including to the Loddon valley and over West Berkshire

Valuable Landscape Attributes

- Remnant historic parklands and visually prominent parkland trees, including many Wellingtonias, especially the avenue of this species which provides time-depth, visual diversity and a sense of orientation to the landscape
- Pattern of arable and pastoral fields, which provide a rural character away from the urban areas and provide an important separation between settlements
- Small-scale woodlands provide visual diversity in the landscape, as well as ecologically important habitats
- Strong hedgerow network with standard oaks provides a wooded character and visual interest within the rural landscape
- Network of rural lanes bordered by water-filled ditches provide evidence of the original settlement pattern
- Views to the surrounding lowlands provide a sense of place and of orientation
- Undeveloped slopes of the clay ridgeline which is visually prominent and provides separation between settlements
- The GHQ Stop Line and associated Second World War features which follow the course of the Foudry Brook crossing the southern end of the clay ridge and along the River Loddon
- Isolated traditional farmsteads and their associated buildings, particularly in the south of the LCA

Visual Baseline

15.3.5 Given the relative visual containment of much of the Site, there are few views of the Site from the wider area. Current visual receptors are listed below:

Within the Site's Extents

- Users of the existing public rights of way within the Site:
  - SHIN FP 39 I
  - SHIN FP 3 I
  - SHIN FP 4 II
  - SHIN FP 5 I
  - SHIN FP 6 I-II
  - ARBO FP 1 I-III
  - ARBO FP 2 II
  - ARBO BW 3 I-II
  - ARBO BW 4 I-III
  - ARBO BW 5 II-III
  - ARBO BW 5 V-VII
  - ARBO FP 5 II-IV
  - ARBO FP 21 I
  - WINN BW 11 I-II
  - WINN FP 7 I
  - WINN FP 8 I
  - EARL FP 15 I
- Residents and users of Carter's Hill Lane, Arborfield
- Residents and users of Julkes Lane, Carter's Hill
- Users and residents of Parkcorner Lane, Carter's Hill
- Users and residents of Copse Barnhill Lane, Carter's Hill (PRoW ARBO BW 4 III)
- Users and residents of Betty Grove Lane, Sindlesham
- Users and residents of Gipsy Lane, Sindlesham

North of the Site

- Users of the existing Gateway building at Thames Valley Science Park
- Users of Mill Lane, Sindlesham (south of the M4)
- Users of Mill Lane, Earley (north of the M4)
- Users and residents of Hatch Farm Way, Winnersh
- Users of the M4 between the Site's western and eastern boundaries
- Users of Lower Earley Way
- Users of Paddick Drive, Lower Earley
- Users of Meldreth Way, Lower Early Earley

West of the Site

- Users and residents of Cutbush Lane
- Users of Shinfield Eastern Relief Road
- Residents of eastern side of Shinfield

South of the Site

- Users of A237 Arborfield Road to the south of the Site
- Users of Church Lane, Arborfield
- Visitors to St. Bartholomew Church, Arborfield
- Users of Sindlesham Road to the south of the Site

East of the Site

- Users of Mole Road
- Users and residents of Wheatsheaf Close, Sindlesham
- Users of Nirvana Health Sindlesham
- Users of the Reading Football Club Training Ground, Mole Road

15.4 Potential Environmental Impacts & Effects

Construction Impacts and Effects

15.4.1 The main impacts to landscape character and features will relate to the change of land use from agriculture to a construction site in the parts of the Site that will accommodate new buildings and access infrastructure.

15.4.2 Visually, the construction impacts will especially relate to the introduction of construction elements such as hoardings and partially constructed buildings, as well as tall elements such

as cranes. During the construction process it will also include the 'raw' appearance of new buildings and parkland prior to the establishment of associated green infrastructure planting.

Occupation Impacts and Effects

15.4.3 Occupational impacts will consider changes at Year 0 and Year 15. The effects at Year 15 are considered to be the 'residual effects', having allowed for the establishment of mitigation planting. A Year '0' and 'Year 15' appraisal will be undertaken for each of the various phases of development

Potential Effects on Designations

15.4.4 Whilst the Site is not designated for its landscape amenity, there could be potential effects on the emerging draft 'Valued Landscape' designations along the Loddon Valley and adjacent to the Bearwood College RPG.

15.4.5 Whilst the Landscape and Visual Impact chapter will not constitute a heritage assessment, potential impacts on the setting of heritage assets and the contribution that they make to landscape character will be considered. This will include the Bearwood College RPG, the listed buildings and the Scheduled Monument within and adjacent to the Site. Whilst new development has the potential to erode the historic character of parts of the Site, assets such as the spire of St Bartholomew's Church can be incorporated within new vistas set within the development layout and existing ancient woodland and associated protected buffers can be incorporated within the development layout.

Potential Effects on Landscape Characteristics: Landform and Water Features

15.4.6 The assessment will consider effects on the valley landform of the Site, however it is likely that the Proposed Development will not result in significant changes to the landform, as the emerging masterplan shows how new homes can be situated to respect the existing topography.

15.4.7 The introduction of Sustainable Drainage Systems (SuDS) has the potential to have a positive impact on the Site. Subject to detailed design, these could provide opportunities for permanent ponds/ wetlands on the Site, creating a valuable landscape/ nature conservation feature. In addition, there is the potential for extensive areas of enhancements to the existing areas of meadow adjacent to the River Loddon and the characteristics of the River Loddon itself.

Potential Effects on Landscape Characteristics: Vegetation

15.4.8 Whilst the Proposed Development would result in the replacement of areas of grazing and arable farmland with built infrastructure associated with the new garden village, the proposed land uses can incorporate significant areas of native woodland and grassland, as well as retaining extensive areas of existing woodland, hedgerow and pasture. Whilst this is likely to result in the net reduction in the area of Green Infrastructure, the overall quality and diversity of the vegetation within the Site has the potential to be improved.

Potential Effects on Landscape Characteristics: Access and Rights of Way

15.4.9 The Proposed Development will enhance accessibility throughout the area, with the provision of new footpaths and cycleways, as well as the upgrading of existing routes. Where existing footpaths are diverted/ closed, new access routes can be provided to compensate for the loss

of their alignment. In particular, the Proposed Development provides enhanced opportunities for crossing the River Loddon in an east-west direction, joining the new residential area with the Innovation Valleys area, as well as the provision of a new cycle/ footpath route adjacent to the River Loddon. These routes can connect with existing communities within the wider area.

Potential Effects on Overall Landscape Character

15.4.10 The Proposed Development is likely to result in effects on the landscape character of a small part of National Landscape Character Area 115 and within Wokingham Borough Council Areas C1 Arborfield River Terrace and J2 Arborfield and Barkham Settled and Farmed Clay, with existing farmland to the east of the River Loddon being replaced by a new residential community. Much of the valley side to the west of the River Valley (Wokingham Borough Council Character Area A2 Loddon River Valley) is likely to retain its riverside character and has the potential to experience beneficial effects relating to habitat creation of enhanced meadows. The proposed road crossing across the northern part of the valley is likely to result in a negative effect on landscape character in this area. Similarly, the new M4 bridge crossing and road connecting to Lower Earley Way, is likely to have a potential effect on the landscape character of the northern part of the Site.

Potential Effects on Visual Amenity

15.4.11 Any potential visual effects of the Proposed Development are likely to be from within the Site and immediately adjacent to its boundaries. This will include the new housing and open spaces as well as a new spine road and bridge across the M4 motorway connecting with Lower Earley Way and the Thames Valley Science Park. The potential effects on the current visual receptors (set out in Section 15.3 above) will be the focus for the appraisal.

15.5 Scoping Summary

Landscape Character and Features

15.5.1 The assessment will review the existing baseline conditions of the Site's landscape character and features, based on site surveys and reviews of OS mapping, historic mapping, aerial photography, designations, policies and published landscape character assessments. Baseline conditions will be illustrated with drawings and photographs.

15.5.2 The overall sensitivity of key landscape receptors will be considered and the magnitude and significance of potential effects resulting from the Proposed Development will be appraised, following guidance set out in the *Guidelines for Landscape and Visual Impact Appraisal* (3rd Edition, Landscape Institute & IEMA, 2013). Effects will be considered during construction, following completion (Year 0), and 15 years following completion (Year 15).

Visual Amenity

15.5.3 The assessment will review the existing baseline conditions of the Site's views and potential visual receptors, based on site surveys and computer-generated Zones of Theoretical Visibility. Type 1 and Type 3 visualisations will be provided, in agreement with Wokingham Borough officers. These will be based on methodology set out in the *Visual Representation of Development Proposals Technical Guidance Note 06/19* (Landscape Institute, 2019).

15.5.4 The overall sensitivity of key visual receptors will be considered and the magnitude and significance of potential effects resulting from the Proposed Development will be appraised,

following guidance set out in the *Guidelines for Landscape and Visual Impact Appraisal* (3rd Edition, Landscape Institute & IEMA, 2013). Effects will be considered during construction, following completion (Year 0), and 15 years following completion (Year 15), for each of the development phases.

16 Noise and Vibration

16.1 Introduction

16.1.1 This chapter of the ES Scoping Report has been produced by the acoustics team of RPS Consulting UK (RPS). RPS is a member of the Association of Noise Consultants (ANC), the representative body for acoustics consultancies, having demonstrated the necessary professional and technical competence. This report has been prepared with integrity, objectivity and honesty in accordance with the Code of Conduct of the Institute of Acoustics (IOA) and ethically, professionally and lawfully in accordance with the Code of Ethics of the ANC.

16.1.2 This chapter outlines the proposed scope of the noise and vibration impact assessment for the Proposed Development.

16.2 Assessment Criteria & Methodology

Previous Assessment

16.2.1 RPS are not aware of any previous studies or assessments in the immediate area that will be relevant to this assessment or provide useful baseline data.

Legislative Context, Technical Guidance and Best Practice

Legislative Context

16.2.2 The following noise and vibration related legislation are relevant to the Proposed Development:

- Control of Pollution Act 1974
- Environmental Protection Act 1990

16.2.3 The key national policy relevant to the Noise and vibration (N&V) assessment are as follows

- The National Planning Policy Framework (NPPF 2023)
- Noise Policy Statement for England (NPSE 2010)
- National Planning Practice Guidance – Noise (PPG-N 2019)

Guidance and Best Practice

16.2.4 The following standards and guidance documents are relevant to the Proposed Development and are likely to be referred to as part of the SNV impact assessment:

- British Standard 7445-2:1991 “Description and measurement of environmental noise - Part 2: Guide to the acquisition of data pertinent to land use”
- British Standard 4142:2014+A1:2019. “Methods for rating and assessing industrial and commercial sound”
- British Standard 5228-1:2009+A1:2014. “Code of practice for noise and vibration control on construction and open sites - Part 1: Noise”

- British Standard 5228-2:2009+A1:2014. “Code of practice for noise and vibration control on construction and open sites - Part 2: Vibration”
- British Standard 8233:2014 “Guidance on sound insulation and noise reduction for buildings”
- Calculation of Road Traffic Noise 1988 (CRTN, 1988)
- Design Manual for Roads and Bridges – LA111 – Noise and vibration - Revision 2 (LA 111, 2020)
- Professional Practice Guidance on Planning & Noise – New Residential Development (ProPG, 2017)
- Acoustics, Ventilation and Overheating Residential Design Guide V1.1 (AVO, 2020)
- Building Bulletin 93: Acoustic Design for Schools: Performance Standards (BB93, 2015)
- Institute of Acoustics/Association of Noise Consultants Guidelines for Acoustic Design of Schools (ADS, 2015)

Significance Criteria

16.2.5 Likely significant effects will be those from the construction and operational phases of the scheme. The likelihood of an effect will be determined through baseline collection, calculation and computational noise modelling.

16.2.6 The scale attributed to each effect will be determined based on the sensitivity of the receptor and magnitude of impact arising as a result of the Proposed Development. Professional judgement and experience will be drawn upon to assess the scale and significance based on the following scales of sensitivity and impact.

Receptors and Receptor Sensitivity

16.2.7 Receptor sensitivity will be evaluated based on a review of the baseline position of each receptor and its relative status against benchmark definitions, in line with the proposed scale set out in Table 16.1.

Table 16.1 Proposed sensitivity criteria

Sensitivity/Value	Definition
High	Receptors where people or operations are particularly susceptible to noise or vibration. Sensitive ecological receptors known to be vulnerable to the effects of noise or vibration. (e.g. Residential quiet outdoor areas used for recreation; schools / educational facilities in the daytime; hospitals/ residential care homes; ecologically sensitive areas for example Special Protection Areas (SPAs); and Special Areas of Conservation (SAC) etc).
Medium	Receptors moderately sensitive to noise or vibration where it may cause some distraction or disturbance. (e.g. Offices; restaurants/ retail; and sports grounds when spectator or noise is not a normal part of the event and where quiet conditions are necessary (e.g. tennis, golf)).
Low	Receptors where distraction or disturbance of people from noise or vibration is minimal. (e.g. Residences and other buildings not occupied during working hours; factories and working environments with existing high noise levels; and sports grounds when spectator or noise is a normal part of the event).

Sensitivity/Value	Definition
Very Low	Receptors which are not sensitive to noise.

Magnitude of Impact

16.2.8 The magnitude of any adverse impact to a receptor will be determined by considering the estimated deviation from baseline conditions both before, and, if required, after mitigation, variously assessed based on the criteria proposed in Table 16.2 to Table 16.6.

Table 16.2 Proposed impact magnitude criteria – Construction Phase noise

Impact Magnitude	Description
High	Noise levels exceed the Assessment Category threshold level for the duration of the construction works.
Medium	Noise levels exceed the Assessment Category threshold level for periods of more than one month, but for significantly less than the whole duration of the construction works.
Low	Noise levels exceed the Assessment Category threshold level for periods of less than one month.
Very Low	Noise levels do not exceed the Assessment Category threshold level during any period.

Table 16.3 Proposed impact magnitude criteria – Construction Phase vibration

Impact Magnitude	Description
High	> 10 mm per sec. Vibration likely to be intolerable for more than brief exposure. Approaching the level at which cosmetic damage may occur in light structures
Medium	5 mm – 10 mm per second. Tolerance less likely even with prior warning and explanation.
Low	1 mm – 5 mm per second. Complaints are likely but can be tolerated if prior warning and explanation given.
Very Low	<1mm per second. Below level at which complaints are likely.

Table 16.4 Proposed impact magnitude criteria – Operational Phase noise

Impact Magnitude	Description
High	Impact resulting in a considerable change in baseline environmental conditions predicted either to cause statutory objectives to be significantly exceeded or to result in severe undesirable/desirable consequences on the receiving environment.
Medium	Impact resulting in a discernible change in baseline environmental conditions predicted either to cause statutory objectives to be marginally exceeded or to result in undesirable/desirable consequences on the receiving environment.

Impact Magnitude	Description
Low	Impact resulting in a discernible change in baseline environmental conditions with undesirable/desirable conditions that can be tolerated.
Very Low	No discernible change in the baseline environmental conditions, within margins of error of measurement.

Table 16.5 Proposed impact magnitude criteria – Operational Phase Road Traffic noise

Impact Magnitude	Description
High	Change in traffic noise level >5 dB ($L_{A10,18hr}$)
Medium	Change in traffic noise level between 3 dB and <5 dB ($L_{A10,18hr}$)
Low	Change in traffic noise level between 1 dB and <3 dB ($L_{A10,18hr}$)
Very Low	Change in traffic noise level <1 dB ($L_{A10,18hr}$)

Table 16.6 Proposed impact magnitude criteria – Operational Phase Industrial noise

Impact Magnitude	Description
High	Where the Rating Sound exceeds the Background Sound by >15 dB.
Medium	Where the Rating Sound exceeds the Background Sound by around 10 dB.
Low	Where the Rating Sound exceeds the Background Sound by around 5 dB.
Very Low	Where the Rating Sound exceeds the Background Sound by 0 dB or less.

Significance of Effect

16.2.9 The significance of the effect of Noise and Vibration will be determined by taking into account the sensitivity of the receptor and the magnitude of the impact. The proposed method to be employed for this assessment is presented in Table 16.7. Where a range of significance levels is presented, the final assessment for each effect will be based upon expert judgement.

16.2.10 In all cases, the evaluation of receptor sensitivity, impact magnitude and significance of effect will be informed by professional judgement and underpinned by narrative to explain the conclusions reached.

16.2.11 For the purpose of this assessment, effects with a significance level of minor or less will not be considered significant in terms of the EIA Regulations.

Table 16.7 Proposed assessment matrix

Sensitivity of Receptor		Magnitude of Impact			
	No Change	Negligible	Low	Medium	High
Negligible	Negligible	Negligible	Negligible or Minor	Negligible or Minor	Minor
Low	Negligible	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate
Medium	Negligible	Negligible or Minor	Minor	Moderate	Moderate or Major
High	Negligible	Minor	Minor or Moderate	Moderate or Major	Major

16.2.12 Where the magnitude of impact is 'no change', no effect would arise.

16.2.13 The definitions for significance of effect levels are described as follows.

- Substantial: Only adverse effects are normally assigned this level of significance. These effects are generally, but not exclusively, associated with sites or features of international importance that are likely to suffer a most damaging impact and loss of resource integrity. However, a major change in a site or feature of national importance may also enter this category.

- Major: These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process. These effects are generally, but not exclusively, associated with sites or features of international, national or regional importance that are likely to suffer a most damaging impact and loss of resource integrity. However, a major change in a site or feature of local importance may also enter this category. Effects upon human receptors may also be attributed this level of significance.

- Moderate: These beneficial or adverse effects have the potential to be important and may influence the key decision-making process. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse or beneficial effect on a particular resource or receptor.

- Minor: These beneficial or adverse effects are generally, but not exclusively, raised as local factors. They are unlikely to be critical in the decision-making process but are important in enhancing the subsequent design of the project.

- Negligible: No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

- No change: No loss or alteration of characteristics, features or elements; no observable impact in either direction.

Baseline Data Collection

16.2.14 The baseline noise climate at the site and surrounding area is likely to be affected primarily by the M4 motorway and other transportation routes in the area,

16.2.15 The baseline noise conditions on site will be established by undertaking a noise survey. The format of the baseline survey will be agreed in advance with Wokingham Borough Council Environmental Health Department (WBCEHD).

16.2.16 The survey is likely to involve continuous long-term unattended noise monitoring (i.e. 7 days or more) at a number of positions around and across the site. The unattended monitoring will also be supplemented by attended short-term measurements, where appropriate (this is likely to be required to help quantify less significant, and more localised noise sources).

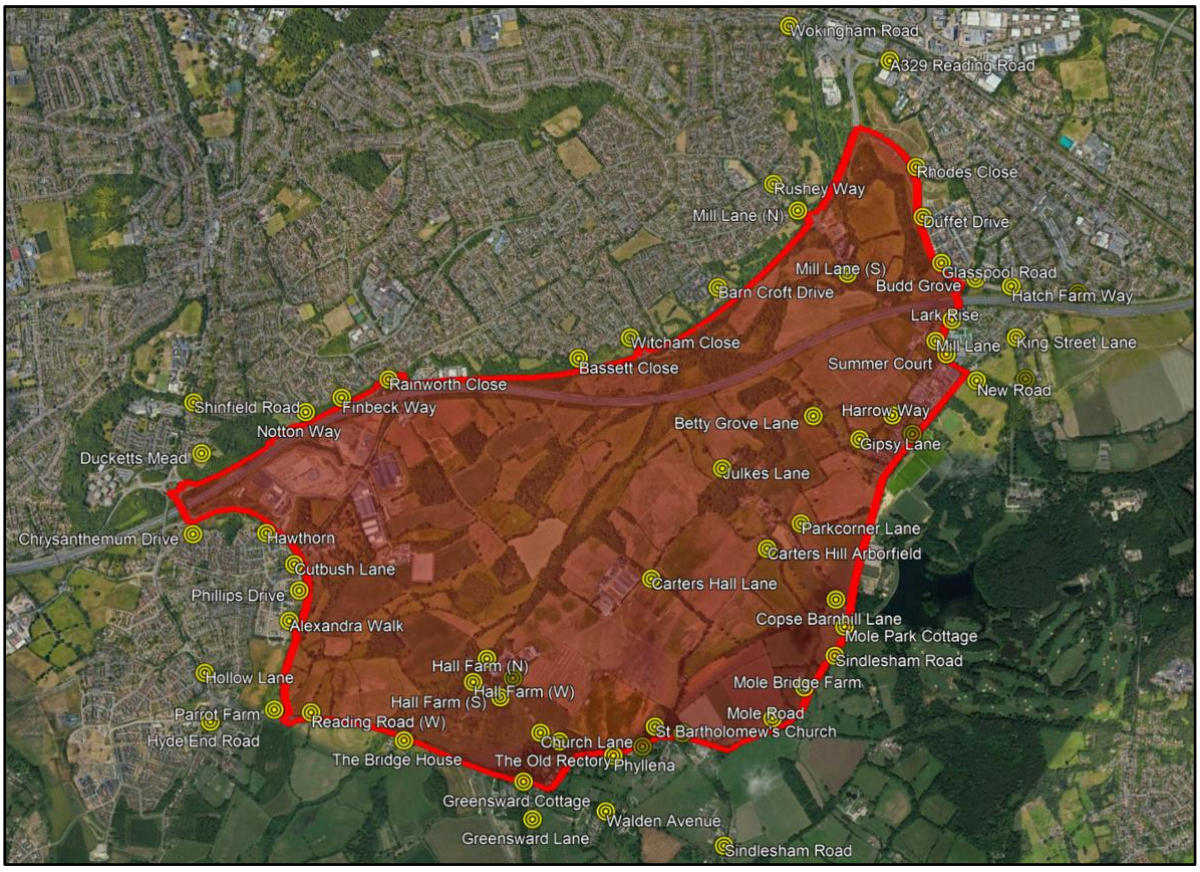
16.2.17 3D noise modelling, based on the survey results, may also be used to better understand the spatial spread of noise across the site.

16.2.18 A review of currently available information has not identified any significant sources of vibration that are likely to affect either the Proposed Development or existing receptors. Therefore, no baseline vibration survey is proposed.

Proposed Assessment Methodology

16.2.19 Proposed noise sensitive receptors (NSR) are presented in **Error! Reference source not found.** and listed in Table 16.8 for consideration and approval by WBCEHD.

Figure 16.1 Proposed NSR locations



16.2.20 The type of assessment for which each receptor will be used (C: construction, O: Operational (excluding changes in traffic noise) and T: changes in Traffic noise) is also indicated in Table 16.8.

Table 16.8 Proposed NSRs and Assessment Type (Construction, Operation or Traffic)

ID	Name	Latitude	Longitude	Type		
R1	Ducketts Mead	51°25'2.89"N	0°56'48.05"W		O	T
R2	Notton Way	51°25'10.00"N	0°56'19.27"W		O	T
R3	Finbeck Way	51°25'12.47"N	0°56'9.30"W		O	T
R4	Rainworth Close	51°25'15.62"N	0°55'56.33"W		O	T
R5	Bassett Close	51°25'19.24"N	0°55'3.83"W		O	T
R6	Witcham Close	51°25'22.79"N	0°54'49.56"W		O	T
R7	Barn Croft Drive	51°25'31.42"N	0°54'25.33"W		O	T
R8	Mill Lane (N)	51°25'44.68"N	0°54'3.24"W		O	T
R9	Mill Lane (S)	51°25'33.80"N	0°53'49.49"W		O	
R10	Rhodes Close	51°25'52.15"N	0°53'30.48"W		O	T
R11	Duffet Drive	51°25'43.56"N	0°53'28.68"W		O	T
R12	Glasspool Road	51°25'35.65"N	0°53'23.53"W	C	O	T
R13	Budd Grove	51°25'32.96"N	0°53'14.08"W	C	O	T
R14	Lark Rise	51°25'25.84"N	0°53'20.65"W	C	O	T
R15	Mill Lane	51°25'22.23"N	0°53'25.15"W	C	O	T
R16	Summer Court	51°25'19.96"N	0°53'22.16"W	C	O	T
R17	New Road	51°25'15.41"N	0°53'13.83"W	C	O	T
R18	Harrow Way	51°25'9.44"N	0°53'37.13"W	C	O	
R19	Gipsy Lane	51°25'5.32"N	0°53'46.20"W	C	O	
R20	Betty Grove Lane	51°25'9.32"N	0°53'58.98"W	C	O	
R21	Julkes Lane	51°25'0.29"N	0°54'24.11"W	C	O	
R22	Parkcorner Lane	51°24'50.81"N	0°54'2.40"W	C	O	
R23	Carters Hill Arborfield	51°24'46.48"N	0°54'11.74"W	C	O	
R24	Copse Barnhill Lane	51°24'37.73"	0°53'52.74"W	C	O	T
R25	Mole Park Cottage	51°24'33.10"N	0°53'50.39"W	C	O	T
R26	Sindlesham Road	51°24'28.05"N	0°53'53.03"W	C	O	T
R27	Mole Bridge Farm	51°24'22.63"N	0°54'1.47"W	C	O	T
R28	Mole Road	51°24'17.32"N	0°54'10.24"W	C	O	T
R29	Arborfield Church	51°24'14.75"N	0°54'35.17"W	C	O	
R30	St Bartholomew's Church	51°24'15.87"N	0°54'42.73"W	C	O	
R31	Carters Hall Lane	51°24'41.31"N	0°54'43.73"W	C	O	
R32	Longcroft	51°24'12.45"N	0°54'46.18"W	C	O	T
R33	Phyllena	51°24'10.87"N	0°54'54.25"W	C	O	T
R34	The Old Rectory	51°24'13.33"N	0°55'9.13"W	C	O	
R35	Church Lane	51°24'14.84"N	0°55'14.40"W	C	O	
R36	Greensward Cottage	51°24'6.41"N	0°55'19.06"W	C	O	T
R37	Hall Farm (S)	51°24'20.91"N	0°55'25.45"W	C	O	
R38	Hall Farm (W)	51°24'23.55"N	0°55'32.98"W	C	O	
R39	Hall Farm (E)	51°24'24.23"N	0°55'22.01"W	C	O	
R40	Hall Farm (N)	51°24'27.55"N	0°55'29.17"W	C	O	
R41	The Bridge House	51°24'13.51"N	0°55'52.08"W	C	O	T
R42	Reading Road (W)	51°24'18.32"N	0°56'17.76"W	C	O	T
R43	Parrot Farm	51°24'18.78"N	0°56'27.94"W	C	O	T

ID	Name	Latitude	Longitude	Type		
R44	Alexandra Walk	51°24'34.06"N	0°56'23.78"W		O	T
R45	Phillips Drive	51°24'39.29"N	0°56'21.04"		O	T
R46	Cutbush Lane	51°24'43.81"N	0°56'22.41"W		O	T
R47	Hawthorn	51°24'49.17"N	0°56'30.11"W		O	T
R48	Chrysanthemum Drive	51°24'48.98"N	0°56'50.41"W		O	T
R49	Hyde End Road	51°24'16.72"N	0°56'45.59"W			T
R50	Hollow Lane	51°24'25.11"N	0°56'47.12"W			T
R51	Walden Avenue	51°24'1.30"N	0°54'56.32"W			T
R52	Greensward Lane	51°23'59.95"N	0°55'16.60"W			T
R53	Sindlesham Road	51°23'55.37"N	0°54'23.66"W			T
R54	King Street Lane	51°25'22.81"N	0°53'2.89"W			T
R55	Bearwood Road	51°25'15.69"N	0°53'0.30"W			T
R56	Longdon Road	51°25'30.41"N	0°52'45.83"W			T
R57	Hatch Farm Way	51°25'31.65"N	0°53'4.23"W			T
R58	A329 Reading Road	51°26'10.46"N	0°53'37.81"W			T
R59	Wokingham Road	51°26'16.46"N	0°54'5.57"W			T
R60	Rushey Way	51°25'49.27"N	0°54'9.97"W			T
R61	Shinfield Road	51°25'11.65"N	0°56'50.25"W			T
R62	Toad Cottage	51°25'6.22"N	0°53'31.58"W			T

16.2.21 Proposed baseline monitoring locations are presented in **Error! Reference source not found.** and tabulated in 0 for consideration and approval by WBCEHD. Additional specific consultation may be required with WBCEHD to agree locations and durations of any required short-term monitoring and/or further long-term monitoring of existing commercial/industrial sources.

Figure 16.2 Proposed long-term monitoring locations

Table 16.9 Proposed NSRs and assessment activity

ID	Description
LT1	Residual and background noise levels around the middle of the proposed residential development to inform site suitability assessment and calibrate noise model
LT2	Residual and background noise levels adjacent to the M4 to inform the noise model
LT3	Residual and background noise levels adjacent to Mole Road to inform the noise model
LT4	Residual and background noise levels adjacent to Church Lane to inform the noise model
LT5	Residual and background noise levels adjacent to A327 Reading Road to inform the noise model

16.2.22 All measurements will be carried out in general accordance with guidance provided in BS 7445-2:1991 and BS 4142:2014+A1:2019.

16.2.23 The assessment of noise and vibration impacts during the construction / demolition phase will be carried out qualitatively and, where appropriate information is available, quantitatively based on guidance provided in BS:5228-1:2009+A1:2014 Part 1: Noise and BS:5228-2:2009+A1:2014 Part 2: Vibration.

16.2.24 The impact of changes in traffic noise as a result of the construction / demolition phase will be predicted based on the methodology contained in the CRTN and assessed based on guidance provided in LA 111.

16.2.25 The impact of operational noise from the Proposed Development (assumed to be primarily commercial / industrial noise associated with building services plant / equipment) on existing receptors will be assessed based on the guidance provided in BS 4142:2014+A1:2019.

16.2.26 The impact of changes in traffic noise as a result of the operation of the Proposed Development will be predicted based on the methodology contained in CRTN and assessed based on guidance provided in LA 111.

16.2.27 The impact of existing transportation noise sources on the Proposed Development will be assessed based on guidance provided in the Professional Practice Guidance on Planning & Noise (ProPG), BS 8233:2014 and BB93.

16.2.28 The impact of existing industrial and commercial noise sources on the Proposed Development will be assessed based on the guidance provided in BS 4142:2104+A1:2019 and BB93.

Geographical Scope

16.2.29 The geographical scope of the assessment will be defined by two main factors:

- The location of existing noise and vibration sensitive receptors; and
- Where there are acoustically significant changes in traffic flows on existing (and new) roads as a result of the Proposed Development

16.2.30 The geographical scope of the construction noise assessment will extend to 300m from the Site redline boundary, which is in accordance with the guidance set out in LA 111 for the identification of significant effects from construction operations. As indicated in **Error! Reference source not found.**, those receptors closest to construction noise sources have

been proposed as being indicative of worst case, as more distant receptors will be subject to lower levels of construction noise.

16.2.31 The geographical scope of the operational assessment will extend to 600m from the Site redline boundary, which is in accordance with the guidance set out in LA 111 for the identification of significant effects from operational road traffic. As indicated in **Error! Reference source not found.**, those receptors closest to the Proposed Development, and to the roads that may be affected by change in traffic flow, have been proposed as being indicative of worst case, with more distant receptors being subject to lower levels of operational noise.

Temporal Scope

16.2.32 The noise and vibration impact assessment will cover both the construction and operational phases of the Proposed Development.

16.2.33 The assessment of impacts will consider the construction stage, the initial scheme opening year and a future design year (typically 15 years from the scheme opening year). As a consequence, this will capture the cumulative effects of nearby committed developments.

16.3 Baseline Environment

16.3.1 In advance of the proposed noise and vibration surveys, detailed baseline noise information is not available. However, to inform the scoping exercise, information was gathered from several publicly available sources, including online imagery and Defra strategic noise mapping data. A review of the information available from these sources identified that the main source of noise affecting the Proposed Development is likely to be road traffic from the M4 motorway. Other existing sources of noise are likely to include road traffic from the A327 that runs along the southwest perimeter of the site, the A329 that runs to the east of the site, and a number of local roads running around and through the Site.

16.3.2 The Site is bounded by the residential areas of Shinfield to the southwest, Earley to the north and Winnersh and Sindlesham to the east. Isolated properties are located to the south of the Site, which includes the village of Arborfield.

16.4 Potential Environmental Impacts & Effects

16.4.1 From a noise and vibration perspective, an impact is considered to result from a change in the existing noise and/or vibration environment. This could be an increase or decrease in noise levels, the introduction of a new noise or vibration source or potentially the removal of an existing sound. Impacts can also occur when new sensitive receptors are introduced into the existing noise and/or vibration environment. These impacts will result in effects that could include, but may not be limited to, the following:

- Annoyance
- Changes in speech intelligibility
- Task disturbance
- Sleep disturbance
- Building damage
- Interference with sensitive equipment

16.4.2 The noise and vibration impact assessment will include consideration of the following potential effects:

Construction / demolition phase impacts and effects

16.4.3 Noise and vibration effects on existing sensitive receptors surrounding the site as a result of the proposed demolition / construction works (any effects will be temporary and direct).

16.4.4 Noise and vibration effects on new sensitive receptors formed as part of the Proposed Development due to its phased nature (any effects will be temporary and direct).

16.4.5 Noise effects at existing sensitive receptors due to changes in traffic on existing roads as a result of the construction / demolition works (any effects will be temporary and indirect).

Operational phase

16.4.6 Noise effects on existing sensitive receptors generated by the operation of building services plant and equipment associated with the Proposed Development (any effects will be long-term and direct)

16.4.7 Noise effects on existing sensitive receptors due to changes in traffic on existing roads as a result of the operation of the Proposed Development (any effects will be short and/or long-term and direct).

16.4.8 It is considered unlikely that the operation of a residential led development will result in significant vibration effects at nearby receptors and therefore it is proposed that vibration effects during operation are scoped out of the assessment.

16.4.9 In addition to assessing the impact of the Proposed Development on existing receptors, this chapter of the ES will also consider the impact of the existing noise climate on the Proposed Development. This will include an assessment of the suitability of the site for both residential development and schools and will consider the impact of both existing transportation and commercial / industrial noise sources (this assessment may be covered in detail in a separate 'site suitability' report but this will form an appendix to the EIA and any likely significant noise and vibration effects will be identified in the ES chapter).

16.4.10 The assessment will also identify the noise effects resulting from the operation of the Proposed Development on new sensitive receptors that are formed as part of the development itself.

16.4.11 A review of currently available information has not identified any significant sources of vibration in close proximity to the Proposed Development. Therefore, it is proposed that assessment of impact for existing vibration affecting the Proposed Development is scoped out of the assessment.

16.5 Scoping Summary

16.5.1 It is proposed that a noise survey will be undertaken to quantify the baseline noise conditions across the Proposed Development site and at existing noise sensitive receptors likely to be affected by it. No baseline vibration survey is proposed based on currently available information.

16.5.2 The following assessments will be undertaken to identify likely construction / demolition and operational phase noise and vibration impacts as a result of the Proposed Development.

- Noise and vibration effects on existing sensitive receptors surrounding the site as a result of the proposed demolition / construction works (any effects will be temporary and direct).

- Noise and vibration effects on new sensitive receptors formed as part of the Proposed Development due to its phased nature, as a result of the proposed demolition / construction works (any effects will be temporary and direct).

- Noise effects at existing sensitive receptors due to changes in traffic on existing roads as a result of the construction / demolition works (any effects will be temporary and indirect).

- Noise effects on existing sensitive receptors generated by the operation of building services plant and equipment associated with the Proposed Development (any effects will be long-term and direct)

- Noise effects on existing sensitive receptors due to changes in traffic on existing roads as a result of the operation of the Proposed Development (any effects will be short and/or long-term and direct).

- Noise effects resulting from the operation of the Proposed Development on new sensitive receptors that are formed as part of the development itself.

16.5.3 The following assessments are proposed to be scoped out:

- Vibration effects on existing and proposed sensitive receptors generated by operation of the Proposed Development.

16.5.4 Where necessary, appropriate noise and vibration mitigation measures will be proposed.

16.5.5 The proposed baseline collection and assessment methodology is subject to agreement with WBCEHD and may require further specific consultation.

17 Socio-Economics

17.1 Introduction

17.1.1 This chapter of the Scoping Report has been produced by Savills Economics and sets out the methodology to assess the potential effects on social infrastructure and the economy that the Proposed Development may have on the Site and the surrounding area during the demolition and construction phase and subsequently upon completion.

17.1.2 Socio-economic effects are scoped into the proposed EIA. The consideration of socio-economic matters within the context of the EIA will cover issues such as demographic changes, economic effects, and employment generation.

17.1.3 This chapter will also provide an assessment of the effects of the Proposed Development on a range of community facilities. The analysis will consider the demographic context of the surrounding area and establish the existing levels of provision for a range of facilities and services in the vicinity of the Site. This includes education facilities (early year provision, primary and secondary schools), community halls, and open space typologies (including play areas for children and young people). The potential impact arising from the Proposed Development will be considered whilst accounting for facilities which will be provided as part of the scheme.

17.1.4 A section on mitigation will be provided, which will set out any measures that are designed to bring forward socio-economic and community benefits and ameliorate potential adverse impacts.

17.1.5 The stages of the overall methodology include:

- Review of planning policy – consider the compliance of the Proposed Development with relevant policies;
- Analysis of socio-economic baseline conditions – including a review of the existing Site, its context and the demographic profile of the local population. Local socio-economic metrics include population, age profile, qualifications, occupation, employment status and structure, local deprivation and housing. Work will also identify social infrastructure (education, community hall, and open space typologies) within the Study Area and assess their characteristics;
- Impacts assessment – this will consider the scale, magnitude, duration, frequency and permanence of the potential impacts and effects during the demolition and construction and operation phases of the Proposed Development;
    - Assessment of the employment potential of the proposal during the construction and operational phase of the development and associated economic activity;
    - Consideration of the net employment benefits, of the housing market, and of the capacity of social infrastructure (education, community hall, and open space typologies); and
- Assessment of mitigation measures, cumulative and residual effects.

17.2 Assessment Criteria & Methodology

Previous Assessment

17.2.1 There is no previous assessment relevant to the Site.

Legislative Context, Technical Guidance and Best Practice

Legislative Context

17.2.2 There is no legislation specifically relevant to the socio-economic assessment.

Planning Policy and Guidance

National Planning Policy and Guidance

17.2.3 The following national planning documents are relevant to undertaking the socio-economic assessment at the national level. In particular:

- National Planning Policy Framework (NPPF), December 2023; and
- Planning Practice Guidance (PPG), live document.

Local Planning Policy and Guidance

17.2.4 There is a range of current and emerging planning documents that are relevant to undertaking the socio-economic assessment at the local level.

Current Planning Policy and Guidance

17.2.5 The following current planning documents are relevant to this assessment:

- Wokingham Borough Local Development Framework (LDF) Adopted Core Strategy, 2010;
- Wokingham Borough Development Plan Managing Development Delivery (MDD) Local Plan, 2014;
- Arborfield & Barkham Neighbourhood Plan 2019-2036, 2019;
- Shinfield Parish Neighbourhood Plan, 2017;
- Infrastructure Delivery and Contributions Supplementary Planning Document (SPD), 2011;
- Wokingham Borough Community Infrastructure Levy (CIL) Charging Schedule, 2015;
- Wokingham Borough CIL Guidance Notes for Applicants, 2019.
- Wokingham Borough School Places Strategy 2024/25 to 2029/30, 2024;
- Play Space Design Guide Technical Note, 2019; and
- Open Space, Sport and Recreation Facilities Strategy, 2013;
- PPG17 Open Space, Sport & Recreation Study Revised Standards Paper, 2012; and

Emerging Planning Policy and Guidance

17.2.6 Wokingham Borough Council (WBC) is preparing a new Local Plan for Wokingham (the Local Plan Update), which will guide where and how growth will take place in the borough in the years up to 2040. WBC published a consultation document on the revised growth strategy November 2021 to January 2022.

17.2.7 The following evidence-base documents have been produced in the preparation of the Local Plan Update, which are relevant to undertaking the socio-economic assessment:

- Local Housing Needs Assessment, 2023;
- Employment Land Needs Review, 2023;
- Retail and Commercial Leisure Needs Assessment, 2023;
- Wokingham Strategic Sites Report, 2021;
- Local Green Space Assessment Report, 2021; and
- Draft Infrastructure Delivery Plan (IDP) Hall Farm/ Loddon Valley and South Wokingham, 2021

17.2.8 The LDS also states a new CIL charging schedule would be reviewed and adopted between 2023 and 2026.

Proposed Assessment Methodology

17.2.9 The assessment intends to be objective and to quantify impacts, where possible. Quantitative assessment will be used where possible and significance criteria will be produced in line with **Table 17.4** to ensure that there is a consistent identification of effects applied during the assessment. Due to the complexity of socio-economic issues and the numerous interactions that can occur with neighbouring and more distant communities, it is not possible to predict the precise nature or scale of each impact. Qualitative assessment will therefore also be used where necessary and justified.

17.2.10 The methodology for assessing economic impacts will involve the following key stages:

- An analysis of the current state of the local demographic and economic metrics. Understanding the demographic and economic profile of the study area will enable the assessment of the local population's ability to take up employment opportunities created by the scheme. This will help define receptor sensitivity and assess the scale of those impacts in relation to the needs of the local population; and
- An assessment of the employment potential of the commercial and residential space included within the proposal. This will follow best practice guidance (for example, the Homes and Community Agency's (HCA) Additionality Guide (2016) and the HCA Employment Density Guide (2015)). The assessment will consider construction and operational phase jobs, applying assumptions to account for leakage, displacement and multiplier effects.

17.2.11 The methodology for assessing the impact of housing will consider a review of housing needs, planning policy delivery targets and annual monitoring reports of Wokingham Borough.

17.2.12 The methodology for assessing impacts on users of social infrastructure will involve the following key stages:

- Identification of existing social infrastructure within their respective geographical scope (defined further below), including access to education facilities (early year provision, primary and secondary schools), community halls, and open space typologies (including play areas for children and young people);

- Assessment of whether there is any spare capacity in the current social infrastructure based on local and national standards (for example, Wokingham Borough LDF Adopted Core Strategy 2010 and Development Plan MDD Local Plan 2014);

- Projection of demand for social infrastructure from the incoming population of the Proposed Development; and

- Assessment of whether the on-site provision will meet the needs of the incoming population, accounting for any spare capacity in existing infrastructure.

Receptor Sensitivity and Impact Magnitude

17.2.13 Changes brought by the development, whether adverse or beneficial, will have different levels of significance depending on their scale, the length of the impact, and the number of people (or receptors) affected, and the relative sensitivity of that receptor. The sensitivity criteria used to provide a consistent identification of effects in the assessment are shown in **Table 17.1**.

Table 17.1: Methodology for determining receptor sensitivity

Sensitivity	Evidence for Sensitivity Assessment
High	Evidence of direct and significant socio-economic challenges relating to receptor with limited potential for substitution. Accorded a high priority in local, regional or national economic and regeneration policy.
Medium	Some evidence of socio-economic challenges linked to receptor, which may be indirect. Change relating to receptor has medium priority in local, regional and national economic and regeneration policy.
Low	Little evidence of socio-economic challenges relating to receptor. Receptor is accorded a low priority in local, regional and national economic and regeneration policy.

17.2.14 The magnitude of impacts is assessed as ‘high’, ‘medium’, ‘low’ and ‘negligible’ as set out in **Table 17.2**. The impact magnitude will be determined with reference to planning policy, best practice guidance and relevant contextual factors. For example, employment generation of 100 new jobs could be considered a major beneficial effect in a settlement of 1,000 residents, but it would be a less significant effect in a larger settlement of 100,000 residents.

Table 17.2: Magnitude of impact

Magnitude of Impact	Description/Criteria
Major	Proposals would cause a major change to existing socio-economic key characteristics, features or elements in terms of absolute and/ or percentage change.
Moderate	Proposals would cause a moderate change to existing socio-economic key characteristics, features or elements in terms of absolute and/ or percentage change.
Minor	Proposals would cause a minor change to existing socio-economic key characteristics, features or elements in terms of absolute and or percentage change.
Negligible	No discernible change in baseline socio-economic key characteristics, features or elements.

Effect Significance

17.2.15 **Table 17.3** below shows how the receptors' sensitivity and the impact's magnitude are used to estimate the significance of an effect.

Table 17.3 Matrix of Significance

		Receptor Sensitivity		
		Low	**Medium**	**High**
Magnitude of the Impact	**Negligible**	Neutral	Neutral	Neutral
	Minor	Slight	Slight	Moderate
	Moderate	Slight	Moderate	Large
	Major	Moderate	Large	Very Large

Source: Savills, 2024.

17.2.16 In terms of describing the duration of effect, short to medium-term effects are considered to be those associated with the Site preparation and construction phase, and long-term impacts are those associated with the completed development and its operation.

17.2.17 Effects are defined as either:

- Positive – an advantageous effect on the impact area;
- Negligible – an imperceptible effect on the impact area; and
- Negative – detrimental effect on the impact area

17.2.18 The nature and scale of an effect will be determined by considering the sensitivity of the receptor group and the magnitude of the impact (the amount of change from the baseline conditions) a. Where possible the effects will be quantified, however, as many social and community effects are interrelated and difficult to characterise or measure in a precise way some baseline judgements will need to be formed on professional opinion and so will be subjective. Where this is the case, this will be clearly stated in the assessment chapter.

17.2.19 As a guide, effects that are assessed as moderate or greater are generally assessed as significant with other types of effects considered insignificant. Beneficial and adverse effects are based on a standard set of significance criteria defined in **Table 17.4** below.

Table 17.4 Definition of Significance

Significance	Definition
Very large	These effects represent key factors in the decision-making process. They are generally, but not exclusively associated with resources/ features which are unique and which, if lost, cannot be replaced or relocated.
Large	These effects are likely to be important considerations to the receptors but, if adverse, are potential concerns to the project, depending upon the relative importance attached to the issue during the decision-making process.
Moderate	These effects, if adverse, while important to the receptors, are not likely to be key decision-making issues. Nevertheless, the cumulative effect of such issues may lead to an increase in the overall effects on receptors.
Slight	These effects may be raised as issues but are unlikely to be of importance in the decision-making process. Nevertheless, they are of relevance in the detailed design of the project.
Neutral	Effects which are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

Source: Savills, 2024.

Geographical Scope

17.2.20 The concept of defining a primary area of influence or zone of impact to enable assessment is standard in EIA practice. However, there is no standard measure of scale, and the relevant area differs for each project and Site context. Due to the mobility and network of potential receptors, it is not directly transferrable to socio-economic impact assessment. Barriers to access, such as major roads or rivers, can also affect the area of influence. As such, the Study Area will vary according to the receptors and effects assessed.

17.2.21 For the assessment of economic benefits, we consider the Local Authority Level (the boundary of WBC) to be the most appropriate geographical area.

17.2.22 For the assessment of the housing market, we consider the most appropriate geographical area to be at the Local Authority Level (the boundary of WBC). This is the local housing market area in the Local Housing Needs Assessment 2023 and used to inform the Local Plan Update. As WBC is one of the four local authorities within the Western Berks Housing Market Area (HMA) as defined in the Berkshire (including South Bucks) Strategic Housing Market Assessment (SHMA) 2016, we will draw on information from the SHMA to undertake the assessment.

17.2.23 For the assessment of the capacity of social infrastructure, we use relevant policy and research into walkable impact areas to define the most appropriate geographical area. This varies across different social infrastructures:

- Early year provision – the Manual for Streets (2019) guidance published by the Department for Transport (DfT) states that journeys up to 2km could be considered suitable for walking, where the journey would be safe for pedestrians and in attractive surroundings. This walking catchment (2km) around the Site is therefore considered the most appropriate geographical scope to assess the capacity of early year provision. The assessment is also informed by the Wokingham Borough School Places Strategy 2024/25 to 2029/30, which uses the boundary of WBC to assess early years and childcare provision at the Local Authority Level;

- Primary schools—the Travel to School for Children of Compulsory Age (2024) guidance produced by the Department of Education (DfE) states that eligibility for free school travel should be determined by statutory walking distance. For children under 8 years old, the threshold is 2 miles (3.2km). This walking catchment (3.2km) around the Site is therefore

considered to be the most appropriate geographical scope to assess primary school capacity;

- Secondary schools – For children aged 8 years or above, the Travel to School for Children of Compulsory Age (2024) guidance states the walking distance threshold eligible for free school travel is 3 miles (4.8km). This walking catchment (4.8km) around the Site is therefore considered to be the most appropriate geographical scope to assess secondary school capacity;

- Community halls – This walking catchment (2km) around the Site is considered the most appropriate geographical scope to assess community halls' capacity. This is based on the Manual for Streets (2019) guidance by DfT; and

- Open space — the WBC PPG17 Open Space, Sport & Recreation Audit Update 2012 divides Wokingham into three analysis areas reflecting the borough's geographical and demographical nature. The Site is located within the South West and the South East analysis area. This takes into account local circumstances and examines provision at a local level and is therefore considered the most appropriate geographical scope to assess open space capacity.

Temporal Scope

17.2.24 Potential impacts and effects upon socio-economic receptors will be assessed in relation to temporary and permanent impacts. As a general rule, temporary impacts relate to construction phases of development, and permanent impacts relate to the occupation/operational phase.

17.3 Baseline Conditions

17.3.1 The socio-economic assessment will assess the Proposed Development against the socio-economic baseline of the area and the 'do-nothing' scenario.

17.3.2 The baseline will include information about the economic and population receptors, as well as existing relevant infrastructure serving them. The Site is a large area of land to the west of Wokingham and to the south of Reading, between the villages of Shinfield, Arborfield and Sindlesham. The Site's relationship with the surrounding area will be considered as part of the baseline assessment. This includes the characteristics of the local population and economy and provision of nearby community infrastructure.

17.3.3 The following have been considered as potential receptors of socio-economic effects from the Proposed Development and will be discussed under the following headings:

- Population;

- Employment and economy;

- Housing; and

- Social infrastructure (education facilities, community halls and open space).

Baseline Data Collection

17.3.4 The baseline conditions for the Site will be established by undertaking a policy review to provide an outline of the relevant local and regional, social and economic policies for the area, and, through a desk-top review of the current social and economic conditions prevalent in the local area. Baseline information on the socio-economic conditions of the area will be collated from a variety of sources including:

- Office for National Statistics (ONS) Census (2021)
- Other datasets produced by the ONS;
- Department for Business, Energy and Industrial Strategy (BEIS);
- Indices of Multiple Deprivation;
- Oxford Economics Employment Projections;
- Department for Education (DfE); and
- Evidence-base documents from WBC;

17.3.5 These will provide a broad quantitative 'baseline' of socio-economic conditions. These indicators will be considered for the existing population and compared to the regional and national population where applicable.

Receptors

17.3.6 The socio-economic impact assessment assesses the effect of the Proposed Development on the local population and economy. The sensitivity of these socio-economic receptors will be based on the baseline conditions.

17.4 Potential Environmental Impacts & Effects

Construction Impacts and Effects

17.4.1 Construction of the Proposed Development would, over its time period, support the employment of a range of trades and professions in the construction industry. It would also have an indirect economic effect through the sourcing of building materials, services and supplies as well as the local expenditure of construction workers.

Occupation Impacts and Effects

17.4.2 Operational effects that will result from the Proposed Development include effects generated from the new operational jobs associated with the different use types included in the proposal and from the delivery of new homes.

17.4.3 The majority of new operational jobs will be generated by the proposed Thames Valley Science Park and complementary uses (film and television studio campus and research development). New neighbourhood and district centres will also comprise a range of retail, leisure (including indoor and outdoor sports), cultural, health and education facilities that provides new job opportunities. Additionally, an increase in the local population will bring an associated increase in expenditure within local shops, businesses and services.

17.4.4 The assessment will consider the net additional benefits, excluding any benefits which will be retained from current operations (reference case) and considering leakage, displacement, deadweight, and multiplier impacts.

17.4.5 The social infrastructure assessment will incorporate a review of the existing and proposed capacity of the social infrastructure facilities to inform whether the provision will meet the needs arising from the development. Relevant infrastructure to review will include education facilities, community halls and open space. The assessment will also account for facilities which will be provided as part of the scheme, for example, the increases to local education provision which

is likely to comprise two 3-form entry (FE) primary schools and one 8-FE secondary school with additional land reserved to enable expansion to 12-FE.

17.4.6 In summary, the likely potential effects of the development are likely to relate to:

- Effects related to the generation of employment during the construction of the Proposed Development;
- Effects related to the generation of employment during the operation of the Proposed Development, through the proposed employment floorspace, the proposed neighbourhood and local centres, and employment supported indirectly by new resident spending in local shops;
- Effects related to the provision of new housing;
- Effects related to the demand for and provision of social infrastructure, including education facilities (pre-schools, primary schools, secondary schools), community centres, and open space typologies (including play areas for children and young people).

17.4.7 The assessment will include an analysis of cumulative impacts. This will assess the impacts of the Proposed Development in combination with those of each committed scheme (based on the data available), and their relative effects.

Assumptions

17.4.8 By the nature of the methodology, estimates of change in the socio-economic elements such as economic and employment impacts are subject to uncertainty. The estimates will be based on good practice, but there will likely be a degree of uncertainty around estimates. We estimate that actual impacts are likely to be in a range of +/- 20% of figures given to account for this uncertainty, as is standard practice with our estimates.

17.4.9 The economic analysis and conclusions presented in this assessment assume that there are no major macro-economic shocks to the UK economy. Ongoing issues include the Russia-Ukrainian War and high inflation. The potential impact of such external factors means these figures should be kept under review in the future.

17.4.10 The assessment of spare capacity in social infrastructure is relatively high-level and is a reflection of the availability of data.

Scoped Out Effects

17.4.11 The potential for on-site business operations to be adversely affected by construction traffic will be considered as part of the assessment of transport effects. In general, it is considered that disruption during construction will be controlled and managed through implementation of the Construction and Environment Management Plan (CEMP).

17.4.12 The appropriate levels of affordable housing will be dealt with in the wider suite of planning application documents in the context of the viability appraisal. Therefore, effects associated with affordable housing provision are scoped out.

17.5 Scoping Summary

17.5.1 This scoping chapter sets out the methodology that will be used to assess the potential socio-economic effects that the Proposed Development may have on the Site and the surrounding area during its construction and operational phases.

17.5.2 This scoping chapter has outlined the geographical and temporal scope of the assessment and lists all socio-economic considerations for the assessment. Effects scoped in the Socioeconomic Chapter therefore include:

- Effects related to the generation of employment during the construction of the Proposed Development;
- Effects related to the generation of employment during the operation of the Proposed Development, through the proposed employment floorspace, the proposed neighbourhood and local centres, and employment supported indirectly by new resident spending in local shops;
- Effects related to the provision of new housing;
- Effects related to the demand for and provision of social infrastructure, including education facilities (pre-schools, primary schools, secondary schools), community centres, and open space typologies (including play areas for children and young people).

Mitigation

17.5.3 The assessment will consider probable measures and actions to mitigate any harmful effects that are identified during the assessment.

17.5.4 In general, it is considered that disruption during construction would be controlled and managed through the implementation of the CEMP.

17.5.5 The Proposed Development will be phased in such a way as to ensure that essential infrastructure and services are delivered to ensure that those who occupy the development in the early phases of the project are adequately served.

17.5.6 A principal objective of the Proposed Development will be to meet the needs of the new residents on-site as much as is feasibly possible.

17.5.7 Proposed mitigation will reflect the impacts of the Proposed Development in accordance with the CIL Regulations. Proposed mitigation measures for socio-economic impacts will be directly related to meeting policy and infrastructure requirements as necessary and in a proportionate manner.

18 Transport and Access

18.1 Introduction

18.1.1 This chapter of the ES Scoping Report has been produced by Abley Letchford Partnership Limited.

18.1.2 Transport and Access will be scoped into the EIA and will appraise the effects of the Proposed Development on the local transport network for both the construction and operational phases of the Proposed Development.

18.1.3 A Transport Assessment and Travel Plan will be produced in order to quantify the transport and highways impacts of the Proposed Development and identify suitable mitigation. The Transport Assessment, which will from an Appendix to the ES chapter, will focus upon the following key tests to demonstrate that:

- Appropriate opportunities to promote sustainable transport modes can be – or have been - taken up, given the type of development and its location;
- Safe and suitable access to the Site can be achieved for all users;
- The design of streets, parking areas, other transport elements and the content of associated standards reflects current national guidance, including the National Design Guide and the National Model Design Code; and
- Any significant impacts from the Proposed Development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree.

18.1.4 The appraisals undertaken within the Transport Assessment will in turn be used to help inform the Transport and Access chapter of the ES which will be prepared to present an assessment of the likely significant effects of the Proposed Development on the environment with respect to transport and access.

18.1.5 The following chapter sets out the proposed Assessment Criteria and Methodology that will be employed to undertake the assessment as well as providing a summary of the Baseline Environment in respect of transport and access. This will focus in particular on how trips travelling to and from the Site (both by vehicular and non-vehicular means) will access the network. It then identifies the potential impacts and effects in respect of transport which are likely to occur as a result of the Proposed Development during the construction and operational phases.

18.2 Assessment Criteria & Methodology

Previous Assessment

18.2.1 Consideration has been given to the findings of October 2021 Wokingham Transport Assessment Report which was produced by Stantec on behalf of the Council to help inform the evidence base for Wokingham Borough Council's Local Plan Update. This was subject to public consultation in January 2022. The October 2021 Wokingham Transport Assessment Report presents the results of initial appraisals based on assessment of a range of development

scenarios at the Site and identifies likely access strategies for all modes of travel as well as potential mitigation measures along the surrounding highway network.

18.2.2 The findings of the October 2021 Wokingham Transport Assessment Reports form a useful initial basis from which to ascertain the likely transport implications of the development and hence have helped to inform the nature and scale of assessment as set out in this Scoping chapter.

18.2.3 It is important to note however that the assessment of the Proposed Development which will be undertaken to inform the Transport and Access Chapter for the ES will be based on updated traffic modelling work which will be undertaken using Wokingham Borough Council's Strategic Transport Model (WSTM). This approach will ensure that the traffic forecasting fully reflects the quantum of development being promoted as well as the proposed access configurations and off-site highway mitigation measures that would accompany the Proposed Development.

Legislative Context, Technical Guidance and Best Practice

18.2.4 The Transport Assessment, Travel Plan and ES Chapter will be prepared with respect to the key transport tests as set out in paragraph 110 of the current National Planning Policy Framework (NPPF), as well as guidance outlined in the National Planning Policy Guidance (PPG).

18.2.5 Although now revoked, the DfT document 'Guidance on Transport Assessment' is still widely regarded as providing useful guidance on appropriate means by which to assess the transport impacts of development proposals. Reference will therefore be made to this guidance as appropriate. Use will also be made of policy and guidance produced by Wokingham Borough Council, as the local highway authority, as well as adjacent highway authorities including Reading Borough Council and National Highways.

18.2.6 Accordingly, the following national and local planning policies will be reviewed and analysed with relevance to the Proposed Development and its locational context.

- National Planning Policy Framework (2023).
- NPPG 'Travel Plans, Transport Assessments and Statements in Decision-Taking' (March 2014).
- DfT Guidance on Transport Assessment (March 2007).
- Circular 02/2013: Strategic Road Network and Delivery of Sustainable Development (DfT & Highways Agency – September 2013)
- Wokingham Borough Adopted Core Strategy (2006-2026).
- Wokingham Borough Third Local Transport Plan (LTP3) (2011-2026).
- Reading Borough Council Third Local Transport Plan (2011-2026).
- Shinfield Parish Council Neighbourhood Development Plan (Made February 2017).

18.2.7 In accordance with best practice, the assessment will be undertaken based on the relevant guidance for the assessment of a proposed development's environmental impacts on transport and access. This includes:

- Institute of Environmental Management and Assessment (IEMA) Guidelines; Environmental Assessment of Traffic and Movement (July 2023). These guidelines have been used to assess the significance of the changes in environmental conditions caused by road traffic generated by the Development ; and

- Environmental Impact Assessment, A Guide to Procedures, Department for Transport, Local Government and the Regions (2000);

18.2.8 Aside for the national and local planning policies set out above, there is no legislation relevant to the assessment of traffic and transport effects of a proposed development that need consideration within the Transport and Access chapter of the ES.

Baseline Data Collection

18.2.9 The traffic data to be utilised in the assessment, including baseline and future year baseline traffic flows, is to derived from the Wokingham Strategic Transport model (WSTM). Given the availability of only certain design years from the WSTM traffic model, it is proposed to use data from the 2026 model scenario to represent the existing baseline position along with the results from the 2040 model to represent the future year scenarios. This approach will ensure the appraisal of traffic impact is undertaken in a comprehensive manner that fully allows for committed development and other planned growth in the area.

18.2.10 The traffic flows obtained from the Wokingham Strategic Traffic model will be supplemented by speeds surveys which will be undertaken along roads in the vicinity of the Site to ascertain the prevailing traffic speeds. Similarly, records of personal injury accident data will be obtained from Wokingham Borough Council to aid the appraisal of effects in terms of highway safety.

Proposed Assessment Methodology

18.2.11 The Guidelines for the Environmental Assessment of Road Traffic (the IEMA Guidelines) recommend two broad rules of thumb as criteria to assist in delimiting the scale and extent of environmental assessment when assessing the impact of development-generated traffic on a highway link:

- Rule 1: Include highway links where traffic flows will increase by more than 30% (or the number of HGVs will increase by more than 30%); and

- Rule 2: Include highway links of high sensitivity where traffic flows have increased by 10% or more.

18.2.12 The above guidance is based upon knowledge and experience of environmental effects of traffic and acknowledges that traffic forecasting is not an ‘exact science’. The guidance recommends that as a starting point, a 30% change in traffic flow represents a reasonable threshold for including a highway link within an environmental assessment and that projected changes in traffic flow on less than 10% create no discernible environmental effects.

18.2.13 Section 2.17 of the guidance also identifies that Rule 1 and Rule 2 ‘criteria’ process may not be appropriate for some impacts, and it is generally accepted by regulators and practitioners that it should not be applied to assessments of air quality, noise, road safety and driver delay. For these impacts, a separate study area and assessment criteria should be agreed with the relevant stakeholders.

18.2.14 Paragraph 1.30 of the 2023 IEMA Guidelines identifies special interests that should be considered when defining sensitive receptor locations. These include sensitive / vulnerable

groups, locations with concentrations of vulnerable users (eg hospitals or schools) and collision clusters and routes with road safety concerns. The basis for determining if there is any transport impact should first make use of the 30% threshold outlined in the IEMA Guidelines, at which point additional consideration should then be given to the sensitivity of the link, in accordance with the methodology set out below.

Nature of Effect

18.2.15 Paragraph 3.3 of the 2023 IEMA Guidelines sets out the guidelines addressing specific traffic and movement related impacts. Each category and the potential effects that are relevant to transport and access are listed below, along with some explanatory text relating to the assessment criteria. It is on this basis that the assessment in the Transport and Access Chapter of the ES will be undertaken.

- **Severance of Communities**: Severance is the perceived division that can occur within a community when it becomes separated by major transport infrastructure. In general terms, according to the IEMA Guidelines a 30% change in traffic flow is likely to produce a 'minor' change in severance, with 'moderate' and 'substantial' changes occurring at 60% and 90%, respectively;

- **Road Vehicle Driver and Passenger Delay**: Delay to the drivers generally occurs at junctions where opposing vehicle manoeuvres are undertaken with vehicles having to give or receive priority depending upon the type of junction arrangement. This potential effect will be assessed on links which the increase in traffic flow is above the 30% threshold or 10% for sensitive links during a peak hour period and the magnitude of effect is determined by the junction capacity assessment results which quantify the increase in delay that would result. Moreover, an appraisal of delays will also be undertaken throughout the study area to an extent agreed with Wokingham Borough Council;

- **Non-motorised User Delay**: The severance and delay incurred by pedestrians is generally a direct consequence of their ability to cross roads. This should be assessed on links where the increase in traffic flow is above 30% threshold or 10% for sensitive links during a peak hour period and the magnitude of effect is determined qualitatively based on the existing speed of the link and width of the road and pedestrian crossing infrastructure available;

- **Non-motorised User Amenity**: The term pedestrian amenity is broadly defined as the relative pleasantness of a journey and is considered to be affected by traffic flow, traffic composition and pavement width / separation from traffic. This should be assessed on links where the increase in traffic flow is above the 30% threshold, or 10% for sensitive links during a peak hour period and the magnitude of effect is determined qualitatively based on the existing speed of the link and the types of additional vehicles (i.e. HGVs). The assessment of amenity should pay full regard to specific local conditions;

- **Fear and Intimidation on and by Road Users**: The environmental impact of fear and intimidation from moving objects, including various modes of transportation such as motorcycles, cars, and e-scooters, is a concern. Factors influencing fear include traffic volume, heavy vehicle composition, speed, and proximity to pedestrians. Despite a lack of universally agreed-upon thresholds, referencing past studies can aid in estimating danger levels. A weighting system is presented in Table 3.1 of the IEMA guidance assists in evaluating the likelihood of pedestrian's fear and intimidation, considering factors like high-speed areas and unfamiliar locales. This system involves assigning scores based on established thresholds, enhancing hazard assessment on highway links.

- **Road User and Pedestrian Safety**: This establishes the effect on the road safety record of the adjoining road network. This should be assessed on links where the increase in traffic flow is above the 30% threshold, or 10% for sensitive links during a peak hour period and the magnitude of effect is determined by reviewing the previous five years accident data on the link from data obtained from WBC. Moreover, an appraisal of accidents will also be undertaken throughout the study area to an extent agreed with Wokingham Borough Council; and

- **Hazardous/Large Loads**: Due to the nature of the Proposed Development's uses, it is unlikely to result in any hazardous loads and therefore an assessment of the effects on hazardous and dangerous loads is proposed to be scoped out of further consideration within the Transport and Access chapter of the ES.

Magnitude of Effect

18.2.16 A description of the terminology used in describing the magnitude of the environmental effects, which could be either adverse or beneficial, is set out in Table 18.1 below. It is important to note that the following parameters will be used as a guide and that, as advocated in the IEMA guidance, a range of factors are considered in reaching a professional judgement when assessing the magnitude of the effects.

Table 18.1: Criteria for Evaluating Magnitude of Environmental Impacts

Magnitude of Change	Magnitude of Impact	Typical Description
Change in total traffic flows of less than 10%	No Change	No loss or alteration of characteristics, features or elements; no observable impact in either direction.
Change in total traffic flows of less than 30%	Negligible	Very little change from baseline conditions. Change barely distinguishable, approximating to a 'no change' situation.
Change in total traffic flows of 30-60%	Minor	A minor shift away from baseline conditions. Some discernible, but not material, change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.
Change in total traffic flows of 60-90%	Moderate	Partial loss or alteration to one or more key elements / features of the baseline conditions such as the characteristic will be materially changed, albeit not necessarily compromising its integrity or functionality..
Change in total traffic flows over 90%	Major	Substantial loss or alteration to one or more key elements / features of the baseline conditions such as the characteristic's integrity or functionality has the potential to be fundamentally changed.

18.2.17 Where the IEMA Guidelines' 30% threshold is exceeded (or 10% for sensitive links), the assessment of effects relating to pedestrian severance, delay and amenity will be undertaken, primarily by examining the effects of the changes in traffic flows. The existing pedestrian and cycle provision along the links, including pedestrian crossing locations, will also been accounted for. The magnitude of any effects will be identified based on the criteria set out in Table 18.1.

18.2.18 Where the IEMA Guidelines' 30% threshold is exceeded (or 10% for sensitive links), then the effects on driver delay may also need to be calculated. This would be informed through the results of junction operational assessments which would be undertaken. The magnitude of any effects will be identified based on an appraisal of the forecast changes to queuing that may occur at the junctions.

18.2.19 Similarly, if the IEMA Guidelines' 30% threshold is exceeded (or 10% for sensitive links), then the effects on accidents and safety will be appraised. The effects on accidents and safety will be identified using the appraisal of the personal injury accident data along the local highway links. The magnitude of any effects will be identified based on an appraisal of the likely changes in accident rates that may occur as a result of the forecast changes in traffic flows.

18.2.20 Finally, where the IEMA Guidelines' 30% threshold is exceeded (or 10% for sensitive links), then the effect on Fear and Intimidation on and by Road Users will be considered.

Sensitivity of Receptor

18.2.21 In order to identify the significance of each effect, its magnitude will be appraised against the sensitivity of the receptor. For example, an effect with a moderate magnitude in a typical area of highway network may become more significant if it were to occur in a location near to a school where pedestrian activity would be higher.

18.2.22 Where the traffic flow increases exceed the IEMA Guidelines' 10% threshold, road links will therefore be assessed in further detail. At that point, additional consideration will be given to the sensitivity of the link and how it accords with the sensitivities set out at Table 18.2 below and in the context of the approach advocated in paragraph 2.21 of the IEMA Guidelines.

Table 18.2: Methodology for Determining Receptor Sensitivity

Value (sensitivity) of Receptor	Typical Description
Very High	Very high concentration of sensitive land uses (such as schools, hospitals or very high pedestrian flows) along link with very poor standard of provision of road users.
High	High concentration of sensitive land uses (such as schools, hospitals or high pedestrian flows) along link with poor standard of provision of road users.
Medium	Sensitive land uses (such as schools, hospitals or high pedestrian flows) along link with good standard of provision for road users.
Low	Some adjacent land uses along link with poor standard of provision of road users
Negligible	No adjacent land uses along link with good standard of provision for road users

Significance of Effect

18.2.23 The resultant transport related effects will be determined based on the sensitivity of the receptor and the magnitude of impact. Table 18.3 below illustrates the result of the interaction of each.

Table 18.3: Methodology for Determining Significance of Effect

	Magnitude of Impact (Degree of Change)					
		No Change	Negligible	Minor	Moderate	Major
Environmental Value (Sensitivity)	Very High	Neutral	Slight	Moderate or Large	Large or Very Large	Very Large
	High	Neutral	Slight	Slight or Moderate	Moderate or Large	Large or Very Large
	Medium	Neutral	Neutral or Slight	Slight	Moderate	Moderate or Large
	Low	Neutral	Neutral or Slight	Neutral or Slight	Slight	Slight or Moderate
	Negligible	Neutral	Neutral	Neutral or Slight	Neutral or Slight	Slight

18.2.24 The environmental effects in respect of transport will be evaluated using the above methodology in order to establish the Initial Effects (ie those which would occur as a result of the Proposed Development prior to the adoption of any mitigation or enhancement measures).

18.2.25 Where appropriate, the process will be repeated to identify the Residual Effects which will take into account the adoption of identified mitigation or enhancement measures.

18.2.26 Of note is that the traffic flows used to undertake the assessment will be derived from Wokingham Borough Council's Strategic Transport Model (WSTM) which includes the traffic impact arising from committed and planned developments in the area as well as background traffic growth. It is not possible to remove the effects of other planned development and background growth from the future year models and hence the resultant outputs for the 2040 'Forecast Baseline' and 2040 'With Proposed Development' scenarios will be inherently representative of a cumulative assessment.

18.2.27 Accordingly, all assessments will be undertaken on a cumulative basis and subsequently there will not be a requirement to appraise a separate cumulative development scenario to assess traffic effects from the Proposed Development in combination with the cumulative schemes.

Geographical Scope

18.2.28 The modelling methodology and scope of the transport appraisal will be agreed during scoping discussions with Wokingham Borough Council in collaboration with National Highways and neighbouring highway authorities. This process will define the extent of the study area to be used within the Transport Assessment Report and also the Transport and Access chapter of the ES. However, based on a review of the initial traffic modelling presented in the October 2021 Wokingham Transport Assessment Report, it is anticipated that the appraisal will encompass the road links and junctions listed below and depicted on Figure 18.1.

1. Basingstoke Road/Three Mile Cross Signal Junction
2. Basingstoke Road/Church Lane Mini Roundabout
3. Black Boy Roundabout/Eastern Relief Road Signal Junction
4. Eastern Relief Road/Arborfield Road Roundabout
5. Lower Earley Way/Meldreth Way Roundabout
6. Link Road/Lower Earley Way Signal Junction

7. Showcase Roundabout
8. A3290/Wharfdale Road Roundabout
9. Wharfdale Road/A329m Slips Roundabout
10. A3290/A329m Roundabout
11. Winnersh Crossroads Signal Junction
12. Mill Lane /New Road Roundabout
13. Lower Earley Way/Beeston Way Linked Roundabouts
14. B3270/Whitley Wood Road Priority Junction
15. M4/J11 Junction
16. Brookers Hill/Hollow Lane Signal Junction
17. Church Lane/Hollow Lane Roundabout
18. Hollow Lane/Arborfield Road Roundabout
19. Hyde End Road/Basingstoke Road Signal Junction
20. Shinfield Road/Whitley Wood Road Signal Junction
21. Shinfield Road/Elm Road Signal Junction
22. Barkham Road/Bearwood Road Mini Roundabout
23. Observer Way/Eversley Road/A327 Roundabout
24. A33/ B3349/Welsh Lane Roundabout
25. Arborfield Victory Roundabout
26. Langley Common Road/B3349 Priority Junction
27. Barkham Road/Barkham Street Mini Roundabout
28. A327 Reading Road / Fleet Hill Priority Junction

18.2.29 In addition, the appraisal will also include the anticipated access junctions for the development as listed below and also depicted on Figure 18.1

A. Thames Valley Science Park Access Roundabout
B. Arborfield Relief Road Roundabout
C. Access Junction at Mole Road
D. A 4-arm Roundabout at Mill Lane Adjacent to Hatch Farm
E. Mill Lane Junction /Access Road Roundabout
F. Lower Earley Way/Mill Lane Roundabout

G. Hatch Farm Way Junction/Access Road Roundabout

Temporal Scope

18.2.30 The assessment of the impact of the Proposed Development will be informed using traffic flow information obtained from Wokingham Borough Council's Wokingham Strategic Transport Model (WSTM). This will assess the impact of the Proposed Development on a cumulative basis accounting not only for traffic associated with the development but also that from other committed and planned development sites.

18.2.31 The assessment years that will be appraised with the Transport and Access chapter of the ES are :

- 2026 Baseline
- 2040 Forecast Baseline
- 2040 With Proposed Development

18.2.1 A construction phase assessment will be undertaken which will account for the construction traffic attributable to the likely HGV movements and construction workers. This will be quantified based on anticipated build rates for the Site and distributed onto the network via routes such traffic is likely to utilise. An appraisal will then be undertaken using the Assessment Methodology outlined above in order to identify the initial environmental effects as well as the residual effects which will account for mitigation measures.

18.2.1 As well as undertaking a construction phase assessment, the environmental effects will also be appraised for the operational phase accounting for the traffic that would be generated when the development is fully operational. Again, the appraisal will identify the initial effects as well as the residual effects which account for mitigation measures.

18.2.2 As identified above, Wokingham Borough Council's Strategic Transport Model (WSTM) includes the traffic impact arising from committed and planned developments in the area as well as background traffic growth. Accordingly, the 2040 With Development Scenario will inherently appraise the traffic effects from the development on a cumulative basis.

18.3 Baseline Environment

18.3.1 The Site is a large area of land to the west of Wokingham, between the villages of Shinfield, Arborfield and Sindlesham and a Site Location Plan is presented as Figure 1.1.

18.3.2 The Site is well located in terms of existing highway infrastructure and benefits from good connections to the local and strategic highway networks.

18.3.3 The Site lies predominantly to the south of the M4 motorway as it routes to the south of Reading, providing strategic connections along the motorway corridor between Wales and London, including Heathrow airport. Junction 11 of the M4 motorway lies only 4km to the west, accessed via B3270 Lower Earley Way, whereas alternative access to the motorway network is available approximately 4km to the east via the A329M corridor at Winnersh Triangle.

18.3.4 The Shinfield Eastern Relief Road lies to the west of the Site. This new road opened in late 2017 and comprises a high standard 7.3m wide carriageway that connects the A327 Arborfield Road to the Shinfield Gyratory just north of the M4 via a new bridge which caters for three lanes of traffic in each direction over the M4 motorway. The Relief Road allows traffic routing through the area to bypass the centre of Shinfield village. Similarly, the Arborfield Relief Road lies to

the south and was opened in late 2020, performing a similar function allowing traffic to avoid routing through Arborfield.

18.3.5 The other highway corridors of particular note are Mole Road and Mill Lane which run to the east of the Site providing a connection between the A327 Arborfield Road and Winnersh, via Sindlesham.

18.3.6 The area also enjoys a high level of pedestrian, cycle and bus connectivity, not least due to the significant investment in new infrastructure that has been implemented over recent years in conjunction with the South of M4 SDL and Thames Valley Science Park developments.

18.4 Potential Environmental Impacts & Effects

18.4.1 The Transport and Access chapter of the ES will outline all relevant traffic and transport considerations, detail the likely effects of the Proposed Development in terms of the number of trips generated, assess how the Proposed Development may affect the local transport situation, and propose any appropriate mitigation measures.

18.4.2 The ES Chapter will also consider non-car modes of transport, taking into account the local walking, cycling and public right of way networks as well as public transport accessibility.

18.4.3 It is likely that the Proposed Development will give rise to a number of transport related environmental impacts to varying degrees and across the study area. This is likely to include effects on the following matters which will be appraised in detail with the Transport and Access chapter of the ES:

- Severance
- Driver Delay
- Non-Motorised User Severance and Delay
- Non-Motorised User Amenity, Fear and Intimidation
- Accidents and Safety

18.4.4 Due to the nature of the development's uses, it is unlikely to give rise to any hazardous or dangerous loads and hence it is not proposed that such matters are considered in the Transport and Access chapter of the ES.

Construction Impacts and Effects

18.4.5 The traffic generated by the Proposed Development during the construction phase, particularly the associated HGV movements, is likely to give rise to transport related environmental impacts such as in respect to pedestrian amenity. Similarly, the process of forming the associated highway infrastructure such as the access junctions will cause disruption that could cause adverse effects in respect to driver delay.

18.4.6 The Transport and Access chapter of the ES will therefore appraise the initial effects with consideration given to all of the matters identified above in paragraph 18.4.3. At this stage it is considered there is potential for adverse effects to be identified for each of the criteria, particularly along the highway network in the immediate vicinity of the Site.

18.4.7 Where adverse effects are identified, account will be taken of the benefits of any specific mitigation measures being proposed. This may include the promotion of a Construction and

Environment Management Plan and / or temporary traffic management measures during the construction period. The residual effects which account for mitigation measures will then be identified.

Occupation Impacts and Effects

18.4.8 The vehicular trips that would be generated by the Proposed Development when fully operational has the potential to result in adverse effects for all of the criteria identified in paragraph 18.4.3. The Transport and Access chapter of the ES will therefore comprehensively appraise the initial effects against all of these matters across the full geographical scope of the assessment.

18.4.9 Where adverse effects are identified, account will be taken of the ameliorative effects of any specific mitigation measures being proposed. This may include the proposed implementation of off-site highway and transport infrastructure aimed at reducing impacts such as driver delay as well as improved pedestrian and cycle facilities which are likely to be proposed which would act to reduce adverse effects on matters such as pedestrian severance, amenity and safety. The residual effects which account for mitigation measures will then be identified.

18.5 Scoping Summary

18.5.1 Table 18.4 summarises the transport related elements that will be appraised within the Transport and Access chapter of the ES.

Table 18.4: Scoping Summary for Transport and Access Chapter of ES

Receptor	Consideration	Scoped In
Local Roads and Junctions (as identified on Figure 18.1)	Severance	✓
	Driver Delay	✓
	Non-Motorised User Severance and Delay	✓
	Non-Motorised User Amenity, Fear & Intimidation	✓
	Accidents and Safety	✓
	Dangerous / Hazardous Loads	x

18.5.2 The appraisal of effects will be undertaken for both the construction and operational phases of the Proposed Development.

18.5.3 Of note is that the traffic flows used to undertake the assessments will be derived from Wokingham Borough Council's Strategic Transport Model (WSTM) which includes the traffic impact arising from committed and planned developments in the area as well as background traffic growth scenarios and hence will be inherently representative of a cumulative assessment. Subsequently, there will not be a requirement to appraise a separate cumulative development scenario to assess traffic effects from the development in combination with the cumulative schemes.

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